Policy support and growing ecosystem provide driving force for social development through **innovation and technology**

Morningside Professor of Life Science
The Hong Kong University of Science and Technology

Nancy IP Yuk-yu

In the face of an ever-changing global landscape and increasingly fierce competition in technology, China is determined to become a world-leading country by implementing innovation-driven development strategies and using the power of technology to lead the development of all aspects of society, from social to economic, wellbeing to health. The National 14th Five-Year Plan indicates support for Hong Kong's development into an international innovation and technology (I&T) hub. Professor Nancy Ip Yuk-yu, Morningside Professor of Life Science and Director of the State Key Laboratory of Molecular Neuroscience at the Hong Kong University of Science and Technology (HKUST), says that Hong Kong's I&T ecosystem is getting more and more mature. She adds that by grasping the tremendous development opportunities in the Guangdong-Hong Kong-Macao Greater Bay Area (GBA) and collaborating with its GBA counterparts, Hong Kong will be able to complement each other's strengths, undertake more scientific research tasks and become an important force contributing to the national strategic planning.

After receiving her PhD from Harvard University, Professor Ip undertook research work at a biotechnology company in New York. With her outstanding performance, she was soon promoted to become the only Chinese senior scientist in the company, taking charge of a laboratory with over 20 researchers. Professor Ip admits that it was not an easy decision to give up a career that was already on track to return to Hong Kong. However, she was born and raised here, and has always hoped to contribute to the city's development in science and technology and help nurture a new generation of technology talents. It so happened that HKUST was established in 1991 and its founding president, Professor Woo Chia-wei, was recruiting top scholars and scientists from overseas to join HKUST. Sharing the same vision with Professor Woo, Professor Ip joined the university in 1993 and has been working there ever since. She says: "Twenty-nine years have passed in no time. I am glad that I have witnessed and taken part in the flourishing development of technology in Hong Kong and the Mainland over these years."

Hong Kong is very strong in basic scientific research, with five universities ranked among the top 100 in the world. Many scholars and experts are recipients of leading international and national research awards, demonstrating the abundance of local talents. According to results of the Research Assessment Exercise 2020 conducted by the University Grants Committee, 45 per cent of the research projects assessed were rated "internationally excellent" while another 25 per cent have even attained "world leading" rating. "The assessment was conducted by distinguished scholars from around the world to ensure international credibility," Professor Ip explains. "The results reflect the exemplary scientific research capabilities of local universities and they have assumed a leading role in terms of research quality in various fields. The solid foundation helps attract top-notch research institutions and talents from around the world to Hong Kong."

Professor Ip adds that in the past four years alone, the Government has put more than $130 billion into infrastructure development, promotion of scientific research, nurturing talent and industry support. The Government is also pushing ahead with the development of I&T platforms at the Hong Kong Science Park and Lok Ma Chau Loop, which will be conducive to attracting international talents. “In addition to pursuing an academic career, scientific researchers can also take up the diverse employment opportunities offered by I&T institutions and enterprises in the Hong Kong Science Park and Cyberport. In addition, the rapid development of the GBA and the Loop, including the emerging Shenzhen-Hong Kong Innovation and Technology Co-operation Zone in the Loop, is providing scientific research talents with great opportunities to realise their entrepreneurial dreams.”

Professor Ip believes that Hong Kong is well-equipped to become an international I&T hub. The city possesses world-class universities and research talents, with the Government constantly perfecting policies and measures to attract foreign talents and providing various kinds of funding support. Together with Hong Kong’s strength as an international financial centre that attracts long-term investment in local I&T projects, the I&T ecosystem is getting more mature. Professor Ip has confidence in the future of I&T development in Hong Kong and hopes that the industry will grasp opportunities in the GBA, deepen co-operation with the Mainland in scientific research, and integrate into the national development. Hong Kong has outstanding research capabilities and second-to-none basic research levels, while Shenzhen and other GBA cities have well-equipped production chains. Professor Ip says that as long as Hong Kong and other GBA cities strengthen collaboration and exchange, complement the strengths of one another and develop a synergistic mechanism, the huge market in the GBA will be transformed into a highland for I&T talents, putting the country’s technology strategic plan into action.

Funding is another key factor in promoting I&T development. In addition to providing funding support to universities for teaching and research work, the Government has set up the first two InnoHK research clusters at the Hong Kong Science Park, focusing on medical technology and AI & robotic technology respectively. The research clusters have successfully admitted 28 research laboratories set up by world-renowned universities and research institutes to conduct collaborative researches with local universities and research institutes. Since the Hong Kong Exchanges and Clearing Limited amended its listing rules in 2018 to allow pre-revenue or pre-profit biotechnology companies to be listed in Hong Kong, the city soon became the world’s second-largest biotech fundraising centre. Professor Ip says that the measure is conducive to helping biomedical start-ups look for funding sources. “Investors are becoming more interested in technological research projects after the listing reform and this can promote the rapid and comprehensive development of the entire biotechnology ecosystem.”

Universities are breeding ground for start-ups and unicorns. Professor Ip is glad to see the birth of home-grown unicorns. “Of the 18 unicorns in Hong Kong, seven were founded with the help of HKUST professors or alumni. The flourishing development of start-ups in recent years shows that Hong Kong is not only strong in scientific research but also able to transform scientific research outcomes into commercial products, which then develop further into an industry with real benefits, fostering development of the city’s overall economy.”

Post and Title

- Morningside Professor of Life Science, Hong Kong University of Science and Technology
- Director, State Key Laboratory of Molecular Neuroscience, Hong Kong University of Science and Technology
- Director, Hong Kong Centre for Neurodegenerative Diseases, InnoHK

Honours

- Academician, Chinese Academy of Sciences (2001)
- L'Oréal-UNESCO for Women in Science International Awards (2004)
- Medal of Honour from the Government of the Hong Kong Special Administrative Region (2008)
- Knight of l'Ordre National du Mérite, French Government (2011)
- Founding Member, Hong Kong Academy of Sciences (2015)
- International Member, National Academy of Sciences, USA (2015)
- Foreign Member, American Academy of Arts and Sciences (2016)
- Bronze Bauhinia Star from the Government of the Hong Kong Special Administrative Region (2017)

Education Background

- PhD in Pharmacology, Harvard University, USA

Professor Ip (centre) is the Morningside Professor of Life Science at HKUST. She is among the first batch of scholars being conferred named professorships by the university.

Professor Ip (sixth right) collaborates with Stanford University and University College London to set up the Hong Kong Centre for Neurodegenerative Diseases at Hong Kong Science Park.

Professor Ip (centre) and her team have been working hard to unlock the secret of nerve cells, hoping to find a treatment for people suffering from neurodegenerative diseases including Alzheimer's and Parkinson's.

"Investors are becoming more interested in technological research projects after the listing reform and this can promote the rapid and comprehensive development of the entire biotechnology ecosystem."

Professor Ip praises the Hong Kong Science and Technology Parks Corporation for providing InnoCells, a smart living and co-creation space for I&T talents, at an affordable rent. It helps scientific research institutions and enterprises attract and retain talents.

Professor Ip (left) was a recipient of the L'Oréal-UNESCO for Women in Science International Awards in 2004. She hopes that her achievements will set an example for other female scientists and young female students and help encourage them to keep up their scientific research work.

As the commercialisation of scientific research results not only brings economic returns but also benefits society, Professor Ip attaches great importance to technology transfer. She is the patent owner of 70 international technological inventions and has launched research collaboration with a number of major biopharmaceutical companies. One of the research projects of her and her team has made use of the data of Chinese patients to develop a simple and highly accurate blood test to enable the early identification of people with Alzheimer's disease, which is commonly known as dementia. This is expected to change the current pathological assessment methods, such as brain imaging and lumbar puncture, which are expensive and intrusive. "Our study is not confined to looking for biomarkers in the blood, developing methods for early diagnosis and helping monitor the disease progression. We also aim to identify new drug targets through these biomarkers so as to understand the pathogenesis of the disease and develop new drugs."

Professor Ip has always been keen on exploring neuroscience. She focuses research on neural development and function as well as pathology and drug discovery for neurodegenerative diseases including Alzheimer's and Parkinson's. It is her wish to develop a drug for treating those diseases, but she admits this is not an easy task. "My maternal aunt was also a patient of Alzheimer's disease. When my mother was still alive, she often asked about my research progress and whether a cure had been found. I always replied that we would do our best. After all, we cannot rely on the efforts of just one single team or laboratory. We need scientists from all over the world to collaborate and study the disease from different perspectives, and perhaps we will succeed one day."

Professor Ip has been fond of biology and chemistry since childhood. After obtaining her undergraduate degree, she went to Harvard University to study pharmacology and chose neurochemistry as her research topic. This marked the beginning of her journey in studying brain-related diseases. "We know very little about how the brain works, and so it is difficult to find drugs to treat brain-related diseases. I am particularly interested in neurodegenerative diseases because it affects a large number of patients. At present, about 50 million people worldwide are suffering from Alzheimer's disease, and the number is expected to rise rapidly to 150 million by 2050. As a scientist, I would have a sense of satisfaction if I could contribute to the treatment of this disease."

Scientific research is a long journey that requires the hard work and unwavering perseverance of one generation after another. Professor Ip is well aware of the importance of legacy and succession, and is committed to training graduate students. Over the years at HKUST, she has nurtured nearly 100 students on master and doctoral levels, and many of them have made their mark in the scientific field, having their own research teams and laboratories. Some of her students have completed postdoctoral research at prestigious universities in the US such as the Massachusetts Institute of Technology and Harvard University, and have returned to Hong Kong to go after their pursuits or even collaborate with her on research projects. She says: "It gives me a great sense of satisfaction and achievement for being able to nurture young scientists for Hong Kong. We work together and inspire one another. Such combined strength will be conducive to the development of scientific research in Hong Kong."