

Chapter 16

Innovation, Technology and Industry

Promoting innovation and technology (I&T) development ranks highly on the government's agenda and a number of major I&T initiatives were implemented in 2022.

The government promulgated the Hong Kong I&T Development Blueprint in December to set out a clear roadmap and systematic strategies for Hong Kong's I&T development in the coming five to 10 years. The blueprint will be taken forward under four broad development directions: enhance the I&T ecosystem and promote new industrialisation in Hong Kong; enlarge the I&T talent pool to create strong impetus for growth; promote digital economy development and develop Hong Kong into a smart city; and proactively integrate into the overall development of the country and consolidate the city's role as a bridge connecting the Mainland and the world.

Two InnoHK research clusters were launched to promote global research collaboration in Hong Kong. They have attracted over 30 world-class universities and research institutes from 11 economies to set up 28 research laboratories in collaboration with local universities and research institutions. The subsidy for participating universities under the Technology Start-up Support Scheme for Universities and the annual funding for 16 State Key Laboratories and six Hong Kong Branches of Chinese National Engineering Research Centres in Hong Kong were doubled. Furthermore, the government has earmarked \$10 billion to support the long-term development of life and health technology.

The Mainland and Hong Kong have made significant progress in facilitating the cross-boundary flow of key elements of scientific research. As at end-2022, the Mainland had approved over RMB750 million for universities and research institutes in Hong Kong to conduct research and development projects and establish laboratories. Five Mainland branches established by Hong Kong universities have been allowed to lodge applications for exporting human genetic resources to Hong Kong for scientific research purpose. With support from the government, the Hong Kong Science and Technology Parks Corporation launched the GBA InnoAcademy and GBA InnoExpress in 2022 to support the development of local start-ups in the Guangdong-Hong Kong-Macao Greater Bay Area.

Various I&T initiatives are bearing fruit. The number of start-ups increased from about 1,000 in 2014 to close to 4,000 in 2022, and the number of research and development personnel also increased continuously. Over 10 unicorns were created in Hong Kong over the same period. Venture capital investment also increased substantially, making Hong Kong Asia's largest and the world's second-largest fundraising hub for biotechnology companies. Hong Kong was ranked second worldwide in the Technology category in the World Digital Competitiveness Ranking 2022.

Policies and software aside, a number of I&T infrastructure projects will be completed in the coming few years. This will provide the necessary hardware for Hong Kong's I&T ecosystem to continue to develop robustly in the future.

The Innovation, Technology and Industry Bureau formulates innovation and technology (I&T) policies in Hong Kong. The bureau is supported by the Innovation and Technology Commission, the Office of the Government Chief Information Officer and the Efficiency Office.

The Innovation and Technology Commission promotes and supports applied research and development (R&D) and technology transfer and applications. It also promotes internationally accepted standards and conformity assessment services to underpin technological development and international trade in Hong Kong.

The Office of the Government Chief Information Officer provides information technology (IT) services, governance and support within the government, and promotes the wider adoption of IT in the community. It also seeks to develop a vibrant information and communications technology (ICT) industry and promote high-tier data centres, smart city development and cyber security awareness in Hong Kong.

The Efficiency Office, through its role as internal management consultant, supports government agencies in taking forward initiatives through the application of technology and innovation in business processes. It accelerates innovation to improve services and operations across the government and promotes cross-sectoral collaboration between the government and stakeholders to design and implement better services for the community.

Leveraging Hong Kong's competitive edge, the government develops a high value-added and diversified economy which embraces the development of new economic sectors. The government also encourages industry participation to capitalise on opportunities emerging from the Guangdong-Hong Kong-Macao Greater Bay Area (GBA) development and the Belt and Road Initiative, in order to generate new impetus for the territory's economic development.

Infrastructure

Hong Kong Science and Technology Parks Corporation

The Hong Kong Science and Technology Parks Corporation (HKSTPC) provides infrastructural and one-stop support for technology companies, and manages the Hong Kong Science Park and the InnoCentre. The Science Park provides around 400,000 square metres of gross floor area for R&D activities and was home to about 1,000 companies as at end-2022. The total workforce was around 17,000, over 11,000 of whom were researchers.

The HKSTPC has introduced various measures to support the sustainable development of the local I&T ecosystem, such as providing all-round support to start-ups, attracting technology enterprises to set up operation in the Science Park, and promoting technology transfer and commercialisation of R&D results.

The corporation also manages three InnoParks in Tai Po, Yuen Long and Tseung Kwan O, which together provide 217 hectares of serviced land for I&T and manufacturing setups. Key projects include the Advanced Manufacturing Centre, Data Technology Hub, and Microelectronics Centre which is under construction.

Hong Kong-Shenzhen Innovation and Technology Park

The Hong Kong-Shenzhen Innovation and Technology Park Limited is a wholly owned subsidiary of HKSTPC responsible for building, operating, maintaining and managing the superstructure of the park.

Cyberport

Cyberport provides basic infrastructure and technical know-how to enhance the overall development of the ICT ecosystem. The Cyberport community consists of more than 1,900 ICT companies. Its campus provides 98,000 sq m of rental office area, of which over 15 per cent is Smart-Space, co-working areas used by nearly 600 start-ups. Cyberport also offers incubation programmes, funding support for market development and accelerator programmes, as well as venture capital investment support.

Hong Kong Productivity Council

The Hong Kong Productivity Council aims to help local enterprises adopt advanced technologies and production processes and increase productivity. It provides integrated support for their business operations in Hong Kong and the Mainland, focusing on manufacturing technologies, IT, environmental technologies and management systems. It also promotes new industrialisation and smart city development.

Research and Development Centres

The government has five R&D centres to drive and coordinate applied R&D and to promote the commercialisation of R&D results and technology transfer: the Automotive Platforms and Application Systems R&D Centre, Hong Kong Applied Science and Technology Research Institute, Hong Kong Research Institute of Textiles and Apparel, Logistics and Supply Chain MultiTech R&D Centre, and Nano and Advanced Materials Institute.

Hong Kong Council for Testing and Certification

The council advises the government on the overall development strategy of the testing and certification sector.

The Mainland has been opening up its market to Hong Kong's testing and certification sector through the Mainland and Hong Kong Closer Economic Partnership Arrangement (CEPA). The council promotes the liberalisation measures under CEPA, helps the testing and certification sector explore opportunities in the GBA, and encourages manpower development in the sector.

Hong Kong Accreditation Service

The accreditation service operates according to international standards and is active in international and regional accreditation communities. It has mutual recognition arrangements with accreditation bodies in 117 economies, allowing the results of tests, calibrations, certifications, inspections, validations and verifications provided by its accredited organisations to be recognised globally, thus facilitating cross-border business.

Standards and Calibration Laboratory

The laboratory is Hong Kong's official custodian of physical measurement reference standards and provides calibration services traceable to the International System of Units. It represents Hong Kong, China as a signatory to the Mutual Recognition Arrangement of the International Committee for Weights and Measures, and its calibration certificates are recognised internationally. It also provides proficiency testing schemes for testing and calibration laboratories to assess their technical competence.

Standards-related Services

The Innovation and Technology Commission sells standards documents and offers free technical advice on standards-related matters. It also represents the Hong Kong Special Administrative Region in major forums relating to standards and conformance issues and acts as Hong Kong, China's Enquiry and Notification Point under the World Trade Organisation Agreement on Technical Barriers to Trade.

Innovation and Technology Development

The government promulgated the Hong Kong I&T Development Blueprint in December. The blueprint lays out the general directions and major strategies for the development of I&T in the next five to 10 years. It sets out major facilitation policies under four broad development directions in order to develop Hong Kong into an international I&T centre and provide impetus to the economy. The four directions are:

- Enhance the I&T ecosystem and promote new industrialisation;
- Enlarge the I&T talent pool to create strong impetus for growth;
- Promote digital economy development and develop Hong Kong into a smart city; and
- Proactively integrate into the overall development of the country and consolidate Hong Kong's role as a bridge connecting the Mainland and the world.

In the International Institute for Management Development's World Digital Competitiveness Ranking 2022, Hong Kong was ranked second worldwide in the Technology category. Hong Kong is Asia's largest and the world's second-largest biotech fundraising hub.

R&D and Technology Transfer

Hong Kong's gross domestic expenditure on R&D (GERD) amounted to \$27.8 billion in 2021, and the ratio of GERD to Gross Domestic Product was 0.97 per cent.

The government offers tax deductions for R&D expenditure incurred on or after 1 April 2018. The deduction is 300 per cent for the first \$2 million of such expenditure and 200 per cent for the remaining balance. There is no cap on the amount of tax deduction. The total amount of R&D expenditure eligible to claim tax deduction for the year of assessment 2020-21 was about \$2.56 billion.

Sixteen State Key Laboratories and six branches of the Chinese National Engineering Research Centres in Hong Kong are recognised by the Ministry of Science and Technology. The government has doubled the maximum annual funding to \$20 million for each of these institutions starting from the 2022-23 financial year, and provides up to \$8 million a year for the Technology Transfer Office of each of seven designated universities¹.

The Innovation and Technology Fund assists in upgrading technology and promoting innovation in manufacturing and services. In 2022, it committed over \$6 billion to supporting over 17,900 projects undertaken by research institutions and the industry, ranging from R&D and subsidising enterprises to adopt I&T and introduce smart production lines, to promoting I&T culture. Over 420 were R&D projects with total funding exceeding \$1 billion. Research funding also comes from the University Grants Committee and Research Grants Council, which provided \$6.93 billion in 2021-22.

The Innovation Hub@HK website was launched in August to showcase the R&D outcomes of Hong Kong universities and research institutes. The website provides a one-stop platform to connect universities, research institutes and the industry to facilitate commercialisation and technology transfer of R&D outcomes.

InnoHK Research Clusters

To promote global research collaboration, the government has allocated \$10 billion to the InnoHK initiative. Two research clusters have been set up at the Science Park, namely Health@InnoHK, focusing on healthcare technologies, and AIR@InnoHK, focusing on artificial intelligence and robotics technologies. The initiative has attracted more than 30 world-class universities and research institutions from 11 economies to set up 28 research laboratories in collaboration with local universities and research institutions.

Start-ups

According to an Invest Hong Kong survey, the number of start-up companies increased to nearly 4,000 in 2022, up by 50 per cent compared with 2018.

The Innovation and Technology Venture Fund encourages venture capital funds to co-invest with the government in local I&T start-ups. As at end-2022, the fund had invested \$203 million in 27 local I&T start-ups and attracted around \$1.8 billion in private investment. The HKSTPC's Corporate Venture Fund and the Cyberport Macro Fund co-invest with angel investors or venture capital funds in start-ups supported by the respective parks.

The Technology Start-up Support Scheme for Universities supports teams from six local universities² to start technology businesses and commercialise their R&D results. The annual funding for each university will be doubled to \$16 million starting from the financial year

¹ City University of Hong Kong, Hong Kong Baptist University, the Chinese University of Hong Kong, the Education University of Hong Kong, the Hong Kong Polytechnic University, the Hong Kong University of Science and Technology, and the University of Hong Kong

² City University of Hong Kong, Hong Kong Baptist University, the Chinese University of Hong Kong, the Hong Kong Polytechnic University, the Hong Kong University of Science and Technology, and the University of Hong Kong

2023-24. As at end-2022, over \$300 million had been approved for 382 start-ups, which had derived over 1,700 intellectual property rights from their R&D. Over 200 start-ups had taken their products or services to market and over 240 had received funding injections.

Pooling and Nurturing Talent

The government aims to expand Hong Kong's I&T talent pool by nurturing, retaining and attracting talent, with relevant initiatives spanning across different life stages.

The IT Innovation Lab in Secondary Schools and Knowing More About IT programmes subsidise secondary and primary schools respectively to organise extra-curricular IT activities. As at end-2022, some 700 schools joined the programmes with the total approved funding exceeding \$300 million.

The STEM Internship Scheme encourages students of science, technology, engineering and mathematics (STEM) at local universities to undertake short-term full-time internships related to I&T. As at end-2022, over 8,100 student interns had joined the scheme.

The Research Talent Hub funds each eligible organisation or R&D project to engage up to four graduates for R&D work. As at end-2022, about \$4.4 billion had been used to fund about 10,400 positions.

The Global STEM Professorship Scheme helps local universities attract world-renowned I&T scholars and their teams to undertake teaching and research work in Hong Kong. The first four tranches supported over 80 scholars.

The Technology Talent Admission Scheme provides fast-track admission to Hong Kong for R&D talent. It was enhanced in December to lift the local employment requirement, extend the quota validity period to two years, and cover companies undertaking R&D activities in 14 technology areas. From its launch in 2018 to end-2022, 335 applications were approved.

Smart City and Digital Economy

The government published the Smart City Blueprint for Hong Kong in 2017 and its updated 2.0 version in 2020. Blueprint 2.0 set out over 130 initiatives to make Hong Kong a more advanced and liveable smart city, covering smart mobility, smart living, smart environment, smart people, smart government, smart economy, use of I&T in combating COVID-19, and smart village pilots.

The iAM Smart platform allows users to access more than 240 government, public and private organisation services with a single digital identity. As at end-2022, more than 1.6 million residents had registered as users.

The Digital Economy Development Committee chaired by the Financial Secretary was set up in June to look into the digital infrastructure needed to promote the development of the digital economy, ways to facilitate transfer of cross-boundary data, digital transformation of enterprises, and human resources support.

New industrialisation

The Advanced Manufacturing Centre (AMC) at Tseung Kwan O InnoPark provides a gross floor area of about 108,600 sq m for accommodating high value-added manufacturing processes and was ready for tenants to move in from the second quarter. The Microelectronics Centre at Yuen Long InnoPark is expected to open in 2024.

The Re-industrialisation Funding Scheme subsidises manufacturers on a matching basis to set up new smart production lines in Hong Kong. It funds one-third of the total project cost, or \$15 million, whichever is lower. As at end-2022, 32 applications had been supported with total funding of about \$276 million.

The Re-industrialisation and Technology Training Programme subsidises local employees on a matching basis to receive training in advanced technologies. By end-2022, it had provided some \$240 million in funding for training over 15,700 people.

Use of I&T in Government, Business and Community

The government is committed to providing more electronic services to facilitate businesses and improve public service delivery. As at end-2022, electronic submission options have been provided for more than 1,200 licence applications and government services. Around 3,200 government forms can be submitted online. Most of the licences have also been provided with electronic means for payment and collection.

The government releases data in machine-readable format on the data.gov.hk portal for free use. As at end-2022, there were about 5,100 open datasets on the portal. The Common Spatial Data Infrastructure Portal was launched at end-2022, releasing over 500 new spatial datasets.

The TechConnect Block Vote supports the government to implement I&T projects to enhance operational efficiency and improve public services. As at end-2022, TechConnect had supported 121 projects proposed by 32 bureaus or departments.

As at end-2022, the Smart Government Innovation Lab had matched 73 business needs of departments with technology solutions and arranged proof-of-concept tests for 52 solutions with potentials. Among them, 35 projects were being planned for or under pilot implementation.

The government encourages the elderly to use ICT through a web-based learning portal, an outreach programme and enriched ICT training, as well as facilitate usage by the disabled through adopting accessible website and mobile application designs. Mobile service stations have been set up to promote the use of smartphones to the elderly.

The Technology Voucher Programme supports local enterprises or organisations to adopt technological services and solutions to improve productivity or transform their business processes. As at end-2022, some 19,500 applications had been approved with around \$3.27 billion in funding.

The Distance Business Programme under the Anti-epidemic Fund supported enterprises to adopt IT solutions to continue their business and services during the pandemic. Over 25,700 approved applications proceeded to implementation, involving total funding of around \$1.7 billion. Around 95 per cent of approved applications came from small and medium enterprises.

The Social Innovation and Entrepreneurship Development Fund encourages social entrepreneurs to develop innovative ideas, products and services to address poverty and social exclusion and foster social cohesion through cross-sectoral collaboration. As at end-2022, 449 funded projects had benefited about 330,000 people.

Cooperation with Mainland

The National 14th Five-Year Plan supports Hong Kong's development into an international I&T centre and includes the Shenzhen-Hong Kong Loop as a major platform of cooperation in the GBA.

Over RMB750 million of R&D funding has been approved for universities and research institutions in Hong Kong. Five Mainland branches established by Hong Kong universities have been approved by the Ministry of Science and Technology to apply to export human genetic resources to Hong Kong for research.

The Hong Kong and Shenzhen governments are jointly developing a cooperation zone, which comprises the Hong Kong-Shenzhen Innovation and Technology Park and the Shenzhen Innovation and Technology Zone, to establish 'one zone, two parks'. The GBA InnoAcademy and GBA InnoExpress were launched in July, while the Shenzhen branch of the Hong Kong Science Park is expected to launch in the first half of 2023.

The government promotes technological cooperation with the Mainland through regular mechanisms, including the Mainland/Hong Kong Science and Technology Cooperation Committee, and the Guangdong-Hong Kong Expert Group on Cooperation in Technology and Innovation.

Applying Local R&D to Fight COVID-19

The government adopted many local R&D solutions to combat the COVID-19 pandemic and the Innovation and Technology Commission provided funding exceeding \$102 million to support local product development and application of technologies related to COVID-19. These included devices to check body temperature and track virus transmission.

Electronic wristbands and the StayHomeSafe mobile app, all developed locally, monitored over 1.5 million people under quarantine or isolation from 2020. Online systems developed for the COVID-19 Vaccination Programme recorded over 15 million bookings.

The COVID-19 Electronic Vaccination and Testing Record System allowed the public to download electronic records of test results, vaccination and recovery during the pandemic. The system recorded more than 22.7 million downloads.

The LeaveHomeSafe mobile app enabled users to record their visits to different venues and store their electronic COVID-19 vaccination records to support the implementation of the Vaccine Pass arrangement. The number of downloads exceeded 9.5 million, and the QR codes of more than 140,000 public and private venues had been displayed.

The QR Code Verification Scanner mobile app enabled operators of designated premises to scan Vaccine Pass QR codes and check a person's compliance with the Vaccine Pass requirements of different stages and to detect red or amber code holders. More than 760,000 downloads had been recorded.

Websites

Cyberport: www.cyberport.com.hk

Efficiency Office: www.effo.gov.hk

Hong Kong Applied Science and Technology Research Institute: www.astri.org

Hong Kong Automotive Platforms and Application Systems R&D Centre: www.apas.hk

Hong Kong Council for Testing and Certification: www.hkctc.gov.hk

Hong Kong Productivity Council: www.hkpc.org

Hong Kong Research Institute of Textiles and Apparel: www.hkrita.com

Hong Kong Science and Technology Parks Corporation: www.hkstp.org

iAM Smart: www.iamsmart.gov.hk

Innovation, Technology and Industry Bureau: www.itib.gov.hk

Innovation and Technology Commission: www.itc.gov.hk

InnoHK: www.innohk.gov.hk

IT Innovation Lab in Schools programme: www.it-lab.gov.hk

Logistics and Supply Chain MultiTech R&D Centre: www.lscm.hk

Nano and Advanced Materials Institute: www.nami.org.hk

Office of the Government Chief Information Officer: www.ogcio.gov.hk

Public sector information portal: www.data.gov.hk

Smart City Blueprint for Hong Kong: www.smartcity.gov.hk

Smart Government Innovation Lab: www.smartlab.gov.hk

Wi-Fi.HK portal: wi-fi.hk