

Chapter 6

Innovation and Technology

Hong Kong attracts top-notch overseas and Mainland research institutions with its strong research capability, robust intellectual property protection regime, world-class technological infrastructure and the opportunities presented by national development. The city is keen to stimulate novel ideas and tap into unexplored business opportunities, thus developing into an international innovation and technology hub as promulgated in the National 14th Five-Year Plan.

The Innovation and Technology 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.

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-based 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 900 companies as at end-2021. The total workforce was around 16,000, over 10,000 of whom were researchers.

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.

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 Hong Kong-Shenzhen Innovation and Technology Park.

Cyberport

As the city's ICT flagship institution, Cyberport provides basic infrastructure and technical know-how to enhance the overall development of the ICT ecosystem. The Cyberport community consists of over 1,700 ICT companies. Its campus provides 98,000 sq m of rental office area, of which over 10 per cent is Smart-Space, co-working areas used by over 500 start-ups. Cyberport offers incubation programmes, funding support for market development and accelerator programmes, as well as early-stage venture capital investment support.

Cyberport also operates the Smart-Space 8 co-working space in Tsuen Wan to accommodate some 100 start-ups, offering entrepreneurial training and 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 re-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 Guangdong-Hong Kong-Macao Greater Bay Area (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 105 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 the Hong Kong Special Administrative Region's (HKSAR) official custodian of physical measurement reference standards and provides a calibration service traceable to the International System of Units. It represents the HKSAR as a signatory to the Mutual Recognition Arrangement of the International Committee for Weights and Measures, and its calibration certificates are recognised internationally. It assists laboratories to assess their technical competence through proficiency testing programmes.

Standards-related Services

The Innovation and Technology Commission sells standards documents and offers free technical advice on standards-related matters. It also represents the HKSAR 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 promotes I&T development in eight major areas: increasing resources for R&D, pooling technology talent, providing funding investments, providing technological research infrastructure, reviewing legislations and regulations, opening up government data, leading changes to procurement arrangements, and promoting popular science education.

The Steering Committee on Innovation and Technology, chaired by the Chief Executive and with most principal officials as members, examines and steers measures in these eight areas, as well as initiatives under the Smart City Blueprint for Hong Kong.

In the International Institute for Management Development's World Digital Competitiveness Ranking 2021, Hong Kong was ranked first in Asia and second worldwide, with its performance in the Technology category ranked as first worldwide. 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 \$26.5 billion in 2020, and the ratio of GERD to Gross Domestic Product increased to 0.99 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 2019-20 was about \$3.21 billion.

Sixteen State Key Laboratories and six branches of the Chinese National Engineering Research Centre in Hong Kong are recognised by the Ministry of Science and Technology. The government provides maximum annual funding of \$10 million for each of these facilities, and 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 2021, it committed over \$4 billion to supporting over 8,500 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 450 were R&D projects with total funding exceeding \$1.2 billion. Research funding also comes from the University Grants Committee and Research Grants Council, which provided \$7.08 billion in 2020-21.

InnoHK Research Clusters

The government has allocated \$10 billion for the establishment of two InnoHK research clusters in the Hong Kong Science Park to develop the city as a global research collaboration hub. Health@InnoHK focuses on healthcare technologies, while AIR@InnoHK focuses on artificial intelligence and robotics technologies. The InnoHK initiative has attracted over 30 world-class universities and research institutions from 11 economies to set up 28 research laboratories in collaboration with local universities.

Start-ups

According to an Invest Hong Kong survey, the number of start-up companies increased around 70 per cent to some 3,800 this year, compared with 2017.

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-2021, the fund had invested around \$172 million in 23 local I&T start-ups and attracted \$1.332 billion in private investment. The HKSTPC's Corporate Venture Fund and the Cyberport Macro Fund co-invest in start-ups supported by the respective parks.

The Technology Start-up Support Scheme for Universities provides annual funding of up to \$8 million each to six local universities² to support their teams in starting technology businesses and commercialising their R&D results. As at end-2021, over \$250 million had been approved for 334 start-ups, which had derived over 1,500 intellectual property rights from their R&D. Over 190 start-ups had taken their products or services to market and over 210 had received funding injections.

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

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

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 of end-2021, some 380 schools had submitted applications for the programmes with total funding exceeding \$85 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-2021, over 4,200 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-2021, about \$3.4 billion had been used to fund about 8,600 positions.

The Greater Bay Area Youth Employment Scheme, launched in January, encourages enterprises to deploy local university or tertiary institution graduates to work in the Mainland cities of the GBA. Over 300 graduates were employed for I&T posts as at end-2021.

The Global STEM Professorship Scheme, launched in June, helps local universities attract world-renowned I&T scholars and their teams to undertake teaching and research work in Hong Kong. The first two tranches had supported over 60 scholars.

The Technology Talent Admission Scheme provides fast-track admission to Hong Kong for R&D talent. The scheme is applicable to all companies undertaking R&D activities in 13 technology areas.

Smart City Development

The Smart City Blueprint for Hong Kong focuses on six areas: Smart Mobility, Smart Living, Smart Environment, Smart People, Smart Government and Smart Economy. Digital infrastructure projects and other major initiatives have been implemented under these areas since 2017.

The Smart City Blueprint for Hong Kong 2.0 was released in December 2020, with over 130 initiatives to bring benefits and convenience to the public. It added a chapter titled 'Use of I&T in Combating COVID-19' and proposed smart village pilots to explore the use of I&T to address everyday issues faced by residents in rural or more remote areas.

The iAM Smart platform allows users to access over 170 government services with a single digital identity. As at end-2021, more than 1 million residents had registered for the platform.

The inaugural City I&T Grand Challenge, launched in 2020, invites the public to propose innovative solutions to tackle livelihood issues, and has received over 740 submissions from more than 1,250 participants.

Re-industrialisation

The HKSTPC is developing the Advanced Manufacturing Centre at Tseung Kwan O InnoPark and the Microelectronics Centre at Yuen Long InnoPark, expected to complete in 2022 and 2023 respectively.

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-2021, 21 applications had been supported in principle with total funding of about \$153 million.

The Re-industrialisation and Technology Training Programme subsidises local employees on a matching basis to receive training in advanced technologies. By end-2021, it had provided some \$75 million in funding for training over 8,000 people.

Use of I&T in Government, Business and Community

The government releases data in machine-readable format on the data.gov.hk portal for free use. As at end-2021, there were about 4,845 open datasets on the portal, with 24 new datasets related to COVID-19 opened since 2020.

Application forms for government services are digitised for online submission. As at end-2021, around 2,500 government forms are electronically submittable.

The TechConnect Block Vote supports the government to implement I&T projects to enhance operational efficiency and improve public services. As at end-2021, TechConnect had supported 99 projects proposed by 31 bureaus or departments.

The Smart Government Innovation Lab launched the 'Catch the Innovation' campaign in 2020 to encourage government departments to leverage robotics technologies for enhancing public services.

The Government Computer Emergency Response Team Hong Kong has been working with the police, the Hong Kong Computer Emergency Response Team Coordination Centre and the Hong Kong Internet Registration Corporation Limited to deepen the community's understanding of cyber security.

Technology is critical to the operation of the 1823 contact centre, which enables the public to lodge enquiries and complaints and improves departmental services by deploying chatbots, speech recognition, voice analytics, robotic process automation and data analytics.

The Youth Portal is a citizen-centric, one-stop platform connecting with the youth through social media and multimedia content.

The government encourages the elderly to use ICT through a web-based learning portal, enriched ICT training and an outreach programme, as well as adopting accessible website and mobile application designs to facilitate use by the disabled. From December, mobile service stations were set up on a pilot basis to help the elderly use smartphones.

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-2021, some 7,000 applications had been approved with around \$1.1 billion in funding.

The Distance Business Programme under the Anti-epidemic Fund supports enterprises to adopt IT solutions to continue their business and services during the pandemic. Over 25,500 approved applications had proceeded to implementation, involving total funding of around \$1.7 billion. Around 95 per cent of the 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-2021, 358 funded projects had benefited over 290,000 people.

The Innovation and Technology Fund for Better Living supports I&T projects that benefit the public or specific groups. The 38 projects approved so far cover health, education, safety and transport.

Cooperation with Mainland

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

Over 620 million RMB of R&D funding has been approved for universities and research institutions in Hong Kong. The number of Mainland branches established by Hong Kong universities, approved by the Ministry of Science and Technology, applying to export human genetic resources to Hong Kong for research increased from three to four.

The Hong Kong and Shenzhen governments have been 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 governments signed a cooperation arrangement in September and launched a joint package of policy measures conducive to the flow of talent, scientific research resources and business development. The HKSTPC signed a framework agreement in September to establish the Shenzhen branch of the Hong Kong Science Park, including GBA InnoAcademy and GBA InnoExpress.

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. A memorandum of understanding was also signed with the Shanghai government in August.

Applying Local R&D to Combat COVID-19

The government adopted many local R&D solutions to combat the pandemic in 2021. Highlights include:

- The Innovation and Technology Commission provided funding exceeding \$102 million to support local product development and application of technologies related to COVID-19, such as the 'kNOw Touch' contactless elevator control panel, body temperature checking devices and virus transmission tracking devices.
- Electronic wristbands and a monitoring system developed by the Logistics and Supply Chain MultiTech R&D Centre, complemented by the 'StayHomeSafe' mobile app developed by a local start-up, were used to monitor around 620,000 persons under quarantine.
- IT systems were developed for the COVID-19 Vaccination Programme for online booking, setting vaccine quotas for each vaccination centre and providing booking statistics.
- The COVID-19 Electronic Testing Record System was launched for the public to upload electronic records of test results and vaccination records.
- Online booking systems for the 'Return2hk' and 'Come2hk' schemes were set up to facilitate residents and travellers who met the specified conditions to apply for quarantine exemption quotas for returning or travelling to Hong Kong from the Mainland or Macao.
- The Hong Kong Health Code system was launched for the public to register an account and familiarise themselves with the functions in advance.
- The 'LeaveHomeSafe' mobile app enables users to record the time of their visits to different venues and taxi rides. Since its launch, the number of downloads has exceeded 7 million, and the QR codes of over 100,000 public and private venues have been displayed.

Websites

Cyberport: www.cyberport.com.hk

Efficiency Office: www.effo.gov.hk

Government Computer Emergency Response Team Hong Kong: www.govcert.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 Health Code: www.healthcode.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 and Technology Bureau: www.itb.gov.hk
Innovation and Technology Commission: www.itc.gov.hk
IT Innovation Lab in Schools programme: www.it-lab.gov.hk
LeaveHomeSafe: www.leavehomesafe.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
Youth Portal: youth.gov.hk