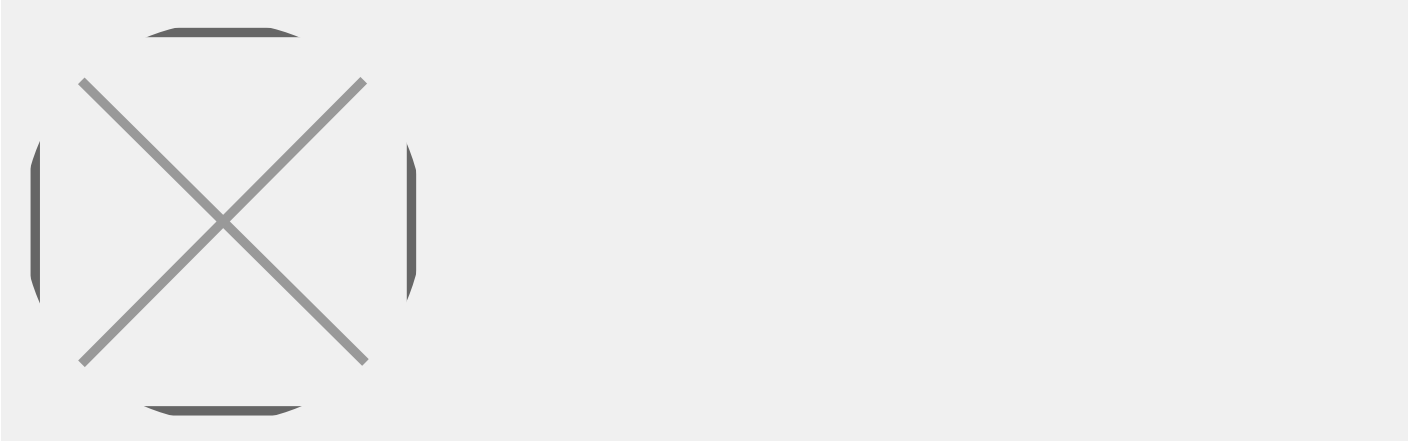
Interview: Randy Tzong-Ming Yen, Director General, Hsinchu Science Park, Taiwan



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The Director General of one of the world's most successful science parks discusses the history of the park, the reasons behind its incredible success, the unique set-up of the park which allows its administation board to act as a one-stop shop for tenants in terms of regulation and approvals, and his thoughts on the future of innovation in Taiwan.

Hsinchu Science Park has been a leading force in driving Taiwan's innovation and manufacturing capabilities, notably in high-tech sectors like semiconductors and ICT. What is the history of this park?

It is widely believed that the concept of science parks first emerged in the 1950s, with Silicon Valley being a typical example. Generally speaking, a science park is an intellect-intensive establishment geared toward developing advanced technologies and innovative ventures by combining the strengths across R&D, education and production. As such, a science park is supposed to bring together institutions of higher learning, research organizations and businesses with the purpose of effecting technology innovation. Empirical evidence has confirmed the establishment of science parks as a key breakthrough in constantly innovating the technologies and industries of our times.

In tandem with a global trend that rapidly gained momentum, Taiwan initiated its first science park—Hsinchu Science Park (HSP)—in 1980. Hopefully the success story of Silicon Valley could

repeat itself in Taiwan. The HSP does not disappoint as it eventually comes to be recognized globally as one of the most successful of its breed. In retrospect, it is fair to attribute the HSP's success to the fact that it was set up at the right place at the right time. In the world's history of science parks, the HSP might as well be viewed as a mid-term entrant while both the Southern Taiwan Science Park (STSP) and Central Taiwan Science Park (CTSP) should be categorized as latecomers.

Imaging that a piece of land sharing less than 0.04% of land in Taiwan but creating global high-tech industry records from times to times, the Hsinchu Science Park has generated an annual revenue of more than US$35 billion over the past five years and enjoys its global reputation as a brilliant science park. The Hsinchu Science Park has cultivated a number of high-tech talent and global flagship IT enterprises over the past three decades plus, for example the largest IC foundry provider TSMC, the second largest IC foundry provider UMC, the largest notebook PC and branded PC maker Acer, the third largest TFT-LCD maker Chimei Innolux, the fourth largest TFT-LCD maker AUO, the second largest mobile phone chipset maker and the fourth largest IC designer MediaTek, the fourth largest NOR Flash IC maker Macronix, and the largest Polymeric Positive Temperature Coefficient (PPTC) components manufacturer Polytronics Technology Corp., which solidifies the position of the Hsinchu Science Park in global IT industries. Besides, the park also includes a number of renowned foreign companies, such as the largest plasma etching equipment maker Lam Research, the second largest IC equipment maker TEL, the largest telecom IC designer Qualcomm, the third largest optical lens maker HOYA, and so on. The Hsinchu Science Park is constantly extending its industry capacity as well as competence in semiconductor, opto-electronics, information, and telecommunications industries. Thus, more than 70% of global IT industry products are initiated from companies at the Hsinchu Science Park. As a venue full of chances, the Hsinchu Science Park has turned out to be the first choice of high-tech industry investment globally.

How do the park's administrators ensure the strength of HSP's innovation ecosystem?

The National Science Council set up the Hsinchu Science Park (HSP), the first establishment of its kind in Taiwan, on December 15, 1980. By ushering in technologies and talent from abroad, bringing about the transformation of domestic conventional industry, and fostering the upgrade of industrial technology across the board, the park is intended to help high-tech industry take off in Taiwan.

Straddling the city and county of Hsinchu, the 6.5km^2 HSP now mainly houses semiconductor and optoelectronics ventures. More than 500 tenant companies employ more than 150,000 people. For

the past three years, HSP companies posted an annual average of more than NT$1 trillion in revenue, which tends to fluctuate in tandem with the ups and downs in the global economy. Over the years HSP companies have been approved to invest more than NT$1 trillion. The close dependence of tenant companies on the Industrial Technology Research Institute, National Tsing Hua University and National Chiao Tung University can be easily illustrated by the fact that more than 50 of them have emerged as spinoffs from the aforementioned institutions. The high concentration of high-caliber talent at the HSP is only to be expected. Those who are devoted to R&D and technology development account for 40% of the HSP's overall workforce, with the remaining 60% taken by people engaged in production, management and marketing.

Because the park administration belongs to National Science Council, a cabinet-level organization, it is fully authorized by various central government sectors, such as the Ministry of Economic Affairs, the Ministry of Finance, the Council of Labor Affairs, the Ministry of the Interior, and the Ministry of Education. In other words, the tenant companies can go directly to the administration for all necessary operational applications, such as company registration, foreign labor employment, health care and environmental protection, instead of running back and forth between many other government agencies.

Besides, there are eight national laboratories at the park; where six of them are in HSP and two in Jhunan satellite park. Under National Science Council, there are National Nano Device Laboratory, Instrument Technology Research Center, National Space Program Office, High Performance Computing Center, National Chip Implementation Center, and National Synchrotron Radiation Research Center. The two in Jhunan Science Park are National Health Research Institute and Animal Technology Institute Taiwan. The labs work closely with industry sectors at the Park. Joint research programs were frequently carried out every year.

To what extent can HSP replicate its success with ICT in the biotech industry?

Biotech will be a tomorrow's industry star with promising future, that's why local government invests a great deal in this high value-added industry via incentives and encouraging benefits. Establishment of the Hsinchu Biomedical Science Park further solidifies the foundation of domestic biotech industry development. By means of effort endeavored by government and private sectors, biotech industry thus becomes a golden gate that attracts a lot of companies with interests. The Science Park Administration of the Hsinchu Science Park would also take this wonderful chance to attract move-in of domestic as well as foreign biotech companies and form local biotech industry clusters, so as to bring about domestic biotech industry prosperities. Strength of innovative R&D competence of ICT based high-tech firms at the Hsinchu Science Park acts as a great backup for

biotech industry development at the Hsinchu Biomedical Science Park. Biochips, biotech used electronics appliances, and ICT parts of applications can easily find the chips manufactured by companies at the Hsinchu Science Park.

What are Taiwan's broader strengths as an economy capable of incubating knowledge-intensive industries?

The advance of biomedical science depends on a high quality academic research environment, while innovation and uniqueness should be highly emphasized. A successful development of biotechnology industry will be impossible if the progress is not based on extensive and in-depth research work and verification acquired from clinical implementation. Biotech industry is very different from IT industry. For IT industry products, industry outcomes can be traded in market as long as clients like or prefer to own. A series of tests, verifications, clinic tests, and accreditations, e.g. FDA, CE Mark, etc., are required before human body can adopt for new biotech outcomes. For this concern, the government has invested a great deal in software as well as hardware in biomedical industry development of the past decades. Even though biotech industry development is not a good niche for Taiwan because of late market entrant but endeavor of a number of companies and startups of biomedical firms at the Hsinchu Biomedical Science Park bring new hopes for next generation of global biomedical industry as well as technology development.

What international linkages has the HSP fostered through the years?

In recent years, global economic downturn has influenced worldwide trade and business activities significantly. Many industries thus have to make necessary adjustments to cope with unpredictable challenges. We all know that the key factors of successful enterprises in the world root in continuous technological innovation as well as a firm grip on advanced technologies. Those who hold superior technologies and find their wide applications are the winners in the next generation of industrial revolution. Marching into the 21st Century, global economy is stepping into an adjustment phase with interaction of new and conventional economic models. Globalization and knowledge-base economy are the two main currents impacting our life, where knowledge masters economic and industrial development. As the "mother" of industries, ICT industries are playing a crucial role influencing global industrial development. Only incessant innovation together with technological collaboration and globalization allow an enterprise to maintain its permanent competitiveness. Pioneer of the Hsinchu Science Park is a typical example. Besides competing with global competitors and pursuing its own advancement in hi-tech industry, the HSP also concerns itself with international collaboration and experience sharing; over the past three decades, HSP has built sister relationship with 26 science parks in 14 different countries. The content of such

cooperation includes seeking business and technology partnering and sharing information; HSP has also hosted ASPA and IASP conferences, and attended AURP conferences in the US, trying to diffuse the experiences of the park to benefit more people in more countries.

What are your key targets for HSP's future development?

Science parks undertake the responsibilities of upgrading regional economy and strengthening local industrial structure in most industrial start-up countries. The renowned successful case of the Hsinchu Science Park is a typical example. Over the past 32 years, the Park has not only contributed to global high-tech industry development but also revealed the arduous high-tech industrial competence of Taiwan.

The reason why HSP can become such a success is because of its superior operational model. The infrastructure and one-stop services coming from the park administration provide all park tenants with governmental supports and efficient services. High-quality human resource form National Tsing Hua, Chiao Tung Universities and ITRI. The cooperation between industry and academia creates a good R&D environment. Also, the complete capital marked includes venture capital and stock market. The most important factor among all is cluster effect. Because there is a complete industrial chain formed in the HSP, no matter for a big company or a newly set up company, they can find all the backups and resources they need right here in the park.

The past three decades have seen the HSP attain the strategic goal of luring high-tech investments. By putting in place an internationally competitive environment for Taiwan's high-tech industry, it has helped induce an across-the-board upgrade of domestic industry and foster expansion of the national economy. In addition to stimulating R&D on the science and technology front, benefits are enjoyed in many other respects—creating clusters of industrial ventures, cultivating talent, brining prosperity to local communities and enhancing the nation's overall cultural awareness. Furthermore, the experience of the HSP is now being diffused to the CTSP and STSP as well as its various satellite parks, expecting to create another economic miracle in the next ten years.

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