

## Chapter 6

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# Innovation and Technology

*Hong Kong attracts top research institutions with its strong research capability, robust intellectual property protection regime, world-class technological infrastructure and close cooperation with the Mainland. The city is developing into an international innovation and technology hub through a comprehensive I&T agenda and a smart city blueprint.*

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 transformation projects which include technological deployment, operational improvements and the development of new service models. It accelerates innovation to improve services and operations across the government and develops cross-sectoral collaboration between civil servants 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 to technology-based companies. It manages the Hong Kong Science

Park and the InnoCentre. The Science Park provides 330,000 square metres of gross floor area for R&D activities. As at end-2018, it was home to about 700 companies. Stage one of the Science Park expansion programme will be completed in 2019 to provide about 74,000 sq m of additional floor area.

The corporation also manages three industrial estates in Tai Po, Yuen Long and Tseung Kwan O, which together provide 217 hectares of serviced land for I&T setups.

### ***Hong Kong-Shenzhen Innovation and Technology Park Limited***

The Hong Kong-Shenzhen Innovation and Technology Park Limited (HSITPL) is a wholly owned HKSTPC subsidiary vested with the responsibility to build, operate, maintain and manage the superstructure of the Hong Kong-Shenzhen Innovation and Technology Park.

### ***Cyberport***

As the city's ICT flagship infrastructure, Cyberport aims to foster the growth of digital technology enterprises and strengthen the overall development of the ICT ecosystem by providing basic infrastructure and technical know-how. It has a community of over 1,200 local, Mainland and overseas ICT companies. Its campus comprises 94,700 sq m of rental office area, of which 12 per cent is used as Smart-Space co-working space. To support ICT start-ups, Cyberport offers incubation programmes, funding for market development, accelerator programmes and early-stage venture capital.

### ***Hong Kong Productivity Council***

The Hong Kong Productivity Council aims to enhance productivity and competitiveness among local enterprises and help them move up the value ladder by adopting technologies and high value-added manufacturing processes. It focuses on four areas of the manufacturing and service industries in Hong Kong and the Mainland, namely manufacturing technology, IT, environmental technology and management systems.

### ***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, namely the Automotive Parts and Accessory 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<sup>1</sup>, 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 is opening up its market to Hong Kong's testing and certification sector. In December, new liberalisation measures were introduced under the Mainland and Hong Kong Closer Economic Partnership Arrangement, expanding the scope of China Compulsory

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<sup>1</sup> Formerly known as the Hong Kong R&D Centre for Logistics and Supply Chain Management Enabling Technologies

Certification testing that can be undertaken by Hong Kong testing organisations to all products that are processed or manufactured in the Mainland requiring China Compulsory Certification.

### ***Hong Kong Accreditation Service***

The accreditation service operates according to international standards and is active in international and regional accreditation communities. As at end-2018, it had mutual recognition arrangements with accreditation bodies in 102 economies. Through these arrangements, the results of tests, calibrations, certifications, inspections, validations and verifications provided by its accredited organisations are 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. As such, calibration certificates issued by the laboratory are recognised internationally.

### ***Product Standards Information Bureau***

The bureau 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 outlined by the Chief Executive, Mrs Carrie Lam, namely increasing resources for R&D, pooling technology talent, providing funding investments, providing technological research infrastructure, reviewing legislation and regulations, opening up government data, leading changes to procurement arrangements and promoting popular science education.

To promote I&T development expeditiously and efficiently, the Chief Executive chairs a high-level, inter-departmental Steering Committee on Innovation and Technology to examine and steer measures under the eight major areas as well as smart city initiatives. Most of the principal officials are standing members of the committee.

### ***R&D and Technology Transfer***

The government's goal is to increase the ratio of gross domestic expenditure on R&D to Gross Domestic Product by 2022 to 1.5 per cent, and to reverse the ratio of public-sector to private-sector R&D expenditure gradually from being government-led to one of public-private participation.

To encourage enterprises to conduct more research activities, the government grants a 300 per cent tax deduction for the first \$2 million of qualifying local R&D expenditure and 200 per cent for the remaining balance. The measure applies to qualifying expenditure incurred on and after 1 April 2018.

The territory has 16 State Key Laboratories, renamed from Partner State Key Laboratories, and six Hong Kong branches of the Chinese National Engineering Research Centre, all recognised by the Ministry of Science and Technology. Starting from 2019-20, the government will double the maximum annual funding for each of these 22 facilities and for the Technology Transfer Office of each designated university<sup>2</sup> to \$10 million and \$8 million respectively, to fully unleash Hong Kong's strengths in scientific research and to foster technology transfer and the realisation of R&D results.

The Innovation and Technology Fund (ITF) supports projects that upgrade technology and promotes innovation in manufacturing and services. In 2018, the fund committed more than \$1.8 billion to supporting over 2,270 projects undertaken by research institutions and the industry, over 370 of which 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 \$5.37 billion in 2017-18.

### **InnoHK Research Clusters**

The government set aside \$10 billion in 2018 to establish two world-class InnoHK research clusters in the Science Park, namely Health@InnoHK, focusing on healthcare technologies, and AIR@InnoHK, on artificial intelligence and robotics technologies. The aim is to attract top-notch universities, research institutions and technology enterprises to set up research centres and laboratories at the two clusters and conduct collaborative R&D work. Non-profit-making research institutions will receive financial support. The target is for the research centres and laboratories to start operating progressively from the fourth quarter of 2019.

### **Start-ups**

Hong Kong has one of the fastest-growing start-up ecosystems. The number of start-up companies increased 18 per cent year on year to 2,625 in 2018, according to an Invest Hong Kong survey.

The government's \$2 billion Innovation and Technology Venture Fund encourages private venture capital funds to invest in local I&T start-ups. It signed the master agreement with six venture capital funds in 2018 and will co-invest with them on a government-to-venture-fund investment ratio of about 1:2.

Six local universities obtain government funding through the Technology Start-up Support Scheme for Universities to support their teams in starting technology businesses and commercialising their R&D results. From the scheme's inception in 2014 till end-2018, about \$114 million had been provided for 188 start-ups. Starting from 2019-20, the annual maximum funding for each university will be doubled to \$8 million.

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<sup>2</sup> With effect from 2019-20, the designated universities are the University of Hong Kong, the Chinese University of Hong Kong, City University of Hong Kong, the Hong Kong University of Science and Technology, Hong Kong Baptist University, the Education University of Hong Kong and the Hong Kong Polytechnic University.

Over four years from 2018-19, the HKSTPC will receive total government funding of \$10 billion, about \$7 billion of which will go towards supporting its tenants and incubatees, including through the launch of a new Science and Technology Entrepreneur Programme.

Cyberport finances its own Creative Micro Fund and Cyberport Macro Fund, providing early-stage funding to Cyberport's start-up community. Under the Space Sharing Scheme for Youth, Cyberport set up a Smart-Space 8 co-working space in Tsuen Wan in July to accommodate some 140 start-ups, offering entrepreneurial training and support to help young entrepreneurs carry out innovation activities.

### **Pooling and Nurturing Talent**

Talent is crucial for developing I&T. In August, the government launched the Postdoctoral Hub and the Re-industrialisation and Technology Training Programme. The Postdoctoral Hub funds ITF recipients, HKSTPC and Cyberport incubatees and I&T tenants, and investee start-ups of the Innovation and Technology Venture Fund to engage postdoctoral talent for R&D work. Up to end-2018, the government had supported over 300 postdoctoral researchers with about \$150 million in total funding. The training programme subsidises employees of local enterprises on a government-enterprise matching basis of 2:1 to receive training in advanced technologies, especially those related to Industry 4.0. As at end-2018, it had supported the training of 275 people with about \$1.8 million.

The Researcher Programme, formerly known as the Internship Programme, supports eligible organisations in recruiting undergraduates and postgraduates from local universities as researchers to help in R&D projects. Since its inception in 2004, more than 3,700 researcher positions had been approved, involving about \$880 million.

In June, the Technology Talent Admission Scheme was launched to provide a fast-track arrangement for eligible technology companies and institutes to admit overseas and Mainland technology talent to undertake R&D work in Hong Kong.

### **Smart City Development**

The government seeks to build a world-famous Smart Hong Kong characterised by a strong economy and high quality of living. The Smart City Blueprint for Hong Kong sets out development plans under six major areas, namely 'Smart Mobility', 'Smart Living', 'Smart Environment', 'Smart People', 'Smart Government' and 'Smart Economy', listing over 70 initiatives.

In particular, to support smart city development, the government is pursuing three key digital infrastructure projects:

- providing all Hong Kong residents, in mid-2020 and for free, an electronic identity (eID) as a single digital identity for authentication when conducting government and commercial transactions online;
- implementing a pilot Multi-functional Smart Lampposts scheme to collect real-time city data to enhance city management; and

- launching a next-generation government cloud infrastructure and building a big data analytics platform in 2020.

### **Re-industrialisation**

The government promotes re-industrialisation, the development of high-end manufacturing that is based on new technologies and smart production without taking up a lot of land, to identify a new area of economic growth for Hong Kong and to create more quality and diversified job opportunities.

To drive re-industrialisation, the Productivity Council helps local industries adopt technology relating to Industry 4.0. In March, it launched Hong Kong's first Professional Diploma Programme in Industry 4.0 jointly with the Vocational Training Council and the Fraunhofer Institute for Production Technology of Germany. An Invention Centre was set up jointly with Fraunhofer in October to promote digital manufacturing and smart city development. The Productivity Council's Inno Space provides workspace and technical support to start-up entrepreneurs, students and graduates.

The HKSTPC is developing a Data Technology Hub and an Advanced Manufacturing Centre at the Tseung Kwan O Industrial Estate, to be completed in 2020 and 2022 respectively. It is also studying a 56-hectare site near the Liantang/Heung Yuen Wai boundary for the development of an industrial estate. The government plans to establish a \$2 billion Re-industrialisation Funding Scheme that subsidises manufacturers on a matching basis to set up smart production lines, and to provide the HKSTPC with an additional \$2 billion to develop a Microelectronics Centre.

### **Use of I&T in Government, Business and Community**

A new open data policy was announced during the year. To provide raw material for research and innovative applications, government bureaus and departments will release their data in machine-readable format on the data.gov.hk portal for free use by the public and enterprises. The portal will open up about 700 new datasets in 2019, including real-time and geospatial data, bringing the number of available datasets to about 4,000.

Application forms for various government services are being digitised to allow for online submission. As at end-2018, more than 1,500 types of forms could be submitted electronically. With the help of the upcoming eID, virtually all the remaining 1,500 types of forms will offer an e-submission option by mid-2021.

Technology is also critical to the operation of the 1823 contact centre, a one-stop service for the public to lodge enquiries and complaints about government services. This telephone hotline deploys speech recognition, voice analytics and robotic process automation, and provides data analytics to improve departments' services.

The Youth Portal is a citizen-centric, one-stop platform for young people to access government or thematic information and services. Through the use of social media and multimedia content, the government connects with young people on their interests, such as entrepreneurship, career development, volunteering, culture and creativity.

The government attaches great importance to information security and cyber security, and encourages businesses to collaborate in strengthening Hong Kong's defence against cyber threats. The Government Computer Emergency Response Team Hong Kong works with the police and the Hong Kong Computer Emergency Response Team Coordination Centre to raise community awareness and knowledge of cyber security.

The annual signature event, Internet Economy Summit, was organised in April to discuss the development and strategies of the internet-driven economy, while the Hong Kong ICT Awards was held jointly with the local industry to recognise outstanding inventions and applications.

The InnoTech Month was held from October to December to promote an I&T culture among industry stakeholders and the public. Notable projects from the five R&D centres were showcased at Shenzhen's China Hi-Tech Fair in November and the Hong Kong Trade Development Council's SmartBiz Expo in December. The Innovation and Technology Commission supports the organisation of the Innovation and Technology Scholarship every year to raise undergraduates' interest in I&T and encourage them to pursue related careers.

To tackle social issues using I&T, the government supports I&T projects that benefit the public or specific groups, such as the elderly or disabled, through the \$500 million Innovation and Technology Fund for Better Living.

The Social Innovation and Entrepreneurship Development Fund encourages social entrepreneurs to create innovative ideas, products and services to tackle poverty, social exclusion and social cohesion, and to foster the well-being of the underprivileged. By supporting cross-sectoral collaboration, the fund aims to build an ecosystem which enables social entrepreneurs to thrive. As at end-2018, it had funded 166 projects comprising social ventures, capacity-building programmes and evidence-based research since its launch in 2013, benefiting over 100,000 people.

Digital inclusion measures to help needy groups include an outreach programme that encourages the elderly and the disabled to apply ICT in their daily living and the promotion of accessible website and mobile application designs.

### **Cooperation with Mainland**

The HKSAR Government and the Shenzhen Municipal People's Government are jointly developing the Lok Ma Chau Loop into the Hong Kong-Shenzhen Innovation and Technology Park, which will become a key base for scientific research and host relevant higher education, cultural, creative and other complementary facilities. Government representatives from both cities sit on the Joint Task Force on the Development of the Hong Kong-Shenzhen Innovation and Technology Park in the Loop.

The HSITPL began two studies during the year on the master planning and the business model and business planning of the park. Separately, the HKSAR Government started advance works with the aim of delivering the first batch of land parcels by 2021 for the HSITPL to construct the first batch of buildings and relevant facilities.

The HKSAR Government is participating actively in the development of the Guangdong-Hong Kong-Macao Greater Bay Area into an international I&T hub, backed by the country's long-running staunch support of Hong Kong's I&T development. President Xi Jinping has given a personal instruction affirming Hong Kong's solid scientific and technological foundation and quality technological talent. The instruction also supported Hong Kong's development into an international I&T hub. The Ministry of Science and Technology and the Ministry of Finance announced in May a new policy allowing Hong Kong universities and research institutions to apply directly for science and technology funding provided by the Central People's Government and to use the funding in Hong Kong.

In September, the HKSAR Government and the Ministry of Science and Technology signed the Arrangement on Enhancing I&T Cooperation between the Mainland and Hong Kong, and the Agreement on Commencing Jointly Funded Projects between the Ministry of Science and Technology and the Innovation and Technology Bureau of the Hong Kong Special Administrative Region Government. The arrangement and its annex, Joint Action Plan on Mainland and Hong Kong I&T Collaboration, will serve as an action framework for the two parties to take forward I&T cooperation initiatives. The ministry also announced the establishment of a National Open Innovation Platform for Next-Generation Artificial Intelligence on Intelligent Vision, and presented plaques to Hong Kong's 16 State Key Laboratories, which would enjoy more flexibility to work with different Mainland R&D institutions after being renamed from Partner State Key Laboratories.

In November, the HKSAR Government and the Chinese Academy of Sciences signed the Memorandum of Understanding on Establishing Affiliated Institution by the Chinese Academy of Sciences in Hong Kong. The MoU confirms the academy will set up an institution in Hong Kong to help its Guangzhou Institutes of Biomedicine and Health and Institute of Automation establish a presence in the Science Park's upcoming Health@InnoHK and AIR@InnoHK research clusters, and that the new institution will serve as the Secretariat of the Greater Bay Area Academician Alliance.

The HKSAR Government promotes technological cooperation with the Mainland through regular mechanisms, including the Mainland/Hong Kong Science and Technology Cooperation Committee, the Guangdong/Hong Kong Expert Group on Cooperation in Technology and Innovation, and the Guangdong-Hong Kong Technology Cooperation Funding Scheme. The scheme encourages collaboration among universities, research institutions and technology enterprises from the two places.

### **Websites**

Cyberport: [www.cyberport.com.hk](http://www.cyberport.com.hk)

Government Computer Emergency Response Team Hong Kong: [www.govcert.gov.hk](http://www.govcert.gov.hk)

GovHK one-stop portal: [www.gov.hk](http://www.gov.hk)

Hong Kong Applied Science and Technology Research Institute: [www.astri.org](http://www.astri.org)

Hong Kong Automotive Parts and Accessory Systems R&D Centre: [www.apas.hk](http://www.apas.hk)

Hong Kong Council for Testing and Certification: [www.hkctc.gov.hk](http://www.hkctc.gov.hk)

Hong Kong ICT Awards: [www.hkictawards.hk](http://www.hkictawards.hk)

Hong Kong Productivity Council: [www.hkpc.org](http://www.hkpc.org)



Hong Kong Research Institute of Textiles and Apparel: [www.hkrita.com](http://www.hkrita.com)  
Hong Kong Science and Technology Parks Corporation: [www.hkstp.org](http://www.hkstp.org)  
Innovation and Technology Bureau: [www.itb.gov.hk](http://www.itb.gov.hk)  
Innovation and Technology Commission: [www.itc.gov.hk](http://www.itc.gov.hk)  
Internet Economy Summit: [www.ieconomysummit.hk](http://www.ieconomysummit.hk)  
Logistics and Supply Chain MultiTech R&D Centre: [www.lscm.hk](http://www.lscm.hk)  
Nano and Advanced Materials Institute: [www.nami.org.hk](http://www.nami.org.hk)  
Office of Government Chief Information Officer: [www.ogcio.gov.hk](http://www.ogcio.gov.hk)  
Public-sector information portal: [data.gov.hk](http://data.gov.hk)  
Smart City Blueprint for Hong Kong: [smartcity.gov.hk](http://smartcity.gov.hk)  
Youth Portal: [youth.gov.hk](http://youth.gov.hk)