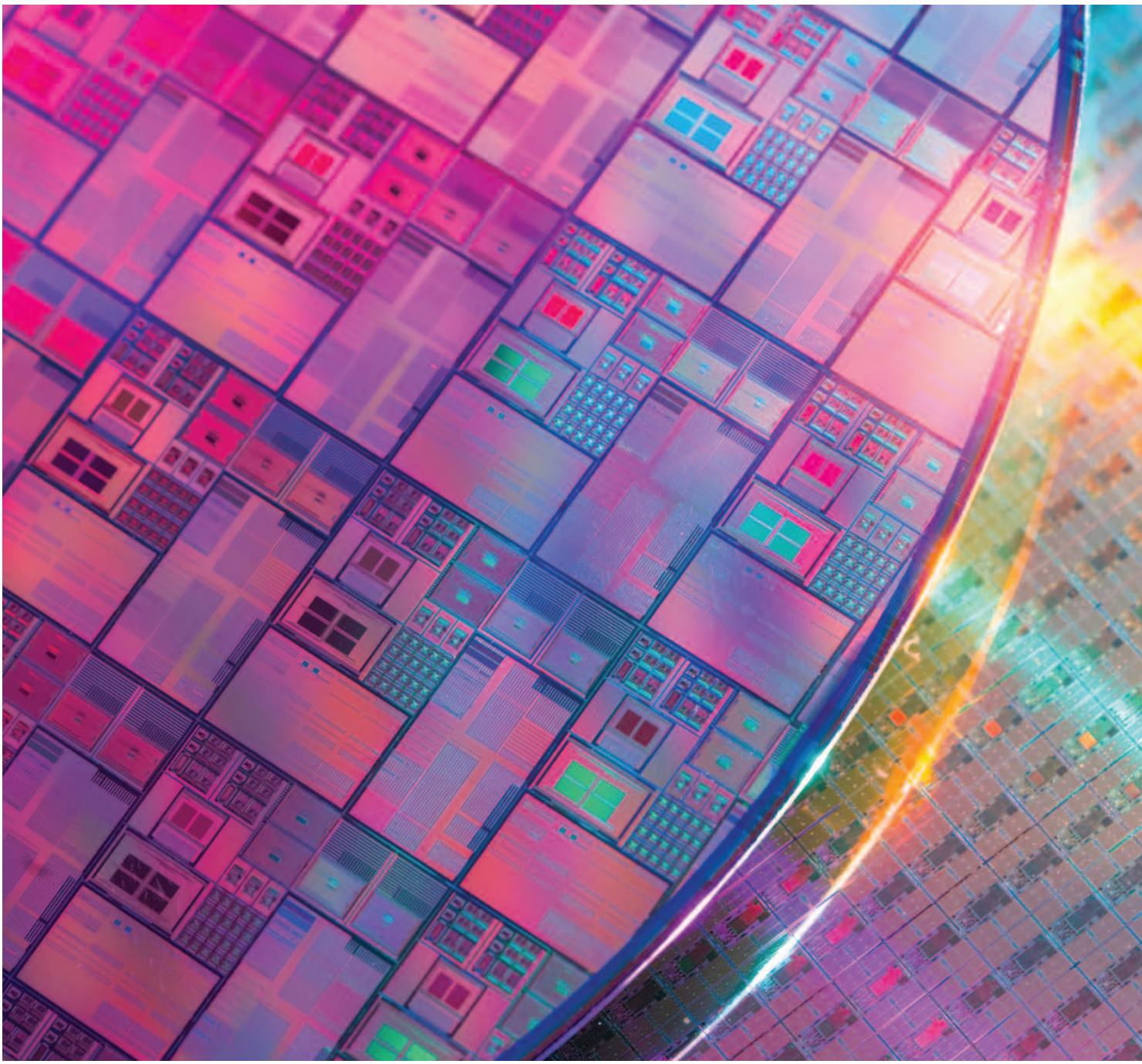
InvestHK
The Government of the Hong Kong Special Administrative Region

Deloitte.



Microelectronics *in* Hong Kong:

INNOVATE IN A WORLD-CLASS RESEARCH HUB AND ACCELERATE THROUGH THE GBA GATEWAY

Foreword

Global demand for microelectronics continues to grow at an unprecedented pace, driven largely by the proliferation of technology that is becoming increasingly connected, intelligent and autonomous. Hong Kong has played a vital role in advancing the research and development of microelectronics, with top researchers making distinctive breakthroughs in this blossoming industry. With its strategic location in the Greater Bay Area (GBA), Hong Kong connects one of the most comprehensive semiconductor value chains globally, which provides a platform for the end-to-end development of microelectronics.

Invest Hong Kong (InvestHK) and Deloitte are delighted to present this in-depth analysis of Hong Kong's microelectronics landscape. This report illustrates the breadth and depth of microelectronics research and development (R&D) and commercialisation resources in Hong Kong. The ecosystem is augmented by a network of best-in-class researchers, industry partners, start-ups, investors and the Hong Kong Government. The report also outlines the opportunities for businesses involved in the microeconomics value chain, in particular leveraging Hong Kong as a gateway to the GBA to access extended manufacturing capabilities and a larger customer base.

Deloitte professionals and industry experts used their rich experience and market research to generate this comprehensive analysis of Hong Kong's microelectronics ecosystem. We are grateful for the insights and perspectives contributed by stakeholders, all of whom have played vital roles in advancing Hong Kong's microelectronics sector.

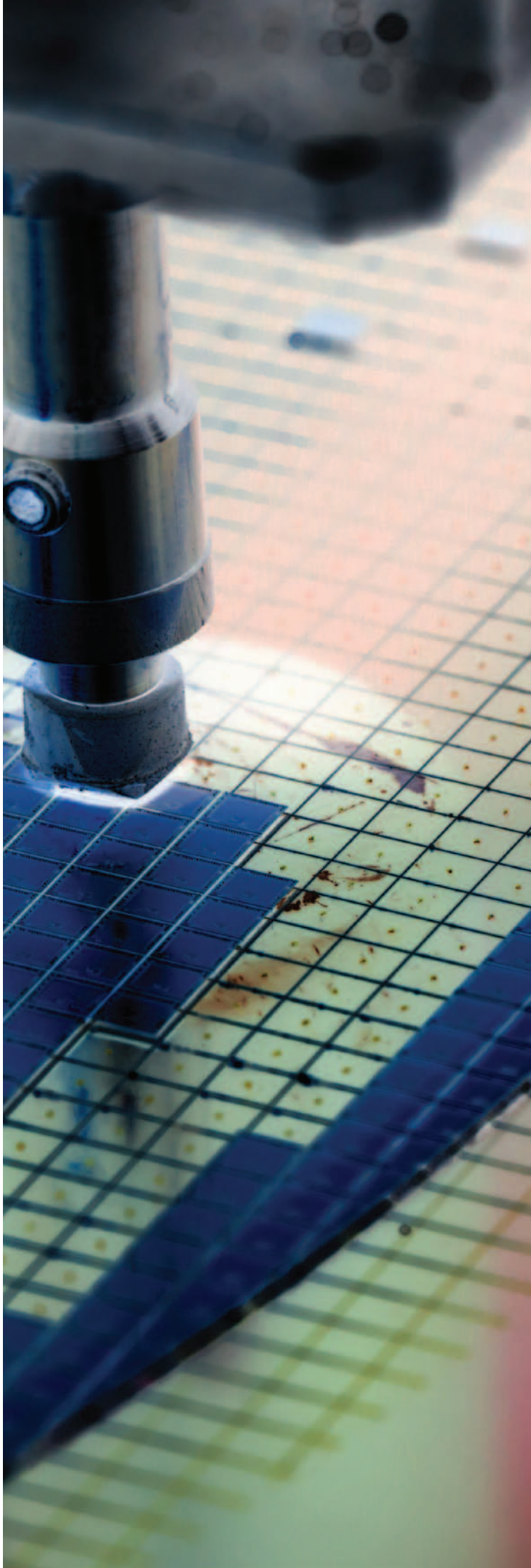
Introduction

With the rapid proliferation of consumer digital electronics and smart devices, microelectronics is becoming an increasingly vital part of the global economy. Applications of microelectronics have started to transcend industries such as automobiles and healthcare, which are racing to incorporate solutions powered by artificial intelligence (AI) to retain competitiveness. The semiconductor industry will play an even more prominent role in the next decade as the adoption of 5G, AI, and the Internet of Things (IoT) flourishes.

According to World Semiconductor Trade Statistics, the global semiconductor market was expected to reach USD553 billion in 2021, representing 25.6% year-on-year growth, the biggest advance since 11 years earlier.[1]

By 2030, the global semiconductor industry is expected to exceed USD1 trillion.[2] Amid surging global demand for integrated circuits[3] and the growing importance of the semiconductor sector; Asia Pacific countries are accelerating the pace of innovation, including R&D of semiconductor technologies. The Asia-Pacific region is forecast to hold 62% of global market share, led by South Korea, China, Taiwan (China), and Japan.[4]

The design and manufacture of semiconductors require deep technical know-how across a highly specialised global value chain. A typical semiconductor value chain spans R&D, design, fabrication, assembly and testing, and distribution. R&D plays a key role in advancing every component across the value chain.



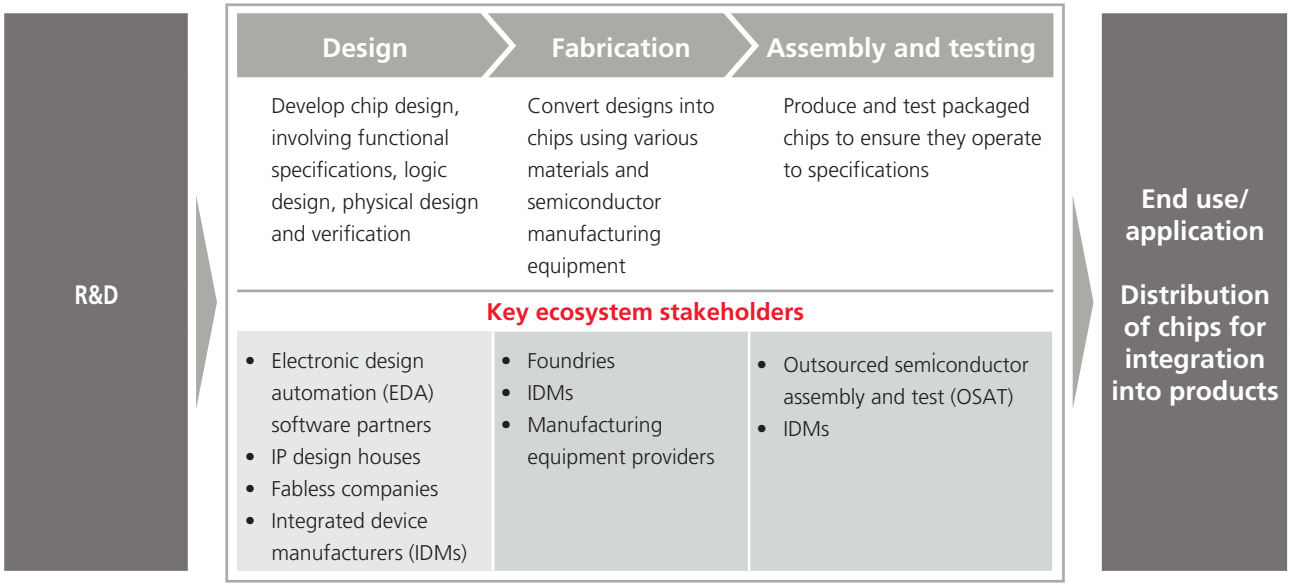
1 WSTS Semiconductor Market Forecast Fall 2021

2 Anchor of global semiconductor – Asia Pacific takes off (2021), Deloitte

3 Integrated circuit, also known as IC, microchip or chip

4 Anchor of global semiconductor – Asia Pacific takes off (2021), Deloitte

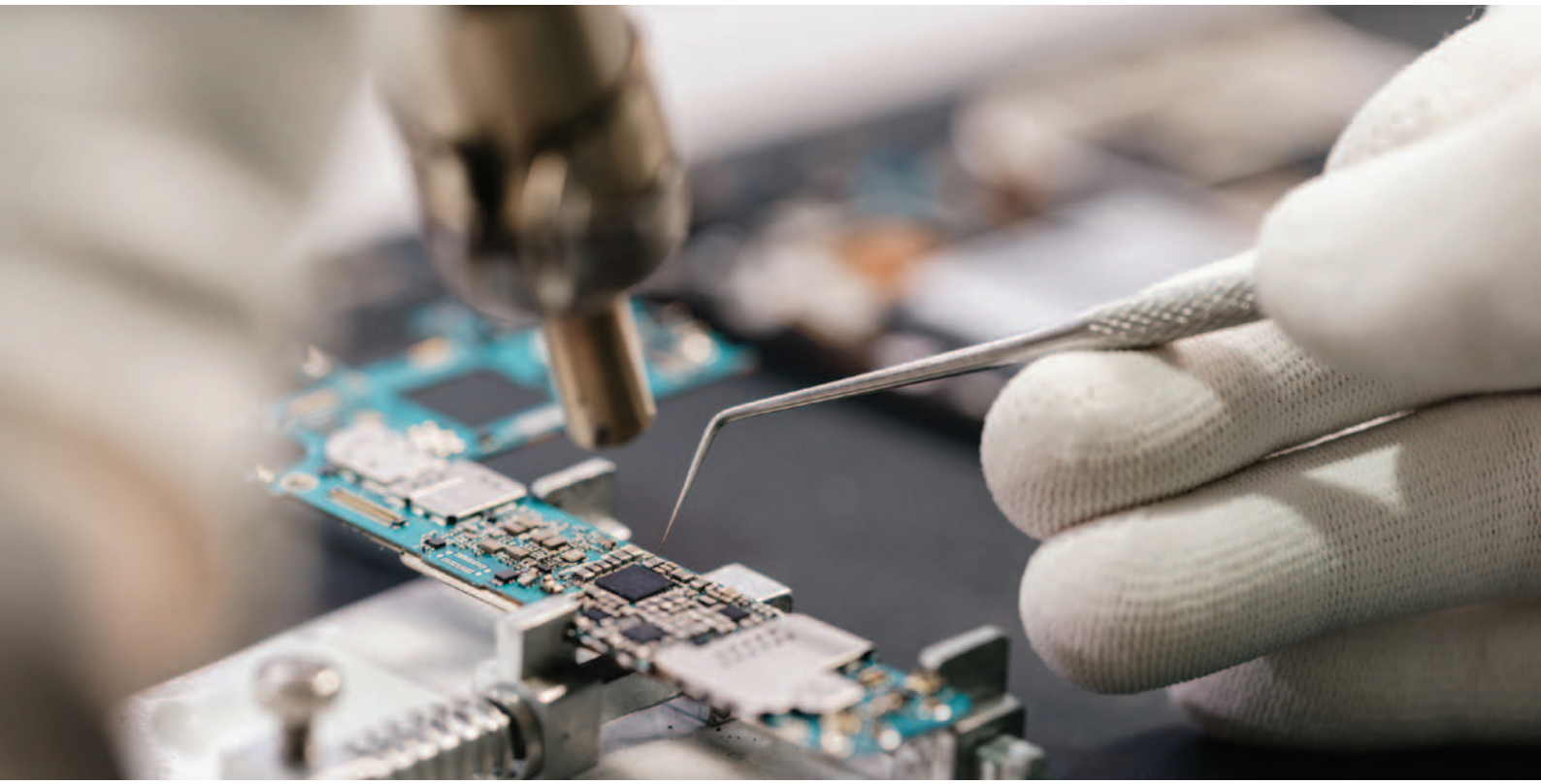
Semiconductor value chain



Source: Deloitte analysis

As the largest importer of chips, China is seeking to become more self-reliant by reinforcing its domestic semiconductor industry. The Chinese Government has introduced favourable policies and offered funding assistance to accelerate the achievement of this vision, as highlighted in the National 14th Five-Year Plan.

Under the plan, Hong Kong is earmarked for development into an international I&T hub. Hong Kong's world-leading research in microelectronics and competitive edge in the semiconductor value chain are the keys to accelerating business innovation in semiconductors.



Why Hong Kong?


P. 6

1 TOP NOTCH MICROELECTRONICS RESEARCH AND TALENT

First-class microelectronics research

Hong Kong has a highly concentrated cluster of international, world-leading microelectronics researchers. This community has achieved outstanding research breakthroughs across AI chip design, Electronic Design Automation (EDA), advanced packaging and silicon photonics.

Hong Kong also has a pool of microelectronics and science, technology, engineering and mathematics (STEM) talent that has risen through an exceptional education system that equips them with multilingual abilities and a global mindset to perform at an international level.

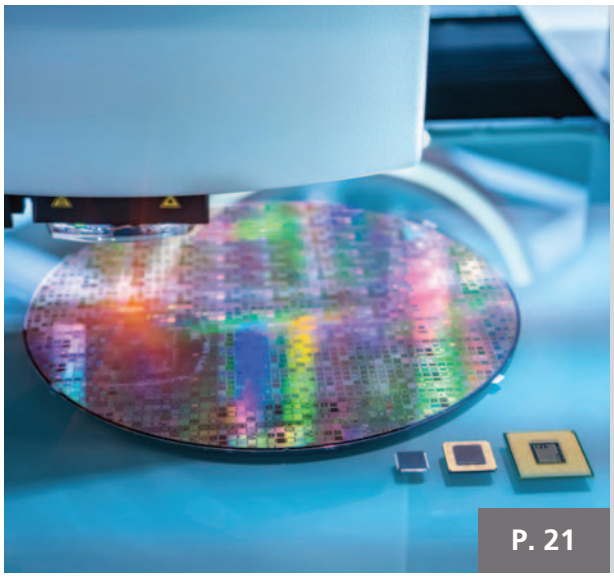
2 COLLABORATION IN APPLIED RESEARCH

Established mechanism to foster applied research and commercialisation

Hong Kong has a bustling applied research ecosystem, with the Nano and Advanced Materials Institute (NAMI) leading the way in materials-related research and the Hong Kong Applied Science and Technology Research Institute (ASTRI) renowned for its integrated circuit (IC) research achievements.

Co-funding programmes are available for corporations to collaborate with local research institutions on joint R&D.


P. 15


P. 21

3 ADVANCED INFRASTRUCTURE

Infrastructure and technical support to accelerate microelectronics innovation

Advanced microelectronics-specific infrastructure is available across a network of science parks, local universities, and government-backed centres in Hong Kong. The Microelectronics Centre (MEC) and Hong Kong-Shenzhen Innovation and Technology Park (HSITP) are set to provide further state-of-the-art facilities and support.

4 FUNDING SUPPORT

Ample funding programmes to support innovation and growth

Various government-established programmes are available to fund the growth of microelectronics-related businesses. These include programmes launched by the Innovation and Technology Fund (ITF) and accelerators and incubators offered by Cyberport, Hong Kong Science Park (HKSTP) and universities.

Hong Kong's private funding scene includes private equity funds, venture capital firms and family offices that actively fund the early, growth and expansion stages.


P. 26


P. 33

5 BUSINESS FRIENDLY ENVIRONMENT

Conducive business environment with dedicated business support and intellectual property (IP) protection

Hong Kong is a business friendly, livable, easily accessible international city with a sound legal and financial system. It is a free trade port and offers a low, simple and competitive tax system. Researchers and inventors can benefit from a strong IP protection regime.

Hong Kong also has a highly sophisticated professional services industry that operates to international standards, including legal services, financial services, IP services and business advisory support.

6 LAUNCHPAD TO NEW MARKETS

Close ties with the GBA and as a gateway to key international markets

Hong Kong enjoys proximity and a long history of close cooperation with Mainland China and international markets. As a leading global trading hub, Hong Kong is the world's largest ICs exporter, reaching USD153 billion in exported value in 2020.[5]

Hong Kong is strategically located within the GBA. Establishing a presence in Hong Kong opens opportunities to leverage the sophisticated manufacturing capabilities of the Mainland GBA cities.


P. 43

[5] International Trade Centre, list of exporters for the selected product in 2020 (electronic integrated circuits)

TOP-NOTCH MICROELECTRONICS RESEARCH AND TALENT

First-class microelectronics research

A wealth of world-leading researchers in microelectronics

Hong Kong attracts world-leading scholars and researchers focused on microelectronics, ranging from electronic design automation (EDA) and advanced packaging to silicon photonics. Many multidisciplinary collaborations by researchers and industry players have resulted in groundbreaking discoveries and innovations in application domains.

"The future of EDA is highly promising. With an array of professors and research academics working across various areas of this segment, Hong Kong has the talent network to lead EDA development."

Prof. Martin Wong
Dean of Engineering,
The Chinese University of Hong Kong

"The Hong Kong microelectronics research ecosystem continuously strives to advance the capabilities of the sector through high-impact research. This holds true for the Integrated Photonics field, and we are honored that our work has been recognised globally and played a part in shaping the industry's application and understanding of the subject."

Prof. Kei May Lau
Chair Professor of Department of Electronic and Computer Engineering,
Hong Kong University of Science and Technology

1st	5	20th	30th	68	120+
in EDA-related research among world's top computer science institutions[6]	of the world's top-100 universities[7]	in computer science[7]	in electrical & electronic engineering[7]	electrical & electronic engineering scholars ranked in the world's top 2% of scientists[8]	Institute of Electrical and Electronics Engineers (IEEE) fellows at Hong Kong universities and R&D centres[9]

6 CSRankings 2021

7 QS World University Ranking 2021

8 World's Top 2% Scientists in 2021 released by Stanford University. Sixty-eight Hong Kong-based scientists in Electrical & Electronic Engineering listed in the top- or second-ranked category using career data. Based on "Updated science-wide author databases of standardised citation indicators" (August 2021).

9 The IEEE Fellowship is a distinction reserved for select IEEE members whose extraordinary accomplishments in any IEEE field of interest are deemed fitting for this prestigious grade elevation. The number of fellowship recipients each year does not exceed 0.1% of the total voting IEEE membership.

University ranking by subject

	Electrical and Electronic Engineering		Computer Science and Information	
University[10]	QS (2021)[11]	THE (2022)[12]	QS (2021)	THE (2022)
HKUST	20	28	30	26
HKU	36	42	43	41
CUHK	50–100	50–100	31	39
CityU	50–100	50–100	50–100	50–100
PolyU	50–100	50–100	100–150	50–100

Hong Kong's top five universities have consistently ranked amongst the top 100 universities worldwide. Hong Kong universities have demonstrated success in developing top talent who have gone on to be leaders in their fields, particularly in advanced science and technology.

"Hong Kong has one of the highest academic densities within the semiconductor field. The range of labs conducting groundbreaking research is extensive, which attracts many international scholars. Moreover, the top industry players from Mainland China are beginning to establish research teams in Hong Kong, having recognised the remarkable quality of talent available. Hong Kong's attractiveness as a microelectronics research hub will be further elevated with the upcoming launch of the Microelectronics Centre, which is equipped with cleanroom facilities."

Prof. Philip Chan
Former Deputy President, PolyU
Honorary Chairman, Vice-convener, Semiconductor Nanotechnology Alliance

"The microelectronics research talent pool in Hong Kong is highly commendable, with leading experts across EDA design, advanced packaging such as 3D-IC, and new materials research, among others. There is also the exciting potential for industry players in Hong Kong to leverage the research expertise of academics to advance technologies. Industry players can communicate the technological advancements required to improve their work on collaborative research projects with academics."

Prof. Lance Li
Chair Professor of Mechanical Engineering,
The University of Hong Kong

[10] The University of Hong Kong (HKU), The Hong Kong University of Science and Technology (HKUST), The Chinese University of Hong Kong (CUHK), City University of Hong Kong (CityU) and The Hong Kong Polytechnic University (PolyU)

[11] QS World University Rankings 2021

[12] Times Higher Education (THE) World University Rankings 2022

Semiconductor Nanotechnology Alliance (SNA)

"Here in Hong Kong, we pride ourselves on the presence of a strong international microelectronics talent base, many of whom have made notable contributions to the semiconductor industry. SNA aims to promote open collaboration between this academic community, industry players and public bodies to ignite further meaningful research output."

Meikei Ieong
Founding Chairman,
Semiconductor
Nanotechnology Alliance

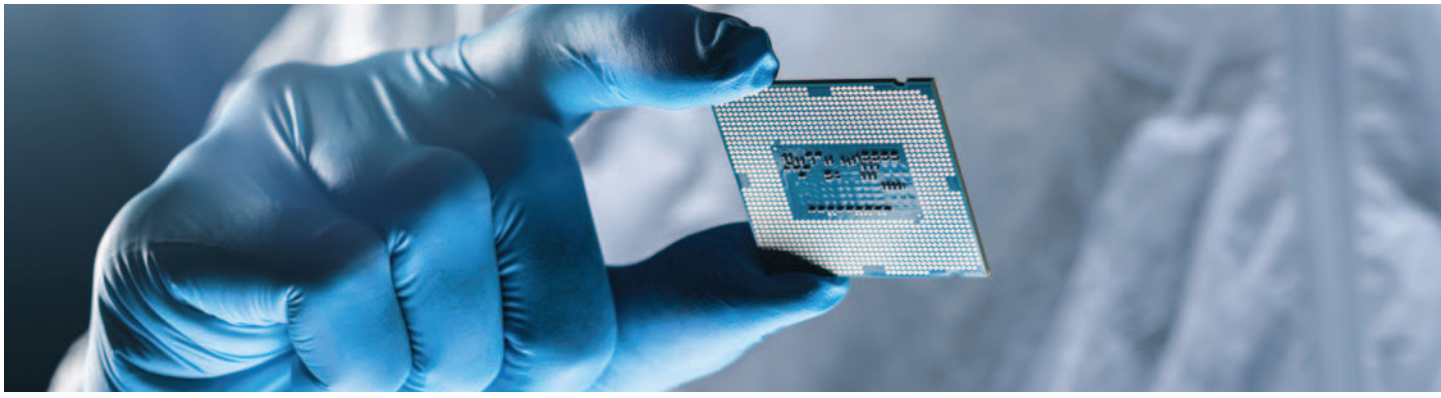
SNA was established in August 2021, with its launch officiated by Alfred Sit, Former Secretary for Innovation and Technology of the Innovation and Technology Bureau, and Zhi Ming Liu, General Manager of the Beijing-Hong Kong Exchange of Personnel Centre.

SNA promotes research and innovation in micro- and nano-electronics by encouraging open collaboration among academia, industry and public bodies, and facilitating commercialisation and venture formation through strategic networks.

It also serves as a global platform for sharing the latest technologies and best practices, and promotes the application of micro- and nano-technologies for society. In August 2021, SNA organised the three-day Microelectronics Technologies Forum where multiple world-leading scholars, industry pioneers, entrepreneurs and global investors shared their views on the latest IC trends, technologies and business opportunities. More than 700 participants from over 20 countries attended the event.

"SNA has compiled a list of microelectronics and semiconductor related research efforts by researchers in Hong Kong. This includes areas such as EDA, advanced packaging, integrated photonics and advanced logic. With this consolidated view of Hong Kong's microelectronics research scene, SNA hopes to find overlaps between potential research outputs and industry requirements"

Ming Yam Wong
Honorary Chairman, Convener,
Semiconductor
Nanotechnology Alliance



SNA, in collaboration with more than 50 well-known field experts and industry leaders, recently issued a microelectronics whitepaper outlining the key competencies and advanced technologies of local universities and technology companies. Hong Kong universities are pioneers in several fields of microelectronics research:

ADVANCED PACKAGING AND 3D IC

Advanced electronic packaging research focusing on heterogeneous integration technology and associated performance and reliability issues

ELECTRONIC DESIGN AUTOMATION (EDA)

Research expertise engaged across all stages of chip design flow, including design space reduction and exploration, logic synthesis, placement, routing, testing, verification and manufacturing

EMERGING MEMORY

Innovation centred on the design of materials, device, circuit and architecture for various emerging memory technologies such as RRAM, MRAM, NAND and PCM

IC DESIGN

Specialising in the research, design and development of IC and system solutions, spanning analog IC, digital IC, RF IC, smart sensors, power management, reconfigurable computing systems and VLSI system

INTELLIGENT WEARABLES

Leveraging multidisciplinary collaboration to innovate intelligent wearable technology used for many applications such as apparel, healthcare, robotics and sports

IN-MEMORY COMPUTING

R&D focusing on architecture and memory design for in-memory computing used in image classification, speech recognition, graphic computing and content search

META-DEVICES

Collaborative research from metamaterials, metasurfaces and nanophotonics for the development of meta-devices to be used in a wide range of applications

NANOPATTERNING

Leveraging cleanroom and other advanced facilities at universities, innovating flexible and large-scale nanopatterning technologies to fabricate integrated devices for an array of applications

SCALING OF SEMICONDUCTOR DEVICES

Technology innovations to extend the size and performance of scaling of logics in three key areas: lateral scaling, monolithic scaling and system scaling

SILICON PHOTONICS

Expertise in designing state-of-the-art silicon photonics integrated circuits and using university cleanroom facilities for research device fabrication

WIDE BAND GAP MATERIALS – SiC AND GaN

Focusing on various aspects of GaN and SiC devices and IC innovations including device structure design and simulation, process development, characterisation and testing, and circuit design

AI Chip Center for Emerging Smart Systems (ACCESS)

Hong Kong is on the global map for AI chip design. Founded by HKUST in September 2020, the AI Chip Center for Emerging Smart Systems (ACCESS) brings together world-leading experts in AI chip design, producing cutting-edge research results and successful technology transfer for societal impact. It also offers customised chip design and software-hardware co-designed solutions to technology start-ups and smaller-sized companies.

ACCESS is a multi-disciplinary centre formed by world-leading universities, including HKUST, Stanford University, HKU and CUHK. Its main aims are to improve AI hardware performance and energy efficiency 1,000 fold and accelerate AI chip design processes with greater design productivity and shorter time-to-market.[13]

Since receiving initial funding of HKD443.9 million from the government as part of the InnoHK initiative, ACCESS has grown to include more than 100 researchers supervised by 36 academics. It also maintains close partnerships with application and system industry players. Moreover, ACCESS fully integrates the R&D process, bridging the gap between research and impact.

ACCESS has launched 14 research projects, with additional projects in the pipeline. Its current R&D focus areas include IC design, nano electronics and emerging devices, design methodology and EDA, architecture, embedded and reconfigurable systems, and AI or machine learning and applications. Most excitingly, ACCESS projects have brought two brand-new AI chip prototypes to the evaluation and product analysis stage.

Selected research work now underway at the Centre includes:

- Exploring the integration of silicon-compatible emerging memory and photonic technologies with scaled silicon chips
- Novel memory-centric chip architecture and integration of heterogeneous systems
- Development of new design methodologies and design automation tools dedicated to designing AI chips
- AI application-algorithm-and-hardware co-optimisation to achieve breakthroughs in the speed and energy efficiency of AI hardware

"ACCESS represents a golden opportunity for top talent across the globe to work together to advance the development of chips for AI applications. It also provides a platform for technological transfer to industry players who can use these advanced technologies to design new products. We are pleased to acknowledge the overwhelming responses to this initiative we have received from industry players, and look forward to the future potential of ACCESS."

Prof. Tim Cheng
Chair Professor and Vice-President for Research and Development,
Hong Kong University of Science and Technology
Director of AI Chip Center for Emerging Smart Systems (ACCESS)

[13] HKUST Establishes Asia's first Transnational R&D Consortium on AI Chip Design (November 30, 2021), HKUST

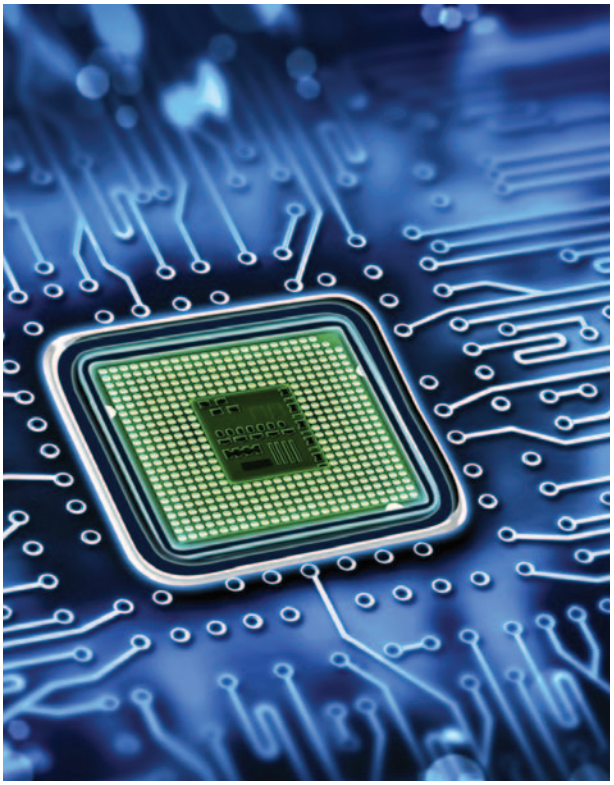
Highly skilled STEM graduates and talent[14]

Multilingual population

A majority of Hong Kong talent are trilingual, having business proficiency in Cantonese, English and Putonghua. In addition, English is the main medium of instruction at top universities, making it easy for foreign talent to study and conduct research activities in Hong Kong.

Amongst the most culturally diverse universities globally

HKU has been ranked 1st and CUHK 3rd in the list of the world's most international universities.[15] The multicultural environment in Hong Kong fosters a diverse, inclusive culture that is one of the key drivers of innovation.



High microelectronics talent readiness

Hong Kong's highly skilled workforce is organised globally. In 2021, its talent pool ranked 1st globally in the percentage of graduates from science disciplines[16] and talent readiness.[17]

There are about 1,000 fresh electrical and electronics engineering graduates from Hong Kong's top universities as of Q1 2022.[18]

[14] STEM refers to science, technology, engineering and mathematics

[15] Times Higher Education Most International Universities in the World 2021

[16] Scientific disciplines include ICT, engineering, mathematics and natural sciences

[17] IMD World Talent Ranking 2021

[18] Estimate based on admissions information from HKU, HKUST, CityU, CUHK and PolyU as of Q1 2022

Tap into the global talent pool

Hong Kong continues to encourage inflows of research talent. Through the Technology Talent Admission Scheme (TechTAS), companies in selected sectors can hire and secure R&D talent from overseas and Mainland China more quickly with fast-track visa applications. The selected sectors include AI, Biotechnology, Cybersecurity, Robotics, 5G, IoT and microelectronics.

Scan the QR code to discover more about the Technology Talent Admission Scheme

The Global STEM Professorship Scheme offers competitive remuneration packages and subsidies to world-renowned I&T researchers.

Hong Kong universities have a close collaborative relationship with other tertiary institutions in the Mainland GBA cities. Five universities (HKUST, HKU, CUHK, CityU and PolyU) have established research institutes in the Mainland GBA cities and will open branch campuses in cities including Shenzhen, Guangzhou, Dongguan and Foshan. This has helped promote cross-border R&D collaboration, making it easier for Hong Kong companies to tap the talent pool in the GBA.

ASM Pacific Technology — Hong Kong, an international microelectronics hub with exceptional R&D and talent

Case study

Founded in 1975 in Hong Kong, ASM Pacific Technology Limited (ASMPT) is a global integrated solutions provider in the semiconductor and electronics industries, providing leading-edge solutions from carriers for chip interconnection and chip assembly and packaging to Surface Mount Technology. The company is headquartered in Singapore.

ASMPT's packaging and assembly solutions can be deployed across a wide range of end-uses including the electronics, mobile communications, automotive, industrial and LED industries. The company invests heavily in research on innovative, cost-efficient solutions, providing customers outcomes that have higher productivity, greater reliability and enhanced quality.

"As a company with deep roots in Hong Kong, ASMPT has been consistently dedicated to R&D and supporting Hong Kong's I&T development. A large proportion of our Hong Kong team are involved in R&D."

Peter Ng
Vice President, Technology,
ASM Pacific Technology

In 2019, ASMPT opened new facilities in Tsing Yi, Hong Kong. This includes an Innovation Centre, which occupies more than 300,000 square feet. ASMPT's Hong Kong R&D centre is also the largest of its R&D centres around the globe.
Outside Hong Kong, ASMPT also has three manufacturing facilities in the GBA, employing thousands more people.[19]

"The boom in the consumer electronics market has led to a strong demand for microelectronics in Southern China. Hong Kong's unparalleled expertise in R&D makes it well positioned to develop leading-edge technologies and innovations that can meet demand in Southern China. These technologies can subsequently go into high volume manufacturing using the strong supply chain capabilities of the GBA."

ASMPT has been listed on the Hong Kong Stock Exchange since 1989, and is one of the constituent stocks on the Hang Seng TECH Index, Hang Seng Composite MidCap Index under the Hang Seng Composite Size Indexes, the Hang Seng Composite Information Technology Industry Index under Hang Seng Composite Industry Indexes and the Hang Seng HK35 Index. To learn more about ASMPT, please visit us at https://www.asmpacific.com/.

[19] ASM Pacific Technology celebrates opening of new Hong Kong office at Tsing Yi (6 May 2019), ASM Pacific Technology

COLLABORATION IN APPLIED RESEARCH

Established mechanism to foster applied research and commercialisation

R&D centres

There are five government-established research centres in Hong Kong conducting applied R&D.

AUTOMOTIVE PLATFORMS AND APPLICATION SYSTEMS R&D CENTRE (APAS)
Focused on automotive, in particular green transportation, smart mobility, and intelligent systems

HONG KONG APPLIED SCIENCE AND TECHNOLOGY RESEARCH INSTITUTE (ASTRI)
Focused on smart city, financial technologies, intelligent manufacturing, digital health and application specific ICs

HONG KONG RESEARCH INSTITUTE OF TEXTILES AND APPAREL (HKRITA)
Focused on high value-added manufacturing and servicing activities for the textiles and fashion industry

LOGISTICS AND SUPPLY CHAIN MULTITECH R&D CENTRE (LSCM)
Focused on logistics, supply chain management and e-Commerce

NANO AND ADVANCED MATERIALS INSTITUTE (NAMI)
Focused on nanotechnology and advanced materials for applications in construction, electronics, energy, environmental and healthcare

In microelectronics-related research, ASTRI and NAMI are the key contributors. Moreover, ASTRI has a co-innovation alliance with Shenzhen's Micro & Nano Institute to foster microelectronics-related collaboration.

Hong Kong Applied Science and Technology Research Institute (ASTRI)

ASTRI focuses on applied research initiatives relating to information and communications technologies in collaboration with industry players and the public sector. It has developed a portfolio of IP across various industries and sectors, and has been granted more than 900 patents in Mainland China, the US and elsewhere.[20]

Application Specific Integrated Circuits (ASIC) is one of the five application focuses for ASTRI. Its research concentrations include packaging, mixed signal systems and advanced digital systems through its role as the Hong Kong branch of the Chinese National Engineering Research Centre (CNERC).

ASTRI is also involved in national semiconductor related development, taking part in the compilation of China's third-generation semiconductor power electronics roadmap and organising 2021's Advanced Semiconductor Innovation and Development Conference, which brought together well-known experts to discuss ways of fostering R&D collaborations and new applications of advanced semiconductors in the GBA.

"Application-specific IC is among the five core priority areas for ASTRI. As part of efforts to advance research in microelectronics and IC, the Hong Kong Branch of CNERC was established within the infrastructure of ASTRI. To date, ASTRI has developed multiple solutions that are being applied in sectors including smart manufacturing, smart city, financial technologies and next-gen networks solutions."

Lucas Hui
Chief Technology Officer, Hong Kong Applied Science and Technology Research Institute

[20] ASTRI – Patents

Nano and Advanced Materials Institute (NAMI)

NAMI is dedicated to the R&D of nanotechnology and advanced materials in Hong Kong, through active collaboration with industry, government and public organisations. With electronics as one of its R&D focus areas, NAMI is committed to market-driven research on materials for wearable electronics, high power and new generation display electronic devices. The core platform technologies NAMI is currently working on include battery technologies, thermal management materials, printed sensors and optical materials.

"At NAMI, we collaborate with industry players to drive applied R&D projects related to nanotechnology and advanced materials. We have a strong portfolio of innovative technologies, with electronics one of our key focus areas. To highlight one of our major accomplishments, we successfully integrated highly thermal conductive carbon fibres into silicone to form an effective thermal interface composite material. This technology plays an essential role in the use of next-generation 5G wireless communications."

Ivan Sham
Chief Commercial Officer,
Nano and Advanced Materials Institute

University Technology Transfer Offices

Many universities in Hong Kong have established technology transfer or knowledge transfer offices to facilitate the commercialisation of research output generated by their research labs. The range of services offered include connecting the research community with industry players, managing activities related to intellectual property, promoting entrepreneurship activities and marketing the university's available technologies. These initiatives allow industry players to leverage various leading-edge technologies and benefit from Hong Kong's rich research expertise.

Technology transfer offices of selected universities in Hong Kong

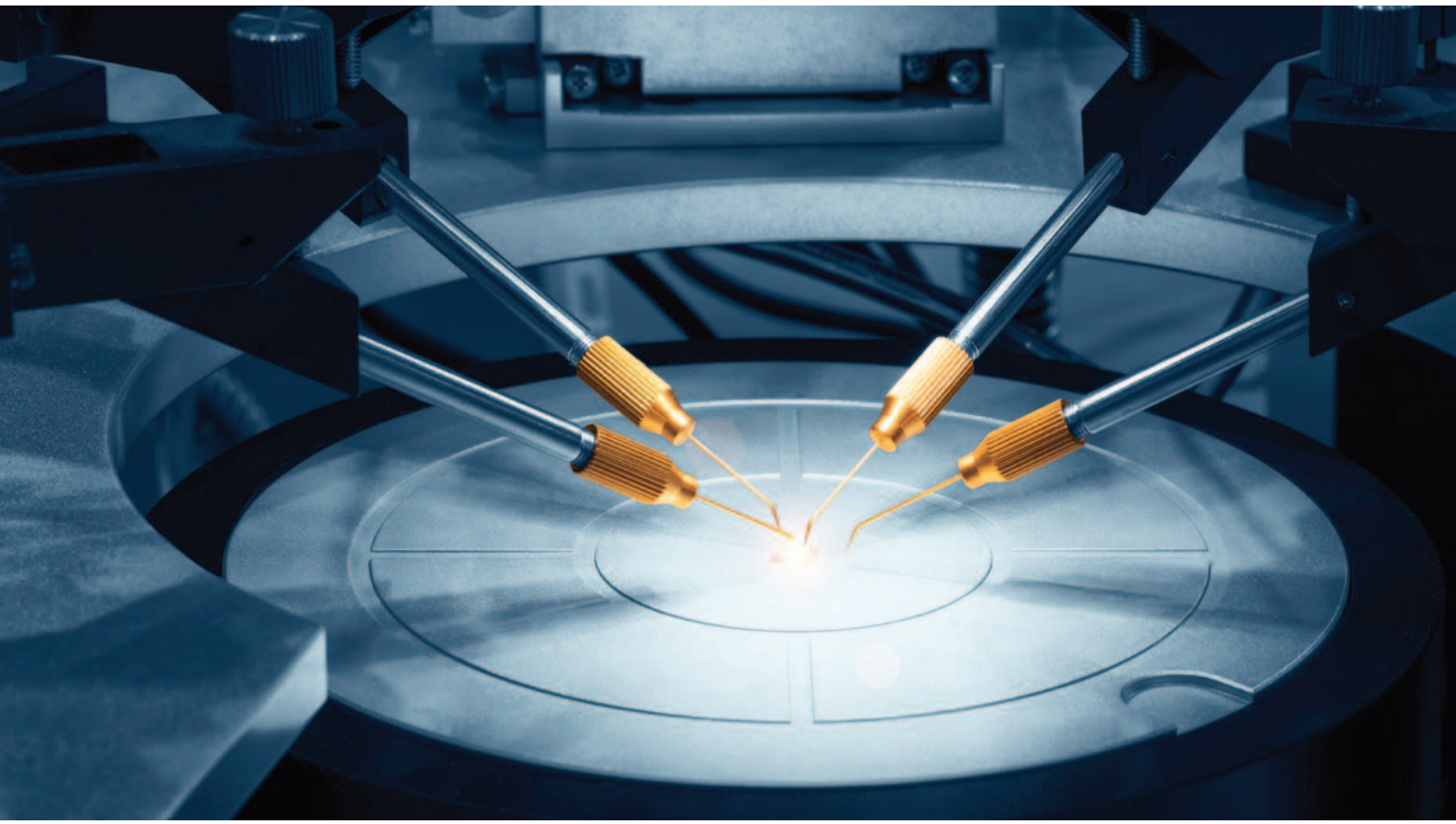
HKU Technology Transfer Office
Number of patents filed:
c.1,500

HKUST Technology Transfer Centre
Number of patents filed:
c.1,760

CUHK Office of Research and Knowledge Transfer Services
Number of patents filed:
> 1,400

PolyU Knowledge Transfer and Entrepreneurship Office
Number of patents granted:
c.1,083

CityU Knowledge Transfer Office
Number of patents filed:
c.1,100

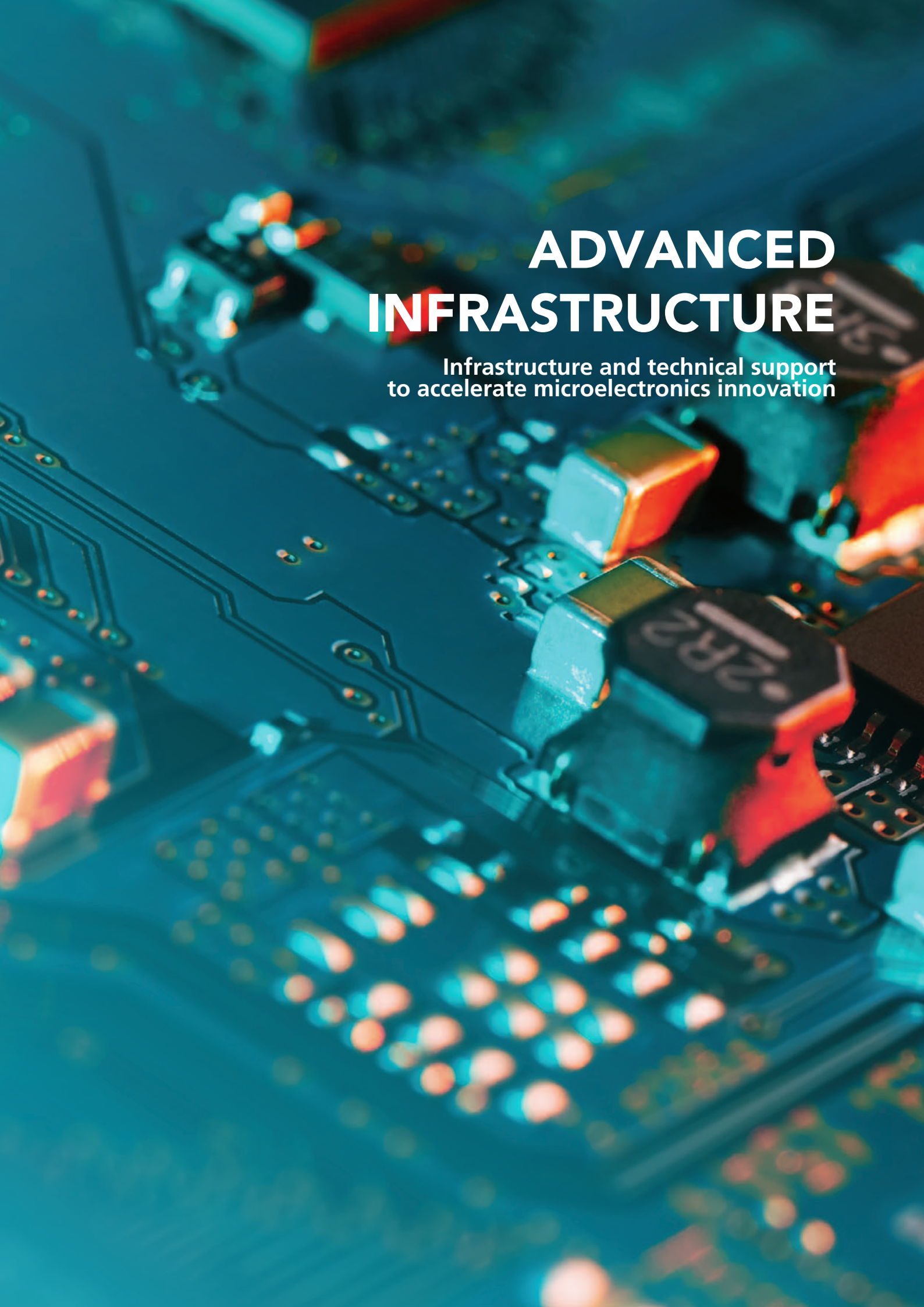


Co-funding programmes hosted by the Innovation and Technology Fund[21]

The Hong Kong Government provides co-funding programmes to promote collaboration on applied R&D projects. Through these programmes, industry players can partner with local research institutions (local public research institutes or R&D centres). Industry players are eligible for different IP rights based on the level of funding provided.

Project type	Funding from industry player as a % of total project cost	Benefits to industry player
Collaborative	At least 50% to a local public research institute or R&D centre	Own the resulting IP
	30%–50% to R&D centre	Granted exclusive rights to use the IP for a limited time
Platform	At least 10% to a local public research institute or R&D centre	IP rights belong to the local research institution, which will disseminate or transfer the knowledge to relevant parties

[21] Innovation and Technology Fund – About the Innovation and Technology Fund

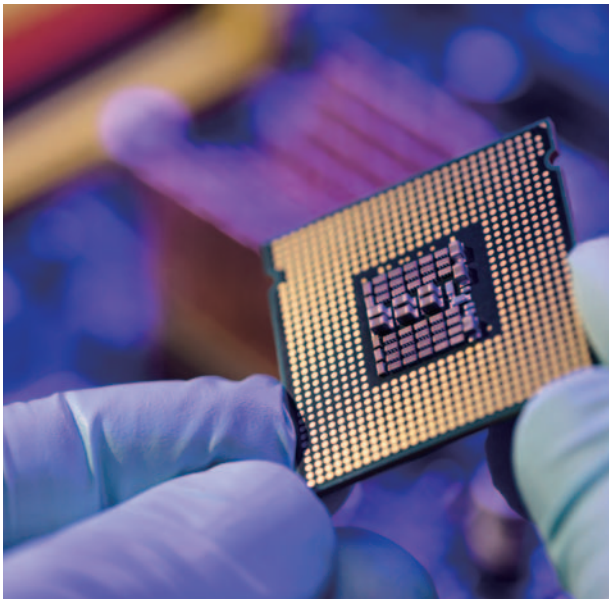


ADVANCED INFRASTRUCTURE

Infrastructure and technical support to accelerate microelectronics innovation

Facilities and services to support semiconductor research, fabrication and testing

Offered by various government bodies, local universities and organisations, Hong Kong has a wealth of facilities that enable companies to conduct the R&D and testing that is required to turn initial microelectronics concepts into concrete final outputs without incurring heavy machinery costs. Given Hong Kong's growing expertise in microelectronics, the Hong Kong Government has invested additional resources into expanding this network of facilities, including the recently launched Sensor Lab 2.0 and the upcoming Microelectronics Centre (MEC) established by HKSTP.



HKSTP's Sensor Packaging and Integration Laboratory — a dedicated hardware hub supporting full R&D processes, micro or nano sensors

The Sensor Packaging and Integration Laboratory (Sensor Lab) was established in 2017 by HKSTP to support industry players and researchers throughout the R&D processes of micro or nano sensors and associated devices, including sensor chip and devices fabrication and pilot runs, packaging and testing.[22]

In March 2021, Sensor Lab 2.0 (the next phase of Sensor Lab) was launched by HKSTP in collaboration with leading global industry partners Arrow Electronics (Arrow) and Analog Devices Inc. (ADI) to further expand infrastructure and facilities and enhance support to elevate the development and deployment of advanced sensor products and solutions.[23]

Available facilities and support at Sensor Lab (non-exhaustive):

- 10,000 square feet of cleanroom space (Class 100/1,000/10,000) for research and product development
- Equipment to support wafer-level processes (pre and wet processes, etching, packaging), die and chip-level processes (preparation and packaging), testing and characterisation
- Dedicated support and training from HKSTP and partners on go-to-market and business expansion strategies

[22] HKSTP – Sensor Packaging and Integration Laboratory

[23] HKSTP's Sensor Lab 2.0 signals HK's growing microelectronics and reindustrialisation drive (5 March 2021), HKSTP

State-of-the-art Microelectronics Centre (MEC)[24]

The HKD2 billion MEC facility, which is due to be launched in 2023, will be dedicated to the development and manufacture of electronics and communications products including advanced semiconductors, smart sensors, electronics and smart power devices. The two-story centre with a gross floor area of 36,180 square metres is under construction at HKSTP's Yuen Long InnoPark. It will be fully equipped with state-of-the-art facilities including high standard super-clean rooms, dangerous goods storage spaces and shared laboratories for testing and certification. The centre will also provide shared workspaces, offices and conference rooms to create an integrated ecosystem.

"HKSTP is in full support of the development of the microelectronics industry in Hong Kong. From research, innovation to commercialisation, we facilitate and accelerate the growth of the whole value chain of this sector in Hong Kong with our advanced testing labs, sophisticated production infrastructures and a full range of value-added services.

Our newly built Advanced Manufacturing Centre and the soon-to-be-completed Microelectronics Centre are dedicated state-of-the-art facilities providing smart manufacturing settings to support the translation of research results into marketable products and services. Microelectronics research commercialisation has been one of our renowned strengths over the past decades. We are determined to continue this tradition and welcome innovators and industrialists from around the world to join us."

H.L. Yiu
Head of Re-industrialisation,
Hong Kong Science &
Technology Parks Corporation

[24] Latest Development of the Hong Kong Science Park and Industrial Estates (2021), Legislative Council Panel on Commerce and Industry

Hong Kong-Shenzhen Innovation and Technology Park (HSITP)

HSITP, a brand new, I&T-focused science park, is being established as part of the Northern Metropolis Development Strategy.

Microelectronics will be one of its key target areas, and with the park's strategic location at the Lok Ma Chau Loop bordering Shenzhen, microelectronics businesses can tap into the extensive microelectronics supply chain and addressable market offered in the Mainland GBA cities.

"We are excited to be establishing the Hong Kong-Shenzhen Innovation and Technology Park at the Lok Ma Chau Loop in the Northern Metropolis, which is commissioned to strengthen collaboration between the I&T communities in Hong Kong and Shenzhen. Microelectronics is one of the key focus areas of the Park, in addition to healthcare technologies, big data and AI, robotics, new materials and fintech."

Patrick Siu
CEO,
Hong Kong-Shenzhen Innovation and Technology Park

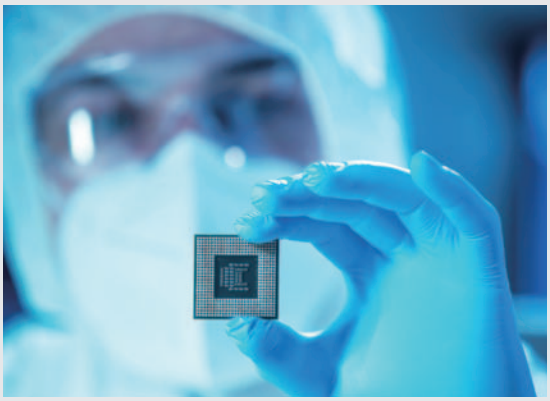
Accredited testing facilities dedicated to electronics

Hong Kong has a highly reputable and robust accreditation system. It offers a wide range of lab testing and product certification services, through 770 private independent establishments engaging in testing, inspection and certification.[25]

The Hong Kong Productivity Council (HKPC), as a statutory body serving the industry, offers support services through its testing facilities, which are accredited by the Hong Kong Accreditation Service (HKAS) under the Hong Kong Laboratory Accreditation scheme (HOKLAS). Its service centres and testing facilities dedicated to electronics and electric technologies include:

Reliability Testing Centre

Provides components, Printed Circuit Board (PCB) and PCB assembly reliability testing and consultancy



Advanced Electronics Processing Technology Centre

Provides services for electronics manufacturing, including small batch prototype assembly, materials analysis and green product design, surface mount accuracy and stability testing, consultancy and training

Electromagnetic Compatibility Centre

Offers full compliance testing services according to various national and regional standards, and pre-compliance testing to help manufacturers achieve compliance during the design stage

[25] Hong Kong Council for Testing and Certification – Profile and Role of Testing and Certification Sector

FUNDING SUPPORT

Ample funding programmes to support innovation and growth

Innovation and Technology Fund (ITF)

The ITF is a fund administered by the Innovation and Technology Commission of the Hong Kong Government to promote innovation and increase the technological level of businesses in Hong Kong. ITF hosts multiple funding programmes, including initiatives to support R&D, facilitate technology adoption and promote technology start-ups.

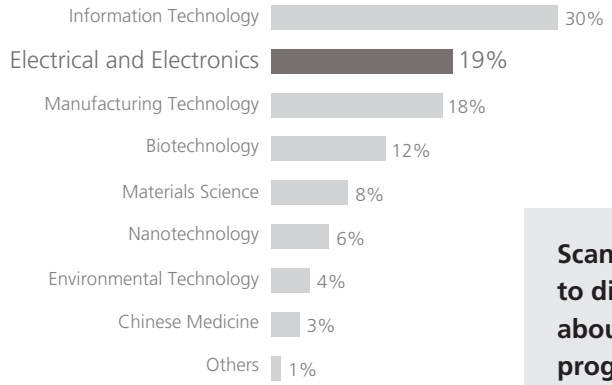
Within R&D support, two types of projects promote research-industry collaboration: platform projects (at least 10% industry sponsorship) and collaborative project (at least 50%, or at least 30% for R&D centre projects) industry sponsorship, with the industry participant receiving IP rights.

Available funding programmes or schemes provided by ITF

Purpose	Initiative	Overview of initiative
Supporting R&D	Innovation and Technology Support Programme (ITSP)	• Supports applied R&D projects by R&D centres, universities and other designated local public research institutes • Seed projects are given a maximum support of HKD2.8 million if undertaken by R&D centres, and HKD1.4 million for other applicants
	Mainland-Hong Kong Joint Funding Scheme (MHKJFS)	• Supports platform and collaborative R&D projects with an element of Mainland and Hong Kong cooperation
	Guangdong-Hong Kong Technology Cooperation Funding Scheme (TCFS)	• Supports platform and collaborative R&D projects that involve cooperation between Hong Kong and Shenzhen or Guangdong
	Partnership Research Programme (PRP)	• Provides matching funding support for R&D centres or designated local public research institutes for collaborative R&D projects
	Enterprise Support Scheme (ESS)	• Provides matching funding support to local companies for R&D work • Maximum funding support of HKD10 million per project
	Research and Development Cash Rebate Scheme (CRS)	• Provides a 40% cash rebate on eligible expenditure on R&D projects funded by the ITF or projects conducted through partnerships with designated local public research institutes
Facilitating Technology Adoption	Technology Voucher Programme (TVP)	• Supports local businesses to adopt technological services and solutions to enhance their business processes • Maximum funding per enterprise or organisation of HKD600,000
	Re-industrialisation Funding Scheme (RFS)	• Provides manufacturers with subsidies (1 government: 2 company) to establish new smart production lines • Maximum funding support per project is the lower of one-third of the total approved project cost or HKD15 million

About 19% of approved ITF projects are related to electrical and electronics research, indicating the government's strong support for the sector.

Approved ITF projects across technology areas[26]



Scan the QR code to discover more about ITF funding programmes

[26] Innovation and Technology Fund – ITF Statistics (as of January 31, 2022)

Accelerator and incubation support for start-ups

Hong Kong has a wide range of accelerators and incubation programmes available through HKSTP, Cyberport, universities and private organisations. Additionally, StartmeupHK[27] provides a one-stop platform for founders of innovative and scalable start-ups from overseas and Mainland China to establish businesses or expand in Hong Kong.

HKSTP programmes

HKSTP offers four main incubation and accelerator programmes to start-ups at various business stages. The programmes offer comprehensive services including funding, R&D support, mentorship and investor matching. Start-ups also have access to specialised labs, meeting venues and other facilities within HKSTP.

Scan the QR code to discover more about incubation programmes at HKSTP

	Ideation	Incubation	Acceleration	Elite
Period	1 year	3 years (general start-ups); 4 years (biotech start-ups)	2 years	3 years
Funding and support	Up to HKD100,000	Up to HKD1.3 million (general start-ups); up to HKD6 million (biotech start-ups)	Up to HKD4.8 million	Up to HKD21.5 million
Business valuation	N/A	Up to USD5 million	USD5 million–USD50 million	USD50 million–USD100 million
Years of incorporation	2 years or less	General start-ups 5 years or less; biotech start-ups 2 years or less	No limitation	2 years old or more

[27] Launched in 2013, StartmeupHK is a division of InvestHK, a Hong Kong Government Department that helps overseas and Mainland Chinese companies establish their presences in Hong Kong.

IDM² Microelectronics Node — a Field-programmable Gate Array (FPGA)-based electronics accelerator programme

The IDM² Microelectronics Node is a hardware development training programme launched by HKSTP to support start-ups' design of microelectronics optimised for product development. For three months, start-ups undergo training in FPGA, a chip architecture used in electronic circuits. This technology has immense potential for big data processing and running machine-learning algorithms. The training accelerates start-ups' product design, re-design and problem solving and reduces personnel costs.[28]

Scan the QR code to discover more about IDM² Microelectronics Node

"HKSTP offers a wide range of incubation programmes that help technology startups develop and scale up. The IDM² Microelectronics Node is the first FPGA-based electronics accelerator in Hong Kong — IDM² stands for Idea, Design, Manufacture and Market. We strive to empower start-ups and companies to speed up their microelectronics product design and re-design process, propelling the growth of the microelectronics industry in Hong Kong."

Monsess Leung
Senior Manager of Incubation and Acceleration Programmes, Hong Kong Science & Technology Parks Corporation

[28] HKSTP launches IDM² microelectronics node, Hong Kong's first FPGA-based electronics accelerator, HKSTP

Cyberport programmes[29]

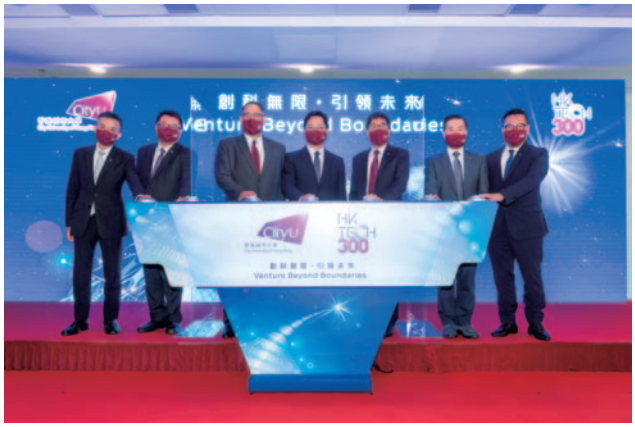
Cyberport offers a variety of funding schemes to support start-ups at various points in their lifecycles. Each funding scheme offers additional benefits including access to free workspaces, training and mentorship programmes, and networking opportunities.

	Cyberport Creative Micro Fund	Cyberport Incubation Programme	Cyberport Accelerator Support Programme	Market Development Support Scheme	Cyberport Macro Fund
Period	6 months	2 years	N/A	2 years	N/A
Financial assistance	Up to HKD100,000	Up to HKD500,000	Up to HKD300,000	Up to HKD200,000	HKD1 million–HKD20 million
Further description	Additional benefits: • Training, mentorship and business advice • Business development and investment connections • Publicity and promotion • Alumni network and peer support	Additional benefits: • Rent-free workspace at Cyberport • Free use of shared facilities at Cyberport • Networking opportunities	Financial assistance provided by covering 75% of accelerator programme fees, office rental, interns, travel and accommodation, marketing and promotion, and professional services	Financial assistance provided by covering 75% of: • Overseas or Mainland delegation mission and or marketing exhibition or conference • Overseas or Mainland expansion (marketing, landing services)	Co-investment fund for digital technology companies

Scan the QR code to discover more about incubation programmes at Cyberport

[29] Cyberport – About Cyberport

CityU HK Tech 300[30]



CityU launched HK Tech 300, a large-scale flagship innovation and entrepreneurship programme, which aims to help students, alumni, researchers and other members of the public create 300 start-ups in three years.

Since its launch in March 2021, more than 1,000 participants have received entrepreneurial training by professional organisations. The programme has also provided over 300 teams with HKD100,000 of seed funding each. Furthermore, over 70 startups have been granted angel fund investments of up to HKD1 million each.

HK Tech 300 is supported by about 60 strategic partners, including the Innovation and Technology Commission of the HKSAR Government, InvestHK, the four major chambers of commerce, and other supporting organisations and professional services partners. In addition, teams have received guidance from 80 seasoned industrialists and entrepreneurs on their entrepreneurship journey through the HK Tech 300 Mentorship Scheme.

CityU has further expanded the reach of this programme by launching a nationwide HK Tech 300 Start-up Competition covering Hong Kong and the Mainland China. The competition aims to synergise the advantages and resources of Hong Kong and the Mainland, encourage exchange and collaboration in innovation, and promote the application of CityU's research achievements and intellectual property on the mainland.

Scan the QR code to know more about available incubation and acceleration programmes in Hong Kong

[30] City University of Hong Kong, 2022

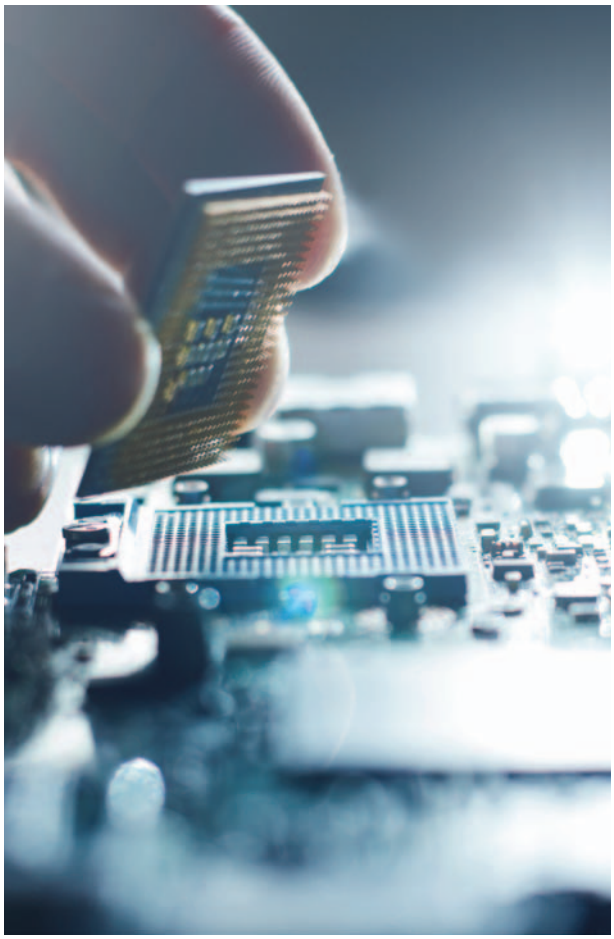
Mature private investor profile for start-up funding in Hong Kong

Hong Kong has an active private investment scene supported by venture capital and private equity firms. Family offices in Hong Kong are also increasingly interested in investing in technology start-ups. More than 70% of private investments in Hong Kong are focused on early, mid or expansion stage start-ups.[31]

Private investment appetite is being boosted by co-investment schemes like the ITVF. Since 2017, the ITVF co-investment scheme has attracted more than HKD889 million in private investments.

With a vibrant ecosystem, Hong Kong achieved record funding in 2021 of USD3.4 billion across 59 deals, according to Preqin.[32]

Scan the QR code to discover more about private venture capitalists in Hong Kong



An increasing number of corporates are establishing accelerator and incubation programmes that provide start-ups with funding and mentorship opportunities.

Examples of corporate accelerator and incubation programmes

Accelerator/Incubator	Overview
Eureka Nova	An accelerator initiated by the New World Group as a platform to support the growth of businesses in Hong Kong offering innovative and disruptive technologies
HUAWEI Spark	A hybrid accelerator programme for deep tech start-ups with a presence in Asia Pacific organised by HUAWEI
92 Express	A landing programme launched by Google and CoCoon for start-ups offering innovative hardware solutions
CRE x CityU Innovation and Entrepreneurship programme	A platform with a total allocation of HKD100 million to be invested in start-ups involved in life sciences and healthcare, biomedical engineering, materials science and engineering in the GBA

[31] Based on number of deals using Preqin's 2021 data for early, mid or expansion stage angel, series A, series, B, series C and expansion

[32] Based on disclosed deals from Preqin's database; dataset extracted on 11 February 2022

BUSINESS FRIENDLY ENVIRONMENT

Conducive business environment with dedicated business support and intellectual property (IP) protection

Robust IP protection regime

Hong Kong has a robust IP protection regime that includes an original grant patent system. This provides convenience for companies in Hong Kong, as they are able to acquire patent protection directly without prior registrations outside Hong Kong. Companies can seek IP protection through a standard patent (up to 20 years) or a short-term patent (up to 8 years).

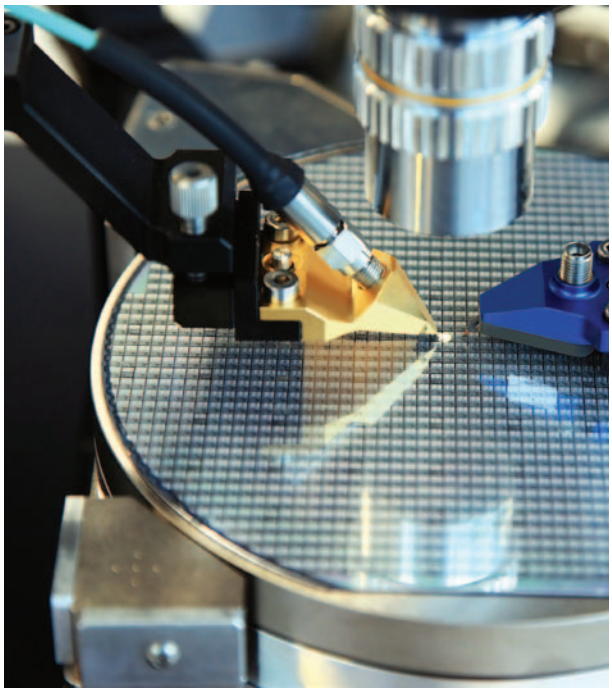
The Intellectual Property Department provides free, one-on-one IP consultation. Furthermore, the Hong Kong Trade Development Council offers a free online platform and database called Asia IP Exchange (AsiaIPEX) that highlights IP from all across the world.

Highly liveable city

English and Chinese are official languages in Hong Kong, making it easy for foreigners to live and work here. There are multiple entertainment venues, attractions and places of natural beauty for leisure and more than 50 schools following international programmes.[35]

Favourable financial system

The Hong Kong dollar is pegged to the US dollar, reducing exchange rate risk for foreign companies using dollar-pegged currencies. Hong Kong is a global financial centre for initial public offerings (IPOs) with Hong Kong Stock Exchange tracing its origins back to 1891. Hong Kong's IPO market ranked 1st in the world in seven of the last 13 years,[33] with an estimated HKD331 billion raised in 2021.[34] Furthermore, a regime for the listing of Special Purpose Acquisition Companies (SPACs) on Hong Kong Stock Exchange became effective in January 2022, further cementing Hong Kong's leading position as an international financial centre.



[33] HKEX – Listing with HKEX

[34] Mainland and Hong Kong IPO Markets to Remain Strong and Vibrant in 2022 (2021), Deloitte

[35] Hong Kong Government, Hong Kong: The Facts – Education

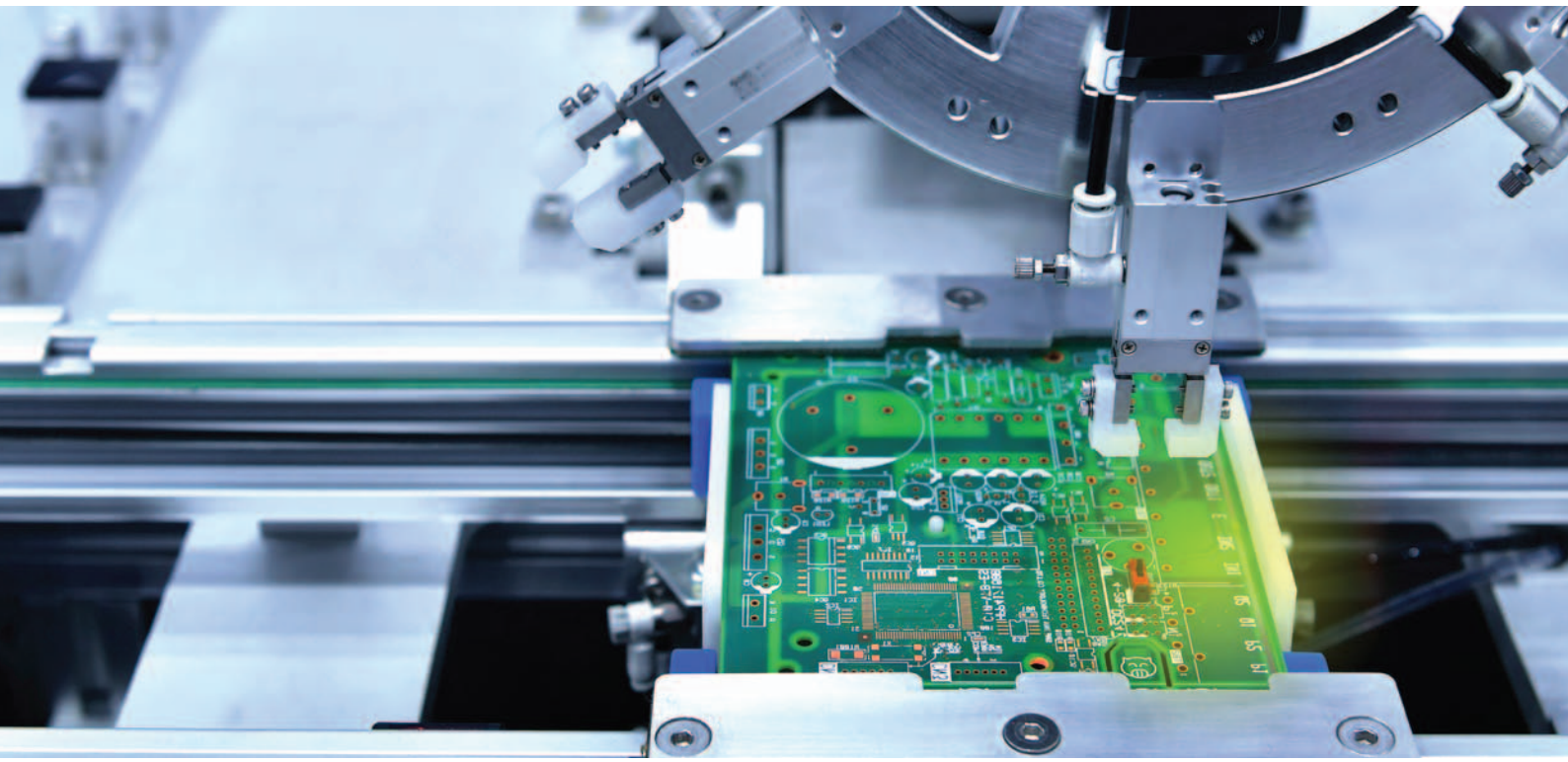
Low, simple, competitive tax system

The first HKD2 million of corporate profits is taxed at only 8.25%, with the remainder taxed at 16.5%. Qualified R&D expenditures receive a super tax deduction. Under the two-tiered, enhanced tax reduction scheme, enterprises are offered a 300% tax deduction on their first HKD2 million of R&D expenditure and a further 200% tax deduction on any remaining R&D spending.[36]

Free trade port status

Hong Kong is a free port and does not levy any customs tariffs on imports or exports. In addition, Free Trade Agreements (FTAs) with Mainland China (through the Mainland and Hong Kong Closer Economic Partnership Arrangement (CEPA)), New Zealand, the Member States of the European Free Trade Association, Chile, Macao, the Association of Southeast Asian Nations (ASEAN), Georgia and Australia, further lower Hong Kong's trade barriers. The CEPA agreement allows Hong Kong-made products and Hong Kong-based service companies to access the Mainland China market. This applies equally to foreign companies with a business presence in Hong Kong.

Hong Kong is also a participant in the Information Technology Agreement (ITA), under which 81 World Trade Organization members have agreed to eliminate and bind customs duties at zero for technology products, such as computers, telecommunications equipment, semiconductors, semiconductor manufacturing and testing equipment, software and scientific instruments.



[36] Inland Revenue Department, Hong Kong Government

Advanced transportation and logistics infrastructure[37,38]

World-class airport and air cargo facilities

- One of the world's busiest airports for international cargo: Connected to more than 220 destinations, Hong Kong International Airport (HKIA) hosts more than 120 airlines that operate over 1,100 flights per day
- The expansion of facilities via the Third Runway System Project is expected to increase HKIA's capacity to 100 million passengers and 9 million tonnes of cargo per year by 2030

Established port infrastructure

- International maritime centre with about 900 shipping-related businesses offering high value-added maritime services
- Situated on the Far East trade routes at the centre of the Asia-Pacific Basin, Hong Kong is a regional transhipment hub port. Transhipment accounts for at least 60% of total container throughput
- Hong Kong Port is one of the busiest container ports worldwide, with a capacity to handle 67,000 twenty-foot equivalent units (TEUs) a day. It has 24 berths, servicing about 320 container vessel sailings a week to around 470 destinations globally
- The nine privately-owned container terminals in Kwai Tsing form one of the most efficient cargo facilities worldwide, handling around 16.7 million TEUs a year

Land connectivity with Mainland China and Macao

- Ten land crossings in Hong Kong: Six road-based crossings and four rail-based crossings
- The 55km-long Hong Kong-Zhuhai-Macao (HZMB) bridge connects Hong Kong to the Western Pearl River Delta region in less than three hours
- The Guangzhou-Shenzhen-Hong Kong Express Rail Link connects Hong Kong to multiple key cities in Mainland China. Trains from West Kowloon Station reach Shenzhen in less than 15 minutes

[37] Hong Kong Logistics Development Council – Regional Logistics Hub

[38] International Transportation Centre, Hong Kong Government Policy Address (October 2021)

Robust telecommunications and digital infrastructure

Hong Kong has world-leading telecommunications and digital infrastructure.

Ranked 1st in Asia Pacific for its readiness to adopt cloud-computing services[39], Hong Kong has a world-leading position in digital infrastructure readiness and a high accessibility rate. Its close to 100% household broadband penetration rate and fast, reliable broadband access allows citizens to connect readily to the internet. This facilitates the development of a digitalised economy as technologies advance.

Overview of digital infrastructure in Hong Kong[40,41]

Hong Kong is equipped with the high connection density and bandwidth offered by 5G networks for the adoption of Industry 4.0 technologies.

At a glance:

- Hong Kong ranks **1st** worldwide for 5G coverage reach, and **2nd** in 5G network availability.[42]
- Commercial 5G services currently reach **90%** of Hong Kong's population.[43]

With wide 5G coverage readily available, Hong Kong is an ideal location for the use of IoT, AI, cloud and blockchain solutions.

12 external submarine optical fibre cable systems, 19 overland optical fibre cables and 10 communications satellites connect Hong Kong to the world

Mobile penetration rate of 305.4%, one of the highest worldwide (July 2021)

Household broadband penetration rate of 96.3%, one of the highest worldwide (July 2021)

Mean download speed over fixed broadband of 260.35 Mbps, among the fastest worldwide

Reliable electricity supply, which currently exceeds 99.999%

Free Wi-Fi service available at 39,000 hotspots in public places (December 2020)

[39] 2020 Cloud Readiness Index published by the Asia Cloud Computing Association

[40] 2021 Policy Address Policy Initiatives of Communications and Creative Industries Branch (2021), Commerce and Economic Development Bureau

[41] Office of the Government Chief Information Officer (OGCIO), Hong Kong Government

[42] Opensignal (2021)

[43] Office of the Communications Authority, Hong Kong Government

Professional services and advisory support

Hong Kong has a highly sophisticated professional services industry that operates to international standards. This includes legal services, financial services, IP services and business advisory support.

Legal and IP consultation services

As Asia's international legal services capital, Hong Kong is home to more than 2,900 local and foreign legal services firms with more than 25,000 people engaged in the industry.[44]

Hong Kong has no foreign ownership restrictions, allowing foreign law firms to enter the market. More than 70% of international law firms and over 50% of the Global 100 firms have a presence in Hong Kong.[45]

IP consultation services from the Hong Kong Government and industry associations:

- **The Intellectual Property Department of Hong Kong Government**, with support from the Law Society of Hong Kong, provides free one-to-one IP consultation services for small and medium-sized enterprises (SMEs)
- **Intellectual Property Services Centre under HKPC** offers assistance to local companies and inventors to capitalise on their intellectual works through patent, trademark and industrial design protection and IP management
- **Intellectual property centre under Federation of Hong Kong Industries (FHKI)** has more than 20 years of professional experience in IP and provides free advisory services for enterprises

[44] As of September 2021, Census and Statistics Department Hong Kong Special Administrative Region

[45] Forbes, 2021

Accounting services

As an international financial hub, Hong Kong has many highly qualified accounting firms. As of September 2021, there were 6,211 accounting, bookkeeping, auditing service and tax consultancy firms in Hong Kong employing more than 32,950 people.[46]

With the close oversight of the Hong Kong Institute of Public Accountants (HKICPA), the quality of accounting services in Hong Kong sustains a high level. Each auditor must hold a certificate issued by HKICPA before being eligible to practice.

Business advisory support

Hong Kong provides an array of business advisory services to support I&T companies through:

Cyberport and HKSTP

Offers promotion and development assistance such as marketing support, press and media services through their accelerator and incubation programmes. For example, HKSTP's TecOne offers guidance on funding, business collaborations, marketing, and much more through TecFunding, TecService, TecFinance and TecMart

Hong Kong Productivity Council (HKPC)

Supports Hong Kong enterprises to reindustralise their businesses through an array of technical support and consultancy services that support the adoption of advanced technologies such as IoT, big data analytics, AI and robotics. The SME ReachOut team helps SMEs identify suitable funding schemes and responds to queries related to funding applications

Support and Consultation Centre for SMEs (SUCCESS)

Run by the Trade and Industry Department, SUCCESS offers free business information and consultation services in collaboration with various trade and industrial organisations, private enterprises, professional bodies and government departments in Hong Kong

Private Management Consultancy Service Providers

Hong Kong has an established cohort of private management consultants who offer business advice on a comprehensive range of topics including strategy and operations. There are 43,484 people engaged in the sector in Hong Kong across 10,202 organisations, including renowned international firms[47]

[46] As of September 2021, Census and Statistics Department Hong Kong Special Administrative Region

[47] As of September 2021, Census and Statistics Department Hong Kong Special Administrative Region

Established I&T community for networking opportunities

Hong Kong is home to numerous international corporations and investment firms. There is a wide range of platforms and business events to connect corporates, start-ups and investors. These include I&T conferences and forums, business matching events and trade shows.

The annual Cyberport Venture Capital Forum hosted by Cyberport is a premier venture forum where global venture experts and entrepreneurial leaders share insights on the latest fundraising strategies, market dynamics and value creation to capture investor interest.

The HKSTP x Global Acceleration Academy (GAA) Global Matching business and investment matching event brings corporate buyers and regional investors to match with potential start-ups and technology ventures worldwide and source best fit, market-proven solutions and valuable portfolios.

The Cyberport Investors Network (CIN) is a dedicated platform established by Cyberport to introduce investors to high potential and high-growth start-ups to boost deal flow. The CIN now boasts a membership of over 100 organisations, including global angel investors, venture capitalists, private equity funds, family offices and corporate ventures, many of which have operations in the GBA. In 2020/21, the CIN connected investors to 23 projects that resulted in investments totalling HKD358 million.[48]

The HKPC 5G Future Hall is a dedicated space in the HKPC Building for 5G-related businesses to highlight their products to potential 5G business users. It is equipped with 5G base stations from all four major telecommunications operators that cover three different frequency bands. Future Hall also serves as a 5G testing platform for applications relating to sectors including construction, transportation, waste management, energy and medical care.[49]

[48] Cyberport, Annual Report 2020–2021

[49] HKPC 5G Future Hall Spearheads the Promotion of 5G R&D and Applications in Hong Kong with New 5G Intelligent Manufacturing and Smart Living Solutions on Show (2021), Hong Kong Productivity Council

StartmeupHK

StartmeupHK is an initiative by InvestHK aimed at helping founders of innovative and scalable startups from overseas to set up or expand in Hong Kong.

Key initiatives

Startmeup.hk

This website informs entrepreneurs of the latest news on the start-up scene, presents upcoming events, shares inspiring stories and provides resources to support their entrepreneurial journey. Its available resources include an overview of potential funding sources and shared facilities that start-ups can access.

StartmeupHK Festival

This annual start-up event includes panel discussions, exhibitions, investor matching initiatives, hackathons and job fairs. This event is open to participants from across the globe and in 2021 welcomed more than 39,000 attendees from 103 countries.

Scan the QR code to discover more about StartmeupHK

Dedicated office spaces and co-working spaces for the I&T community

Dedicated I&T office spaces through Cyberport and HKSTP

Through Cyberport and HKSTP, the Hong Kong Government offers dedicated office spaces for the I&T community. These are equipped with a state-of-the-art broadband network and leading-edge telecommunications facilities. It also offers specific support services, including conference and exhibition centres, retail and entertainment facilities.

Co-working spaces for the I&T community

There are 124 co-working locations in Hong Kong as of 2021.[50]

HKSTP hosts multiple co-working spaces through its onsite campuses (Science Park, InnoCentre) and offsite locations. These co-working spaces are typically charged on a membership or per hot desk or workstation basis. Examples include the 2W co-working space, INNO2, Lion Rock 72 and Wheelock. Some of these co-working spaces are dedicated to a specific sector, which promotes building a strong community of people working towards a similar cause to empower one another. Examples of these sector-focused co-working spaces include the Incu-Bio co-working space, AI Plug, the Fintech Centre, and ICT co-working centre.[51]

Cyberport provides eight Smart-Space co-working spaces across its campuses, which currently house 677 I&T companies. Seven Smart-Spaces in Pokfulam span 120,000 square feet.[52] The latest Smart-Space in Tsuen Wan is reserved for entrepreneurs aged 18 to 35 and offers 60 flexi-spaces, 48 workstations and 34 office rooms across 20,000 square feet. Smart-Space users have access to value-added services provided by Cyberport including access to funding programmes, invitations to networking events and introductions to mentors.

Scan the QR codes to discover more about becoming a tenant at:

Cyberport (office)

HKSTP (office)

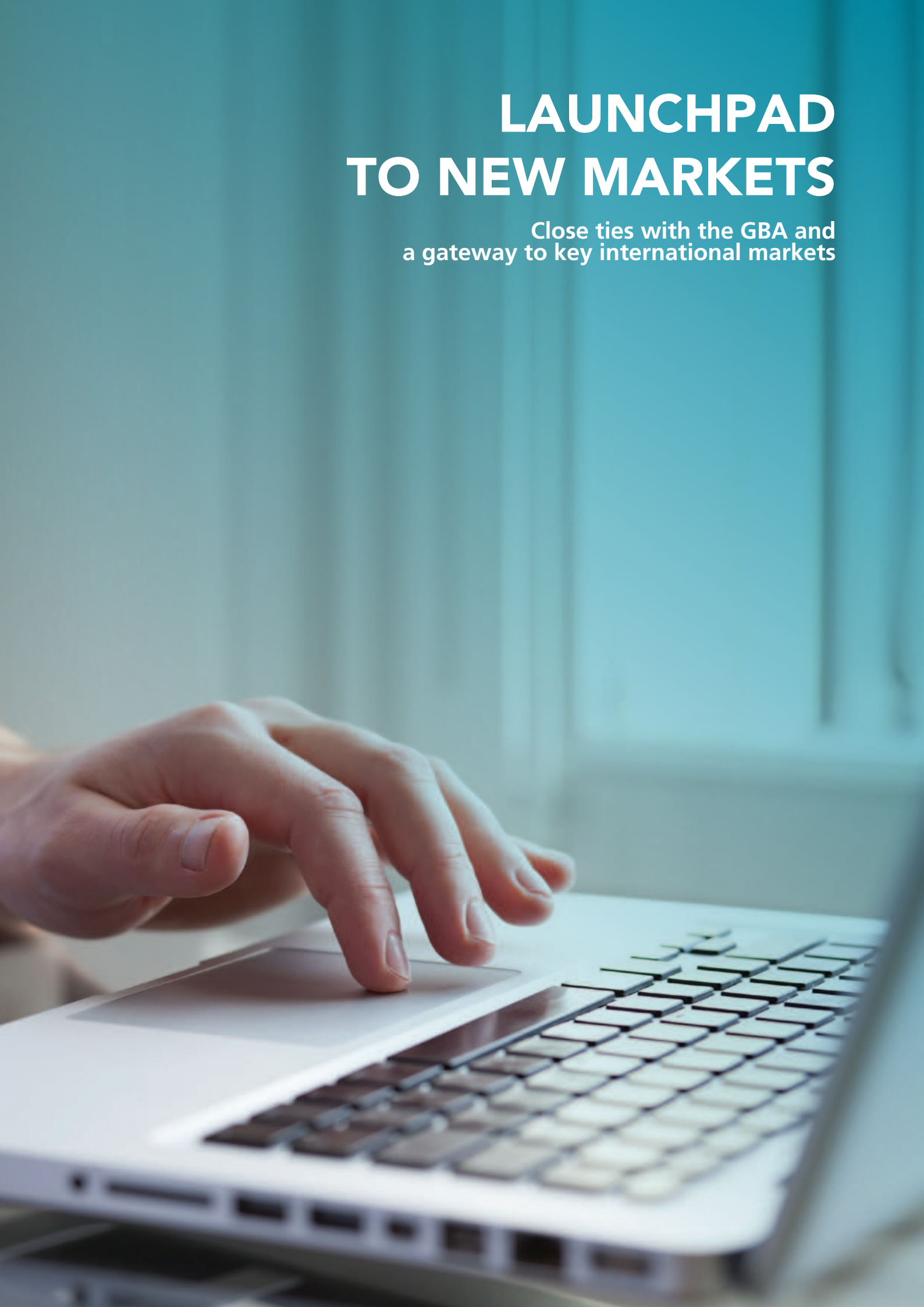
Cyberport (Smart-Spaces)

HKSTP (co-working)

[50] StartmeupHK – Shared Facilities

[51] HKSTP – Labs and co-working spaces

[52] Cyberport – Smart Space



LAUNCHPAD TO NEW MARKETS

Close ties with the GBA and a gateway to key international markets

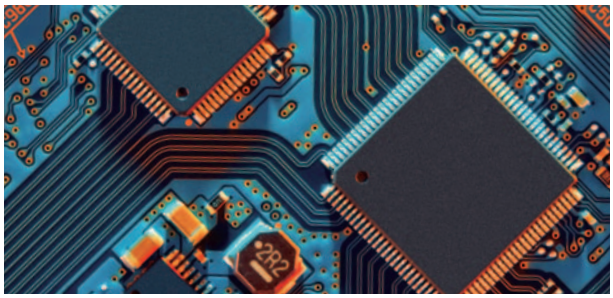
Strategic location for expansion into international markets

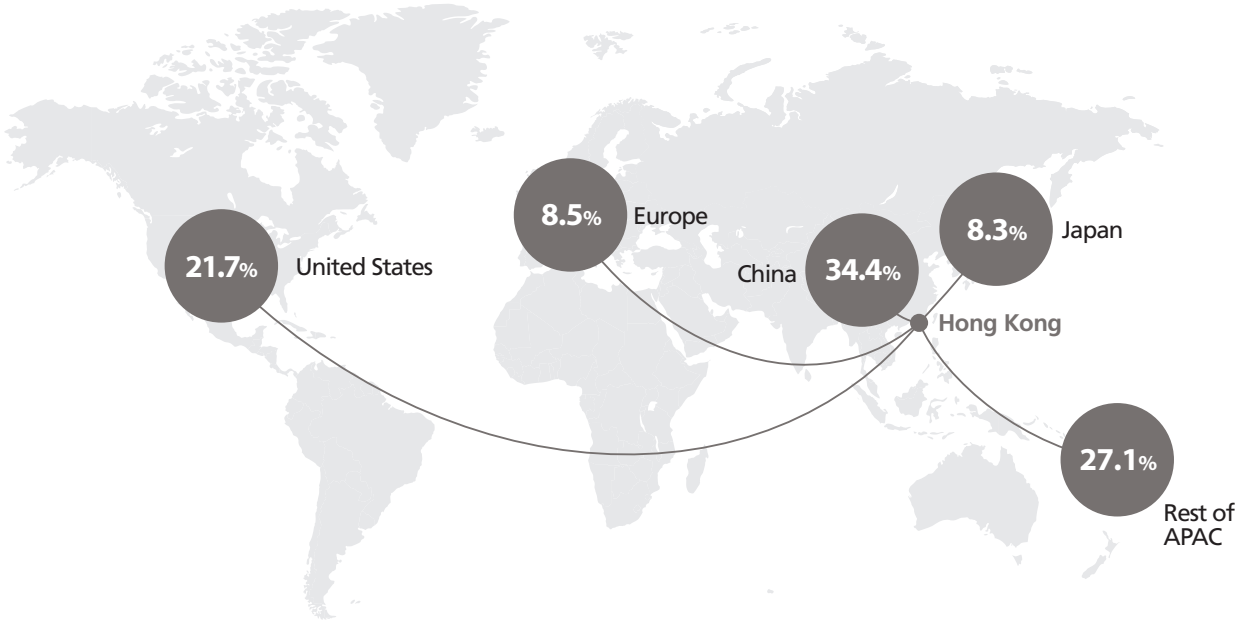
Gateway to the vast semiconductor market in China

China is the largest single country market for semiconductors, accounting for 34.4% of the global market.[53] This status is driven by favourable government initiatives in line with its national 14th Five-Year Plan, in which semiconductors are identified as a strategic technology priority for the country, and huge domestic consumption potential, especially in data processing and communications applications.

As the world's largest importer of chips, China imported around USD432 billion of ICs in 2021, around 24% more than in the previous year.[54] China's semiconductor demand will continue to grow along with the country's huge appetite for ICs used in the production of smartphones, cars, computers and home appliances amid a lingering global chip shortage.

Hong Kong enjoys proximity and a long history of close cooperation with Mainland China and international markets. As the leading global trading hub, Hong Kong is the world's largest ICs exporter, with USD153 billion of exported value in 2020,[55] Hong Kong is uniquely positioned to capture the enormous potential of the global chips market with its established role as an international gateway.





[53] Semiconductor Industry Association 2021 Factbook. This data reflects sales of semiconductors to electronic equipment makers only — final electronic products containing semiconductors are then shipped worldwide for consumption.

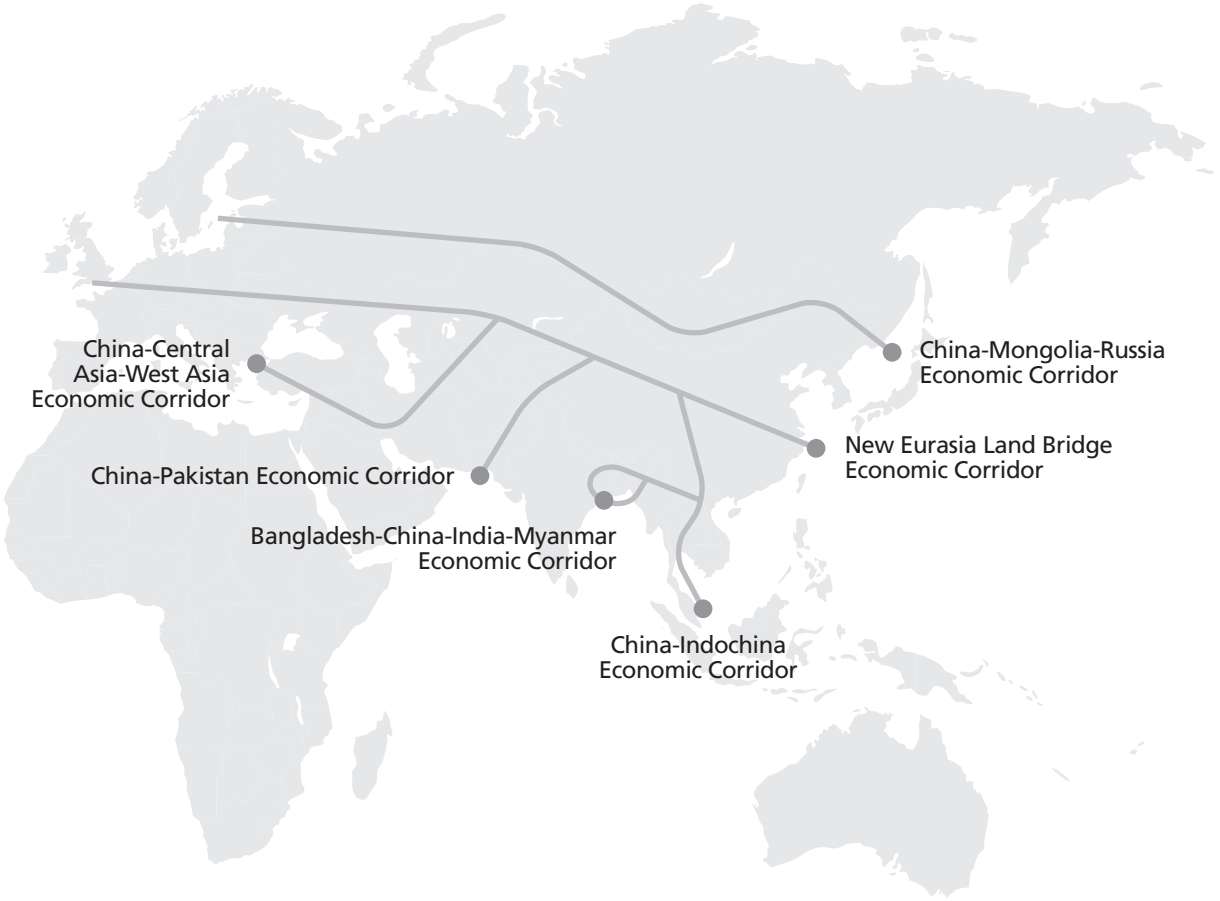
[54] China's Major Exports by Quantity and Value (December 2021), General Administration of Customs PRC

[55] International Trade Centre, list of exporters of selected products in 2020 (electronic integrated circuits)

Linked to other parts of Asia, the Middle East, Africa and Europe through the Belt and Road Initiative

The Belt and Road initiative connects Asia, the Middle East, Eastern Africa and Eastern Europe via the Silk Road Economic Belt and 21st Century Maritime Silk Road. Spanning six economic corridors, the initiative aims to facilitate policy coordination, establish infrastructure connectivity, promote unimpeded trade, cement financial integration, and foster people-to-people bonds. Hong Kong is a connector for companies intending to enter markets within the Belt and Road initiative.

The six economic corridors of the Belt and Road initiative[56]



Close ties with Southeast Asia through trade agreements

In February 2021, Hong Kong entered into a Free Trade Agreement and an Investment Agreement with the 10 members of the Association of Southeast Asian Nations (ASEAN). Moreover, Hong Kong recently applied to join the Regional Comprehensive Economic Partnership (RCEP) trade agreement, a free trade pact signed between China, the 10 ASEAN member states, South Korea, Japan, Australia and New Zealand. These trade agreements reduce trading costs and enhance economic ties between Hong Kong and ASEAN member states.

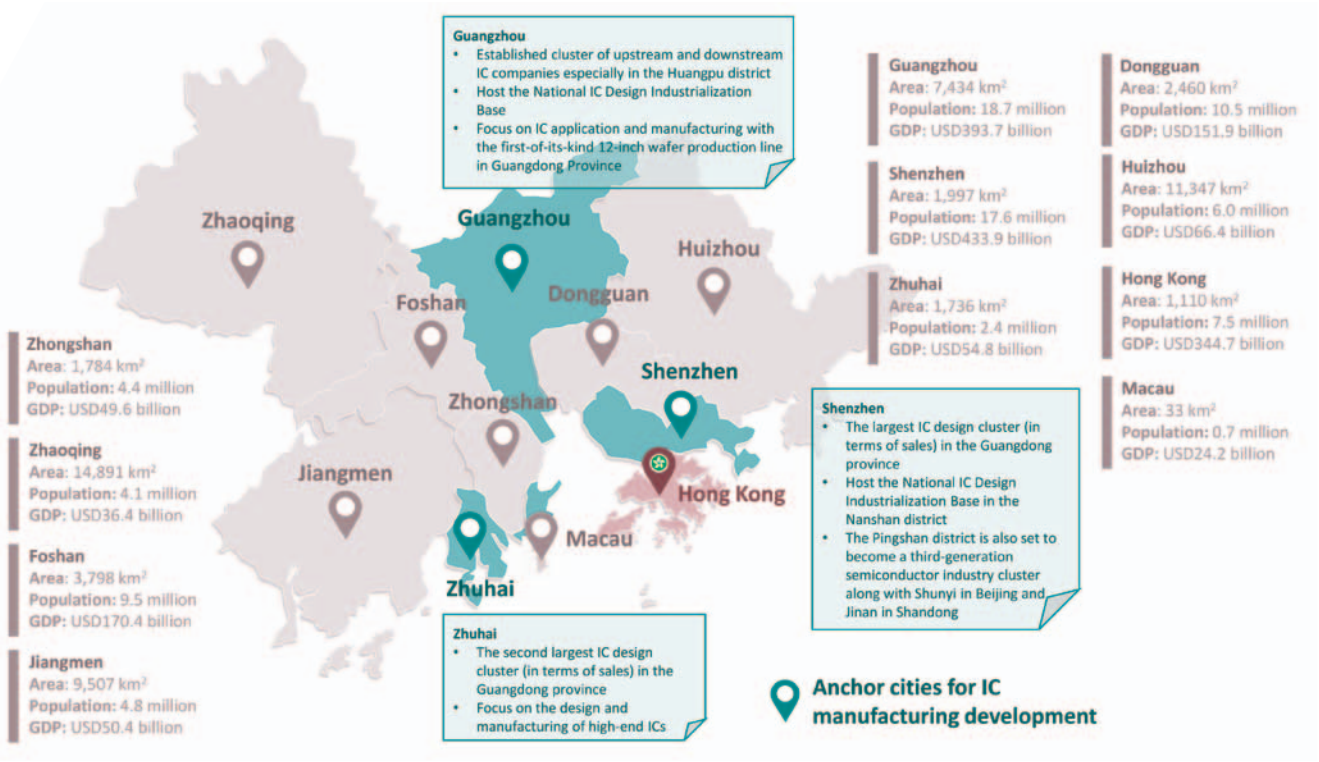
[56] China's Belt and Road Initiative in the Global Trade, Investment and Finance Landscape (2018), OECD

Synergies with the Mainland GBA Cities

With the Central People's Government's ambitious aspirations for the GBA to rise as a global powerhouse for innovation, the GBA has one of China's most developed industrial clusters for semiconductors. The GBA comprises the two Special Administrative Regions of Hong Kong and Macao, and the nine municipalities of Guangzhou, Shenzhen, Zhuhai, Foshan, Huizhou, Dongguan, Zhongshan, Jiangmen and Zhaoqing in Guangdong Province.

Guangzhou, Shenzhen and Zhuhai are strategically positioned as the anchor cities for the development of IC manufacturing, as unveiled in the Guangdong 2021–2025 Action Plan.[57]

Over the past decade, there has been tremendous growth in overall chip manufacturing capabilities. An increasing number of overseas chip manufacturers have established factories in Mainland China and domestic fab construction projects, providing more manufacturing capabilities for mass production. Since 2015, the output of ICs in Guangdong has increased at a CAGR of 22%, reaching 36 billion pieces in 2019 and accounting for 18% of the total national output.[58]



Source: China Semiconductor Industry Association, 2021 China Integrated Circuit Manufacturing Annual Conference

[57] Action Plan for Semiconductors and Integrated Circuits unveiled by Guangdong Province

[58] Department of Industry and Information Technology of Guangdong Province

ProVista — the GBA as an integrated innovation ecosystem

Case study

Established in 1995, ProVista Group is a Hong Kong-based electronics conglomerate offering a wide range of electronics products covering power and solar energy, automotive electronics, lifestyle and care and security products.

ProVista's Hong Kong office is its international headquarters and R&D centre, focusing on product development and business development worldwide. It also has a presence in other Mainland GBA cities and Southeast Asia, focusing on manufacturing operations.

In 2021, ProVista established a joint laboratory with the Department of Electrical Engineering of CityU to bring together industry players, faculty members and students to drive and inspire innovative ideas.

"Hong Kong's competitive edge lies in the presence of a strong academic research community within its top-tier universities, many of whom have achieved global recognition in areas such as IC design and EDA. Because of this, we made the decision to base our in-house R&D and product development team in Hong Kong, allowing ProVista to collaborate with the brightest local minds on various microelectronics-related projects."

ProVista established an innovation park in Songshan Lake, Dongguan in 2020. With an investment of RMB1 billion, the 60,000 square meter park offer quality design, R&D, engineering and manufacturing services, and provides start-ups with a full range of support and services, including incubation and accelerator programmes and business advisory.

"Hong Kong is strategically located in the GBA for businesses to benefit from potential synergies in the region. For example, businesses can leverage Hong Kong's strength in upstream research to accelerate microelectronics research, testing and prototyping, before sending to other GBA cities for mass production. This is the strategy deployed by ProVista, under which we have established three factories across the Mainland GBA cities and an ASEAN country, in addition to R&D centres in Hong Kong and Dongguan."

Steve Chuang
Founder and CEO,
ProVista
Executive Deputy Chairman,
Federation of Hong Kong Industries

"Building on strong capabilities in R&D, world-renowned professors and research pioneers, robust intellectual property protection, favourable policy support from the Hong Kong Government and a strategic location in Asia, Hong Kong is an ideal platform for companies and talent to advance microelectronics development and tap the tremendous business opportunities in Mainland China."

Andy Wong
Head of Innovation and Technology
Invest Hong Kong

"Microelectronics is a highly technical, specialized field. Hong Kong's success in this industry is built on its outstanding research expertise, advanced research facilities, and deep industry collaboration. These assets will continue to strengthen as the Hong Kong Government's efforts to build new research infrastructure and attract top talent via incentive schemes come to fruition. Coupled with a strong intellectual property protection framework and proximity to manufacturing capabilities in Mainland GBA cities, Hong Kong is the optimal place for microelectronics businesses to thrive."

Falcon Chan
Partner, Strategy, Analytics and M&A
Deloitte China

Acknowledgements

We thank the following for sharing their insight and experience. The names are listed solely based on the order in which their quotes appear, which does not reflect or imply any order of priority.

Prof. Martin Wong
Dean of Engineering,
The Chinese University of Hong Kong

Prof. Kei May Lau
Chair Professor of Department of Electronic and Computer Engineering,
Hong Kong University of Science and Technology

Prof. Philip Chan
Former Deputy President,
PolyU
Honorary Chairman, Vice-convener,
Semiconductor Nanotechnology Alliance

Prof. Lance Li
Chair Professor of Mechanical Engineering,
The University of Hong Kong

Meikei Ieong
Founding Chairman,
Semiconductor Nanotechnology Alliance

Ming Yam Wong
Honorary Chairman, Convener,
Semiconductor Nanotechnology Alliance

Prof. Tim Cheng
Chair Professor and Vice-President for Research and Development,
Hong Kong University of Science and Technology
Director of
AI Chip Center for Emerging Smart Systems

Peter Ng
Vice President, Technology,
ASM Pacific Technology

Lucas Hui
Chief Technology Officer,
Hong Kong Applied Science and Technology Research Institute

Ivan Sham
Chief Commercial Officer,
Nano and Advanced Materials Institute

H.L. Yiu
Head of Re-industrialisation,
Hong Kong Science & Technology Parks Corporation

Patrick Siu
CEO,
Hong Kong-Shenzhen Innovation and Technology Park

Monsess Leung
Senior Manager of Incubation and Acceleration Programmes,
Hong Kong Science & Technology Parks Corporation

Steve Chuang
Founder and CEO,
ProVista Group
Executive Deputy Chairman,
Federation of Hong Kong Industries

About Invest Hong Kong

Visit our website:

Invest Hong Kong (InvestHK) is the Hong Kong Government's department for attracting foreign direct investment. Our goal is to help overseas and the Mainland companies to set up and develop their businesses in Hong Kong. For those foreign companies that are already established here, we extend our services to help them expand in our city.

All of our services are free, confidential and tailored to clients' needs. Our comprehensive range of services includes:

Latest information on Hong Kong's business environment:

- Sector-specific advice and opportunities
- Business incorporation procedures
- Tax and business regulations
- Cost-of-business models
- Employment legislation
- Immigration requirements
- Business networking opportunities

Introduction to business contacts:

- Lawyers, accountants, human resource specialists, consultancies, designers, interior specialists and real estate companies

Arranging visit programmes:

- Meetings with service providers, professional associations and government officials and departments

Business support facilitation:

- Support and assistance with business licences, visa applications, trademark registration, IP and trade regulations
- Marketing and public relations services during the launch and expansion of your company
- Advice on living and working in Hong Kong — housing, healthcare, schooling and networking

InvestHK has offices in major cities around the world and industry experts across a range of business sectors. Contact us for free advice on setting up in Hong Kong or for details on how we can support your expansion in our city.

Contact us:

Andy Wong
Head of Innovation & Technology
Invest Hong Kong
Tel: +852 3107 1013
Email: andywong@investhk.gov.hk

Bryan Peng
Head of Innovation & Technology (Greater Bay Area)
Invest Hong Kong
Tel: +852 3107 1465
Email: bryanpeng@investhk.gov.hk

About Deloitte China

Deloitte China provides integrated professional services, with our long-term commitment to be a leading contributor to China's reform, opening-up and economic development. We are a globally connected and deeply locally-rooted firm, owned by its partners in China. With over 20,000 professionals across 30 Chinese cities, we provide our clients with a one-stop shop offering world-leading audit & assurance, consulting, financial advisory, risk advisory, business advisory and tax services.

We serve with integrity, uphold quality and strive to innovate. With our professional excellence, insight across industries, and intelligent technology solutions, we help clients and partners from many sectors seize opportunities, tackle challenges and attain world-class, high-quality development goals.

The Deloitte brand originated in 1845, and its name in Chinese (德勤) denotes integrity, diligence and excellence. Deloitte's professional network of member firms now spans more than 150 countries and territories. Through our mission to make an impact that matters, we help reinforce public trust in capital markets, enable clients to transform and thrive, and lead the way toward a stronger economy, a more equitable society and a sustainable world.

Deloitte refers to one or more of Deloitte Touche Tohmatsu Limited ("DTTL"), its global network of member firms, and their related entities (collectively, the "Deloitte organization"). DTTL (also referred to as "Deloitte Global") and each of its member firms and related entities are legally separate and independent entities, which cannot obligate or bind each other in respect of third parties. DTTL and each DTTL member firm and related entity is liable only for its own acts and omissions, and not those of each other. DTTL does not provide services to clients.

Deloitte Asia Pacific Limited is a company limited by guarantee and a member firm of DTTL. Members of Deloitte Asia Pacific Limited and their related entities, each of which are separate and independent legal entities, provide services from more than 100 cities across the region.

Please see www.deloitte.com/about to learn more.

Contact us:

Edward Au
Southern Region Managing Partner
Deloitte China
Tel: +852 2852 1266
Email: edwau@deloitte.com.hk

Robert Lui
Government Affairs Southern Region Leader
Deloitte China
Tel: +852 2852 6324
Email: rolui@deloitte.com.hk

Coco Tong
Deloitte Consulting China Manager
Tel: +852 2531 1812
Email: cotong@deloitte.com.hk

Falcon Chan
Deloitte Consulting China Partner
Tel: +852 2531 1558
Email: falconchan@deloitte.com.hk

Brian Li
Deloitte Consulting China Senior Manager
Tel: +852 2531 1826
Email: briali@deloitte.com.hk

this page is intentionally left blank

24/F, Fairmont House
8 Cotton Tree Drive
Central, Hong Kong
Tel: (852) 3107 1000
Email: enq@investhk.gov.hk

investhk.gov.hk

Find Us on Social Media