

Innovation and Technology

Hong Kong attracts top research institutions with its strong research capability, robust intellectual property protection regime and world-class technological infrastructure. The city is forging ahead to embrace the innovation and technology era, boosted by an unprecedented sum of more than \$18 billion pledged in the Policy Address and Budget Speech of 2016.

Established in November 2015, the Innovation and Technology Bureau provides dedicated policy support for the development of innovation and technology (I&T) in Hong Kong. The bureau is supported by the Innovation and Technology Commission and the Office of the Government Chief Information Officer.

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, such as cloud computing, and digital inclusion in the community. It also seeks to develop a vibrant industry in information and communications technology (ICT), promoting high-tier data centres, smart city development and cybersecurity awareness in Hong Kong.

Infrastructure

Hong Kong Science and Technology Parks Corporation

The Hong Kong Science and Technology Parks Corporation (HKSTPC) provides one-stop infrastructural support to technology-based companies. It manages the 22-hectare Science Park in Sha Tin. The three-phase development of the Science Park was fully completed on its 15th anniversary in 2016, providing 330,000 square metres of gross floor area for applied R&D in biomedical technology, electronics, green technology, information and telecommunications technology, and material and precision engineering. As at end-2016, it was home to about 630 companies. In August, the Science Park embarked on a \$4.4 billion stage 1 expansion programme to increase the gross floor area by 20 per cent by 2020.

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. It revised the admission criteria and business mode of the industrial estates in 2015, and will mainly build and manage specialised multistorey, high-efficiency industrial buildings for lease to I&T multi-users in future.

Cyberport

As the city's ICT flagship infrastructure, Cyberport aims to foster the growth of digital technology enterprises and strengthen the overall ICT ecosystem by providing infrastructure and technological know-how. It houses over 800 local, Mainland and overseas ICT companies across 94,700 sq m of office space in four grade A office buildings, with Smart-Space small offices and workstations occupying 12 per cent of the area. Its support programmes help develop local small and medium enterprises (SMEs) and ICT start-ups.

Hong Kong Productivity Council

The Hong Kong Productivity Council aims to enhance business productivity and competitiveness among local enterprises and help them move up the value ladder through the adoption of 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 technologies, information technologies, environmental technologies and management systems.

Research and Development Centres

The government has five R&D centres to drive and coordinate applied R&D, and promote the commercialisation of R&D results and technology transfer. They are:

- the Automotive Parts and Accessory Systems R&D Centre,
- the R&D Centre for Information and Communications Technologies under the Hong Kong Applied Science and Technology Research Institute,
- the Hong Kong Research Institute of Textiles and Apparel,
- the Hong Kong R&D Centre for Logistics and Supply Chain Management Enabling Technologies, and
- the Nano and Advanced Materials Institute.

Universities

Six universities are designated local public research institutions, namely the 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. The government allocates up to \$4 million annually to each of these universities to fund the work of their Technology Transfer Offices.

Hong Kong Council for Testing and Certification

The Hong Kong Council for Testing and Certification advises the government on the overall development strategy of the testing and certification industry. Its members come from the industry, businesses, professional organisations and relevant public bodies and government departments. It recommends measures to promote testing and certification services, and to support the industry on manpower, capital, technology and other areas.

A new measure took effect in February, permitting owners of industrial premises to apply to the Lands Department for a waiver of user conditions under their land leases to allow testing and calibration laboratory operations in industrial buildings. Applicants pay an administrative fee but are exempted from the corresponding waiver fee.

The Mainland is opening up its market to Hong Kong's testing and certification industry. By end-2016, the commission's Hong Kong Accreditation Service had accredited 11 laboratories to conduct tests required by the China Compulsory Certification System.

Hong Kong Accreditation Service

The accreditation service operates according to international standards and is active in international and regional accreditation communities. As at end-2016, it had 95 mutual recognition arrangements partners in 94 economies. Through these arrangements, the results of tests, calibrations, certifications and inspections provided by its accredited organisations are recognised globally, thus facilitating cross-border business.

Standards and Calibration Laboratory

The Standards and Calibration Laboratory is the HKSAR's 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 Product Standards Information Bureau operates a product standards library, provides sales of standards and offers free technical advice on standards-related matters. It represents the HKSAR on regional and international standardisation bodies and acts as the city's Enquiry and Notification Point under the World Trade Organisation Agreement on Technical Barriers to Trade.

Innovation and Technology Ecosystem

The government adopts a multi-pronged approach to creating a vibrant I&T ecosystem in collaboration with the industry, academia and research sector. It provides infrastructural and financial support, promotes human resource development, collaborates with external economies and fosters an innovation culture in the community.

The Policy Address and Budget Speech of 2016 injected more than \$18 billion into the I&T ecosystem. A series of measures were formulated to encourage universities to conduct more midstream research, co-invest with private venture capital funds in local technology

start-ups, promote re-industrialisation, subsidise SMEs' adoption of technology, and fund projects that made use of I&T to improve the daily lives of people.

In March, the Innovation and Technology Bureau co-organised a session entitled 'Innovation and the New Economy of Hong Kong' at the Boao Forum for Asia Annual Conference. The following month, Hong Kong teams comprising companies, academia and students won 20 gold, five silver and six bronze medals at the International Exhibition of Inventions of Geneva, the world's largest event of its kind. In June, the Massachusetts Institute of Technology Innovation Node Hong Kong launched its mini-accelerator programme. In October, the Ming Wai Lau Centre for Reparative Medicine, the first establishment of Karolinska Institutet outside Sweden, opened in the Science Park.

Research and Development

The Innovation and Technology Fund (ITF) supports applied R&D that upgrades technology and promotes innovation in manufacturing and services. As at end-2016, the fund had committed more than \$11 billion to supporting about 5,800 projects undertaken by research institutions and the industry, of which over 3,000 were R&D projects with total funding exceeding \$8.7 billion.

The R&D Cash Rebate Scheme reinforces a culture of research among enterprises and encourages them to establish strong partnerships with local research institutions. Companies conducting applied R&D projects under the fund or in partnership with designated institutions are eligible for cash rebates on their investments. The level of rebate was increased to 40 per cent in February. As at end-2016, the scheme had approved more than 1,500 applications for rebates amounting to over \$220 million.

During the year, a \$2 billion Midstream Research Programme for Universities was launched. Its investment income will be used to support institutions funded by the University Grants Committee to conduct more theme-based midstream research in focused technology areas. Each project may receive up to \$5 million; those involving collaboration across multiple disciplines or institutions are accorded priority and a higher funding ceiling of \$10 million. The programme started inviting project proposals under the theme, 'Elderly Health and Care', in December.

Start-ups

Hong Kong is ranked among the top five fastest-growing start-up ecosystems and among the top 25 start-up hubs. The city recorded a 24 per cent increase in the number of start-up companies from around the world, from 1,558 in 2015 to 1,926 in 2016, that registered with 38 operators of co-working space, incubation and acceleration programme, according to an InvestHK survey.

During the year, the government worked to establish a \$2 billion Innovation and Technology Venture Fund that would co-invest with private venture capital funds in local I&T start-ups on an investment ratio of about 1:2. This is to help start-ups with funding during their early growth and to provide them with the professional knowledge and business network of venture capitalists. The fund is expected to be launched in mid-2017.

Incubation programmes are also available to provide rental subsidies as well as marketing, financial and technical support to start-ups in their initial years, and to help them open up markets. The HKSTPC offers a Corporate Venture Fund, while Cyberport runs a Creative Micro Fund and Cyberport Incubation Programme. In 2016, Cyberport launched a \$200 million Macro Fund to invest in its start-up community, and expanded its Smart-Space small offices and workstations by 60 per cent to yield a total floor area of 11,420 sq m, of which 4,400 sq m are designated for companies of financial technologies.

In October, the HKSTPC set up a 930 sq m, downtown start-up hub called Lion Rock 72 at the InnoCentre in Kowloon Tong, its first co-working space outside the Science Park, for start-ups to conduct business activities.

The Technology Start-up Support Scheme for Universities under the ITF provides funding to six local universities to support their teams in starting technology businesses and commercialising their R&D results. Each university receives up to \$4 million annually.

In December, the Public Sector Trial Scheme was extended to benefit incubatees and graduate tenants of the HKSTPC and Cyberport in conducting trials of their products or services in the public sector. Each project gets up to \$1 million.

Nurturing Talent

Talent is crucial for developing I&T. An eight-year Enriched IT Programme in Secondary Schools was introduced in the 2015-16 school year to provide IT training in programming, robotics, 3D printing and drones, and to organise activities to stimulate interest in IT. Some 700 students attended enriched IT classes at the eight partner schools during the 2016-17 school year, and 85 schools were funded to organise IT activities in 2016.

At the undergraduate and postgraduate level, an Internship Programme under the ITF supports organisations to recruit graduates from local universities as interns to help in ITF-funded R&D projects. More than 2,400 internships have been approved, involving a total funding of some \$490 million. The monthly allowances were increased in 2016 to \$14,000 for graduates with a bachelor's degree and \$16,500 for those with a master's or higher degree. The programme was extended in December to benefit incubatees and SME tenants of the HKSTPC and Cyberport.

Promotion of Innovation and Technology

Re-industrialisation

Re-industrialisation, the development of high-value-added industries or manufacturing processes, is a new area of economic growth for Hong Kong. It encompasses robotics, smart city and healthy ageing as strategic development areas.

To promote and support smart production, the Legislative Council approved about \$8.2 billion in 2016 to develop an Advanced Manufacturing Centre and Data Technology Hub at the Tseung Kwan O Industrial Estate. The government is also identifying sites near the Liantang/Heung Yuen Wai Boundary Control Point to meet the long-term needs of I&T setups.

A preliminary planning study by the HKSTPC is under way to examine the suitability of the sites in developing a science park and industrial estate.

The Productivity Council offers one-stop solutions, particularly to the manufacturing and related service industries, to encourage technology adoption and promote innovation and sustainable development. It also facilitates industrial upgrading and helps enterprises adopt high-value-added production.

Smart City Development

The government is seeking to make use of I&T to address urban challenges, enhance city management and improve quality of living. The Office of the Government Chief Information Officer commissioned a consultancy study in September for completion in mid-2017 to formulate a smart city blueprint. The blueprint will comprise policy objectives and strategies, smart city development plans, governance arrangement, digital infrastructure, a legal framework and modes of public-private collaboration. Public views are collected through the www.smartcity.gov.hk portal.

The Wi-Fi.HK brand provides free public Wi-Fi to the public and visitors. Participating organisations from both the public and private sectors together manage over 18,000 hot spots offering at least 30 minutes of free Wi-Fi. The government pledged in 2016 to expand Wi-Fi.HK coverage to 34,000 hot spots by 2019. The speed of Wi-Fi connection at government venues was also doubled to 3-4 Mbps with enhanced security. Plans were under way to subsidise the provision of free Wi-Fi at youth service centres and study rooms run by non-profit-making organisations.

Use of I&T in Government, Business and Community

User-friendly e-government services continued to be rolled out in 2016. The one-stop portal GovHK, at www.gov.hk, was revamped with a responsive web design.

Another portal, data.gov.hk, provides free public-sector information in machine-readable format to encourage innovative use of the information to benefit the community and support the development of a knowledge-based economy. There are over 6,000 data sets in 18 categories, including population, weather, environment, transport, housing, food, health, employment and labour. In 2016, more than 200 application programming interfaces were incorporated into the portal to help software developers create applications and services.

Government forms are being digitised to allow for online submissions. As at end-2016, more than 1,300 forms frequently used by the public could be completed and submitted electronically.

To safeguard information security, the government strengthened the security measures of its information systems during the year and enhanced its IT security policy and guidelines for compliance by government departments. The Government Computer Emergency Response Team Hong Kong (GovCERT.HK) coordinates and manages government IT and cybersecurity issues, and works with the police and Hong Kong Computer Emergency Response Team

Coordination Centre to provide security advice to operators of critical infrastructure, companies, schools and individuals.

Data centres are critical technology infrastructure. They support the digital development of various sectors in areas such as cloud computing, big data and artificial intelligence, thus promoting the growth of high-value-added economic activities in finance, logistics and e-commerce. Many multinational corporations operate data centres in Hong Kong. The following measures aim to further boost the development of data centres:

- **Use of industrial buildings and industrial lots for data centres.** Two concessionary measures allow the conversion of industrial buildings into data centres and the redevelopment of industrial lots for high-tier data centres. As at end-December, the government had approved 16 applications for the conversion of industrial buildings into data centres and approved one application to redevelop an industrial lot.
- **Provision of support services.** The Data Centre Facilitation Unit under the Office of the Government Chief Information Officer provides support and inter-departmental coordination for enterprises interested in setting up data centres.

In November, a \$500 million Technology Voucher Programme was launched to promote the effective use of technological solutions by SMEs to upgrade their business processes and enhance operational efficiency. Each eligible SME will get cumulative funding of up to \$200,000 on a 2:1 matching basis. By the end of 2016, over 500 SMEs had registered online.

The annual signature International IT Fest was held in April to discuss the future development and strategies of the internet-driven economy. The year of 2016 also marked the 10th anniversary of the Hong Kong ICT Awards, held jointly with the local industry to recognise outstanding inventions and applications.

The annual InnoTech Month promotes an I&T culture among industry stakeholders and the public through an InnoCarnival, roadshows, stage performances related to innovation and the arts and other activities. The Innovation and Technology Scholarship Award Scheme, organised jointly with the academia and non-governmental organisations, seeks to enhance students' interest in I&T and encourage them to pursue related careers.

To tackle social issues using I&T, the government is setting up a \$500 million Innovation and Technology Fund for Better Living that will support projects benefiting the public or specific groups, such as the elderly or disabled. The fund is expected to be launched in mid-2017.

Digital inclusion initiatives are in place to serve the elderly and the underprivileged. Initiatives carried out in 2016 included an outreach programme to encourage more elderly people to use ICT in their daily lives, funding support for the development of mobile apps that would meet the needs of underprivileged groups, a Web Accessibility Recognition Scheme to encourage the adoption of accessible design for websites and mobile apps, and an Internet Learning Support Programme to help students from low-income families undertake online learning at home.

Cooperation with Mainland

The State Ministry of Science and Technology recognises 16 laboratories at various Hong Kong universities as Partner State Key Laboratories and has approved six Hong Kong Branches of Chinese National Engineering Research Centres for their strong R&D capabilities and leading positions in their areas of expertise. The government sets aside \$5 million every year to support each of these institutions. It granted further funding support of three years, up to 2018-19, at the beginning of 2016 and also started the first round of reassessment of the Partner State Key Laboratories during the year.

In January, a Hong Kong/Guangdong ICT Expert Committee was set up to strengthen cooperation between the two places in promoting the development and adoption of cloud computing, big data, internet of things, smart city and other technologies.

During the year, Hong Kong joined the Cloud Computing Working Group of the National Information Technology Standardisation Committee to work with Hong Kong and Mainland industry players to formulate national standards on purchase guidelines for cloud computing services.

The Chairman of the National People's Congress Standing Committee, Mr Zhang Dejiang, visited the Science Park in May. He was briefed by the Secretary for Innovation and Technology, Mr Nicholas W Yang, on the city's entrepreneurship and innovation development, the government's I&T policy, the work of major support institutions, cross-boundary cooperation and Hong Kong's role as a super-connector. He also discussed with founders of local I&T start-ups the development of their sectors.

In August, the Mainland-Hong Kong Science and Technology Cooperation Committee, a high-level steering committee set up by the Ministry of Science and Technology and the Innovation & Technology Bureau, agreed at its annual meeting that both sides would work together to promote exchanges between young people on I&T and entrepreneurship.

Cyberport Creative Micro Fund Cross-Border programmes bring young talent in Hong Kong, Guangdong and Shenzhen together to develop digital innovations. The programmes help local tertiary students acquire Mainland experience while encouraging exchange of innovative ideas. Cyberport provides \$100,000 as seed funding for each selected project to turn innovative ideas into prototypes.

The HKSAR and Guangdong governments have run a Guangdong-Hong Kong Technology Cooperation Funding Scheme since 2004 to encourage collaboration by their universities, research institutions and technology enterprises. As at end-December, the ITF had funded 246 projects with about \$833 million, of which \$204 million was for 87 projects funded jointly by the ITF and Guangdong/Shenzhen authorities.

Websites

Cyberport: www.cyberport.com.hk

Cyber Security Information Portal: www.cybersecurity.hk

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

Hong Kong Automotive Parts and Accessory Systems R&D Centre: www.apas.hk

Hong Kong Productivity Council: www.hkpc.org

Hong Kong R&D Centre for Logistics and Supply Chain Management Enabling Technologies:
www.lscm.hk

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

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

Innovation and Technology Bureau: www.itb.gov.hk

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

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

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

Public-Sector Information Portal: data.gov.hk