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Crafting Tomorrow: A Fresh Look at Advanced Manufacturing in Hong Kong

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Contents

Foreword

Advanced Manufacturing stands at the heart of a dynamic and thriving Innovation and Technology ecosystem, poised to reshape the way products are conceived, designed, and ultimately realised.

Hong Kong, with its world-class infrastructure and business-friendly environment, serves as an ideal platform for advanced manufacturing. It's the perfect stage for companies and talents to engage in this transformative industry, further bolstered by the implementation of the Hong Kong Innovation and Technology Development Blueprint and the new initiatives under the Northern Metropolis Development Strategy.

We, at Invest Hong Kong and PwC, are delighted to present an extensive review and analysis of Hong Kong's advanced manufacturing sector.

This Information Pack showcases various critical aspects of Hong Kong's advanced manufacturing industry. It includes policy support, advanced infrastructures, talent pool, funding and incentive support, testing and certification, and the advanced manufacturing ecosystem. All of these elements work in tandem to foster the development of advanced manufacturing in Hong Kong.

Moreover, this Information Pack highlights the impressive achievements of advanced manufacturing operators in Hong Kong. It serves to inspire and inform companies about the opportunities and advantages that await them in our city, further positioning Hong Kong as a key player in the global advanced manufacturing industry.

Executive Summary

This Pitchbook, presented by Invest Hong Kong and PwC, delves into the emerging advanced manufacturing sector in Hong Kong. With a robust tech ecosystem and world-class infrastructure, the city is a hub for industry transformation. The book provides insights into policy support, infrastructure, talent, funding incentives, and the overall ecosystem.

1. The Role of Advanced Manufacturing ("AM")

Advanced Manufacturing ("AM") represents a transformative approach to production that applies cutting-edge technologies such as robotics, artificial intelligence ("AI"), the Internet of Things ("IoT"), and 3D printing to traditional manufacturing processes. This methodology dramatically boosts efficiency, productivity, and quality, enabling a significant increase in flexibility, customization, and precision.

This evolution in manufacturing is largely driven by the momentum of the fourth industrial revolution, or "Industry 4.0," which advocates for the creation of "smart factories". This transformative move has the potential to significantly enhance labour productivity, making high-cost regions globally competitive, particularly in producing high-value goods in small volumes. As projected by the McKinsey Global Institute, these advancements in automation could lift productivity growth by 0.8%-1.4% annually and automate an estimated 64% of tasks within the manufacturing sector.

By adopting Industry 4.0 solutions, Hong Kong is poised to surge in productivity, maintain its competitive edge, and tackle prevailing labour shortages and high labour costs. Moreover, this shift holds the potential to diversify Hong Kong's economy, stimulating innovation, and creating high-value jobs in the process. This diversification strengthens the economy, making it more resilient to market fluctuations and enhancing its global competitiveness in technology and innovation-driven sectors.

AM has wide-ranging applications across various industries such as aerospace, automotive, pharmaceuticals, and consumer goods. It employs advanced materials and components, along with digital design and simulation tools, to create highly specialized products and systems tailored for today's rapidly evolving market.

AM and traditional manufacturing differ fundamentally in their technologies, processes, and business models. While traditional manufacturing is centered around mass production, AM leans towards customization and a customer-centric focus. AM demands a highly skilled labor force, employs state-of-the-art production technology such as 3D printing and robotics, and prioritizes significant investment in R&D.

Difference between Traditional and Advanced Manufacturing

Characteristics	Traditional Manufacturing	Advanced Manufacturing
Production Strategy	Mass Production	Customisation and customer-focused
Labour Supply Criteria	Abundant labour supply	Skilled/technical labour available
Labour Skill Level	Unskilled and semi-skilled	Semi-skilled and technical skills
Educational level	On-the job training, high school/ vocational school	Technical degree from college or university
Labour Force	Labour intensive	Skilled workers
Production Technology	Casting, welding, moulding, brazing, machining, etc.	Additive and rapid manufacturing – 3-D printing, robotics, material deposition, etc.

Characteristics	Traditional Manufacturing	Advanced Manufacturing
R&D/ Innovation	Investment into production	Re-invest revenues into R&D
Energy requirements	Low-cost	Low-cost and high-power resiliency
Infrastructure Requirements	Free space	Information technology and digital infrastructure
Logistics	Road and rail accessibility	Global supply chain management

Advanced manufacturing is particularly suited to Hong Kong as it facilitates the production of high-value goods at low volumes, aligning perfectly with the region's capabilities. By leveraging Industry 4.0 solutions, it addresses issues of labour shortage, high labour costs, and expensive land, making it a practical and viable option for Hong Kong's highly educated workforce. Combined with robust policy support, superior infrastructure, and a strategic geographical location, Hong Kong is perfectly positioned to adopt and implement these sophisticated technologies, thereby optimizing its land use.

2. National Policies and Hong Kong's I&T Development Blueprint for AM

The Chinese government, in the National 14th Five-Year Plan (2021-2025) ("The National 14th FYP"), has laid out a comprehensive framework aimed at bolstering the growth of high-tech industries, including AM. A key strategy of this framework is to boost R&D investment, foster innovation, and promote industrial upgrading. Moreover, the plan encourages the establishment and expansion of technology innovation centers and industrial parks to support high-tech industries.

The Outline Development Plan for the Guangdong-Hong Kong-Macao Greater Bay Area (GBA) envisions a cooperative framework to expedite the growth of AM and modern service industries. The GBA aims to become an internationally competitive AM base, with strategies including enhancing existing industrial clusters, promoting R&D and innovation, developing talent, and building necessary infrastructure.

Hong Kong's 2022 Policy Address identified 're-industrialisation' as a key initiative for becoming an international I&T hub. To facilitate this, the Hong Kong Government established the Innovation, Technology and Industry Bureau to devise policies and strategies promoting I&T and AM. The bureau provides funding support for advanced manufacturing R&D through various schemes and encourages collaboration between industry, academia, and research institutions.

In December 2022, the Hong Kong Government promulgated the Hong Kong Innovation and Technology ("I&T") Development Blueprint. This document outlines a strategic plan for Hong Kong's I&T development over the next five to ten years. The plan is structured around four broad development directions, including enhancing the I&T ecosystem, enlarging the talent pool, promoting digital economy development, integrating into the country's overall development, and consolidating Hong Kong's role as a bridge connecting the Mainland to the world.

The Blueprint identifies five key industries with the highest potential for advanced manufacturing development in Hong Kong, including New Materials, New Energy, Microelectronics, Robotics, and Life and Health Technology.

The Hong Kong Government has established numerous initiatives to encourage these sectors. These include plans for cooperation between Hong Kong and Shenzhen in the advanced materials industry, initiatives to boost the proportion of renewable energy, the establishment of a Microelectronics R&D Institute, the significant potential of the robotics industry, and the robust life and health technology sector.

"Hong Kong has very strong foundations and knowledge to develop advanced manufacturing

Hong Kong manufacturers have established strong presence in the Pearl River Delta since the 80s and 90s. With the Hong Kong offices as the operating headquarters, enterprises adopted the "Front Shop, Back Factory" cooperation model. Due to the low operating cost in Pearl River Delta, the business focus of Hong Kong offices has gradually shifted to producer services, leading to a smooth transition of Hong Kong's economy towards the service industry. As such, even though many Hong Kong manufacturers have relocated to Mainland China and Southeast Asian countries in earlier years, the Hong Kong's manufacturing sector have very strong foundation and knowledge to distinguish itself in the current highly competitive market through the adoption of I&T and advanced technologies.

The Hong Kong Government looks to increase the percentage contribution of manufacturing sector to GDP from 1% currently to 5% by 2032 which provides prospective manufacturers an opportunity to return or enter Hong Kong to set up their operations with tremendous policy support, schemes and initiatives at their disposable."

Combined, the National 14th FYP, the Outline Development Plan for the GBA, Hong Kong's policy objectives, and the Hong Kong I&T Development Blueprint create a promising landscape for AM development in Hong Kong. These policies and initiatives, informed by a commitment to innovation and technology, provide a clear pathway for Hong Kong to become an international I&T hub.

3. Northern Metropolis: The Future of Advanced Manufacturing

Under the National 14th FYP, the Hong Kong Government aims to transform the Northern Metropolis (NM) into a global hub for innovation and technology (I&T). The NM Development Strategy (NMDS) proposes the creation of the San Tin Technopole to spearhead this transformation.

The Technopole, including the Hong Kong-Shenzhen I&T Park (HSITP), spans 627 hectares, with 300 hectares dedicated to I&T – a space equivalent to 17 Science Parks. This space will accommodate enterprises involved in R&D and advanced manufacturing.

Strategically located near Shenzhen's I&T zone, San Tin Technopole is poised to become an I&T development hub, fostering synergy with Shenzhen I&T Zone. It will contribute to the dual engine development of South-North (finance-I&T), offering a community for quality, healthy, and green living.

The development is designed to offer flexibility for different scales of I&T facilities and stages of the I&T value chain. The Hong Kong Government plans to allow a wide range of compatible uses for I&T land, potentially through public-private partnerships, attracting both local and international companies.

The first batch of unformed I&T land is expected to be available in Q4 2024, with formed sites ready by 2026. Enterprises may start operation earlier than 2031 subject to building construction time.

"The Hong Kong-Shenzhen Innovation and Technology Park under San Tin Technopole – New Home for Advanced Manufacturing

Four times the size of the current Hong Kong Science and Technology Park, the Hong Kong-Shenzhen Innovation and Technology Park (HSITP), under San Tin Technopole, is an unparalleled venture – it is anticipated to be the largest I&T platform ever established in the history of Hong Kong and acts as a key base for promoting I&T development in the Guangdong-Hong Kong-Macau Greater Bay Area (GBA) so as to attract top-tier enterprises, research institutions and higher education institutes from Hong Kong, Mainland cities and the rest of the world. Batch 1 development of HSITP, which comprised of eight buildings, has already commenced and will be completed in phases from 2024 to 2027."

4. Hong Kong Advantages to Support AM

A. Advanced Infrastructures: Hong Kong boasts world-class infrastructures crucial for the growth of the AM sector, including a stable and robust electricity supply, robust telecommunication and digital infrastructure, excellent road, highway, and transportation, and ready-to-lease I&T and AM facilities.

B. World Class Talents: Hong Kong has a world-class talent pool, ranking third globally in talent readiness in 2022.

C. Comprehensive Government Funding and Incentives: Hong Kong provides comprehensive government funding and incentives to support the AM sector, including the Innovative and Technology Fund (ITF), the Reindustrialisation Funding Scheme (RFS), and the Reindustrialisation and Technology Training Programme (RTTP).

D. High Quality Testing and Certification Standards: Hong Kong's robust testing and certification ecosystem, supported by key players such as the Reliability Testing Centre (RTC), the Robotics Catalysing Centre (RCC), the Centre for Advances in Reliability and Safety (CAiRS), and the Hong Kong Council for Testing and Certification (HKCTC), ensures stringent quality and reliability standards for AM.

E. Friendly Business Environment: Hong Kong's strategic location, free economy, and vibrant business environment create a friendly business environment for AM. The city's trusted legal system and robust IP protection regime safeguard innovations and technologies developed in the manufacturing process. As an international financial centre with a low, simple, and competitive tax system, Hong Kong provides a favourable environment for businesses.

Advanced Manufacturing

What is Advanced Manufacturing?

Based on internationally recognised definition, Advanced Manufacturing is the use of innovative technologies to improve the efficiency, productivity, and quality of manufacturing operations. It involves the integration of cutting-edge technologies, such as robotics, artificial intelligence, Internet of Things (IoT), and 3D printing, into traditional manufacturing processes to enable greater flexibility, customization, and precision.

The adoption of advanced manufacturing technologies and techniques has largely been driven by the fourth industrial revolution ("Industry 4.0" or "I4.0"). I4.0 is currently fostering the concept of "smart factory", which will lead to substantial increases in labour productivity, enabling countries with relatively high costs to be competitive in the global market, especially for making the manufacturing possible to produce high-value goods at low volumes. I4.0 can in fact address Hong Kong's labour challenges through high-tech enablers like automation, robotics, and AI. McKinsey Global Institute estimates that worldwide's automation can raise productivity growth by 0.8% - 1.4% annually[1]. Approximately 64% of tasks within the manufacturing industry can be automated. PwC predicts that I4.0 technologies could contribute US$15.7 trillion to the global economy by 2030[2].

By adopting I4.0 solutions, Hong Kong can enhance productivity, maintain competitiveness, and mitigate labour shortages and high labour costs, benefiting from the potential economic gains driven by these technologies. Through adopting new industrialisation, it supports the diversification of the Hong Kong economy by reducing reliance on traditional industries and finance, fostering innovation, and creating high-value jobs. This diversification strengthens the economy, making it more resilient to market fluctuations and enhancing its global competitiveness in technology and innovation-driven sectors.

Advanced manufacturing can be applied to a wide range of industries, from aerospace and automotive to pharmaceuticals and consumer goods. It involves the use of advanced materials and components, as well as digital design and simulation tools, to create highly specialized products and systems that meet the needs of today's fast-paced and constantly evolving market.

Advanced manufacturing and traditional manufacturing are two different approaches to manufacturing that involve different technologies, processes, and business models. Figure 1 below examines the difference in characteristics between traditional manufacturing and advanced manufacturing recognised by the industry[3]:

1 McKinsey Global Institute – A Future that Works: Automation, Employment, and Productivity, retrieved from: https://www.mckinsey.com/~/media/mckinsey/featured%20insights/Digital%20Disruption/Harnessing%20automation%20for%20a%20future%20that%20works/MGI-A-future-that-works_Full-report.pdf

2 PwC – Sizing the Prize: What's the Real Value of AI for Your Business and How Can You Capitalise?, retrieved from: https://www.pwc.com/gx/en/issues/data-and-analytics/publications/artificial-intelligence-study.html

3 Thomasnet - What is Advanced Manufacturing, retrieved from: https://www.thomasnet.com/articles/services/what-is-advanced-manufacturing/

Figure 1

Difference between Traditional and Advanced Manufacturing

Characteristics	Traditional Manufacturing	Advanced Manufacturing
Production Strategy	• Mass Production	• Customisation and customer-focused
Labour Supply Criteria	• Abundant labour supply	• Skilled/technical labour available
Labour Skill Level	• Unskilled and semi-skilled	• Semi-skilled and technical skills
Educational level	• On-the job training, high school/vocational school	• Technical degree from college or university
Labour Force	• Labour intensive	• Skilled workers
Production Technology	• Casting, welding, moulding, brazing, machining, etc.	• Additive and rapid manufacturing – 3-D printing, robotics, material deposition, etc.
R&D/Innovation	• Investment into production	• Re-invest revenues into R&D
Energy requirements	• Low-cost	• Low-cost and high-power resiliency
Infrastructure Requirements	• Free space	• Information technology and digital infrastructure
Logistics	• Road and rail accessibility	• Global supply chain management

Source: Thomasnet

Why Advanced Manufacturing is suitable for Hong Kong?

As the advanced manufacturing including new materials/ microelectronics / smart manufacturing industries and products become more complex and customised, the manufacturing focus shifts from labour cost savings to having the ability to build, implement and execute complex processes. The advanced and new technologies make the manufacturing possible to produce high-value goods at low volumes, which is considered as suitable for Hong Kong.

Advanced manufacturing leveraging I4.0 solutions is suitable for Hong Kong as they enable low-volume, high-value production through automation, addressing labour shortage, high labour costs, and expensive land. Given the highly educated workforce in Hong Kong, with 53.3% of individuals aged 25-34 holding a tertiary degree as of 2019, there is a strong foundation for this shift. Coupled with robust policy support, excellent infrastructure, and a strategic geographical location, Hong Kong is well-positioned to adopt and implement these sophisticated technologies, optimizing its land use.

I4.0 solutions help reduce production space requirements, thereby making efficient use of Hong Kong's limited and costly land. By adopting I4.0, Hong Kong can leverage its strengths, enhance productivity, and solidify its position as a global innovation hub. This transition will be attractive to investors and talents, further driving the region's growth and development.

Robust National and Government Support

National Policies Objectives

The National 14th Five-Year Plan ("National 14th FYP") clearly outlines the country's development goals and priorities for the period from 2021 to 2025. One of the main objectives of the National 14th FYP is to accelerate the development of high-tech industries, including advanced manufacturing, by increasing investment in research and development (R&D), innovation, and industrial upgrading. The National 14th FYP also calls for the establishment of a number of new technology innovation centres and industrial parks, as well as the expansion of existing ones, to support the growth of high-tech industries.

In addition, the National 14th FYP aims to promote the development of nine strategic emerging industries that would become the new pillars in its economy, including: 1) next-gen Information & Technology, 2) biotechnology, 3) new materials, 4) new energy vehicles, 5) new energy, 6) high-end equipment manufacturing, 7) environmental protection, 8) aeronautics and astronautics, and 9) marine equipment, by providing incentives for companies to invest in these areas and promoting the development of related supply chains.

Regional Policies Objectives

On the regional level, The Outline Development Plan for the Guangdong-Hong Kong-Macao Greater Bay Area ("Outline Development Plan"), promulgated in February 2019, outlines the current and future cooperation and development of the Greater Bay Area ("GBA"). One of the key objectives under the Outline Development Plan is to expedite the growth of advanced manufacturing and modern service industries and develop an advanced manufacturing base with international competitiveness, measures include:

- Enhancing the existing advanced manufacturing industrial clusters: GBA will further enhance the facilities and facilitating policies of the existing advanced manufacturing industrial clusters, including the Guangzhou-Shenzhen Science and Technology Innovation Corridor, the Shenzhen International Bio Valley, and the Dongguan Songshan Lake High-Tech Industrial Development Zone. These clusters are designed to attract investment, promote innovation, and build a world-class ecosystem for advanced manufacturing in the region;

- Promoting R&D and innovation: GBA has launched several initiatives to promote R&D and innovation in the advanced manufacturing sector and the target is to increase the share of R&D investment in GDP to over 3% by 2025 from 2.6% in 2020;

- Developing talent: These initiatives include the expansion of vocational training programmes, the promotion of lifelong learning, and the provision of support for talent development and retention, so as to develop a highly skilled workforce that can support the growth of advanced manufacturing in the region; and

- Building infrastructure: GBA has launched several initiatives to build the infrastructure needed to support the growth of advanced manufacturing in the region, including the expansion of transportation and logistics systems, the promotion of digital technologies, and the development of financing mechanisms to support infrastructure projects.

In sum, the GBA development brings valuable opportunities to Hong Kong's Innovation and Technology (I&T) development. Leveraging on its advantages in R&D development, internationalisation and its status as an international finance hub, Hong Kong can pool together innovation resources from the GBA and the world to promote R&D on I&T, and boost the competitiveness of Hong Kong.

Hong Kong's Policy Objectives

In the Chief Executive's 2022 Policy Address, 're-industrialisation' has been identified as one of the key initiatives to facilitate Hong Kong's goal to become an international I&T hub. The following highlights the policies and actions as part of the Hong Kong Government initiative to promote 're-industrialisation':

- Establishment of Innovation, Technology and Industry Bureau: The Hong Kong Government has established the Innovation, Technology and Industry Bureau, which is responsible for formulating policies and strategies to promote I&T and advanced manufacturing development in Hong Kong;

- Provision of funding support: The Hong Kong Government provides funding support for advanced manufacturing R&D projects through various schemes such as the Enterprise Support Scheme (ESS) and the Partnership Research Programme (PRP), as well as subsidies to help set up new smart production lines in Hong Kong under the Re-industrialisation Funding Scheme;

- Development of industrial parks: The Hong Kong Government is developing facilities to support the development of advanced manufacturing such as the Hong Kong Science Park, InnoPark and the Hong Kong-Shenzhen Innovation and Technology Park to provide infrastructure and support services for advanced manufacturing companies, including exploring the possibility of constructing the second Advanced Manufacturing Centre at InnoPark; and

- Promotion of collaboration: The Hong Kong Government promotes collaboration between industry, academia, and research institutions to drive I&T development in the advanced manufacturing sector.

In the latest 2023-24 Budget, the Hong Kong Government has furthered that advanced manufacturing activities generate R&D demand and encourage private enterprises to invest more resources in R&D work, thereby supporting Hong Kong in developing into an international I&T hub. To further attract strategic enterprises to establish a presence in Hong Kong and promoting new industrialisation, the Hong Kong Government looks to provide more advanced manufacturing space for which prospective operators can benefit from its proposed world class infrastructure and supporting ecosystem.

The Innovation and Technology Development Blueprint to expedite the development of advanced manufacturing in Hong Kong

In December 2022, the Hong Kong Government promulgated the Hong Kong Innovation and Technology Development Blueprint to establish a clear development path and formulate systematic strategic planning for Hong Kong's I&T development over the next five to ten years, charting Hong Kong in moving full steam towards the vision of an international I&T hub.

The Hong Kong Government has formulated the Blueprint from the perspective of top-level planning and design, and will take forward the Blueprint under four broad development directions, namely "to enhance the I&T ecosystem and promote 'new industrialisation' in Hong Kong"; "to enlarge the I&T talent pool to create strong impetus for growth"; "to promote digital economy development and develop Hong Kong into a smart city"; and "to proactively integrate into the overall development of the country and consolidate our role as a bridge connecting the Mainland and the world".

The advanced manufacturing sector has been in fact earmarked to be an important sectoral development in sustained economic development and FIVE key industries have been identified to have the utmost potential for advanced manufacturing development in Hong Kong, including New Materials, New Energy, Microelectronics, Robotic as well as Life and Health Technology.[4]

- **New Materials** – The Outline Development Plan for the Guangdong-Hong Kong-Macao GBA includes plans to strengthen cooperation between Hong Kong and Shenzhen in the advanced materials industry. Hong Kong's Nano and Advanced Materials Institute (NAMI) is a world-renowned R&D centre for materials, and can play a vital role in integrating Hong Kong's research findings into practical applications in Shenzhen.

- **New Energy** – The Hong Kong Government's goal is to boost the proportion of renewable energy in the fuel mix for electricity generation from its current level of less than 1% to 7.5% to 10% by 2035, followed by a subsequent increase to 15%. In order to achieve this objective, the Hong Kong Government has implemented initiatives such as the Solar Harvest Scheme and the Feed-in Tariff (FiT) Scheme to promote the development of renewable energy.

- **Microelectronics** – In 2020, Hong Kong became the leading global exporter of integrated circuits (ICs), with an export value of USD 153 billion. The upcoming Microelectronics Centre ("MEC"), is scheduled to be in operation in 2024, will provide strong research capability and support industry development & pilot production of the industry's third generation semiconductor products. To further strengthen the industry, the Hong Kong Government has proposed the establishment of a Microelectronics R&D Institute, aimed at fostering collaboration among universities, R&D centres, and the industry.

- **Robotics** – The industrial robotics market in 2019 was dominated by the Asia Pacific region, which accounted for 58% of the market share across various industries, including manufacturing and healthcare. The robotics industry presents promising business opportunities in Hong Kong, with the advent of I4.0.

4 Reindustrialisation Study – Hong Kong, HKPC, retrieved from: https://www.hkpc.org/sites/default/files/2022-01/hkpcxhku_reindustrialisation_study_chi.pdf'

- **Life and Health Technology** – With a biotech and healthcare fundraising amount of almost HK$255 billion (US$32.85 billion) in 2021, Hong Kong has established itself as the largest hub for fundraising in this area in Asia and globally. Over 250 life and health technology businesses are currently operating in Hong Kong, making it a significant player in this field.

Hong Kong has very strong foundations and knowledge to develop advanced manufacturing

Hong Kong manufacturers have established strong presence in the Pearl River Delta since the 80s and 90s. With the Hong Kong offices as the operating headquarters, enterprises adopted the "Front Shop, Back Factory" cooperation model. Due to the low operating cost in Pearl River Delta, the business focus of Hong Kong offices has gradually shifted to producer services, leading to a smooth transition of Hong Kong's economy towards the service industry. As such, even though many Hong Kong manufacturers have relocated to Mainland China and Southeast Asian countries in earlier years, the Hong Kong's manufacturing sector have very strong foundation and knowledge to distinguish itself in the current highly competitive market through the adoption of I&T and advanced technologies.

The Hong Kong Government looks to increase the percentage contribution of manufacturing sector to GDP from 1% currently to 5% by 2032[5] which provides prospective manufacturers an opportunity to return or enter Hong Kong to set up their operations with tremendous policy support, schemes and initiatives at their disposable.

5 ITIB, 2022, Hong Kong Innovation and Technology (I&T) Development Blueprint, retrieved from: https://www.itib.gov.hk/en/publications/I&T%20Blueprint%20Book_EN_single_Digital.pdf

Advanced Infrastructures

World-class infrastructures and facilities are crucial to the promotion of advanced manufacturing. The Hong Kong Government is currently providing a wide range of different facilities to support I&T development. The Hong Kong Government has established various initiatives and programmes to support the growth of the advanced manufacturing sector, including providing ready-to-lease spaces to land for greenfield development as well as offering state-of-the-art facilities and infrastructure to support innovation and research activities in specific areas such as biotechnology and microelectronics.

Stable and robust electricity supply at competitive price

Hong Kong's stable electricity supply, managed by CLP Power Hong Kong and Hongkong Electric, supports advanced manufacturing development. With a 12,600 MW generation capacity in 2020, a nearly 100% availability rate, and a 30% reserve margin, Hong Kong's power infrastructure meets the needs of industries requiring consistent power.[6]

The city uses diverse energy sources, including natural gas, coal, and nuclear power, and has increased natural gas usage for sustainability. The Hong Kong Government is committed to green energy, aiming to raise the share of renewable energy in the total supply to 7-10% by 2030. The Feed-in Tariff (FiT) scheme incentivises the installation of renewable energy systems, which includes solar PV systems and small-scale wind turbines, by allowing premises to sell the renewal energy generated at a premium rate.[7]

In summary, Hong Kong's reliable electricity supply, diverse energy sources, and commitment to green energy set the stage for the sustainable growth of advanced manufacturing industries.

Robust telecommunication and digital infrastructure

Hong Kong's strong digital infrastructure is vital for supporting advanced manufacturing development. The city boasts an impressive internet penetration rate of approximately 95.7% and a mobile penetration rate exceeding 290%, demonstrating its extensive digital connectivity[8] Hong Kong's robust, high-speed broadband infrastructure, with multiple international and regional submarine cable systems, ensures low-latency and high-capacity data transmission.

The city is a regional hub for data centres, mainly operated by local and international providers. Hong Kong's data centres benefit from reliable electricity supply, stable climate and strategic geographic location. The Hong Kong Government is committed to promoting the data centre industry by allocating land and resources specifically for their expansion.

Hong Kong's advanced digital infrastructure, characterised by its widespread connectivity, efficient network, and thriving data centre industry, lays the foundation for advanced manufacturing industries, enabling real-time communication and seamless data sharing among stakeholders.

6 CLP Group - About CLP, retrieved from https://www.clpgroup.com/en/about-clp/overview

7 GovHK - Feed-in Tariff, retrieved from: https://www.gov.hk/en/residents/environment/sustainable/renewable/feedintariff.htm

8 Survey on IT Usage and Penetration, Office of the Government Chief Information Officer, HKSAR Government, from: https://www.ogcio.gov.hk/en/about_us/facts/it_usage_penetration_survey.html

Unparalleled Digital Infrastructure – A Key Enabler for Advanced Manufacturing

In 2021 Hong Kong was the third most digital city in Asia, and ninth in the world[9]. With a highly developed digital infrastructure, Hong Kong industries enjoy superior connectivity and cloud-enabled computing to support digitally enabled and data driven production methods and advanced technologies.

According to the World Competitiveness Year 2021[10], Hong Kong's fixed broadband services are currently available at speeds up to 10 Gbps which is ranked second in average broadband internet speed out of 64 economies. Apart from network infrastructure, Hong Kong has a world-class data centre ecosystem hosting around 400+ MW of IT power to support Hong Kong's digitalisation needs. More importantly, Hong Kong's digital infrastructure is supported by 12 submarine cable landing stations providing uninterrupted connectivity to Asia, Africa, Europe, EMEA and the United States.

With a robust digital infrastructure, including high-speed networks and cloud computing, Hong Kong can enjoy the numerous benefits associated with advanced manufacturing. This infrastructure enables the real-time collection, storage, and analysis of vast amounts of data from sensors, machines, and other devices, providing enhanced visibility into production processes and facilitating more informed decision-making. Consequently, investing in 5G and digital infrastructure is crucial for the growth of advanced manufacturing industries, as it fosters increased innovation, productivity, and competitiveness.

9 IMD World Digital Competitiveness Ranking 2022

10 Telecommunications, Communications Authority Retrieved from: https://www.ofca.gov.hk/filemanager/ofca/en/content_113/telecommunications.pdf

Excellent road, highway and transportation

Hong Kong's world-class transport infrastructure is exemplified by its multimodal transportation system. The Hong Kong International Airport (HKIA) was named the world's busiest cargo airport in 2022, handling a total of 4.2 million tonnes of cargo during the year, and connecting to more than 220 destinations worldwide.[11] The Port of Hong Kong ranked as the nineth busiest container port globally in 2021, handling approximately 17.8 million twenty-foot equivalent units (TEUs) of containers.[12] The 55-kilometer-long Hong Kong-Zhuhai-Macao Bridge[13], the world's longest sea-crossing bridge, and the 142-kilometer-long Guangzhou-Shenzhen-Hong Kong Express Rail Link[14] enhance regional connectivity and support advanced manufacturing industries.

The Hong Kong International Airport
4.2million
tonnes of cargo in 2020

Ready-to-lease I&T and AM facilities

Hong Kong Science and Technology Park – a Hong Kong Flagship Technology Infrastructure

The Hong Kong Government established the Hong Kong Science and Technology Park (HKSTP) in 2001 - a Hong Kong's flagship technology infrastructure. Occupying an area of 22 ha in Pak Shek Kok, HKSTP, under the management of the Hong Kong Science and Technology Corporation (HKSTPC), is aimed to provide one-stop facilities and services supporting the development of I&T, which includes a wide range of facilities such as laboratories, prototyping workshops, and office and manufacturing spaces that are available for lease to businesses and research institutions.

11 Hong Kong International Airport (HKIA) Media Centre – HKIA Named the World's Busiest Cargo Airport in 2022, retrieved from: https://www.hongkongairport.com/en/media-centre/press-release/2023/pr_1642

12 Hong Kong Trade Development Council (HKTDC) Research – Logistics Industry in Hong Kong, retrieved from: https://research.hktdc.com/en/article/MzExMjkxOTgy

13 Hong Kong-Zhuhai-Macao Bridge – Facts and Figures, retrieved from: https://www.hzmb.gov.hk/eng/about-us.html

14 MTR Corporation – High Speed Rail, retrieved from: https://www.highspeed.mtr.com.hk/en/home/index.html

InnoParks – a vision to drive new industrialisation and a new era of economic growth and I&T opportunities

In addition, HKSTPC is managing and operating THREE InnoParks in Tai Po, Yuen Long and Tseung Kwan O, with a combined total area of approximately 217 hectares in Hong Kong. These land resources and multi-storey industrial space will support the tech-driven R&D for developing Industry 4.0.

To strengthen the entire I&T ecosystem from R&D to manufacturing, the INNOPARKs will help industrialists and pioneers accelerate their research into innovation-driven manufacturing or "innofacturing" and market-ready offerings in areas like advanced manufacturing.

Dovetailing the development on "new industrialisation", the Hong Kong Government has developed "ready-to-lease" industrial buildings at the InnoParks to encourage manufacturers to set up their production bases in Hong Kong, promoting smart production and attracting high value-added technology industries and manufacturing processes suitable for advanced manufacturing in Hong Kong. These facilities include:

- **The Advanced Manufacturing Centre (AMC):** HKSTPC has developed the state-of-the-art AMC at Tseung Kwan O INNOPARK, providing a gross floor area (GFA) of about 108,580 sq. m. Opened in 2022, the AMC equips companies of different scales with scalable, efficient, and dedicated logistics serviced manufacturing space, and assists them in embarking on technological innovation, high value-added and low volume but highly customised production with the application of advanced manufacturing and testing processes. AMC also provides comprehensive services for logistics, warehousing, prototyping, low-volume assembly and cleanroom-enabled space. With its high-quality architecture, purpose-oriented and sustainable design, AMC has won recognition from various local, regional and international awards.

  A purpose-developed advanced manufacturing base for industrialists to fast-track commercialization, the AMC is equipped to serve I4.0, which include

  – Medical, health and hospital devices and equipment
  – Robo-electronics and smart power devices for smart city applications
  – Smart electronics and optical equipment
  – Smart sensor fabrication, semiconductor advanced packaging
  – Biomedical engineering devices, implants and equipment

Alongside with the presence of core facilities at the AMC, it also has a provision of professional services for high production efficiency, allowing industrialists to focus their valuable resources on their core propositions. This includes:

- **Proshop** – Commercialisation base for advanced technologies, which include:
  - Industrial design / Mechanical design development support
  - Low volume manufacturing services
  - Laboratory service in pre-certification, reliability and FMEA
- **Third Party Logistics (3PL) Services** - Provision of automatic logistics solution at the AMC, powered by DB Schenker, a global leading logistics service provider
- **The Precision Manufacturing Centre (PMC)** is also situated in the Tai Po InnoPark, providing a GFA of about 8,500 sq. m. Inaugurated on 2018, the PMC sits on a refurbished four-storey factory, and it is one of the first facilities in Hong Kong that is specifically targeted to advanced manufacturing. Tenants of PMC include enterprises engaging in precision engineering and assembly, new material manufacturing and environment-friendly yarn production, tooling and advanced indoor hydroponic industries.
- **The Medical Accessory Resilience Supplies (MARS)**[15] is located in the Tai Po InnoPark, providing a GFA of about 18,600 sq.m. Aimed at boosting the local capacity for supplying personal protective equipment, this refurbished industrial building is built for products demand precision, hygiene and quality at all levels of the production cycle. Medical products that are manufactured there include masks and protective equipment. MARS is equipped with specific features that are "built to fit", which include clean rooms, compressed air supply, and high floor loading for industrial equipment.
- **Microelectronics Centre (MEC)**: HKSTPC is developing MEC in the Yuen Long InnoPark to provide the industry with the necessary dedicated facilities and shared ancillary facilities for the development, testing, trial production/prototype production of microelectronic products, such as semiconductor chips including sensors, third-generation semiconductors and heterogeneous integrated microelectronics, etc. The construction works for the MEC is expected to be opperational in 2024, and will provide over 36,000 sq. m. of gross floor area to support and promote the development of the microelectronics industry in Hong Kong, and the application of R&D in high value-added industries.

Land for greenfield development of advanced manufacturing

The Hong Kong Government also provides support for greenfield development by offering land for development. Under this arrangement, the Hong Kong Government releases land parcels for sale to private developers, which can be used for the development of factories, warehouses, and other industrial facilities.

The Hong Kong Government is committed to the further promotion of new industrialisation. With the success garnered from the inauguration of the advanced manufacturing sites such as the AMC and the PMC, the Hong Kong Government has plans to further develop infrastructure capabilities in the surrounding areas incorporating cutting-edge equipment and support facilities to create an advanced manufacturing ecosystem attractive to multi-national corporations to operate and renowned local brands to return to Hong Kong.

15 HKSTP, 2022, https://www.hkstp.org/why-we-innofacture/innofacturing-tomorrow/mars-centre/

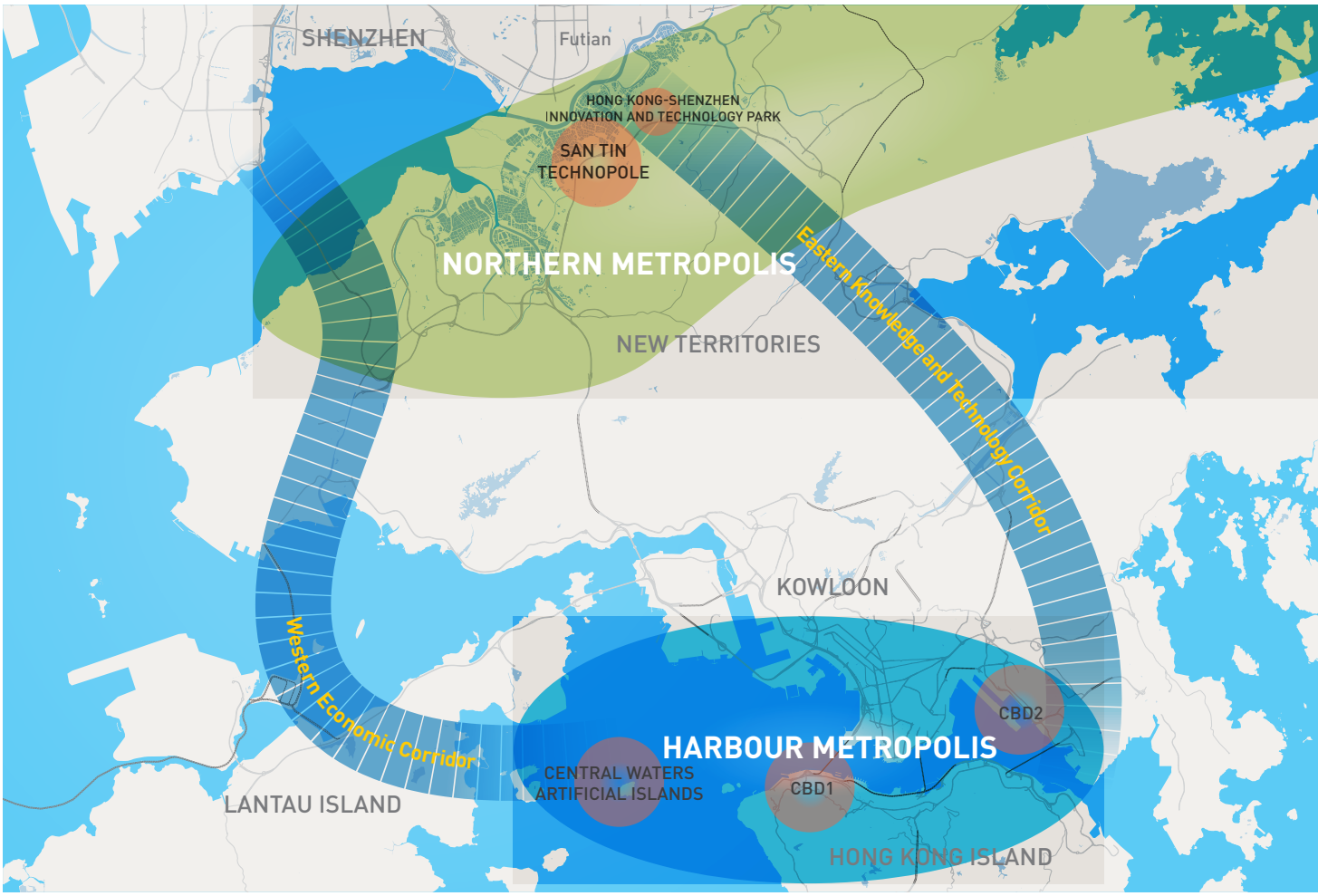
Northern Metropolis:
New home for Advanced Manufacturing

With the National 14th Five-Year Plan supporting Hong Kong to develop into an international I&T hub, the Hong Kong Government aspires to develop the Northern Metropolis into a "new international I&T city". The Northern Metropolis Development Strategy (NMDS) released in 2021 put forward the proposal for San Tin Technopole.

The Northern Metropolis ("NM"), spanning approximately 30,000 ha, with a projected population of 2.5 million, provide over 500,000 new flats as well as generate some 650,000 job opportunities, including 150,000 positions in I&T.[16] The NM's emphasis on I&T industry and the Harbour Metropolis' concentration of high-value financial and professional services will complement each other, resulting in a synergistic effect that will propel Hong Kong's overall development.

Figure 2

Synergy in I&T Development between Northern Metropolis and Harbour Metropolis



16 Northern Metropolis Development Strategy Report, retrieved from: https://www.policyaddress.gov.hk/2021/eng/pdf/publications/Northern/Northern-Metropolis-Development-Strategy-Report.pdf

Figure 3

Conceptual illustration of Rendered I&T Park in San Tin Technopole[17]

Located at the heart of Northern Metropolis and in close proximity to Shenzhen's I&T zone in Huanggang and Futian, San Tin Technopole is strategically positioned to be a hub for clustered I&T development that creates synergy with Shenzhen I&T Zone. It will contribute to the development of the South-North dual engine (finance – I&T), and become a new community for quality, healthy and green living.

Figure 4

Strategic location of San Tin Technopole[18]

17 San Tin Technopole – Recommended Outline Development Plan, retrieved from: https://nm-santintech.hk/en/land-use-proposal/rodp/

18 San Tin Technopole – Planning Vision and Positioning, retrieved from: https://nm-santintech.hk/en/study-overview/pvap/

San Tin Technopole, including the Hong Kong-Shenzhen I&T Park (HSITP) at the Loop, has a total development area of 627 hectares (ha). Underlining The Hong Kong Government's strong commitment to I&T development, the I&T Park (mainly located at the northern part of San Tin Technopole with the southern part planned as an integrated neighbourhood with provision of 50,000 housing units and comprehensive public and community facilities) and HSITP will collectively provide 300 ha I&T land, comparable to the I&T zone in Shenzhen with a size of 300 ha on the other side of Shenzhen River. Accounting for about half of the total development area of San Tin Technopole, the 300 ha I&T land are capable of accommodating 7 million sqm of gross floor area, equivalent to 17 Science Parks.

Figure 5

Overview of the San Tin Technopole[19]

The I&T Park will be served by two cross-boundary rail links to foster travel between Hong Kong and Shenzhen, namely the proposed Northern Link Spur Line connecting to the future co-located new Huanggang Control Point, with new stations near Chau Tau and HSITP, and the existing Lok Ma Chau Spur Line.

The I&T land in San Tin Technopole will be allocated to enterprises to carry out R&D and advanced manufacturing activities. These enterprises may also call for co-location of research, production, staff accommodation and other facilities on the same site. In particular, San Tin Technopole will provide about 6,400 talent accommodations.

Connected land parcels of different sizes, including some sizable ones, have been designed within the I&T Park to provide flexibility in allocation of land for I&T facilities of different scales (start-ups, leading tech firms), different I&T fields (life and health technology, artificial intelligence and data science, advanced manufacturing and new energy technology, etc.), and different stages of I&T value chain (upstream (R&D), midstream (prototype or application development) or downstream (manufacturing) processes).

Figure 6

Different stages of I&T Value Chain[20]

19 San Tin Technopole – Recommended Outline Development Plan, retrieved from: https://nm-santintech.hk/en/land-use-proposal/rodp/

20 https://nm-santintech.hk/en/key-planning-features/its/

In order to nurture a more complete I&T ecosystem, San Tin Technopole can cater for the land uses of different I&T fields and different stages of the I&T value chain, as well as the needs for talent accommodation and other supporting facilities. The Hong Kong Government will formulate a wider range of permitted uses which are compatible with each other for I&T land.

The Hong Kong Government will consider various forms of public-private partnership. When granting land for I&T uses in the area, land disposal methods other than open tendering may be considered taking into account the industry-specific policy of the Innovation, Technology and Industry Bureau. The first batch of unformed I&T land is expected to be available in Q4 2024 for works to start and becomes formed sites in 2026. The Hong Kong Government may also consider allowing the prospective enterprises to carry out site formation works. I&T enterprises may start operation earlier than 2031 subject to time required for building construction.

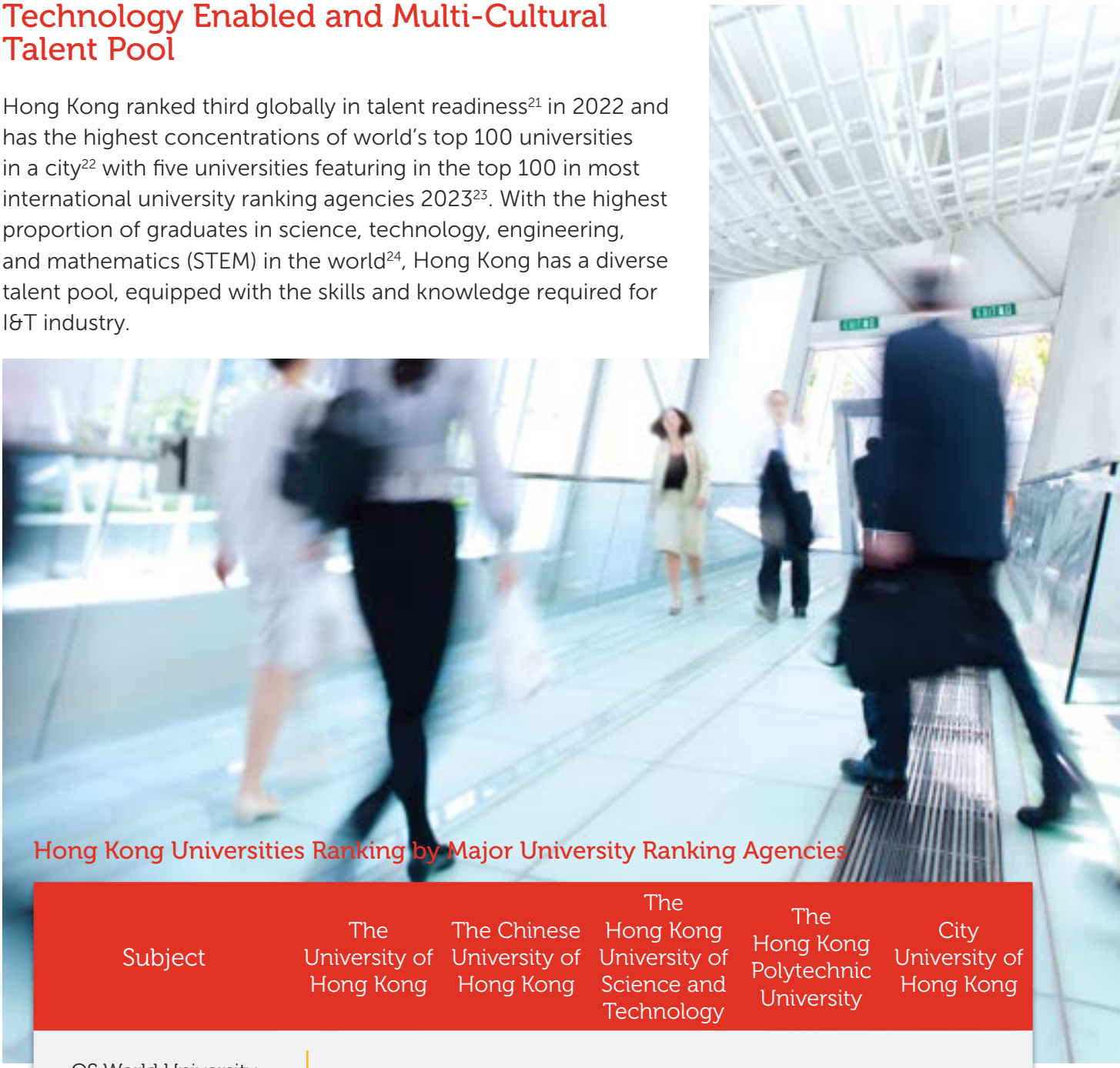
The Hong Kong-Shenzhen Innovation and Technology Park under San Tin Technopole – New Home for Advanced Manufacturing

Four times the size of the current Hong Kong Science and Technology Park, the Hong Kong-Shenzhen Innovation and Technology Park (HSITP), under San Tin Technopole, is an unparalleled venture – it is anticipated to be the largest I&T platform ever established in the history of Hong Kong and acts as a key base for promoting I&T development in the Guangdong-Hong Kong-Macau Greater Bay Area (GBA) so as to attract top-tier enterprises, research institutions and higher education institutes from Hong Kong, Mainland cities and the rest of the world. Batch 1 development of HSITP, which comprised of eight buildings, has already commenced and will be completed in phases from 2024 to 2027.

World Class Talents

Technology Enabled and Multi-Cultural Talent Pool

Hong Kong ranked third globally in talent readiness[21] in 2022 and has the highest concentrations of world's top 100 universities in a city[22] with five universities featuring in the top 100 in most international university ranking agencies 2023[23]. With the highest proportion of graduates in science, technology, engineering, and mathematics (STEM) in the world[24], Hong Kong has a diverse talent pool, equipped with the skills and knowledge required for I&T industry.



Hong Kong Universities Ranking by Major University Ranking Agencies

Subject	The University of Hong Kong	The Chinese University of Hong Kong	The Hong Kong University of Science and Technology	The Hong Kong Polytechnic University	City University of Hong Kong
QS World University Rankings 2024[22]	26	47	60	65	70
Times Higher Education World University Rankings 2023[23]	31	45	58	79	99

21 Institute for Management Development World Talent Ranking, 2022
22 QS World University Rankings 2024
23 THE World University Rankings 2023
24 Institute for Management Development World Talent Ranking, 2022

Package of initiatives offered to trawl the world for talent

Initiative	Target
Top Talent Pass Scheme (TTPS)	• Individuals whose annual salary reached HK$2.5 million (US$322.58 thousand) or above; or • Degree graduates of the world's top 100 universities
General Employment Policy (GEP) - Entrepreneurs (for non-Mainland residents)	• Entrepreneurs from overseas, Taiwan and Macao who plan to establish or join in a business in Hong Kong
General Employment Policy (GEP) & Admission Scheme for Mainland Talents and Professionals (ASMTP)	• Chinese residents of the Mainland & overseas residents with special skills, knowledge or experience of value to and not readily available in Hong Kong
Technology Talent Admission Scheme (TechTAS)	• Overseas and Mainland technology talent to undertake R&D work for eligible companies
Quality Migrant Admission Scheme (QMAS)	• Highly skilled or talented individuals who have not yet secured a job offer in Hong Kong
Admission Scheme for the Second-Generation of Chinese Hong Kong Permanent Residents (ASSG)	• Second generation of emigrated Chinese Hong Kong permanent residents
Immigration Arrangements for Non local Graduates (IANG)	• Non-local graduates; or • Hong Kong's universities GBA campus graduates

Languages used by the Professional in Hong Kong [25]

>90% are able to read and write both Chinese and English

Hong Kong aims to encourage the young generation to pursue careers in the advanced manufacturing field. Hong Kong Productivity Council (HKPC) and Vocational Training Council (VTC) offer upskilling programmes for the workforce and work-based experience, internships, and full-time employment opportunities via collaboration with the industry for graduates to nurture talents valued by industries.

Hong Kong has a solid foundation in the biotech and AI research to support the advanced manufacturing development through transformation and commercialisation of R&D outcomes. Universities in Hong Kong are home to multiple top scientists in the life and health technology field[26] and ranked third globally for the production of most cited and impactful research on AI[27].

To supplement the local talent, the Hong Kong Government is proactively and aggressively trawling the world for talent. The Talents Service Unit (TSU) formulates strategies and provide one stop support for incoming talents and dedicated teams in The Hong Kong Government's Mainland and overseas Economic and Trade Offices (ETOs) would leverage their global network to reach out to target talents.

25 Hong Kong 2021 Population Census
26 Clarivate Highly Cited Researchers 2022
27 Hong Kong I&T Development Blueprint

Comprehensive Government Funding and Incentives

Innovative and Technology Fund (ITF)

The ITF was established on 30 June 1999 and is currently administered by the Innovation and Technology Commission (ITC). ITF aims to increase the added value, productivity and competitiveness of our economic activities. It is designed to fund local companies wishing to upgrade their technological level and introduce innovative ideas to their business in Hong Kong.

As of May 2022, the Financial Committee of the Legislative Council has approved a total of HK$ 45.93 billion[28] for ITF to support the funding schemes. The ITF covers a broad spectrum of beneficiaries, including local public research institutions, various public entities, start-ups and many relevant I&T enterprises/organisations in Hong Kong. Under the five defined goals within the ITF, 17 funding schemes have been administered to serve each of the goals mentioned, as illustrated in the following table:

List of initiatives offered under the ITF [29]

Goals	Relevant Funding Schemes
Supporting R&D	• Innovation and Technology Support Programme (ITSP) • Mainland – Hong Kong Joint Funding Scheme (MHKJFS) • Guangdong – Hong Kong Technology Cooperation Funding Scheme (TCFS) • Partnership Research Programme (PRP) • Enterprise Support Scheme (ESS) • R&D Cash Rebate Scheme (CRS)
Facilitating Technology Adoption	• Public Sector Trial Scheme (PSTS) • Technology Voucher Programme (TVP) • Innovation and Technology Fund for Better Living (FBL) • Re-industrialisation Funding Scheme (RFS)
Nurturing Technology Talent	• Research Talent Hub (RTH) • STEM Internship Scheme • Reindustrialisation and Technology Training Programme (RTTP)
Supporting Technology Start-ups	• Technology Start-up Support Scheme for Universities (TSSSU) • Innovation and Technology Venture Fund (ITVF)
Fostering an I&T Culture	• General Support Programme (GSP) • Patent Application Grant (PAG)

28 HKSAR Government, the 2023/24 Budget, retrieved from: https://www.budget.gov.hk/2023/chi/pdf/c-itf.pdf

29 Innovation and Technology Commission, 2022, retrieved from: https://www.itf.gov.hk/l-eng/about.asp

Reindustrialisation Funding Scheme (RFS)

Announced in the 2018 Policy Address and the 2019-20 Budget, the RFS is a funding scheme which supports the ITF's goal to facilitate technology adoption in Hong Kong. With HK$2 billion (US$258.06 million) injected into the scheme, the RFS was launched in 2020 to subsidize manufacturers to set up smart production lines in Hong Kong, covering sectors such as biotech, food manufacturing, textiles, construction, medical devices and more. All companies incorporated in Hong Kong are eligible to apply for the funding.

Key Features: [30]

- Entire or a significant portion of the production line under application should fulfil the "smart manufacturing" criteria. i.e. the integrated and intelligent use of "smart" technologies such as IoT, real-time data, application of data analytics and advanced human-machine interfaces, artificial intelligence/machine learning/deep learning, automation and robotics, sensors and actuators, etc. in the production process.
- Funding will be provided on a 1 (government) : 2 (company) matching basis.
- Maximum funding support: one-third of the total approved project cost or HK$15 million (US$1.95 million) per project, whichever is lower.
- Funding scope: Expenses directly related to the establishment of the new production line in Hong Kong, including but not limited to the cost of procurement, installation, fees for technical consultants, and any administrative costs incurred.
- Project duration: normally within 24 months.

CASE STUDY

Hong Kong Maxim Group to set up a new smart food production line in Tai Po InnoPark [31]

Luk Yeung Restaurant Ltd, a member company under the Hong Kong Maxim Group, is a Hong Kong based food beverage and restaurant chain operates over 1,000 outlets in Hong Kong, Mainland China and South-East Asia. Renowned for its food products, it has set up a new smart production line for its mooncake products through the RFS.

Carried out in the Tai Po Innopark, the manufacturing line has adopted advanced technologies. This includes IoT, robotics and automation, an advanced human-machine interface, machine vision and digital manufacturing systems to set up a real-time data-driven smart production line for its mooncake products. The mooncake products are mainly sold to the local market but has also exported to overseas markets.

Given Hong Kong's food products are world renowned and maintain high standards in food safety and quality, the RFS has helped to enhance the competitive edge of Hong Kong's food manufacturing industry against regional competitors. With the funding support of the RFS, new smart production lines can be set up in Hong Kong to increase production capacity, enabling exploration and expansion of the industry to 'untapped' international markets.

30 Innovation and Technology Commission, 2022, retrieved from: https://www.itf.gov.hk/sc/funding-programmes/facilitating-technology/rfs/index.html

31 HKSAR Press Releases, 2023, Re-industrialisation Funding Scheme funds project to set up smart production line for mooncake products (with photos), retrieved from: https://www.info.gov.hk/gia/general/202302/09/P2023020900326.htm

Reindustrialisation and Technology Training Programme (RTTP)

Launched by the ITC in August 2018 with the goal to nurture technology talent, RTTP was developed to offer subsidies to enterprises to train their staff in advanced technologies, especially those related to I4.0. As of March 2022, RTTP has approved over 2,600 applications for registering public courses and funded over 9,650 staff of local enterprises to receive training in advanced technologies with total funding of about HK$102 million (US$13.26 million). Enterprises which applied for training grants are from different industries, e.g. manufacturing, microelectronics, food production and processing, and automobile parts industries, etc., some of which are small and medium enterprises.[32]

Key Features:

- Maximum Funding Support: HK$500,000 (US$ 65 thousands) for each enterprise in each financial year.
- Mode of funding: Reimbursement with an option for 50% partial advance payment of training grant.
- Both local and non-local training courses are supported by the RTTP.
- Supports two types of training courses: Public courses are open to the public for enrolment and applications for course registration should be submitted by course providers. Tailor-made courses are designed for a particular enterprise (or enterprises) and the course proposals should be submitted by the enterprise concerned as part of the training grant application.

32 LegCo, 2022, Measures to support re-industrialisation in Hong Kong, retrieved from: https://www.legco.gov.hk/yr2022/english/panels/ci/papers/ci20220621cb1-368-3-e.pdf

CASE STUDY

Courses provided by the Hong Kong Productivity Council (HKPC) Academy

The HKPC Academy is one of the largest course providers funded by the RTTP, with extensive experience in providing technology-related training. Being an advocate of technology advancement, HKPC promotes "FutureSkills" with flexible learning modes and multiple levels of difficulty to cater the needs of both tech and non-tech people and to encourage all individuals to enjoy the benefits of upskilling. [33]

The Academy provides more than 150 accredited training programmes every year, with content covering big data analytics, agile project management, travelling through the metaverse to France to understand the deployment of 3D Technologies from its Virtual e series and more. These programmes have helped companies and workers to acquire all-rounded knowledge in relation to the development of "Industry 4.0". Some of these courses are conducted in cooperation with local business leaders and organisations as well, such as Exquisite Certification – An Accreditation and Certification Agency offering courses on ISO qualifications; Hong Kong Computer Society – offering courses on the adoption of emerging technologies, amongst others.

These programmes are comprehensive and educative, providing invaluable experience to attendees to further their skills in "industry 4.0". For example, a collaboration between HKPC Academy and Esmod France offered an overseas training course to France on "Deploying 3D technologies" from virtual design to digital prototyping in the intimate apparel industry.[34] This level of training support provided by the RTTP has assisted Hong Kong SMEs to integrated advanced technologies in their manufacturing cycles with the purpose of enhancing their design and manufacturing efficiency. Given the limited technical expertise of Hong Kong's workforce in advanced technologies, the RTTP has deemed to be an invaluable resource to help 're-industrialise' Hong Kong again.

33 RTTP, HKPC Academy, retrieved from: https://www.hkpcacademy.org/en/rttp/#:~:text=Reindustrialisation%20and%20Technology%20Training%20Programme,those%20related%20to%20Industry%204.0

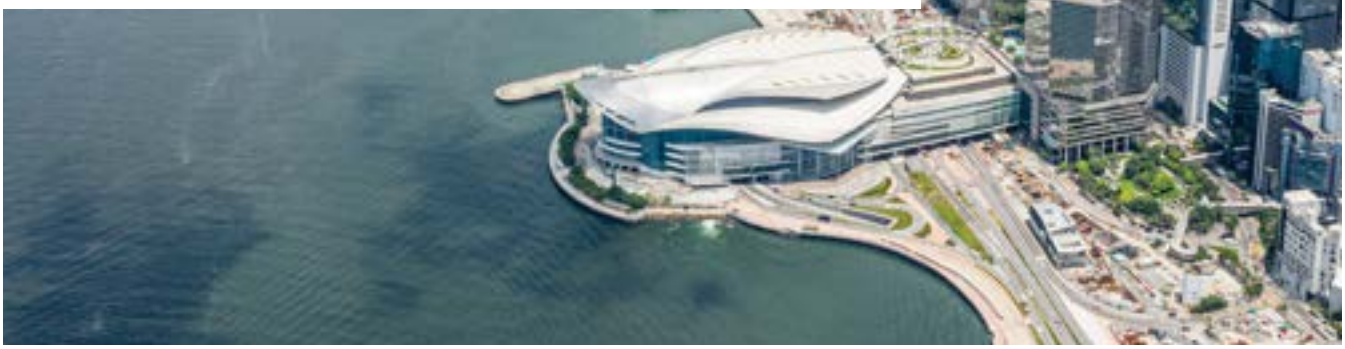
34 Overseas Training to France on Deploying 3D Technologies from Virtual Design to Digital Prototyping in Intimate Apparel Industry, HKPC Academy, retrieved from: https://fhki.s3.ap-east-1.amazonaws.com/assets/coevents/France%20RTTP%202020%20Pamphlet%20enrolment%200904.pdf

High Quality Testing and Certification Standards

Hong Kong's robust testing and certification ecosystem is well-equipped to support the burgeoning advanced manufacturing sector. Several key players contribute to this ecosystem, offering a diverse range of services and state-of-the-art facilities.

Reliability Testing Centre (RTC), Hong Kong Productivity Council

The Hong Kong Productivity Council (HKPC) is a multifaceted organisation that provides integrated support across technology R&D, consultancy, and training. Its Reliability Testing Centre (RTC) offers comprehensive testing services for industries such as electronics, automotive, and medical devices. The RTC is equipped with advanced facilities and technologies that ensure products and components adhere to stringent quality and reliability standards. HKPC also promotes the adoption of Industry 4.0 technologies and assists manufacturers in enhancing productivity and competitiveness.



Robotics Catalysing Centre (RCC), Hong Kong Science and Technology Parks Corporation

The Hong Kong Science and Technology Parks Corporation (HKSTPC) plays a crucial role in accelerating the development and adoption of robotics and automation technologies through its Robotics Catalysing Centre (RCC). The RCC offers a range of services, including proof-of-concept validation, technical consultation, and access to state-of-the-art equipment such as collaborative robots, autonomous guided vehicles, and 3D vision systems. It also provides a co-working space where innovators, startups, and technology companies can collaborate and develop groundbreaking solutions.

Centre for Advances in Reliability and Safety (CAiRS)

The Centre for Advances in Reliability and Safety (CAiRS) is a research center recognized within the AIR@Inno Cluster, specializing in the innovation of reliability and safety research. A collaborative endeavor between The Hong Kong Polytechnic University (PolyU) and the University of Maryland, College Park, CAiRS is a nexus of scholarly inquiry and advancement.

The core mission of CAiRS is to harness the power of AI methodologies to create tailored management strategies. These strategies aim to ensure the reliability and safety of products and systems across a diverse array of industries. This encompasses robotics, medical devices, vehicles, telecommunications, consumer products, public utilities, transportation, microelectronics, power devices, sensors, IoT products, and a wide spectrum of advanced manufacturing applications.

Committed to pioneering interdisciplinary research, CAiRS seeks to address both societal and industrial challenges. Its primary objective is to significantly propel the progress of testing and certification in the realm of advanced manufacturing. By doing so, CAiRS aims to meet the evolving needs of society and industry, while shaping the future of reliability and safety innovation.

Hong Kong Council for Testing and Certification (HKCTC)

The Hong Kong Council for Testing and Certification (HKCTC) was established by the Hong Kong Government to enhance the competitiveness of Hong Kong's testing and certification industry. The organisation provides accreditation services, develops industry standards, and promoftes industry growth. HKCTC plays a key role in ensuring quality assurance for advanced manufacturing by regulating the testing and certification processes.

Collectively, these organisations form a comprehensive support system that bolsters the advanced manufacturing sector in Hong Kong. Through their services and facilities, they facilitate the seamless integration of technology, innovation, and quality assurance, positioning Hong Kong as a global leader in advanced manufacturing.

Collaborative Ecosystem

Hong Kong's advanced manufacturing sector is characterized by a high degree of sophistication, innovation, and specialization. It encompasses a diverse range of industries, including electronics, precision engineering, biotechnology, and materials science.

Hong Kong Government

To support Hong Kong's new industrialisation, the Hong Kong Government has been taking a number of measures to promote advanced manufacturing in the city, including:

- **Established the Innovation, Technology and Industry Bureau:** The Hong Kong Government has set up the Innovation, Technology and Industry Bureau to spearhead the development of I&T in the city. The bureau aims to enhance collaboration between the industry, academia, and research sectors to promote advanced manufacturing.

- **Investing in R&D:** The Hong Kong Government has been investing heavilty in R&D to drive technological innovation and promote advanced manufacturing. Tax breaks were introduced to encourage companies to engage in R&D for tax deductions and exemptions. Apart from that, funding schemes are also available for companies participating in advanced manufacturing.

- **Launching Re-industrialisation Funding Scheme (RFS):** The Hong Kong Government has been providing funding to subsidise manufacturers to set up new smart production lines. The funding is offered on a 1(government): 2(company) matching basis to financially support one-third of their total project cost or HK$15 million (~US$2 million), whichever is lower), whichever is lower.

- **Developing the new concept of "InnoPark":** The Hong Kong Government has respositioned Industrial Estates into "InnoPark" with modern infrastructure and facilities to support the growth of advanced manufacturing in the city. These estates provide a conducive environment for companies to set up their manufacturing operations.

- **Promoting collaboration with Mainland China:** The Hong Kong Government is working closely with Mainland China to promote collaboration in the area of advanced manufacturing. This includes setting up joint laboratories, conducting research, and providing support for technology transfer.

The advanced manufacturing sector in Hong Kong is further supported by a strong and complex network of stakeholders, institutes, infrastructure, and services. Hong Kong's advanced manufacturing industry generally include seven key stakeholders –1) Facility Operator (HKSTPC), 2) Academia, 3) Research Institutes, 4) Industry 4.0 Enabler, 5) Investors, 6) Industry associations and 7) Manufacturers.

Facility operator - HKSTP

HKSTPC is currently managing and operating two important I&T and advanced manufacturing infrastructure - **Hong Kong Science and Technology Park (HKSTP) and THREE InnoParks in Tai Po, Yuen Long and Tseung Kwan O** with total site areas of 22 ha and 217 ha respectively.

For HKSTP, it has been offering its facilities and support services through a clustering strategy since its establishment in 2002. The five technology clusters are biomedical technology, electronics, green technology, information and communications technology, and material and precision engineering. Following the completion of the Stage 1 of the Science Park Expansion Programme in 2019, HKSTP, sitting on a 22-hectare site, has 23 buildings with a total gross floor area ("GFA") of about 400 000 sq m.

As at May 2023, the overall occupancy rate of the Science Park was over 90%, comprising over 1,000 technology enterprises, of which 81% are local, 9% from the Mainland and Taiwan, and 10% from overseas. Apart from sizable enterprises, 65% of them were small and medium-sized enterprises (SMEs)[35] operating in the Science Park.

To better utilize the land of the InnoParks, HKSTPC revised the aforementioned policy in 2015 to develop specialised multi-storey and highly-efficient industrial buildings in the InnoParks for leasing to multiple users, with a view to attracting suitable advanced manufacturing industries to set up production lines in Hong Kong and attracting high value-added technology industries and manufacturing processes suitable for Hong Kong, promoting smart production.

Under exceptional circumstances, HKSTPC will still consider granting sites to single users, and open tendering will be adopted for invitation of tenders in general. HKSTPC will select suitable grantees and tenants for admission to the THREE InnoParks under a rigorous and objective assessment mechanism, so as to dovetail with the development direction of driving "re-industrialisation" through I&T.

Academia

The local universities are dedicated to address critical fundamental research needs in advanced manufacturing and to cultivate talents for the industry. For example, Research Institute for Advanced Manufacturing of the Hong Kong Polytechnic University operates as a hub for local research and knowledge transfer in advanced manufacturing. The Advanced Manufacturing Institute of the Hong Kong University of Science and Technology takes a holistic approach to studying methodologies and the application of information technology to the processes in product development. The City University of Hong Kong offers a Bachelor of Engineering degree in intelligent Manufacturing Engineering where talents develop their capabilities in integrating intelligent manufacturing systems with 1) Industrial Internet of Things, 2) Automation and Robotics, 3) Management Analytics, 4 AI and 5) Industrial Big Data.

35 LegCo, 2022, Measures to support re-industrialisation in Hong Kong, retrieved from: https://www.legco.gov.hk/yr2022/english/panels/ci/papers/ci20220621cb1-368-3-e.pdf

Five R&D Centres

The Hong Kong R&D Centre Programme is the core initiative driven by the Innovation and Technology Commission of the Hong Kong Government with the aim to harness Hong Kong's advantages in applied research, intellectual property protection, business-friendly environment and proximity to the manufacturing based in the Pearl River Delta (PRD) region, to thrive as a regional technology service hub.

In April 2006,the Hong Kong Government set up five R&D Centres to drive and coordinate applied R&D in selected focus areas and to promote commercialisation of R&D results and technology transfer -

- **Automotive Platforms and Application Systems R&D Centre (APAS)** was established in 2006 and is hosted by the Hong Kong Productivity Council. APAS undertakes R&D programmes as well as commercialising R&D results in collaboration with industry, universities and technology institutes for the development of the APAS industry. Since its establishment, APAS R&D Centre has carried out over 100 R&D projects and focus on 3 R&D areas – 1) Green Transportation, 2) Smart Mobility and 3) Intelligent Systems.
- **Hong Kong Applied Science and Technology Research Institute ("ASTRI"),** was founded in 2000 with the mission of enhancing Hong Kong's competitiveness through applied research. ASTRI's core R&D competence in various areas is grouped under four Technology Divisions: Trust and AI Technologies; Communications Technologies; IoT Sensing and AI Technologies and Integrated Circuits and Systems. It is applied across six core areas which are Smart City, Financial Technologies, Re-Industrialisation and Intelligent Manufacturing, Digital Health, Application Specific Integrated Circuits and Metaverse.
- Over the years, ASTRI has nurtured a pool of research, I&T talents and received numerous international awards for its pioneering innovations as well as outstanding business and community contributions. As of 2022/23, ASTRI has transferred almost 1,400 technologies to the industry and has been granted over 1,050 patents in the Mainland, the US, and other countries.
- **Hong Kong Research Institute of Textiles and Apparel (HKRITA),** established in 2006, is hosted by The Hong Kong Polytechnic University, with the mission to be a Hong Kong based world renowned research institute for the textiles and clothing industry by concerted and focused R&D efforts to enhance the economic development of Hong Kong, mainland China and overseas.

  HKRITA has achieved research deliverables over the years around their research clusters targeting in industry 4.0, sustainability, and social benefits through their centre-owned research teams and laboratories as well as collaborations with industry partners and institutions.
- **Logistics and Supply Chain MultiTech R&D Centre (LSCM)** is Hong Kong's leading facilitator of R&D across numerous sectors, both public and private. With an extensive database of projects accumulated over the years, LSCM fosters technological innovation to improve efficiency in logistics and supply chain industries. Hong Kong is considered one of the world's leading centres of logistical professionalism, and LSCM aims to reinforce this position through the continuous improvement of technological facilities.
- **Nano and Advanced Materials Institute (NAMI),** incorporated in 2006 as a subsidiary of the Hong Kong University of Science and Technology, is a R&D Center for nanotechnology and advanced materials. NAMI undertakes and provides support for market-driven research in nanotechnology and advanced materials, and strives for commercialization of the technologies to benefit the industry and the society at large, as well as re-industrialisation to promote the economic growth and sustainability of Hong Kong.

Industry 4.0 Enabler - The Hong Kong Productivity Council (HKPC)

HKPC is a statutory body dedicated to promoting productivity improvement in Hong Kong. HKPC acts as the technology enabler and last-mile accelerator to commercial R&D results to market-ready technology. HKPC collaborates with academia and R&D centres to help upgrading their manufacturing processes by providing upskill trainings and supporting in application of intelligent technology to progress to industrial 4.0. HKPC also provides FutureSkills training to develop digital capabilities and expand STEM competencies of the Hong Kong labour force.

Hong Kong private equity (PE) market

Hong Kong PE market has experienced significant growth in recent years, solidifying its position as a leading financial hub in the Asia-Pacific region. According to the Hong Kong Venture Capital and Private Equity Association (HKVCA), as of 2021, the total assets under management (AUM) of private equity and venture capital firms in Hong Kong reached over USD $159 billion. This growth is driven by the city's strategic location, sound legal system, business-friendly environment, and access to mainland China's vast market. Hong Kong is home to several global and regional PE firms, which actively invest in a wide range of sectors, including technology, healthcare, and consumer products. The burgeoning private equity market in Hong Kong has the potential to play a critical role in supporting the development of advanced manufacturing in the region by providing much-needed capital and resources. Investment in advanced manufacturing can help companies scale their operations, invest in R&D, and adopt cutting-edge technologies. As advanced manufacturing gains momentum in Hong Kong, private equity firms are likely to increasingly target investment opportunities in this sector, offering financial support and strategic guidance to help drive innovation and growth. Such investments not only contribute to the development of Hong Kong's advanced manufacturing sector but also present attractive opportunities for high returns driven by technological advancements and innovation.

While specific examples of private equity investments in Hong Kong's advanced manufacturing sector are limited, there have been several notable investments in the broader manufacturing and technology sectors in recent years. These investments highlight the potential for private equity to support advanced manufacturing development in Hong Kong.

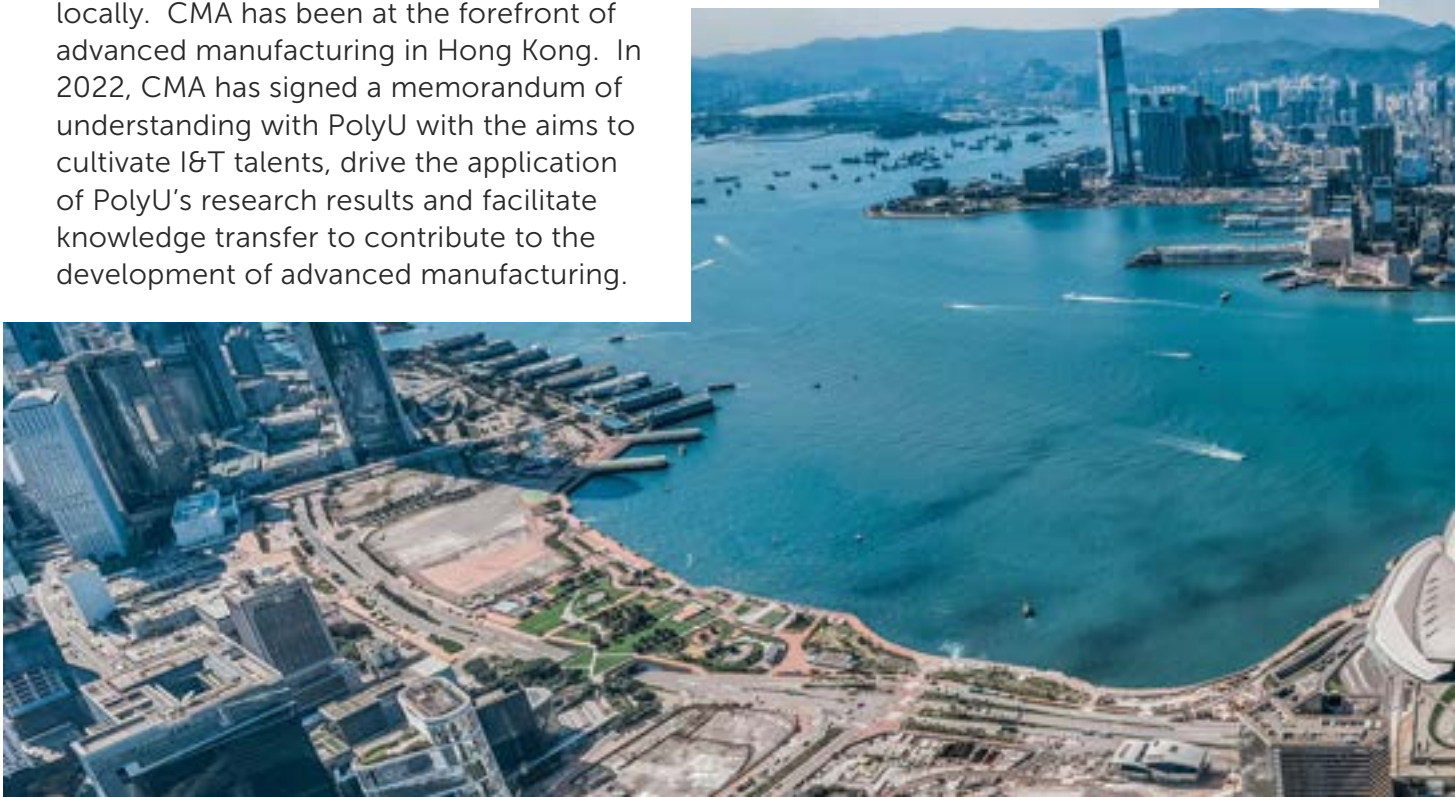
- **Goertek -** In 2019, Hong Kong-based private equity firm PAG invested $150 million in Goertek, a leading Chinese manufacturer of electronic components such as microphones, speakers, and sensors. Goertek's products are used in a wide range of consumer electronics, including smartphones, wearables, and IoT devices. The investment enabled Goertek to expand its manufacturing capabilities, invest in R&D, and strengthen its position in the global market.
- **ASMPT** - In 2013, global private equity firm KKR acquired a 10% stake in Hong Kong-listed ASMPT, a leading provider of assembly and packaging equipment for the semiconductor and LED industries. KKR's investment supported the company's growth strategy, enabling it to invest further in advanced manufacturing technologies and expand its global market presence.

These examples might not be directly related to advanced manufacturing firms based in Hong Kong, they demonstrate the potential for private equity investments to support the growth and development of manufacturing and technology companies in the region. As advanced manufacturing continues to gain momentum in Hong Kong, it is likely that private equity firms will increasingly target investment opportunities in this sector, providing capital and resources to help drive its growth.

Industry Associations in Hong Kong

Industry associations and business chambers play a significant role in promoting advanced manufacturing in Hong Kong. through advocating favourable industry policies, providing opportunities for collaboration and offering business support to local advanced manufacturing sector. Some key industry associations / business chambers include:

- **Federation of Hong Kong Industries (FHKI):** FHKI is the only statutory chamber in Hong Kong established since 1960. FHKI's mission to advocate for Hong Kong's industrial and business communities while catering to the needs of startups SMEs and MNCs in order to help them stay competitive globally. Most importantly FHKI fosters the development of high value-added businesses and re-industrialisation through I&T advancement. FHKI has also established a Smart Manufacturing Sub-Committee in 2021 that aims at promoting the exchange of know-how and adoption of smart manufacturing in Hong Kong between government departments, academia and research institutions.
- **The Chinese Manufacturers' Association of Hong Kong (CMA):** CMA was established 1934 with the aim of representing the interest of industrial sector in Hong Kong. In doing so, CMA aims to promote the development of Hong Kong's manufacturing sector, to enhance the competitiveness of local manufacturers and to foster the economic growth locally. CMA has been at the forefront of advanced manufacturing in Hong Kong. In 2022, CMA has signed a memorandum of understanding with PolyU with the aims to cultivate I&T talents, drive the application of PolyU's research results and facilitate knowledge transfer to contribute to the development of advanced manufacturing.
- **The Hong Kong General Chamber of Commerce (HKGCC):** HKGCC is Hong Kong's largest and oldest business organisation founded in 1861. It is a not-for-profit organisation that promotes and represents the interests of the business community. HKGCC, through it 21 industry-specific committees, makes regular submissions to the Hong Kong Government, providing recommendations and feedback on policies and regulations that can help to promote a more business friendly environment locally. One of the objectives of Industry & Technology Committee under HKGCC is to encourage development of high value-added industries and advanced technologies in Hong Kong. The committee has regularly organised mission trips to advanced manufacturing facilities around the region and hosted seminars and workshops with aim to promote the adoption of advanced manufacturing technologies in Hong Kong. Moreover HKGCC has provided a conductive platform for advanced manufacturing industry stakeholders to collaborate and drive growth in the sector by sharing knowledge, experiences and opportunities.

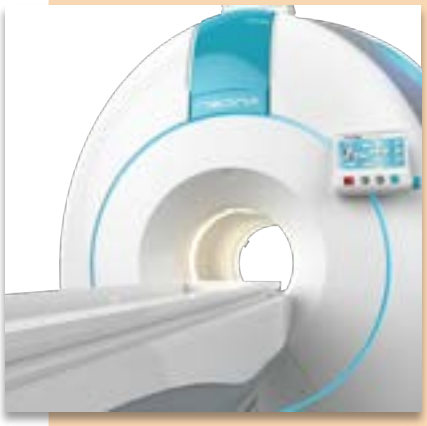


Manufacturers in Hong Kong

Historically Hong Kong was known as a manufacturing hub during the post-World War II era and throughout 1960s and 1970s. During its peak, Hong Kong's manufacturing sector covered a wide range of industries including textiles, garments, electronics, plastics, and toys. Owing to rising operating and labour cost, Hong Kong manufacturers have slowly shifted its manufacturing base to mainland China while the Hong Kong headquarter continue to focus on product design, R&D and innovation.

Today, Hong Kong's manufacturers are at the forefront of I&T adoption, helping to drive growth and competitiveness in new industries. Moving away from traditional labour intensive manufacturing sectors, manufacturers are now focused on electronics, precision engineering life and health technology, pharmaceuticals and food. The manufacturing industry in Hong Kong has embraced advanced manufacturing techniques to drive the development of sustainable, high-quality products that effectively cater to the evolving demands of both consumers and businesses.

Time Medical Company Holdings Ltd. (Time Medical)



Time Medical, founded in 2008, is a pioneer in the medical diagnostic imaging industry with a vision to bring advanced, accessible and affordable imaging services to everyone in the society. Leveraging disruptive technologies, Time Medical has developed state of the art medical imaging systems including Magnetic Resonance Imaging (MRI), Digital Radiography (DR) and Computed Tomography (CT).

Combing the wealth of expertise, research and experiences of its founders from leading universities such as Columbia University, Harvard Medical School, and University of Hong Kong, Time Medical has developed industry leading MRI systems for specialised diagnostic needs in neonatal care, women's health and elderly care.

Simon Yeung, Chief Operating Officer of Time Medical, emphasised that establishing the headquarters in Hong Kong has provided significant advantages. It has allowed Time Medical to tap into a larger talent pool, attracting top-level executives who have played a crucial role in expediting product development. Additionally, conducting collaborations with international research institutions and universities in Hong Kong is considerably easier as compared to other locations.

Hong Kong's state of the art port infrastructure allowed Time Medical's import and export activities to go seamlessly. Simon noted that Hong Kong's efficient custom's clearance system has enhanced the efficiency of Time Medical's manufacturing operations, resulting in cost savings in the long run. Moreover, Time Medical has also been able to save on import and export customs tariffs owing to Hong Kong's free port status.

Hong Kong's robust intellectual property protection framework and sounding legal system were of utmost importance in Time Medical's relocation considerations. As the company is developing world leading imaging solutions, Time Medical can rely on Hong Kong's strong safeguards to protect its rights and assets. Moreover, Hong Kong's dynamic financial market has provided Time Medical with access to funding opportunities, enabling the company to continue advancing its product offerings.

The labels "Designed in Hong Kong" and "Made in Hong Kong" have proven to be significant advantages for Time Medical, instilling confidence in customers regarding the quality of the imaging machines manufactured by the company. "Designed in Hong Kong" signifies that Time Medical's imaging machines have undergone meticulous design processes while "Made in Hong Kong" is testament to Hong Kong's renowned manufacturing capabilities with an unwavering commitment to excellence.

Simon Yeung

Chief Operating Officer
Time Medical Company Holdings Ltd.

Precision Robotics (Hong Kong) Limited

Precision Robotics (Hong Kong) Limited Precision Robotics (Hong Kong) Limited (Precision Robotics) is an innovative robotics company established in 2017. It emerged as a spin-off from the esteemed Hamlyn Centre at Imperial College, renowned worldwide for its research in surgical robotics. The primary goal of Precision Robotics is to design and develop cutting-edge surgical robots equipped with intelligent surgical systems. These robots are distinguished by their precision, agility, and intelligence, and they aim to revolutionise the field of surgery by enabling surgeons to perform intricate procedures with enhanced accuracy and minimal invasiveness.

Precision Robotics currently based in the HKSTP with a vision to further developing its R&D capacity and tapping into the vast Chinese and Asian market. The company has recently established its manufacturing base in Hong Kong in HKSTP's PMC where it plans to develop manufacturing processes and capacity before scaling up in mainland China.

Dr. Benny Lo, CEO of Precision Robotics, believes that Hong Kong is ideal for I&T and advanced manufacturing activities owing to its strategic location. According to Dr. Lo, Hong Kong acts a strong hub for Precision Robotics to tap into the enormous GBA market as well as the rest of southern China. Hong Kong's attractiveness as a destination for international talent is evident for Precision Robotics, given the global shortage of specialised labor in the surgical robotics industry.

Dr Lo. believes that Hong Kong 's common law system serves as another appeal for international I&T and advanced manufacturing organisations. The familiarity of these companies with the common law system, coupled with Hong Kong's strong intellectual property protection framework, provides them with a sense of security and confidence in establishing their presence in the city.

Hong Kong's world-renowned clinicians, healthcare services, and medical research capabilities, including clinical trials, is a significant advantage for life and health technology companies such as Precision Robotics be established in HK. Dr Lo. highlighted that conducting the clinical trial for SIRIUS Robotic Flexible Endoscopic System, a next generation surgical robot for advanced laparoscopic procedures and Natural Orifice Surgery, in Hong Kong facilitated their application of the U.S. Food and Drug Administration approval process. Precision Robotics is planning to manufacture this HK invention locally to further highlight the "Made in Hong Kong" brand name.

Dr. Benny Lo

Chief Executive Officer
Precision Robotics (Hong Kong) Limited

ASMPT Limited

ASMPT Limited ("ASMPT") is a leading global supplier of hardware and software solutions for semiconductors and electronics manufacturers. Its offerings encompass semiconductor assembly and packaging, and Surface Mount Technology ranging from wafer deposition to various solutions that organize, assemble, and package delicate electronic components.

Founded in 1975, with Hong Kong as its global launchpad, ASMPT has since established manufacturing and R&D centers in various countries and regions, including mainland China, Singapore, Malaysia, Germany, the United Kingdom, Netherlands, the United States of America, and Taiwan.

Peter Ng, Vice President for Technology at ASMPT, shared that Hong Kong holds several advantages for a company like ASMPT for which Innovation and Technology ("I&T") and advanced manufacturing go hand in hand. Firstly, Hong Kong's solid and reliable common law legal system is a cornerstone for safeguarding intellectual property ("IP") rights, ensuring a secure and equitable business environment. With an extensive portfolio of over 2,000 patents covering cutting-edge technologies, it is crucial for ASMPT to have the assurance that its valuable IP assets are effectively protected in Hong Kong.

Second, Hong Kong is home to many top scientific research institutions and higher education establishments. The city's highly skilled microelectronics researchers and talented STEM workforce have enabled the continuous advancement of the local industry. Moreover, ASMPT has collaborated with local research centers and academia to conduct research on AI Development. The goal of these partnerships is to facilitate the integration of AI into ASMPT's products, with the aim of enhancing their performance and functionality.

Third, Hong Kong's world-class infrastructure, which includes advanced logistics and telecommunication systems, has enabled I&T and advanced manufacturing companies to thrive and develop. Specifically, Hong Kong offers microelectronics-focused facilities such as the MEC and HSITP that provide state-of-the-art resources and support to foster innovation.

Finally, Hong Kong's relatively low, transparent, and competitive tax system provides another layer of incentives for Hong Kong companies to thrive, offering tax deductions on qualifying R&D expenses to help create an environment that fosters innovation by encouraging companies to invest in R&D activities.

Peter Ng

Vice President, Technology
ASMPT Limited

ADVANCED MANUFACTURING CASE STUDIES AND SUCCESS STORIES

Hong Kong Aerospace Technology Group Limited (HKATG)

HKATG is Hong Kong's first commercial aerospace company that focuses on satellite constellation and precise satellite manufacturing. HKATG's business covers the full satellite value chain, encompassing research and development, manufacturing and data application. Recognising the significant opportunities within the commercial satellite market in the region, HKATG has recently opened ASPACE Hong Kong Satellite Manufacturing Centre (ASPACE), which spans an area of about 200,000 sq.ft in the Advanced Manufacturing Centre (AMC) within the Tseung Kwan O Innopark. The state of the art facility has an annual production capacity of 200 commercial satellites with a wide range of applications.

HKATG has strategically chosen to establish its presence in Hong Kong, recognising the conducive environment offered by the Hong Kong Science and Technology Park (HKSTP) and the vibrant innovation and technology ecosystem of the city. This decision enables HKATG to leverage the collaboration opportunities arising from partnerships with local technology companies. Being located within the facilities of HKSTP provides HKATG with access to a community of like-minded organisations and researchers to engage in joint R&D projects, satellite application promotion programs and more.

Hong Kong's advanced infrastructure and robust logistics system empowers HKATG to run a highly efficient production system. This advantage is particularly valuable for the company as it imports satellite components and raw materials worldwide. AMC's well-designed features such as machine handling arm, central ventilation, loading bays and other support services, facilitate the flexible deployment and continuous upgrade of HKATG's production line. Moreover, HKATG can leverage I4.0 technologies, AI, and other automation solutions enabled by AMC to optimise its logistics and warehousing processes.

Through the synergy of HKATG's intelligent manufacturing technology, Hong Kong's robust innovation and technology ecosystem, and advanced infrastructure, HKATG has the potential to revolutionise and elevate the aerospace industry while simultaneously driving "New Industrialisation" in Hong Kong.

Dr. George Lam BBS, JP

Co-Chairman
Hong Kong Aerospace Technology Group Limited

Friendly Business Environment

A Super-Connector Between the World and Asia Pacific

Hong Kong's prime location in the Asia-Pacific region (APAC) presents an unparalleled advantage for business operating in the region. With a flight time of only five hours connecting Hong Kong to half of the world's population, and its proximity to Mainland China, Hong Kong enjoys a strategic location that is difficult to match. The city's proximity to significant Asian markets and efficient logistics enables businesses to connect with key strategic partners and customers in emerging markets, providing them with valuable opportunities for growth and expansion.

Hong Kong has been the world's longstanding leader in trading and finance and as a strategically positioned port, it has been also an important international business hub in APAC. The global FDI inflows to Hong Kong amounted to US$117.7 billion in 2022, ranked 4th globally, behind the United States US$285.1 billion), Mainland China (US$189.1 billion), and Singapore (US$ 141.2 billion)[36], while in terms of FDI stock, Hong Kong was acting as the world's 5th largest host with US$2,090.6 billion in 2022[37].

36 UNCTAD, 2023, World Investment Report 2023

37 HKTDC Research, 2023, Economic and Trade Information on Hong Kong, retrieved from: https://research.hktdc.com/en/article/MzIwNjkzNTY5

A Free Economy

Hong Kong has the legal status as an SAR and enjoys a high degree of autonomy under the principle of "One Country, Two Systems". To implement this, the Basic Law is enacted by the National People's Congress of the People's Republic of China (PRC) in accordance with the Constitution of the PRC. The city's well-established, world-class legal system is renowned for being transparent, trustworthy and fair, underpinning Hong Kong's reputation as one of the safest cities in the world.

Hong Kong is one of the freest economies in the world, having maintained the title "World's Freest Economy" from 1975 to 2020[38]. Hong Kong has continued to rank number 1 and 3 in "Freedom to trade internationally" and 'Regulation", respectively. A free economic system practiced in Hong Kong and the mechanisms of this economic system are manifested in finance, banking, trade, industry and commerce, real estate, shipping and civil aviation. Hong Kong protects property rights of individuals and has a robust financial and taxation system governing under a high degree of autonomy within the "One Country, Two Systems" principle. Furthermore, the Hong Kong dollar is freely convertible, and no foreign exchange control is applied in Hong Kong. The Hong Kong Government will safeguard the free flow of capital within, into and out of Hong Kong. In addition, Hong Kong has status as a free port, and safeguards the free movement of goods, intangible assets and capital.

What does being in Hong Kong mean for businesses?

- Free Trade Port Status
- Simple and low tax rates
- English and Chinese are official languages
- "One Country, Two Systems" – Common Law legal system
- Strong and robust Intellectual Property protection
- Stable currency pegged to US Dollar
- 170 countries and territories may visit Hong Kong visa free

38 Fraser Institute, 2023, Economic Freedom of the World 2023 Annual Report, retrieved from: https://www.fraserinstitute.org/sites/default/files/economic-freedom-of-the-world-2023.pdf

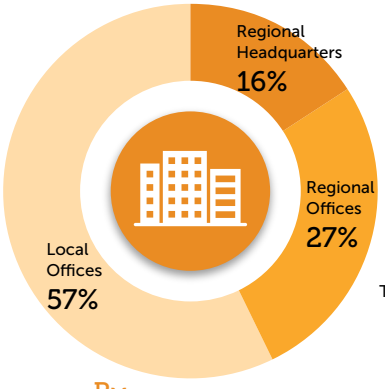
Robust and Vibrant Business Environment

Hong Kong plays an important role for both Mainland Chinese businesses and international firms in APAC. It provides a prime location for regional headquarters and local offices for thousands of businesses, and the diversity of the market means that the city serves as a launch pad into the rest of the region.

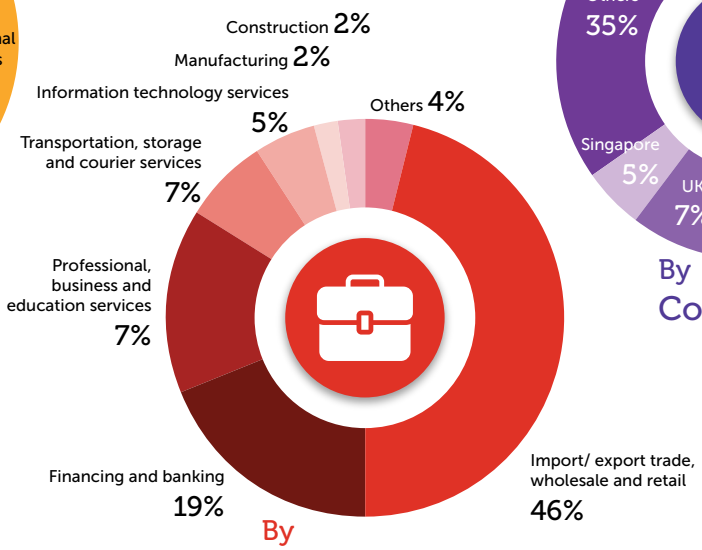
Businesses and banks from across the globe have set up their Asian headquarters in the city to capitalize on the growth opportunities throughout the region. The number of foreign and mainland Chinese companies operating in Hong Kong increased by approximately 10% to around 8,978 in 2022, up from 8,225 in 2017, employing some 468,000 persons in Hong Kong.

Figure 7

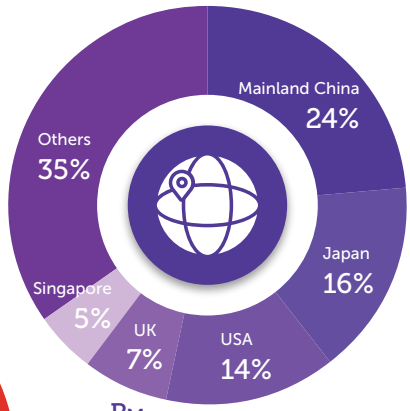
8,978 Companies with Parent Companies Located Outside Hong Kong



By Office Type



By Major Line of Business



By Company Origin

Source: Census and Statistics Department, 2022, Report on Annual Survey of Companies in Hong Kong with Parent Companies Located outside Hong Kong (2022 edition)

Connector of Greater China and South-East Asia

Hong Kong's geographical location as the center between Greater China and South-East Asia makes Hong Kong a strategic location for international businesses to enter Asian markets. Consequently, Hong Kong's talent pool boasts decades of cross-regional experience, and the city's infrastructure is designed to serve as a connection between the Asia-Pacific region and the rest of the world.

As a longstanding advocate of trade and investment liberalization, as well as a rule-based, free, and open economy, Hong Kong supports the multilateral rules-based system and is a founding member of the World Trade Organization. The city provides a level playing field for all companies to compete and conduct business.

Hong Kong has proactively pursued expanding its free trade agreement (FTA) network to ensure favorable conditions for its goods and services to access more international markets. To date, Hong Kong has signed FTAs covering a total of 20 economies. Besides CEPA, Hong Kong has entered into FTAs with the majority of the Regional Comprehensive Economic Partnership Agreement (RCEP) members, including the 10 ASEAN Member States, Australia, and New Zealand.

Positioned to join the RCEP, the largest FTA worldwide, Hong Kong aims to be among the first group of economies to join the partnership. The RCEP will eliminate over 90% of tariffs on imports between its members and help them govern product origin under a common set of rules. Once officially admitted as an RCEP member, Hong Kong's re-exports and domestic exports will be eligible for all preferential tariff treatments and trade facilitation measures[39].

Furthermore, Hong Kong is one of the cities in Asia with the most transport routes into Mainland China and these routes facilitate the movement of both people and goods. In 2021, Hong Kong accounted for a total of HK$4,886 billion (~US$ 634 billion) in re-exports to markets such as Mainland China (59.8 per cent), the United States of America (6.2 per cent), Taiwan (2.8 per cent), India (2.7 per cent) and Japan (2.4 per cent)[40]. Since 1982, Mainland China has been Hong Kong's largest supplier in goods.

39 RCEP and its Possible Impacts on Hong Kong, HKSAR Government 2020, retrieved from: https://www.hkeconomy.gov.hk/en/pdf/box-20q4-3-2.pdf
40 HKSAR Government, 2022, Trade Industry, retrieved from: https://www.gov.hk/en/about/abouthk/factsheets/docs/trade_industry.pdf

Close Ties and Synergies with the Greater Bay Area Cities

The Guangdong-Hong Kong-Macao Greater Bay Area (GBA) comprises of the two Special Administrative Regions of Hong Kong and Macao, and the nine municipalities of Mainland China – Guangzhou, Shenzhen, Zhuhai, Foshan, Huizhou, Dongguan, Zhongshan, Jiangmen and Zhaoqing in Guangdong Province.

The GBA covers China's most open and economically vibrant region and plays an important role in China's vision to be a global leader in innovation driven economic development. In 2022, the GDP of the GBA was approximately 12.9 trillion yuan (~US$ 1, 793 billion)[41], accounting for about 11% of China's total GDP. Also, the value added by high-tech manufacturing in the GBA reached CNY 2.2 trillion (~US$306 billion) in 2022[42] up 10% year-on-year. This accounted for some 55.9%[43] of total value added in the manufacturing sector in the GBA, higher than the national level of 15.1%.[44]

GBA offers a comprehensive supply chain for different types of manufacturers, supporting R&D, prototyping, and small-scale production and mass production. This complete ecosystem is fueled by an educated labor force, abundant raw materials, and exceptional infrastructure etc.

The GBA's well-educated workforce, stemming from prestigious universities and institutions, drives innovation and ensures smooth operations across all stages of manufacturing. The region's extensive network of suppliers caters to various industries, enabling seamless sourcing of materials and fostering rapid product development.

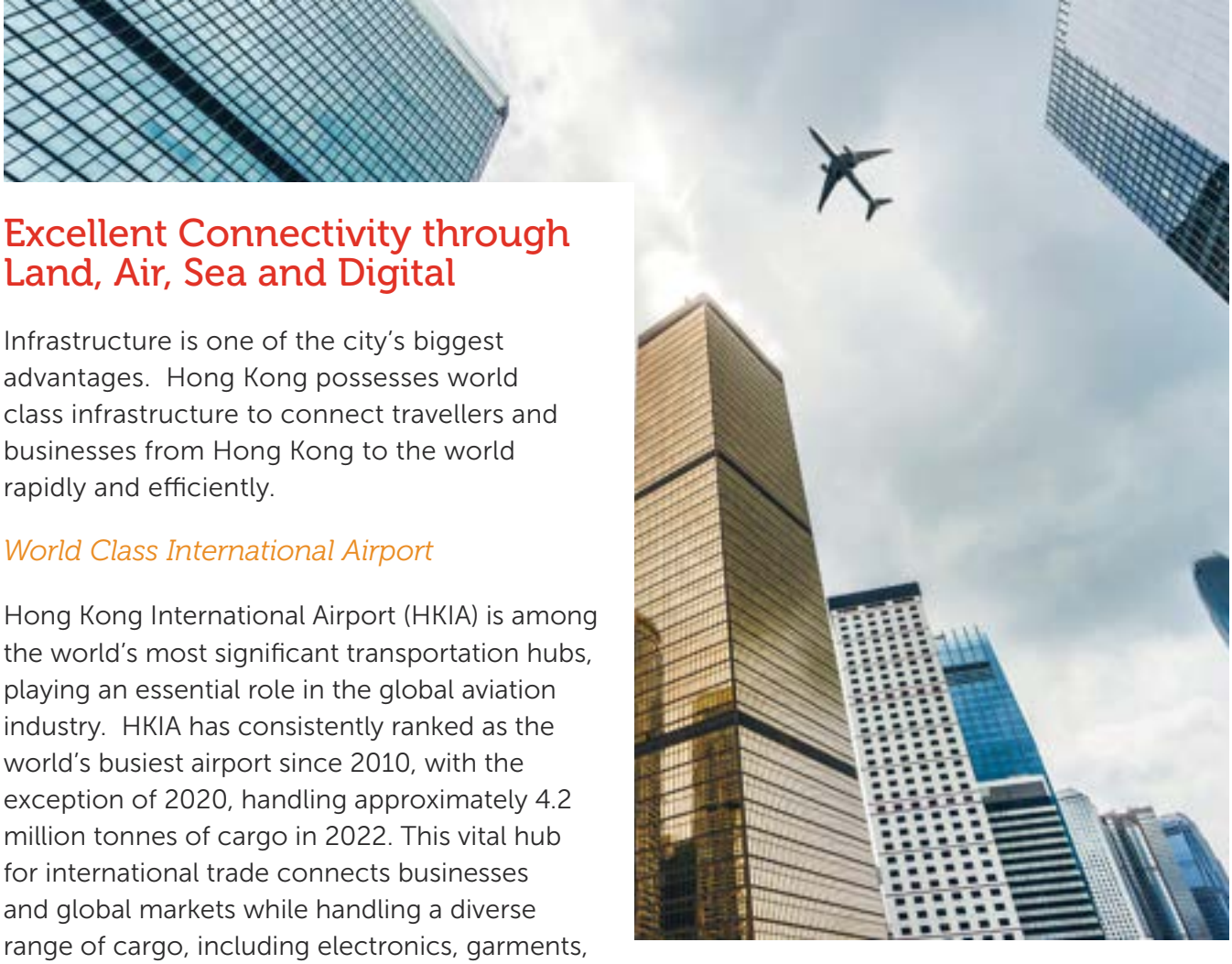
With exceptional transportation networks, including modern seaports, airports, and high-speed rail systems, the GBA facilitates efficient movement of goods and materials, optimizing supply chain logistics and reducing overall costs. The ongoing development of high-tech industrial parks, innovation centres, and logistics hubs further demonstrates the GBA's commitment to fostering a thriving manufacturing ecosystem.

41 2022年粵港澳大灣區GDP總量超13萬億元人民幣, HK01 2023, retrieved from: https://www.hk01.com/article/880052?utm_source=01articlecopy&utm_medium=referral

42 CNBayArea.org, 2023, retrieved from: https://www.cnbayarea.org.cn/news/focus/content/post_1037488.html

43 CNBayArea.org, 2023, retrieved from: https://www.cnbayarea.org.cn/news/focus/content/post_1037488.html

44 SH Observer, 2022, retrieved from: https://export.shobserver.com/toutiao/html/457006.html



Excellent Connectivity through Land, Air, Sea and Digital

Infrastructure is one of the city's biggest advantages. Hong Kong possesses world class infrastructure to connect travellers and businesses from Hong Kong to the world rapidly and efficiently.

World Class International Airport

Hong Kong International Airport (HKIA) is among the world's most significant transportation hubs, playing an essential role in the global aviation industry. HKIA has consistently ranked as the world's busiest airport since 2010, with the exception of 2020, handling approximately 4.2 million tonnes of cargo in 2022. This vital hub for international trade connects businesses and global markets while handling a diverse range of cargo, including electronics, garments, perishable goods, and pharmaceuticals.

Moreover, HKIA serves as a major passenger airport, accommodating 70 million international and domestic passengers annually prior to the COVID-19 pandemic. It connects the GBA to roughly 220 destinations worldwide, facilitating business, tourism, and personal travel. HKIA plays a pivotal role in linking the GBA to the world, enabling cargo and passenger transportation, stimulating economic growth, and fostering the development of the region's aviation industry.

The commissioning of the Third Runway on November 2022 enables HKIA to accommodate approximately 100 million passengers and 9 million tonnes of air cargo annually. Its close proximity to multi-modal transport infrastructures enables businesses to easily access GBA cities and export from Hong Kong, further enhancing the airport's importance in the region.

Land transportation

Hong Kong provides numerous cross-boundary infrastructure options that enable seamless access to the broader China market for businesses and travellers, some exemplar options include:

- High-Speed Express Rail Link which only takes 18 and 50 minutes to reach Shenzhen and Guangzhou[45], respectively; and
- Hong Kong-Zhuhai-Macao Bridge (HZMB) connects HK to other strategic cities in Mainland China in 30 minutes only and allows business travellers to gain access to world class airports and port infrastructure in China.

The high-speed rail and HZMB enable the flow of talent, ideas and capital between Hong Kong and Mainland China seamlessly, and also provide critical cargo route for goods to be transported to and from GBA cities.

45 Train Schedule, MTR HK 2023, retrieved from: https://www.highspeed.mtr.com.hk/res/pdf/long-haul-train-timetable.pdf

Modern Logistics Hub

The Hong Kong Government, alongside the Hong Kong Logistics Development Council, endorses the development of high-value modern logistics in Hong Kong by integrating air, sea and land transport and by broadening the adoption of smart logistics solutions to strengthen the key role played by Hong Kong in the regional GBA logistics chain. Hong Kong is a crucial hub for trading and businesses due to its strategic location and transport routes connecting Asia, Europe and the rest of the world.

Hong Kong is a crucial modern logistics hub for the GBA, thanks to its strategic location, world-class infrastructure, and efficient transportation networks. In 2022, HKIA handled about 4.2 million metric tonnes of cargo, making it the world's busiest cargo airport. The Port of Hong Kong managed around 17 million TEUs of containerized cargo in the same year, connecting the GBA to over 500 ports across 130 countries. The 55-kilometer HZMB enhances land transportation and connectivity within the GBA. These factors, along with Hong Kong's well-established legal framework and trade network, solidify its role as an indispensable logistics hub for the GBA.

International Financial Centre

Hong Kong is a leading global financial centre with liquid capital markets and a fully convertible currency. The city has the largest concentration of financial institutions in the world with 163 licensed banks, 17 restricted licence banks and 13 deposit-taking companies[46] alongside 42 local representative offices of overseas banking institutions. The sophisticated and mature banking system makes funding opportunities readily accessible for businesses and investors.

On the other hand, Hong Kong's capital market is the fifth largest in the world and third largest in Asia in terms of market capitalisation. Hong Kong remains one of the world's most active IPO fundraising hubs with HK$87.8 billion (~US$12 billion) raised in 2022. As of 2022, there are 2,597 companies listed on Main Board and GEM at the Hong Kong Stock Exchange with a market capitalisation of HK$35,667 billion (~US$4,500 billion)[47]. Furthermore, Hong Kong is also the world's largest offshore RMB business hub with the world's largest offshore pool of RMB liquidity resulting in the largest international financial hub for conducting offshore RMB financing activities.

46 HKSAR Government, 2022, retrieved from: https://www.gov.hk/en/about/abouthk/factsheets/docs/financial_services.pdf

47 HKEX Annual Report 2022, retrieved from: https://www1.hkexnews.hk/listedco/listconews/sehk/2023/0313/2023031300159.pdf

Low, Simple and Competitive Tax System

Simple Corporate & Individual Tax

Business operating in Hong Kong enjoys one of the most tax friendly systems in the world:

- To support start-ups and companies in growth stages, profit tax is generally assessed at only 8.25 percent for the first two million of assessable profits, and the remaining profits are assessed at 16.5 percent; and
- For individuals, salary tax is capped at a standard rate of 15 percent. In addition, Hong Kong adopts territorial source principle and profit tax is generally assessed on income arising in or derived from Hong Kong. This means that service income may not be subject to Hong Kong profit tax if the relevant services are performed outside Hong Kong.

Comprehensive Double Taxation Agreements

In addition to the simple tax structure, Hong Kong also has a strong tax treaty network which covers major business partners in the region such as Mainland China, Japan, South Korea, Canada, United Kingdom, United Arab Emirates, India, etc. This tax treaty network is a significant benefit and many investors have set up Hong Kong based companies to do business in these countries so that they will be protected from double taxation on the same income.

Other Benefits of Hong Kong's Tax System

Hong Kong also offers various tax incentives to encourage investors to establish more diversified business functions in Hong Kong. For example, companies may be entitled to 200-300 percent tax deductions of their qualified R&D expenditure spent if conditions are met.

Trusted Legal system and Strong IP Protection

Trusted Legal System

Hong Kong boasts a trusted legal system, rooted in the principles of transparency, fairness, and the rule of law. Hong Kong's legal framework provides a stable and predictable environment for businesses, investors, and citizens alike. The city's judiciary is known for its independence and integrity, ensuring that disputes are resolved impartially and in accordance with established legal procedures. This trusted legal system serves as a cornerstone of Hong Kong's success as a global financial centre and a preferred hub for international commerce.

Strong Intellectual Property (IP) Protection

Strong IP protection is crucial for advanced manufacturing, as it helps to safeguard the innovations and technologies that are developed in the manufacturing process. Hong Kong has a strong and well-established IP protection regime, which can be a significant advantage for advanced manufacturers operating in Hong Kong.

Hong Kong is a signatory to a number of international IP treaties and conventions, including the Paris Convention for the Protection of Industrial Property, the Patent Cooperation Treaty, and the Berne Convention for the Protection of Literary and Artistic Works. These agreements provide for the mutual recognition and protection of IP rights across national borders and help to promote international trade and investment.

In addition, Hong Kong has a dedicated government agency, the Intellectual Property Department, which is responsible for implementing and enforcing IP laws and regulations. The agency provides a range of services, including registration of patents, trademarks, and designs, as well as advice and assistance on IP-related matters.

Two Types of IP Registration Schemes

In Hong Kong, the Intellectual Property (IP) registration scheme is administered by the Intellectual Property Department, which is responsible for the registration and protection of various types of IP rights, including patents, trademarks, designs, and copyrights. The city's patent system comprises two primary patent registration types: Original Grant Patent (OGP) and Re-registration.

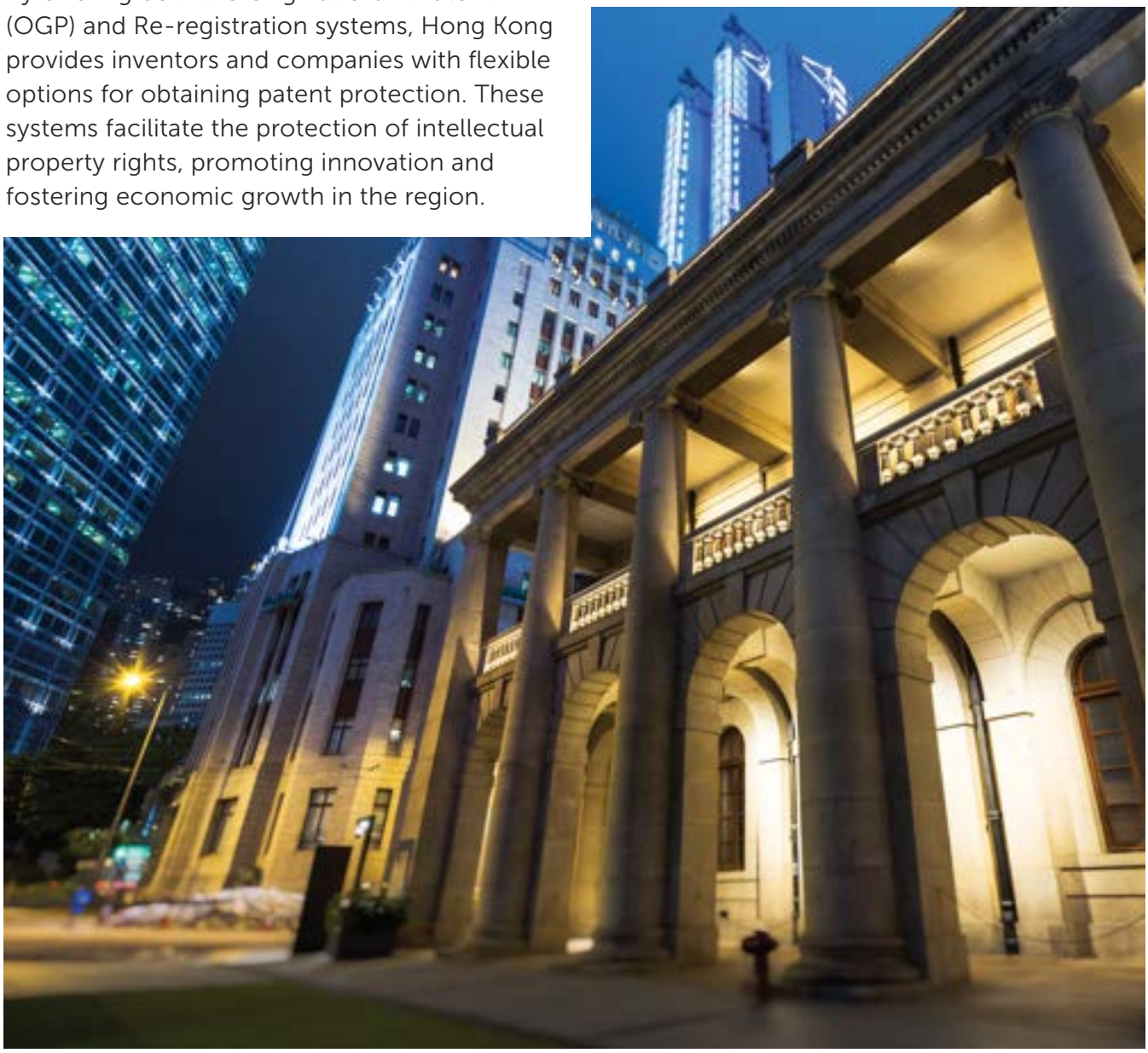
- Original Grant Patent (OGP): Introduced in 2019, the OGP system allows applicants to file patent applications directly with the Hong Kong Intellectual Property Department, eliminating the need to obtain a patent grant from a foreign patent office first. The OGP system streamlines the patent application process and provides a more efficient way to secure patent protection in Hong Kong. Under this system, a Standard Patent offers protection for up to 20 years, subject to the payment of annual renewal fees. The OGP system enhances Hong Kong's IP landscape, making it more accessible for inventors and companies to protect their inventions locally;
- Re-registration: Before the introduction of the OGP system, Hong Kong had a re-registration system for obtaining Standard Patents. Under this system, applicants were required to first obtain a patent grant from one of three designated patent offices: the China National Intellectual Property Administration (CNIPA), the United Kingdom Intellectual Property Office (UKIPO), or the European Patent Office (EPO), designating the United Kingdom. Once a patent was granted from one of these foreign offices, applicants could apply for a Standard Patent in Hong Kong based on the granted patent. This re-registration system provided a way for inventors to extend their foreign patent protection to Hong Kong.

In addition to the OGP and re-registration systems for Standard Patents, Hong Kong also offers a Short-term Patent system. This system provides a quicker and more cost-effective way to obtain patent protection for inventions with a shorter commercial life. Short-term Patents are granted based on a search report from an authorized international searching authority. The protection period for a Short-term Patent is four years from the filing date, which can be extended by another four years, making the maximum protection period eight years.

By offering both the Original Grant Patent (OGP) and Re-registration systems, Hong Kong provides inventors and companies with flexible options for obtaining patent protection. These systems facilitate the protection of intellectual property rights, promoting innovation and fostering economic growth in the region.

Patent Application Grant (PAG)

Patent Application Grant (PAG) refers to a funding scheme in Hong Kong under the Innovation and Technology Fund (ITF). The scheme aims to financially assist local companies and individuals in applying for patents for their inventions. Under this scheme, the Hong Kong Government provides a grant to cover part of the cost of filing a patent application in Hong Kong or overseas. The PAG scheme encourages the development and protection of intellectual property rights in Hong Kong, fostering innovation and economic growth.



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Andy Wong

Head of Innovation and Technology
Invest Hong Kong

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"The Hong Kong Government is actively promoting "New Industrialisation" in the city while creating a favourable environment for the development of Advanced Manufacturing by leveraging its friendly business environment, world-class talent and advanced infrastructures. The opportunities arising from the National 14th Five Year Plan, GBA Outline Development Plan, Hong Kong's I&T Development Blueprint and the Northern Metropolis Development Strategy will accelerate the development of Hong Kong's Advanced Manufacturing whilst helping the city achieve its vision as an international I&T hub."

Elton Yeung

Vice Chairman
PwC China

"New Industrialisation" is vital to the development of Hong Kong's I&T industries, particularly for downstream activities of the value chain. The development of Advanced Manufacturing will not only encourage enterprises to embrace Industry 4.0 technologies and smart production but also revitalise the "Made in Hong Kong" brand. Consequently, this fosters and increased demand for technological research and development, leading to improve productivity for businesses and creating high quality job employment opportunities. Ultimately, Advanced Manufacturing serves as a catalyst to inject new growth momentum into Hong Kong's economy."

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