Chapter 6

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 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 civil servants and stakeholders to design and implement better services with 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 around 400,000 square metres of gross floor area for R&D activities. As at end-2019, it was home to about 800 companies.

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 and manufacturing setups.

Hong Kong-Shenzhen Innovation and Technology Park Limited

The Hong Kong-Shenzhen Innovation and Technology Park Limited (HSITPL) is a wholly owned subsidiary of the HKSTPC 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 overall development of the ICT ecosystem by providing basic infrastructure and technical know-how. It has a community of over 1,500 local, Mainland and overseas ICT companies. Its campus comprises 98,000 sq m of rental office area, of which 11 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 the productivity and competitiveness of local enterprises and help them move up the value ladder by adopting technologies and high value-added manufacturing processes. It provides integrated support to the manufacturing and service industries in Hong Kong and the Mainland, in particular small and medium-sized enterprises (SMEs) and start-ups focused on four areas, namely manufacturing technologies, IT, environmental technologies and management systems. In recent years, the Productivity Council has been dedicated to developing and introducing advanced solutions and innovative services to promote 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, namely the Automotive Platforms and Application Systems R&D Centre[1], 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 is opening up its market to Hong Kong's testing and certification sector through the Mainland and Hong Kong Closer Economic Partnership Arrangement (CEPA). Under the

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[1] Formerly known as the Automotive Parts and Accessory Systems R&D Centre.

CEPA Agreement on Trade in Services, amended in November, the scope of China Compulsory Certification (CCC) testing that can be undertaken by Hong Kong testing organisations in collaboration with designated Mainland bodies will be expanded to cover CCC products processed or manufactured anywhere in the world.

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 103 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. 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 by 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 gradually by 2022 to 1.5 per cent, and to reverse the ratio of public-sector to private-sector R&D expenditure from being government-led to one of public-private participation.

To encourage enterprises to conduct more R&D activities, the government offers enhanced tax deduction for qualifying R&D expenditure. The deduction is 300 per cent for the first $2 million of such expenditure and 200 per cent for the remaining balance.

The territory has 16 State Key Laboratories and six Hong Kong branches of the Chinese National Engineering Research Centre, all recognised by the Ministry of Science and Technology. To unleash Hong Kong's strengths in scientific research and foster technology transfer and the realisation of R&D results, the government provides maximum annual funding of $10 million to each of the above facilities, and up to $8 million a year to the Technology Transfer Office of each of the seven designated universities[2].

The Innovation and Technology Fund (ITF) supports projects that upgrade technology and promote innovation in manufacturing and services. In 2019, the fund committed more than $2.6 billion to supporting over 3,570 projects undertaken by research institutions and the industry, over 430 of which were R&D projects with total funding exceeding $1.3 billion. Research funding also comes from the University Grants Committee and Research Grants Council, which provided $5.41 billion in 2018-19.

InnoHK Research Clusters

The government is pressing ahead with the establishment of InnoHK research clusters in the Science Park to attract renowned universities, research institutes and technology enterprises to conduct more collaborative research in Hong Kong so as to develop the city as a hub for global research collaboration. The two clusters are Health@InnoHK, focusing on healthcare technologies, and AIR@InnoHK, on artificial intelligence and robotics. Non-profit-making research centres are expected to be set up in the clusters in 2020 and will receive financial support from a sum of $10 billion approved for the purpose. The government will also examine forming a third InnoHK research cluster to further promote global research collaboration.

Start-ups

Hong Kong has one of the fastest-growing start-up ecosystems. The number of start-up companies increased 21 per cent year on year to 3,184 in 2019, according to an Invest Hong Kong survey.

Through a $2 billion Innovation and Technology Venture Fund, the government co-invests with partner venture capital funds in local I&T start-ups at a government to venture capital fund investment ratio of about 1:2, to encourage more private investment in such start-ups. In 2019, the fund invested around $50 million in seven deals.

Six local universities[3] obtain government funding through the Technology Start-up Support Scheme for Universities to support their teams in starting technology businesses and

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[2] 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

[3] 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

commercialising their R&D results. Each university gets up to $8 million a year. From the scheme's inception in 2014 till end-2019, about $162 million had been provided for 250 start-ups.

Over the next few years from 2018-19, the HKSTPC will receive total government funding of $10 billion, about $7 billion of which will go towards support for its tenants and incubatees, including the launch of a Science and Technology Entrepreneur Programme and expansion of the Corporate Venture Fund.

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 operates a Smart-Space 8 co-working space in Tsuen Wan to accommodate some 100 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. The government operates the Postdoctoral Hub and the Re-industrialisation and Technology Training Programme, both launched under the ITF. The Postdoctoral Hub funds ITF recipients, HKSTPC and Cyberport incubatees and I&T tenants, and investee start-ups under the Innovation and Technology Venture Fund to engage postdoctoral talent for R&D work. Up to end-2019, the government had supported over 860 postdoctoral researchers with about $500 million in funding. In February, the government extended the maximum engagement period of each postdoctoral researcher from two years to three years.

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-2019, it had supported the training of 2,051 people with about $12.9 million of funding.

In addition, the Researcher Programme under the ITF 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 4,700 researcher positions had been approved, involving about $1.2 billion. In February, the government extended the maximum engagement period of each researcher from two years to three years and raised the monthly allowances for researchers.

The Technology Talent Admission Scheme provides a fast-track arrangement to admit R&D talent. In the 2019 Policy Address, it was announced that the number of technology areas covered by the scheme would increase to 13 and that the coverage would extend to all companies conducting R&D activities in these 13 areas in Hong Kong. The newly added areas were fifth-generation communications, digital entertainment, green technology, integrated circuit design, the internet of things and microelectronics.

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. To support smart city development, the government is pursuing three key digital infrastructure projects:

- to give each Hong Kong resident a single digital identity for authentication in online transactions on a free and voluntary basis in the fourth quarter of 2020, and to launch an 'iAM Smart' platform providing one-stop personalised digital government services;

- to implement a Pilot Multifunctional Smart Lamp-posts Scheme that collects real-time city data to enhance urban management; and

- to launch a next-generation government cloud infrastructure and build a big data analytics platform in the third quarter of 2020.

The government will release Smart City Blueprint 2.0 for Hong Kong in 2020, describing the latest developments of various smart city initiatives and new initiatives to further smart city development.

In 2019, the government significantly expanded the coverage of free public Wi-Fi under the Wi-Fi Connected City programme. The number of Wi-Fi.HK hot spots increased by more than 12,000 to over 35,000, and the quality of the free service was enhanced.

Re-industrialisation

The government promotes re-industrialisation, the development of high-end manufacturing 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. The INC Invention Centre, set up jointly with the Fraunhofer Institute for Production Technology of Germany, runs an Industry 4.0 upgrade and recognition programme and holds workshops that encourage enterprises to adopt smart manufacturing technologies. The Inno Space managed by the Productivity Council provides workspace and technical support to start-up entrepreneurs, students and graduates, and promotes education in science, technology, engineering and mathematics.

The HKSTPC is developing a Data Technology Hub and an Advanced Manufacturing Centre at 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 government-enterprise matching basis of 1:2 to set up smart production lines in Hong Kong, and provide the HKSTPC with an additional $2 billion to develop a Microelectronics Centre.

Use of I&T in Government, Business and Community

Government bureaus and departments are releasing their data in machine-readable format on the data.gov.hk portal for free use by the public and enterprises, to provide raw material for research and innovative applications. The portal opened up about 700 new datasets in 2019, including real-time and geospatial data, bringing the number of available datasets to about 4,000 since the open data policy was announced in 2018. The portal introduced city dashboards at the end of 2019 to enable the public to understand the city-related open data more easily.

Application forms for various government services are being digitised to allow for online submission. As at end-2019, more than 1,700 types of forms could be submitted electronically. With the help of the upcoming 'iAM Smart', virtually all government forms, totalling about 3,000 types, will offer an e-submission option by mid-2021.

The GovHK portal introduced chatbot functions at the end of 2019 to help the public search and access e-government services.

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. The contact centre deploys chatbots, 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 providing information on youth-related public services. Through the use of social media and multimedia content, the government connects with young people on their interests, such as entrepreneurship, career pursuit, and cultural and creative activities.

The Office of the Government Chief Information Officer established a Smart Government Innovation Lab in April to help government departments collaborate on formulating innovative measures that enhance the quality and efficiency of public services. The initiative also provides more business opportunities for SMEs and start-ups in the industry.

The government attaches great importance to cyber security and adopts a diversified strategy to respond to cyber threats and maintain a secure cyber environment for Hong Kong. The strategy involves enhancing the capacity of communities and industries to respond to cyber attacks, training professionals, engaging in international cooperation to combat cyber attacks and protecting government information systems. The Government Computer Emergency Response Team Hong Kong works 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.

The annual signature event, Internet Economy Summit, discusses the development and strategies of the internet-driven economy, while the Hong Kong ICT Awards, held jointly with the local industry, recognises outstanding inventions and applications.

Notable projects from the five R&D centres are showcased at Shenzhen's China Hi-Tech Fair and the Hong Kong Trade Development Council's SmartBiz Expo. 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-2019, it had funded 200 projects comprising social ventures, capacity-building programmes and evidence-based research since its launch in 2013, benefiting around 180,000 people.

Digital inclusion measures to help needy groups include a web-based learning portal, enriched ICT training and an outreach programme that encourage 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 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.

During the year, the HSITPL completed two studies on the master planning and the business model and business planning of the park, and began a technical feasibility study and an economic impact analysis study, so as to facilitate the development of the first batch of buildings. The HKSAR Government is undertaking advance works with the goal of delivering the first batch of land parcels by 2021.

The HKSAR Government, backed by the country's long-running staunch support of Hong Kong's I&T development, is participating actively in the development of the Guangdong-Hong Kong-Macao Greater Bay Area into an international I&T hub. During the year, the Ministry of Science and Technology and Mainland provincial and municipal government agencies opened their R&D programmes to designated universities and scientific research institutions in Hong Kong for application. Approved funds were remitted across the boundary to Hong Kong to conduct R&D projects and set up a laboratory.

In April, the HKSAR's Innovation and Technology Commission launched the Mainland-Hong Kong Joint Funding Scheme with the ministry to encourage scientific research cooperation between Hong Kong and Mainland provinces. Over 100 applications were received during the year.

In November, the Central People's Government announced after the third plenary meeting of the Leading Group for the Development of the Guangdong-Hong Kong-Macao Greater Bay Area that eligible education institutions, hospitals and branches in the Mainland established by Hong Kong's universities and scientific research institutions would be allowed to lodge applications for exporting human genetic resources to Hong Kong independently under a trial scheme. The new policy will promote the development of healthcare technologies in Hong Kong.

The HKSAR 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.

Websites

Cyberport: www.cyberport.com.hk
Government Computer Emergency Response Team Hong Kong: www.govcert.gov.hk
GovHK one-stop portal: www.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
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