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As Asian universities strive to become leading global research institutions, they face a number of local and international issues and challenges. Only very few will make the grade in terms of advancing knowledge, delivering outstanding graduates, and creating new technologies and industries to drive economic development in the region. At the February 2008 Singapore Management University Distinguished Presidential Lecture, Dr Suh Nam Pyo, president of the Korea Advanced Institute of Science and Technology (KAIST) -- outlined his own institution's efforts to excel as a 21st century research university.

Previously at MIT since 1970, Suh held a number of leading positions including head of the department of mechanical engineering, founding director of the MIT Laboratory for Manufacturing and Productivity, and founder and director of the MIT-Industry Polymer Processing Program. In 1984, Suh was appointed to the National Science Foundation by President Ronald Reagan where he set a new direction for the Engineering Directorate, and introduced a new program structure to support engineering education research in the US into the 21st century.

Korea in a Globalised World

To set the scene, Suh began his lecture with an anecdote. A mouse, while hunting for its food, encountered a cat and ran into a hole for safety. The cat sat outside waiting patiently. Some time later, the mouse heard a dog bark. Believing that the dog must have chased the cat away, the mouse crawled out to find itself face to face with the cat. Said the cat to the surprised mouse, "the world is now in a bilingual era".

In a revolutionary move, KAIST recently introduced English to replace the Korean language as its main medium of instruction. Suh stated, "In Korea English is foreign to many people, but we decided to teach KAIST students in English because it is important to survive in the world today." At present, 84% of high school students in Korea attend colleges and universities, with a total of 27 national universities and 300 colleges to choose from.

Suh compared Korea's transition to Singapore which has undergone many changes and improvements. Through the 1970's many major investments were made in manufacturing companies which created leading industries. Yet there are many challenges facing Korea, according to Suh. The country needs to continue to be competitive in heavy and capital intensive industries if it is to achieve its goal of doubling per capita income to US$40,000 by 2017. "In my opinion Korea needs to build new industries which are not energy and capital intensive. China can easily compete in these areas due to its political structure," he said. "It is here, I feel, that education plays a crucial role. KAIST is funded by tax payers and it needs to contribute to economic development."

Lessons from the US

Suh warned that, "Global competition amongst research universities is intense, and is set to become even more intense in the coming years". To differentiate itself, a university needs both outstanding people and financial resources, as exemplified by many leading research universities in the United States. MIT, for instance, started out by receiving US$50-100 million annually for 30 years from the US government. "It [could] establish hubs of knowledge due to the concentrated investment," explained Suh. The top ten universities in the US have an annual budget of over US$2 billion each, the next 50 over US$1 billion, and the next 100 over US$100 million each.

Regarding concerted investments in hight education, Suh said, "Many countries cannot or refuse to do so due to various political reasons. However, unless they do, the US will continue to dominate because they attract a large number of bright students who remain in the US even after they finish their PhD's [about 76 percent]."

Challenges in Asia

Suh highlighted some key issues that Asian research universities need to grapple with to become competitive. These include the lack of strong research programs, sustained investment, and playing the role of 'feeder schools' for universities in the US and Europe. "Graduate programs in local universities are not strong," he said.

In addition, Asian universities tend to provide lifetime employment to professors regardless of performance. "If we are to educate students in the best possible [manner], we need strong faculty, and need to put resources behind the leading professors". There is also a widespread misconception that research contributions can be measured quantitatively, for example through the number of papers published. Suh noted that this perception is encouraged by companies that assign rankings which are "not serving the cause of education well".

Another weakness is the lack of a risk taking culture. "Unless we are willing to let people take risks [universities]

really cannot expect much. As long as they expect every research project to succeed, they cannot expect major results which will make the world a really different place," hed said. According to Suh, most research in Asia can be classified as "emulating" or "mop-up" research—the kind that makes improvements to existing studies. "People need to come up with ideas that others have not conceived," he said. While Suh conceded that at times universities had to go down "a path of following", this should not be the case all the time.

The KAIST Experience

KAIST's goal for the future is to become the "leading research university in the world centered around science and technology," stated Suh. The university aims to achieve this through a multi-pronged strategy:

Raise Performance Standards through Internal Changes

KAIST has adopted a department centric system which assigns primary decision-making power to individual departments, rather than planning by a central authority. It has also introduced a new tenure policy based on performance which will be judged according to "impact rather than number of papers published", said Suh. Furthermore, greater emphasis is being placed on teaching. Driving his point home, Suh pointed out that, "People often overlook the importance of teaching in academia. Being a good researcher is not enough. To be at a university, you must have a passion for teaching as well." The university has also introduced management education into the curriculum. "Unless top leaders know how to design and structure companies, they cannot expect to be successful CEOs," he explained.

Lead in Research and Education

The strategy that KAIST has adopted to achieve this goal is to invest in "high risk and high return projects" which is a "risky policy in terms of [the] probability of success". This has demanded a change in the traditionally more conservative culture at KAIST. It is important that people understand that it is "perfectly acceptable to fail" and to financially support them in their endeavors, he said. Suh outlined how KAIST has stimulated research by increasing competition for grants between graduate students and professors. This has also pushed the notion further that anyone can have ideas and that ideas are not just the domain of educators, he said.

KAIST has also introduced new academic departments in the fields of ocean systems, knowledge services, life sciences and engineering, and nano-science and engineering. These new departments are in line with the four areas that KAIST has decided to focus on: energy, environment, water and sustainability (EEWS). The university has honed in on these fields because these are what he described as "four important issues that humanity has to resolve in the 21st century," and that "any country that helps [in these fields] will create a new industrial backbone."

Changes have also been made at KAIST to improve the overall level of education at the university. In addition to the new curriculum being taught in English, the university has also made it mandatory for engineering students to take design courses to encourage "bi-modal thinking". KAIST has also introduced dual-degree programs and a new admissions policy to ensure that well-rounded students are admitted.

Secure Sustainable Funding & Partnerships

By focusing on research that will be beneficial to the country, Suh hopes that KAIST will be able to secure sustainable funding from both the government and the private sector. He also stressed the importance of partnerships with the private sector to ensure that the university system closely followed the narrowing gap between science and technology in the 21st century.

Citing the rapid advances in Asia which have enabled the region to dominate in the manufacturing sector, Suh stated that universities should similarly "come up with new systems and paradigms and not just improve upon what people did 30 years ago." It is time for Asian universities to rethink their role and look at issues facing their nations.

"Inspiration must come from home. The age of emulation is over and universities must now lead in education and research," he said. "Painful changes must be made to achieve these goals. And, very importantly, universities must be given more money."

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