Hong Kong Economic Policy Green Paper 2026

HKU BUSINESS SCHOOL
港大經管學院

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Table of Contents

Online Version

Preamble

It is my privilege to present the fifth annual Hong Kong Economic Policy Green Paper, produced by the scholars of the HKU Business School. This publication reflects the dedication and rigorous research of our academic community in addressing the complexities of Hong Kong's economic landscape.

Given the current global challenges, heightened geopolitical tensions, and the rapid transformation driven by artificial intelligence, it is imperative for our city to chart a strategic and forward-looking path. The insights and guidance offered in this year's Green Paper are invaluable resources for policymakers and practitioners navigating these uncertain times. The ongoing efforts and scholarly expertise of the University of Hong Kong faculty members remain integral to shaping a resilient and prosperous future for Hong Kong.

The Hong Kong Economic Policy Green Paper is a commendable endeavour, and I wholeheartedly recommend this year's edition to all those deeply involved in Hong Kong's trajectory. May this Green Paper ignite thoughtful discussions, inspire informed decisions, and foster collaborative actions as we confront challenges and seek out opportunities together.

I would like to congratulate the authors and contributors of this exceptional publication and invite you to read the fifth annual Hong Kong Economic Policy Green Paper and join us in working towards a brighter future for Hong Kong.

Y.C. Richard Wong

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1 January 2026

Introduction

As a highly open economy, every small change in the rules governing global trade and finance affects Hong Kong in many different, and often profound ways. The global economy is becoming more fractured amid a heightened frequency in the changes in trade practices and tariffs, introducing ever more uncertainty in trade flows. Given this backdrop, Hong Kong needs to be more agile, not only to ensure it continues to thrive as a key financial hub, but also to stay at the forefront of emerging trends that can reshape its economic positioning. The HKU Business School and its scholars have collaborated on the Hong Kong Economic Policy Green Paper 2026 for the fifth consecutive year, to present recommendations on how Hong Kong can tackle these challenges head-on.

This year's Green Paper covers topics essential to Hong Kong's long-term competitiveness. They examine how to empower trade finance with digital technology, the city's place in the Greater Bay Area (GBA) startup ecosystem and how blockchain can be applied in green finance. They also explore how Hong Kong can consolidate its status as a hub for intellectual property (IP), the maximisation of social and shareholder value among Hong Kong-listed companies, and the chronic challenge of housing affordability and homeownership from 1985 to 2023. Further contributions propose structural reforms to relieve overcrowding in hospital emergency departments, present initial attempts to empirically measure AI activity and its impact on Hong Kong's labour market, analyse how generative AI is reshaping the cybersecurity landscape, and discuss how Hong Kong can pioneer the development of a Web 3.0 ecosystem.

Trade is an essential lifeline for Hong Kong; its total trade was three times the city's HKD3.2 trillion GDP in 2024. Trade finance is thus equally important, yet in the first chapter our research shows that the total loans extended for trade finance have been declining. As geopolitical and technological shifts reshape trade, Hong Kong must upgrade its trade finance services. With consumer-goods trade shifting to smaller, more frequent orders and shorter cycles, financial institutions need to streamline approvals and develop flexible products for e-commerce and logistics-driven cash cycles. Banks also need to digitise core processes in fund settlement. We caution that platforms directly connecting mainland manufacturers with overseas buyers disintermediate Hong Kong's traditional hub-and-spoke role. To address this, we suggest the government leverage digital technologies to elevate the adoption of Hong Kong's digital trade platforms through unifying core digital trade functions. Moreover, speeding up interoperability of trade data platforms with the Chinese Mainland and other economies will enable seamless data exchange.

The next chapter by Moel and Chan looks at how to reinvigorate Hong Kong's place as the premier hub to incubate and grow startups within the GBA. Offering a quantitative analysis of the evolution of Hong Kong's startup landscape, they found that post-2019 activity has been muted, mirroring global trends in venture capital. While optimistic that this slowdown is temporary, they recommend ways to strengthen Hong Kong's advantages in attracting startups to maintain its edge. Moel and Chan also argue that Hong Kong's potential to lead in financial innovation and regulatory technology is aligning with its strategic role as an international financial centre. With this, Hong Kong can simultaneously attract foreign investment and support corporates in transforming their businesses, while making the best out of the strong supply chain in GBA. Next, the city needs to close the gap between academia and market needs. Home to several top global universities with strong research output, Hong Kong can encourage market research on industry pain points and user requirements to successfully transfer technology and penetrate markets. Moreover, Hong Kong needs to bring in large tech platforms to establish operations here - encouraging them to incubate local startups.

The green finance market has entered an important new phase. Hong Kong became the world's first issuer of sovereign tokenised green bond when it priced an HKD800 million one-year note in February 2023. Despite this, Hong Kong faces several challenges in the practical implementation of using blockchain to advance green finance. This is due to the limited interoperability between blockchain platforms and existing financial infrastructure, which hinders cross-market transactions. Real-time settlement for tokenised assets is also difficult, because of scalability constraints. In the chapter on the application of blockchain in green financing, Tang argues that the future success of blockchain development in green finance will depend on progress in three areas: standardisation, scalability, and security. Clear regulatory frameworks and common technical protocols are needed to provide legal certainty and interoperability across platforms. While collaboration among regulators, technology providers, and energy-market participants can align rules for tokenisation. He says blockchain can also connect Hong Kong's Core Climate platform with overseas counterparts, as cross-border integration is crucial to the inherently international nature of climate finance.

The raging success of Labubu in recent years has turned the Pop Mart-made toy-art characters into a global phenomenon. Perhaps less well-known is that Labubu was created by a Hong Kong artist. The fourth chapter by Fan and I takes an in-depth look into why, despite Hong Kong's rich history as a toy manufacturing hub, its corporates have not managed to turn homegrown IP into business triumphs. Before Labubu, Pop Mart's first commercially successful IP was Molly, also created by a Hong Kong artist. However, Molly and Labubu remained niche until Pop Mart catapulted them into global successes. As Labubu's success turns the spotlight on the growing importance of the IP industry, the authors say this can inspire more creators and businesses to invest in branding, licensing, and cross-border collaborations. This can also attract policymakers' attention to the emerging IP sector as a key driver of innovation and economic growth. For Hong Kong to succeed as a leading regional IP trading centre, the various stakeholders from IP developers, entrepreneurs to government agencies need to coordinate efforts in key areas. One of these is to build a robust IP financing ecosystem, such as the government issuing IP bonds, replicating its green finance model.

The next chapter shifts the focus on sustainable finance to the perspective of shareholders. Through a triangulation research approach, Chang examines how social policies, international frameworks, and corporate social responsibility influence a company's valuation and capital budgeting decisions. Using the insights of big Hong Kong-listed companies from nine sectors - spanning transport, utilities, financial, banking, conglomerate, technology, real estate, consumer, and hotel servicing – the findings show that while conventional metrics dominate, incorporating social value enhances long-term value for a company, by elevating shareholder trust while reducing risks.

Often described as one of the world's most unaffordable cities to buy a residence, the increasing inequity of housing affordability and home ownership is exerting the insidious impact on the population's enterprise and upward mobility. With public rental units being the only affordable option available to young people, Huang, Ngau and Wong note that there are many anecdotes of youths deliberately taking on part-time jobs to qualify for public housing. This results in inhibited career progression and a contraction in labour supply as people react to a "distorted" housing market. To address these challenges, the authors recommend further relaxing the leasing and resale restrictions on the circulation of subsidised sale flats. This can increase access to housing and improve the chances for youth to move up the housing ladder. They also recommend that Hong Kong establish housing price and affordability targets, instead of supply targets, and to use dynamic mechanisms for balancing housing demand and supply.

The next chapter sheds a sobering look at the overcrowding in Hong Kong's public emergency departments (EDs), which handle over 2.14 million annual attendances. This crisis, exacerbated by an aging population, results from a structural mismatch: the majority of the attendances are for non-emergency conditions, leading to staff burnout and compromised care.

Ouyang and Zhang propose comprehensive structural reforms. First, improving operational efficiency with accurate wait time information systems is crucial. Second, increasing the ED fee (categories III–V) aims to divert non-critical patients, but its success hinges on assumptions about patient responses, particularly how varied population segments will react to the price signal. International evidence raises concerns, showing that higher ED fees can reduce overall utilisation, but with the decrease primarily occurring among price-sensitive groups who may risk delays in receiving serious care. Therefore, for this reform to succeed, the public must have genuine access to alternative care pathways that can accommodate acute but non-emergency needs outside regular business hours, with pricing acceptable to price-sensitive populations. Third, AI can augment the workforce and manage demand (e.g., through telemedicine). Ultimately, sustainable reform demands robust evaluation, political courage, and a commitment to address root causes, not just symptoms.

With AI-related developments grabbing news headlines and investor attention globally, the surge in AI adoption is having two important results in the real world – the threat to jobs and a rise in cybersecurity crimes.

In an effort to empirically measure the impact of AI on Hong Kong's labour force, Kwan, Tai and Wang observe that firms with a higher adoption of AI experience lower headcount growth. However, the scale of impact appears small in the city, which could be due to several potential reasons. One of these is the different composition of Hong Kong's labour force compared with other countries. For instance, Hong Kong has a high proportion of finance or managerial talents which are harder to displace; the city also features older or more elite workers. On the other hand, much of the impact of AI, particularly generative AI, is on the less elite and younger populations. As such, the authors recommend policymakers produce more labour market statistics that track the impact of AI, particularly by occupation. On the rate of AI adoption in Hong Kong through innovation, the authors find that the city is heavily skewed towards research, but not commercialisation. This means that the quality and quantity of academic research is not translating to commercial use. To address this decoupling, the authors propose that the government tweaks its existing early-stage startup funding platforms to encourage streamlining and higher utilisation of existing government resources.

Another area where GenAI is having a real impact on is the increasingly sophisticated nature of cybersecurity crimes. As GenAI can produce human-like text, code, images, and audio, cybersecurity crimes have become easier and faster to perpetuate. Not only have data leaks and hacks into security systems led to significant financial losses in Hong Kong, they also hurt confidence in the city's digital infrastructure. In this chapter, Chau recommends using AI to fortify Hong Kong's cyber defence, such as using biometric verification and deepfake detection technologies, especially in areas involving critical infrastructure and high financial stakes. It is also important to prevent data leakage and other threats in using GenAI.

The final chapter explores how the financial industry in Hong Kong can embrace the rapidly evolving fintech revolution fueled by Web 3.0. Particularly, given the inherent risks in Web 3.0 operational models—most notably within Decentralized Finance (DeFi) systems—striking a balance between fostering the development of the Web 3.0 ecosystem and implementing appropriate regulation to maintain financial stability is (and should be) a key priority for Hong Kong authorities. To support this, Fang and Mou categorize the industry into three distinct systems—Centralized Finance (CeFi), the integration of Traditional Finance and Centralized Finance (TradFi-CeFi), and Decentralized Finance (DeFi)—and put forward targeted policy recommendations for each. For the CeFi system, the authors recommend creating a more conducive environment for development by refining specialized auditing frameworks, promoting a local Web 3.0 talent certification system, and introducing global leading CeFi institutions to the local market. For the TradFi-CeFi system, they suggest upgrading audit standards for traditional firms holding digital assets and upskilling traditional finance professionals with Web 3.0 expertise. In contrast, for the DeFi system, which carries higher inherent risks and poses greater regulatory challenges, the authors advise authorities to adopt a prudent stance while keeping monitoring its latest technological developments.

As with the other chapters, Fang and Mou propose many areas that authorities can work on to ensure Hong Kong is fully prepared for the Web 3.0 revolution.

In conclusion, our aim is that this green paper will be utilised as an informed starting point to stimulate debates and spark discussions on how to enhance Hong Kong's competitive positioning, while tackling persistent socioeconomic challenges. As technology and the geopolitical factors create more uncertainty at an increasing pace, there is also an abundance of opportunities. As such, it is imperative for policymakers and the business community to collaborate closely, with input from the academic community. The thorough research and analysis presented by our colleagues serve as a valuable resource for guiding collective efforts towards navigating challenges, seizing opportunities, as well as shaping a prosperous and sustainable future for Hong Kong.

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1 January 2026

Empowering Trade Finance with Digital Technology in Hong Kong

Empowering Trade Finance with Digital Technology in Hong Kong

Heiwai Tang

Trading has long been a cornerstone of Hong Kong's economy, sustained by the city's role as a bridge between the Chinese Mainland and the rest of the world. Any comprehensive discussion of Hong Kong's economic development should address the evolution of its trading sector, and, by extension, the trade finance mechanisms that enable it.

Trade finance is a critical enabler of cross-border commerce, particularly because simultaneous, back-to-back payment upon delivery is often unfeasible due to logistical, legal, and informational complexities. Instruments such as letters of credit, under which banks guarantee payment to sellers upon the delivery of goods, mitigate counterparty and performance risks. In addition, sellers may accelerate cash flow by selling outstanding trade receivables to financial institutions, which collect from buyers at maturity.

Amid a rapidly shifting global economic environment, ongoing supply-chain reconfiguration, and the accelerated overseas expansion of Chinese enterprises, developments in trade finance have moved to the forefront of corporate strategy and risk management. To preserve and enhance Hong Kong's competitiveness as a trading hub, upgrading trade finance services is imperative. Drawing on field research conducted in Hong Kong and the Chinese Mainland, this article identifies industry needs and gaps in trade finance with relevant policy recommendations.

1.   Significance of Trading for the Hong Kong Economy

Hong Kong is a highly outward-oriented economy, with total trade roughly three times its GDP. In 2024, Hong Kong's total trade was about HKD 9.5 trillion, compared with a GDP of approximately HKD 3.2 trillion.

As shown in Figures 1 and 2, Hong Kong's total trade has expanded markedly, from HKD 3.2 trillion in 2000 to HKD 9.5 trillion in 2024. The value added from the import-export trade rose from HKD 234.6 billion in 2000 to HKD 460.7 billion in 2024. Although its share of GDP declined from 18.3% in 2000 to 14.8% in 2024, the sector's contribution remains significant. Overall, Hong Kong's trading activity has grown substantially since 2000, albeit with a deceleration in recent years. The performance of the trading sector has a material effect on the city's GDP growth.

Figure 1. Total Trade of Hong Kong

Legend: Imports (HK$ tn), Total Exports (HK$ tn), Total Trade (HK$ tn)
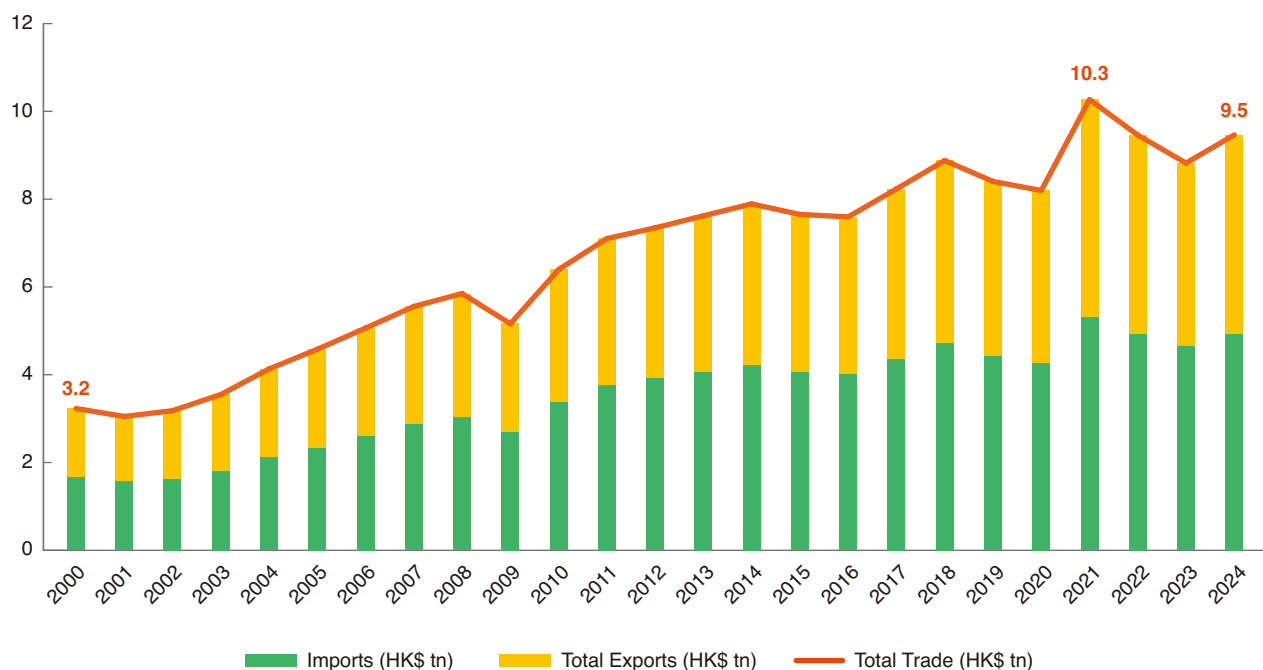
Data source: Census and Statistics Department

Figure 2. Contribution of IE Trade to Hong Kong's GDP

Legend: Import and Export Trade (GDP at currrent prices, HK$ bn), Import and Export Trade (% of GDP)
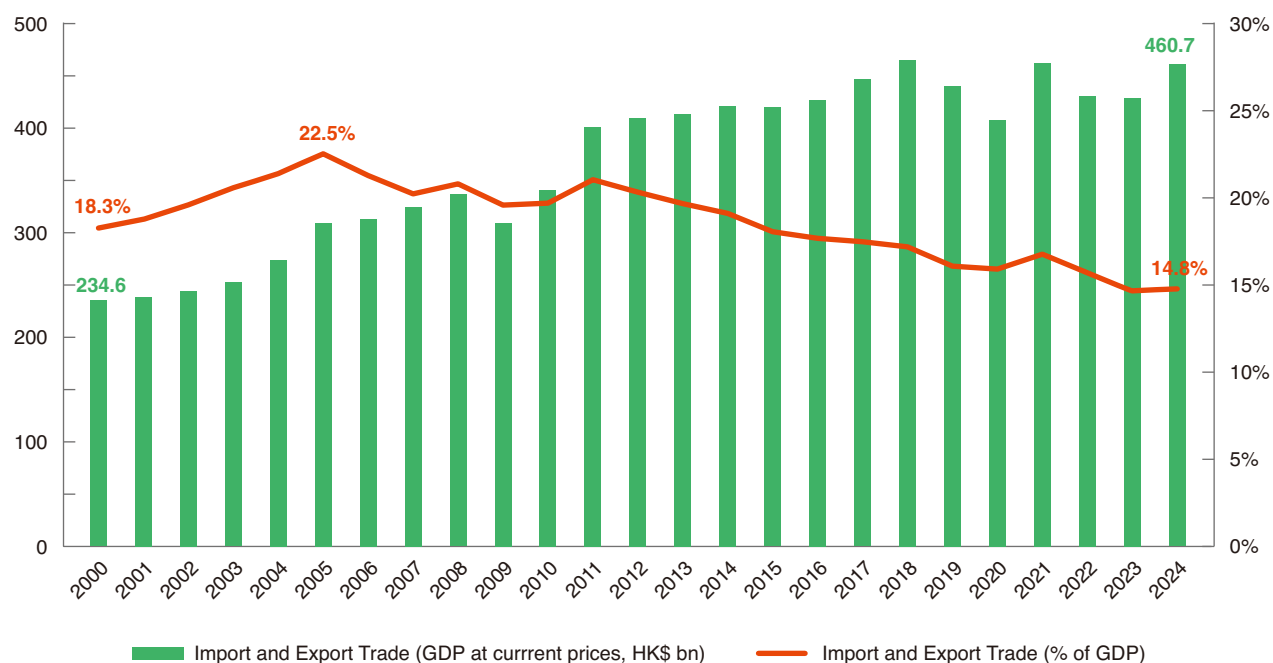
Data source: Census and Statistics Department

2. Geopolitical and Technological Drivers Reshaping Hong Kong's Trade Finance

As an international trading hub and financial centre, Hong Kong has a highly developed market for trade finance services. As shown in Figure 3, domestic loans for trade finance rose from HKD 100.1 billion in 2003 to a peak of HKD 550.2 billion in 2013, before declining to HKD 381.2 billion in 2024 and HKD 373.8 billion as of Q3 2025.

Figure 3. Domestic Loans for Trade Finance in Hong Kong

Data source: Hong Kong Monetary Authority

However, loans for trade finance in Hong Kong have declined over the past decade. This trend, coupled with the geopolitical and technological shifts reshaping the industry, makes it vital for Hong Kong to upgrade its trade finance services.

First, international geopolitics and supply-chain relocation are reshaping corporate behaviour. Amid Sino–US trade tensions, Chinese firms have increasingly invested abroad to access new markets and diversify production networks. While Hong Kong remains the primary platform for outbound investment

for many Chinese enterprises, Singapore has emerged as a significant competitor—particularly as a springboard into Southeast Asia. Hong Kong's policies and digital infrastructure will therefore be critical to retaining its comparative advantage.

Second, evolving trade patterns and the rise of cross-border e-commerce are challenging traditional trade finance models. Consumer-goods trade is shifting toward smaller orders, higher transaction frequency, and shorter delivery cycles, which strain conventional underwriting, documentation, and settlement processes. Market demand is growing for responsive, digitally-enabled financing solutions. Financial institutions will need to streamline approvals, increase transparency in credit information, and develop more flexible products tailored to e-commerce sellers and logistics-driven cash cycles. At the same time, platforms that directly connect mainland manufacturers with overseas buyers disintermediate Hong Kong's traditional hub-and-spoke role and related services.

Third, interest-rate dynamics and changes in the mainland financing environment affect Hong Kong's competitiveness. In recent years, borrowing costs on the mainland have generally been lower than in Hong Kong, while policy initiatives have reinforced the mandate for Chinese financial institutions to serve the real economy. For example, in September 2023, the State Council issued the "Implementation Opinions of the State Council on Promoting the High-Quality Development of Inclusive Finance". Subsequently, on November 1, 2023, the National Financial Regulatory Administration issued the "Administrative Measures for the Capital of Commercial Banks" (referred to as the "New Capital Rules"). These reforms have several impacts, including the introduction of preferential risk weights for exposures to small and medium-sized enterprises (SMEs), supporting domestic inclusive finance and interbank trade finance.

Fourth, stablecoins and real-world asset (RWA) tokenisation are beginning to reshape banks' traditional trade-finance business. In May 2025, Hong Kong's Legislative Council enacted a Stablecoins Bill to establish a regulatory framework for fiat-referenced stablecoins and enable compliant use cases. Hong Kong is promoting the application of stablecoins and smart contracts in trade finance, such as programmable payment terms that can automate the release of funds upon shipment or document verification. These developments put pressure on legacy products—including overdrafts and letters of credit—especially in supply-chain finance. In parallel, RWA tokenisation converts financial claims on physical or contractual assets into blockchain-based tokens, enabling new forms of financing and collateralisation. Banks can explore on-chain asset management by issuing tokenised notes, on-chain trade-finance certificates, or tokenised depositary instruments to open new business lines, subject to regulatory approval and robust risk controls.

3.   Building an Enabling Trade Finance Ecosystem in Hong Kong: Industry Demands and Gaps

In such a context, Hong Kong's trade finance ecosystem requires coordinated upgrades in digital infrastructure, regulatory alignment, and market design to sustain competitiveness. The following highlights eight priority areas.

3.1   Strengthen digital infrastructure and cross-sector data connectivity

Hong Kong hosts several trade-related digital platforms (see Appendix 1), but they are fragmented across departments and sectors. Cross-platform interoperability and stakeholder adoption remain limited. A central challenge is the absence of a widely adopted system that confers mutual recognition and legal effect on electronic trade documents while preserving end-to-end digital consistency. Constraints include gaps in legal enforceability for some electronic instruments, the lack of a strong whole-of-government coordinating body, and implementation costs for firms.

In fund settlement, mainland banks have largely digitised core processes, but many workflows in Hong Kong still depend on traditional methods. More broadly, Hong Kong lags behind regional peers in supply-chain data integration, logistics tracking, smart-contract deployment, and AI-enabled scheduling. Singapore's earlier move to establish a trade information-sharing network that connects government, shipping lines, banks, insurers, and warehouse operators illustrates how data-sharing can deliver end-to-end visibility and more agile, data-driven responses.

3.2   Improve cross-border data flows and mutual recognition with the Chinese Mainland

Cross-border data flows and mutual recognition with the Chinese Mainland remain incomplete. Despite the Digital Policy Office of the HKSAR government actively promoting closer collaboration with the Chinese Mainland on digital infrastructure, data connectivity, corporate registration, and credit frameworks[1], the cross-border flow has not yet achieved seamless integration. Firms, therefore, still

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1   In May 2024, the trial of the Shenzhen-Hong Kong Cross-Boundary Data Validation Platform launched. The platform uses blockchain and data coding to verify documents without cross-border transmission or storage of original data files, enabling credible, user-controlled data verification. HKMA and Chinese Mainland regulators are closely cooperating to support financial institutions in using cross-border data safely, orderly, and compliantly through financial technology.

In May 2025, *"Opinions on Financial Support for "Notice by the State Council of Issuing the Overall Plan of Nansha of Guangzhou to Deepening the Global-oriented Comprehensive Global Cooperation among Guangdong, Hong Kong and Macao"*, Article 7 advocates easing cross-border credit financing among the Guangdong, Hong Kong and Macao Greater Bay Area (GBA). It supports credit agencies in the GBA exploring mutual recognition of credit products with pilot internal data cross-border flows. However, the implementation is not satisfactory because banks are still unable to provide suitable products due to incomplete interoperability across GBA.

face redundant documentation, limited mutual recognition of creditworthiness, and persistent friction in cross-border financing and lending.

3.3   Balance anti-money laundering (AML) rigour with efficiency

AML sets strict requirements for trade financing processes, but trade finance is time-critical and document-heavy, creating delays and higher costs. Data gaps and opaque ownership (especially for SMEs and emerging markets), plus differing standards from correspondent banks, add to last-minute payment blocks. This poses challenges in reconciling robust risk controls with timely processing, document verification, and transaction monitoring.

3.4   Enable receivables financing for government procurement

Payment periods for many government projects extend to a year or longer. "Ban on assignment" clauses in standard HKSAR contracts prevent contractors from pledging government receivables as collateral, which constrains liquidity and raises working-capital costs. By contrast, Singapore permits assignment of receivables arising from government contracts, facilitating vendor cash-flow management.

3.5   Expand and de-risk export credit insurance for SMEs

A growing number of SMEs are exporting to ASEAN, the Middle East, and other emerging markets, yet many struggle to obtain insurance because of their limited scale. Without insurance, banks are less willing to extend trade-finance lines. In other words, expanding and de-risking export credit insurance for SMEs is necessary to ease access to bank finance. However, export credit insurers' approval process faces limited data penetration, as enterprise operational information is often insufficient for comprehensive risk assessment. Besides, weak data-sharing among insurers hinders the development of comprehensive risk databases and consistent underwriting standards. Thus, it is difficult to establish a comprehensive and accurate risk assessment model that correlates "buyer's import quota" and "credit line".

3.6   Strengthen international tax cooperation

Insufficient international tax cooperation remains an obstacle for outward expansion. As Hong Kong corporates and banks participate in Belt and Road projects, gaps in Hong Kong's network of comprehensive double taxation agreements, such as with Kazakhstan and Brazil, expose firms to additional withholding taxes on interest, dividends, and related income. Broader coverage of comprehensive double taxation agreements would improve after-tax returns and reduce structuring frictions for investments in emerging markets.

3.7 Limited effectiveness of RMB trade-finance liquidity arrangements

In February 2025, HKMA launched a RMB 100 billion trade finance liquidity facility. While the initiative has made progress, utilisation has remained limited because prevailing interbank lending rates have at times fallen below the facility's offered rate.

3.8 Address Chinese Mainland enterprises' demand for comprehensive, longer-tenor, and data-adaptive trade financing services from Hong Kong banks

First, some Chinese Mainland enterprises are seeking more comprehensive, longer-term, and data-adaptive services from Hong Kong banks. Firms increasingly want integrated offerings that combine interest-rate and foreign-exchange risk management with global cash management, cross-border supply-chain finance, back-to-back letters of credit, and related solutions that optimize group-level liquidity and returns.

Second, many banks in Hong Kong still focus more on trade finance services with maturities under six months. However, Chinese Mainland enterprises value more products with one-to three-year tenors to better match project and procurement cycles.

Third, some cross-border e-commerce platforms' intermediate transactions are only at the business-to-business stage. Even when companies provide bills of lading, customs declarations, and supplier agreements to evidence the underlying trade, Hong Kong banks frequently request retail-level end-customer data that merchants cannot access. Innovating financial products to match supply chain procurement enterprises' demand would be necessary for improving access to trade finance.

Finally, firms perceive that customer service and operational efficiency are slightly lower than those of Chinese Mainland peers, with longer response times to inquiries and slower processing of documentation. Process re-engineering and digital workflows would help narrow this gap.

4. Recommendations for Further Policy Discussion

To consolidate its position as an international financial and trading centre, Hong Kong must leverage digital technologies to enhance the financial sector's capacity to serve the real economy.

4.1   Strengthening Governance and Authority of Digital Trade Platforms

The government can strengthen coordination and elevate the adoption of Hong Kong's digital trade platforms. At present, government-run and public digital platforms operate in parallel without a strong central coordinator, making it difficult to integrate resources across departments and industries. A government-led initiative to unify core digital trade functions would facilitate the integration of existing platforms and support scaled adoption by market participants.

Besides, legislative refinements should clarify operational protocols, data security requirements, and liability and assurance standards across the end-to-end digital trade process. A clear legal framework would bolster trust in electronic transactions and enable the consolidation of key data from commerce, port operations, customs, banking, insurance, and logistics.

4.2   Standardising and Diffusing Digital Trade Instruments

The wider use of electronic documents and digital signatures enables a shift from balance-sheet banking to transactional, data-driven credit, improving risk measurement and capital efficiency. The government should expedite the digitalisation of bills of lading, bank drafts, and other core trade instruments to achieve paperless processing. It should also actively participate in international standard-setting related to electronic transferable records, electronic signatures, and digital bills to ensure alignment with global norms. Convergence on common standards would facilitate mutual recognition and interoperability in cross-border trade. In parallel, regulators should incentivise system upgrades in the banking sector to support end-to-end digital trade finance, including straight-through processing, secure application programming interfaces, and robust identity and credential frameworks.

4.3   Deepening Cross-Border Interoperability of Trade Data

The government can speed up the interoperability of trade data platforms with the Chinese Mainland and other economies. Building on the cooperation arrangement with the Chinese Mainland's single-window system, Hong Kong should align technical specifications with domestic and international standards and promote mutual recognition of key documents such as certificates of origin and customs declarations. Relevant government departments and industry associations can explore a standard-setting mechanism that formalises unified data formats, interface protocols, and security standards, which also guides their adoption across platforms in Hong Kong, the mainland, and partner economies to enable seamless data exchange.

Interconnection with multiple regional platforms, such as the Chinese Mainland's offshore trade comprehensive supervision platform, ASEAN's single-window system, and enterprise business systems in partner jurisdictions, would increase utilisation and network effects. Within the Greater Bay Area, the rollout of a "white-list" framework for cross-border data flows under a pilot–evaluation–expansion model would help achieve mutual recognition of corporate registration and credit reports, reduce redundant declarations and reviews, and shorten processing times.

4.4 Expanding HKECIC's Mandate to Support SMEs

The government can expand the Hong Kong Export Credit Insurance Corporation's mandate to meet evolving enterprise needs. To support SMEs in a challenging trade environment, amendments to the Hong Kong Export Credit Insurance Corporation Ordinance could be considered to permit investment insurance, guarantees, and related services, and to relax underwriting constraints for overseas companies owned by Hong Kong entrepreneurs.

Complementary measures could be encouraging banks to scale "policy financing" business, with clear regulatory guidance and targeted incentives to address compliance concerns. Besides, a pilot program of "one-place policy pledge mortgage, two-place available" supported by a shared registration platform should be explored. This could enable the interconnection between Hong Kong and the Chinese Mainland, streamline approval procedures, and expand coverage for SMEs operating across the border. Besides, the development of specialised trade-finance intermediation platforms would strengthen linkages between commercial banks and SMEs.

4.5 Balancing Safeguards of AML and Business Convenience with Advanced Technologies

An effective AML system in trade finance should balance rigorous safeguards with business convenience. Technological tools, such as blockchain for verifiable document trails and artificial intelligence for anomaly detection, can be combined with institutional enhancements, including risk stratification and reinforced international cooperation. With technology for precise financial crime controls, Hong Kong can develop a detailed risk-assessment model for trade finance that avoids one-size-fits-all requirements and enhances the efficiency of compliance resource allocation. As a point of reference, supervisory practices in the United States classify activities by transaction size, geographic risk, and counterparty characteristics, which then calibrate due diligence accordingly.

4.6 Anchoring High-Value Trading and Multinational Enterprises

The government should attract high value-add commodity trading and multinational enterprises to set up operations in Hong Kong. Targeted tax and financial support policies for regional supply-chain headquarters, along with a "one enterprise, one policy" approach for strategic projects, could anchor leading firms, platform enterprises, and procurement centres in the city.

Drawing on Singapore's Global Trader Programme (GTP) model, Hong Kong could consider a time-bound preferential profits-tax regime for firms that expand trade-finance activities in emerging markets. In addition, tax credits could reward firms that invest in verifiable green trade-finance projects, as well as digital infrastructure, such as blockchain-based systems, that improve the security and efficiency of trade finance. Together, these measures would bolster Hong Kong's competitiveness in both trade finance innovation and sustainability.

4.7 Broadening FTA and DTA Networks to Improve Business Environment

Multinational corporations consider the breadth of a jurisdiction's Free Trade Agreements (FTAs) and Comprehensive Double Taxation Agreements (DTAs) networks when selecting regional supply-chain hubs, given the implications for tariffs, rules of origin, customs facilitation, and after-tax returns. As Hong Kong firms and banks expand along the Belt and Road, the absence of FTAs and DTAs with certain emerging markets exposes them to higher withholding taxes and uncertainty. Proactive expansion of the DTA and FTA networks would improve the business environment of Hong Kong and support outward investment and trade financing.

## *4.8 Promoting Responsible Stablecoin Adoption and RMB Internationalisation*

Finally, Hong Kong should accelerate the responsible adoption of stablecoins in trade payments and further promote the international use of the renminbi. Building on the financial market advantages and legislative framework for fiat-referenced stablecoins, the government could take the lead in establishing a Stablecoin Service Ecosystem Alliance that brings together bank liquidity, technology expertise, and legal and compliance capabilities to offer one-stop solutions for enterprises.

Over time, and within a rigorous supervisory perimeter, authorities could support the issuance and use of offshore renminbi stablecoins for international payments, settlements, and financing, thereby enhancing the currency's utility in cross-border trade. Pilot projects of stablecoin applications in trade finance should proceed under clear compliance frameworks.

Besides, active dialogue with regulators in the jurisdictions of key trading partners is essential for establishing mutual recognition mechanisms, reducing policy barriers, and improving cross-border stablecoin settlement efficiency. By reducing policy frictions, Hong Kong would be able to accelerate trade fund flows and reinforce its role in global cross-border settlements.

Appendix I: Existing Trade-related Digital Platforms in Hong Kong (Partial List)

Institution	Platform Name	Main Functions
Customs and Excise Department	Trade Single Window	Allowing the industry to submit B2G customs declaration documents in one stop
Hong Kong Monetary Authority (HKMA)	Commercial Data Interchange	Connecting banks and data providers through a single interface
HKMA	Cargo^x	Using freight logistics data to assist small and medium-sized enterprises in trade financing and connection with international partners
Airport Authority Hong Kong	HKIA Cargo Data Platform	Completing air import and export pre-declaration, customs declaration and cargo status tracking electronically in one stop
Hong Kong Logistics and Supply Chain MultiTech R&D Centre	Port Community System	Integrating data from ports, shipping, logistics and other parties
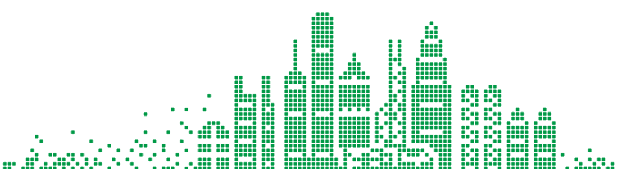
Rebuilding Hong Kong as the Catalyst to the Greater Bay Area (GBA) Startup Ecosystem

Rebuilding Hong Kong as the Catalyst to the Greater Bay Area (GBA) Startup Ecosystem

Alberto Moel   **Joseph Chan**

1.   Introduction

Hong Kong's global reputation as an international finance and trade hub is now complemented by its aspiration to become a centre for innovation and entrepreneurship. In recent years, the city has undertaken significant efforts to develop its startup ecosystem, supported by policy initiatives, encouraging innovation in its world-class academic institutions, and realigning its position within the GBA.

A quantitative analysis of the evolution of Hong Kong's startup landscape, including the latest trends and potential future evolution, situating it within the broader GBA and global innovation rankings. The evaluation of the extent to which Hong Kong is capitalising on its advantages is also explored. We find recent startup activity to be muted, but we are optimistic that this is a temporary condition, and the current initiatives are in the right direction. Further steps to accelerate the city's startup growth and its impact within the region are considered.

Hong Kong's reputation as a global financial hub is well-established, but its ambitions now extend to innovation and technology. Recent policy initiatives, increased investment in research and development (R&D), and the presence of world-renowned universities have laid the foundation for a potentially vibrant startup ecosystem in the long run.

2.   The Size and Trends of Hong Kong's Startup Ecosystem

Hong Kong's startup ecosystem has witnessed substantial growth over the past decade. Startup consultancy Startup Genome[1] has been tracking Hong Kong's startup ecosystem value (defined as the sum of exit and funding valuations for the prior 2.5 years), and the trend is uniformly and strongly positive (Figure 1).

However, this solid performance masks a meaningful slowdown in recent startup activity and vibrancy. Startup data provider Crunchbase[2] shows that the number of startups incorporated in Hong Kong increased sharply from 2010-2018. This growth was supported, as illustrated below, by increased investment activity, a positive global environment for entrepreneurial activity, and favourable government policies, such as the launch of the Innovation and Technology Fund (ITF) in 2015 and the establishment of the Hong Kong Science Park and Hong Kong Cyberport as dedicated innovation hubs.

As Figure 2 indicates, a sharp reversal of this trend can be seen post-2019, mirroring both global trends in venture capital and startup activity and local conditions, including the COVID-19 pandemic, which caused the flow of talents, ideas, and capital to become stagnant.
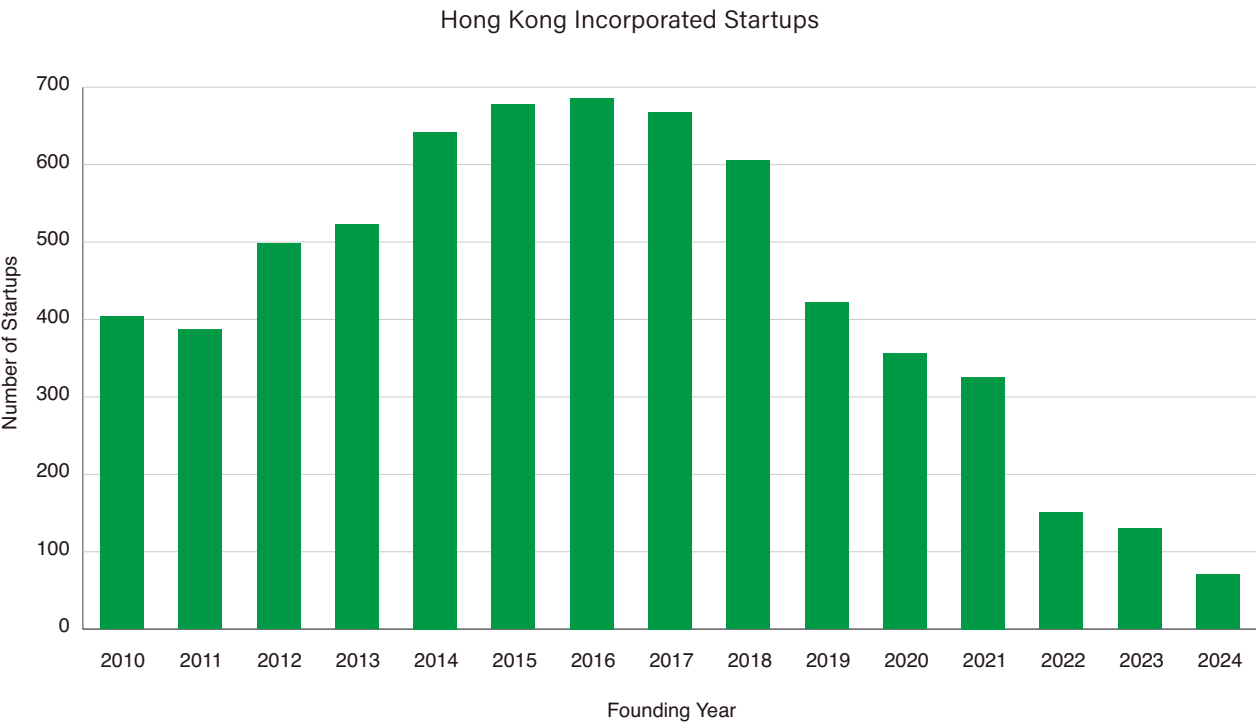
Figure 1. Hong Kong startup ecosystem value trend is uniformly and strongly positive
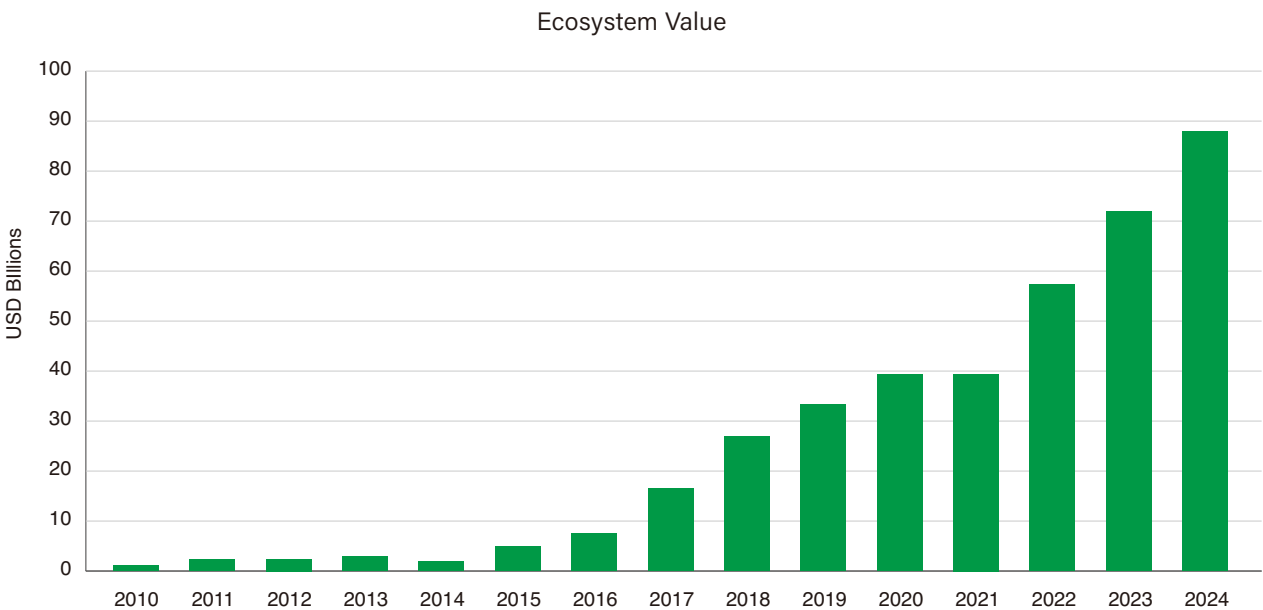
Ecosystem Value

Source: Startup Genome

Figure 2. Hong Kong startup formation, 2010-2024

Hong Kong Incorporated Startups

Source: Crunchbase

One important caveat of the data points in Figure 2 is the material lag in the reporting, so it is very likely that the number of startups incorporated in 2022-2024 is higher than the numbers reported by Crunchbase. However, more complete data from Startup Genome on Seed, Series A, and Series B financings, which represent not startup formation but when they were financed, confirms this slowdown (Figure 3).

Figure 3. Hong Kong Seed, Series A, and Series B financings
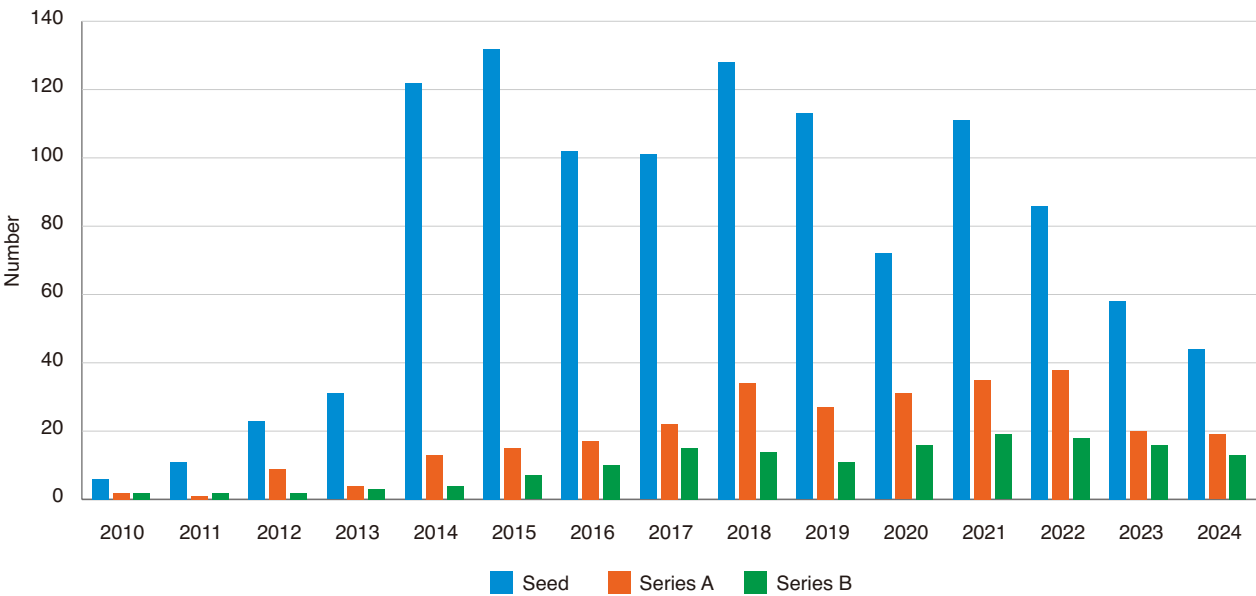
Source: Startup Genome

This slowdown does not just affect Hong Kong but extends more broadly to the Greater Bay Area (GBA), as evidenced by Crunchbase data on Guangdong-incorporated startups for the same period (Figure 4). The caveat about the completeness of the Guangdong data also evidently applies, but the trend is quite clear.

Figure 4. Hong Kong and Guangdong Province startup formation, 2010-2024
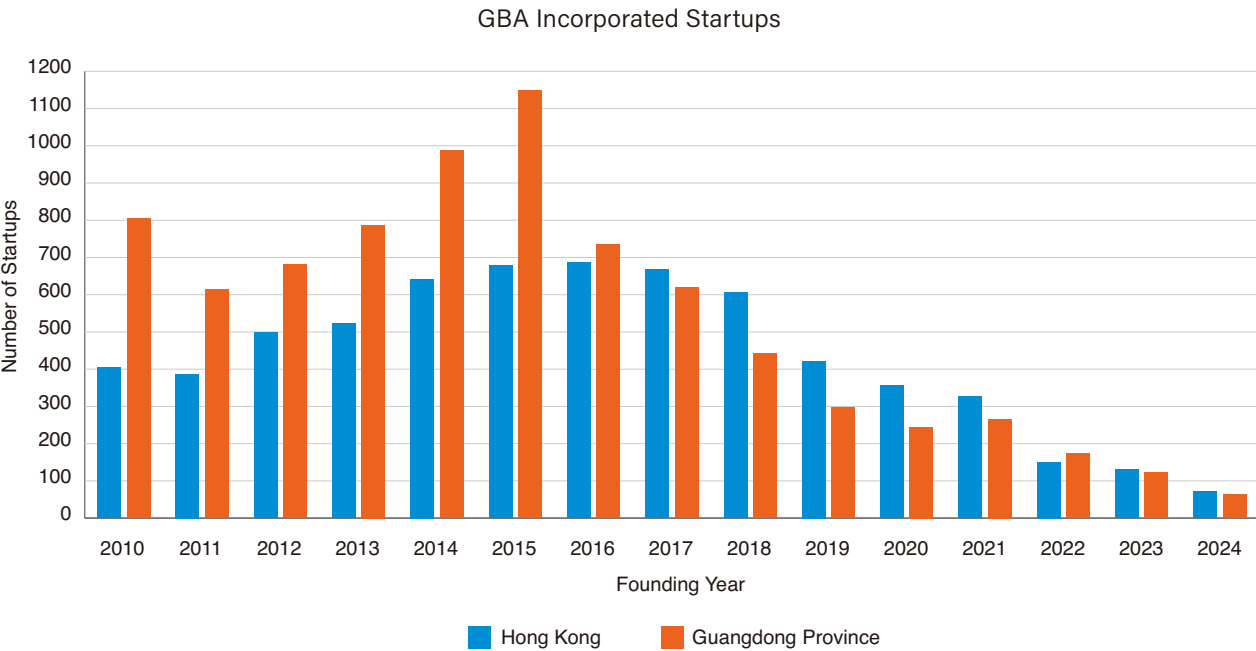
Source: Crunchbase

Another possibility is that this decline is part of a broader macroeconomic trend of reduced economic activity in Hong Kong. But this trend in startup formation does not seem to be correlated to general economic activity, as evidenced by Hong Kong Companies Registry data on company registrations. These data, which are a proxy for overall economic dynamism and business formation, show a recovery to close to historical levels in the last couple of years (Figure 5).

**Figure 5. Hong Kong company registrations last 15 years**

Hong Kong Company Registrations

Source: Companies Registry

2.1 Startup Team Size and Scaling Dynamics

The majority of Hong Kong startups remain small, with more than 80% employing fewer than 50 people. Only a handful have scaled beyond 250 employees, a threshold commonly associated with "breakout" growth in the startup world. This pattern reflects the city's challenges in nurturing and retaining scale-up companies. Local startups often struggle to transition from early success to large-scale operations, hindered by market constraints, funding gaps, and competition from larger regional players.

As Figure 6 shows, using Crunchbase data, mature firms are larger. However, focusing on 2014-2018, there is an obvious plateau in startup size, with limits to scale in the Hong Kong startup ecosystem, and the vast majority of mature firms not growing past 50 employees or so.

**Figure 6. Evidence in recent years of limits to scale in startup size**
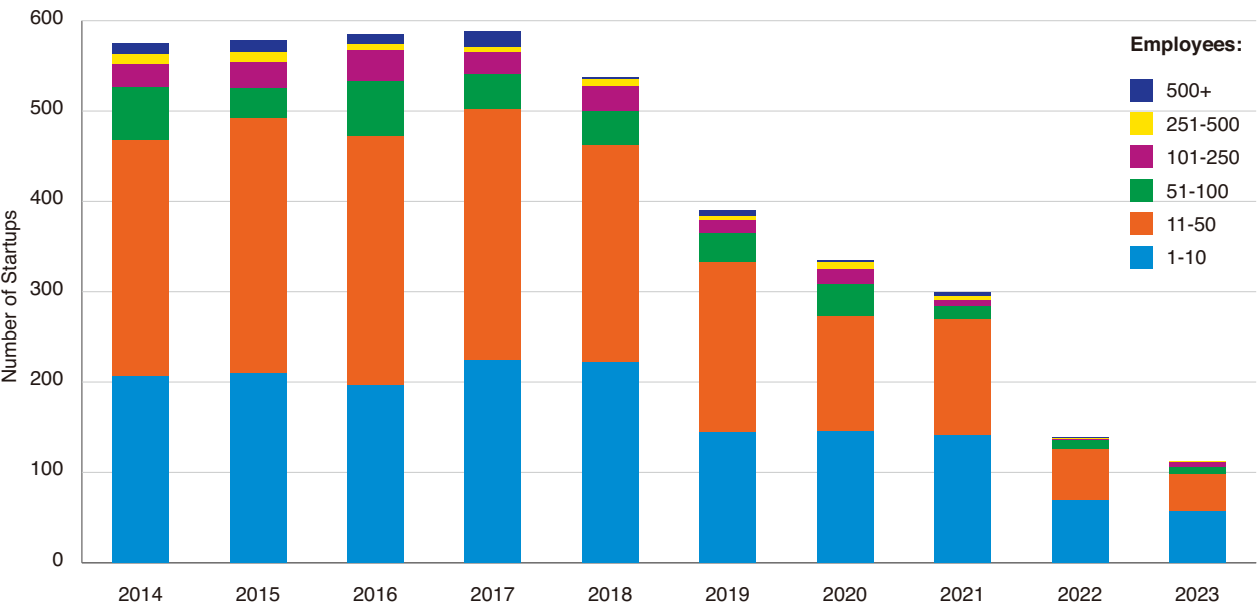
Source: Crunchbase

2.2 Investment, Financings, and Exits

In contrast to the recent rates of startup formation, the financing and funding environment in Hong Kong remains robust. The number of financing transactions had been rising, with a decline in deal size in 2022-2023, which is in line with the global startup financing environment, followed by a strong rebound in financing activity in 2024 and 2025 YTD (Figure 7).

Figure 7. Hong Kong financing numbers and amounts
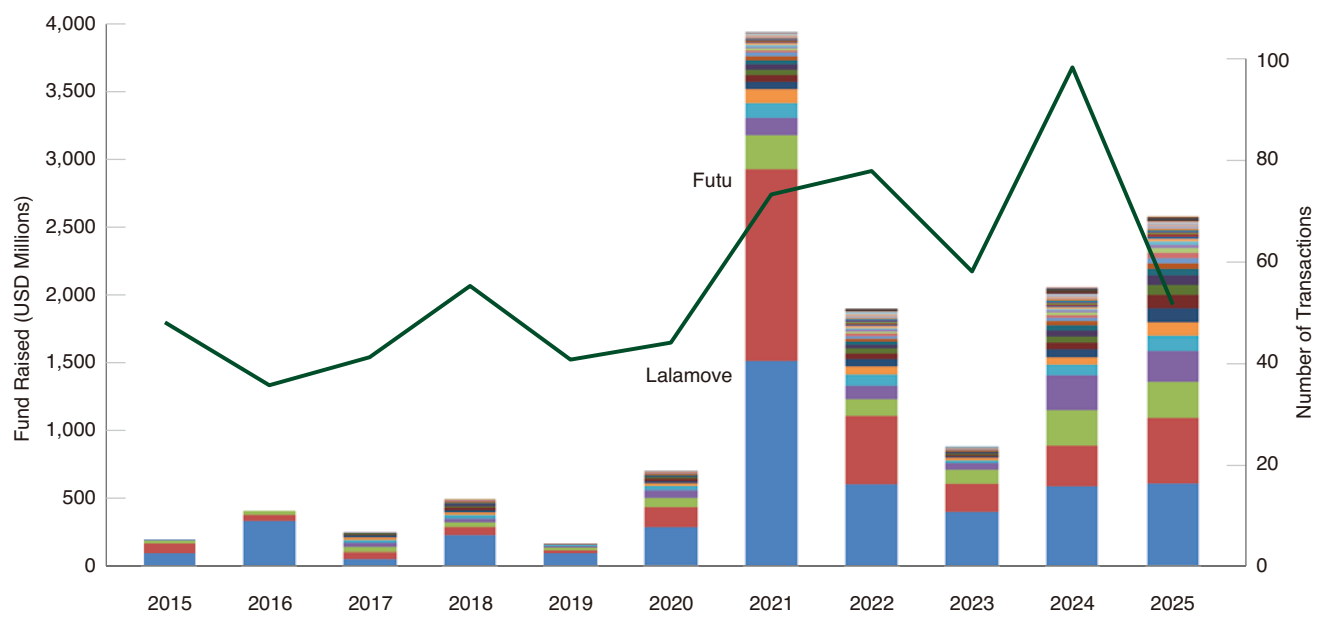
Source: Crunchbase

Seed and early-stage funding remain relatively accessible, supported by government grants and angel investors, but growth-stage and late-stage capital are scarce—this is a critical bottleneck for startups seeking to scale (see Figure 3).

Hong Kong has produced a handful of unicorns and high-value startups, including Futu (digital finance), Lalamove (logistics), and SenseTime (AI). However, these successes are relatively rare, and several of Hong Kong's highest-profile startups have faced stiff competition from the Chinese Mainland and international rivals. This is also apparent in the number of exits, which has been declining over the last few years in line with the reduced rate of startup formation, as shown in Figure 8.

Figure 8. Startup exit declines in the city

Exits
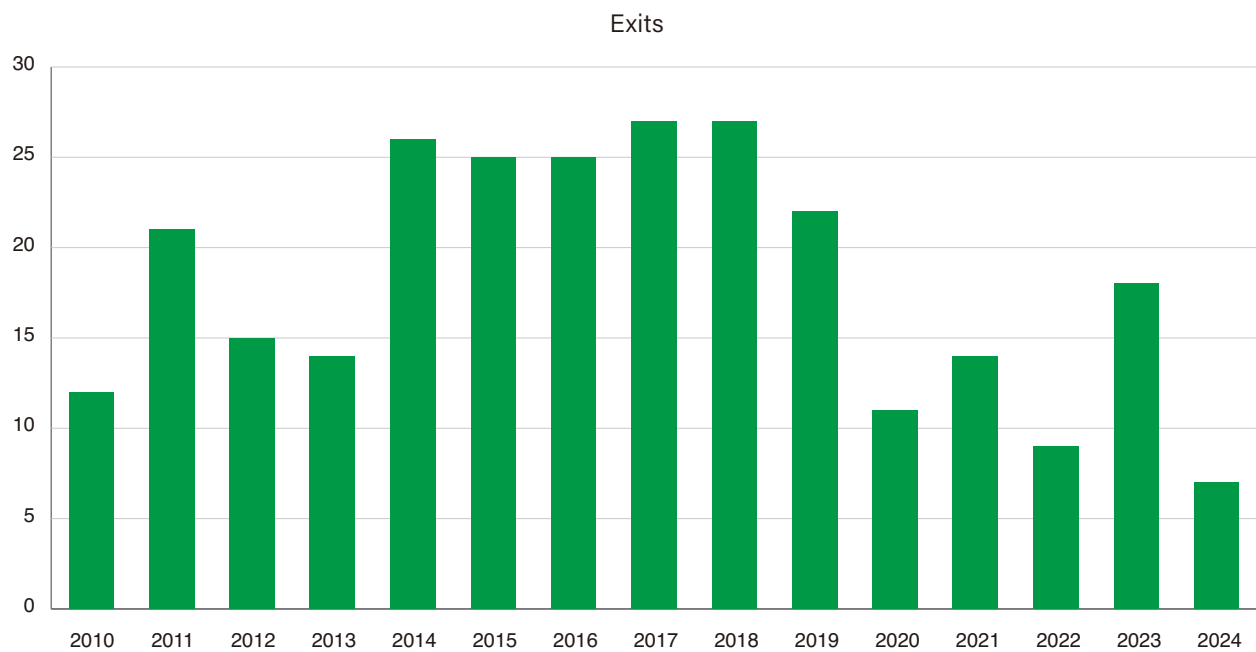
Source: Startup Genome

2.3   Startups across Sectors

From our dataset covering over 10,000 enterprises incorporated in Hong Kong in the past 10 years, we can see the key trends across sectors and how they reflect policy drivers, as well as local and global events (Figure 9). A good example is during the COVID-19 pandemic which hindered businesses related to physical interaction but empowered digital transformation across industries.

Overall, steady contributions to the field have been from the traditional sectors such as Manufacturing & Industrial, Media & Entertainment, Consulting & Professional Services, Retail & e-Commerce, Logistics & Supply Chain Management, Healthcare & Life Sciences, Education & Ed-tech, NGOs, and others. Among those, Software & Internet and Financial Services have been the key sectors delivering higher numbers of startups. It is worth noting that the numbers for blockchain and artificial intelligence (AI) have been rapidly rising.

From the dataset analysis, our forecast would be threefold: 1. traditional sectors are the areas where there will be high demand for digital transformation; 2. our strength in Internet-related and financial services, especially as it will empower and be empowered by cross-border business; and 3. the latest wave of emerging technology, including AI and blockchain.

Figure 9. Startup figures and trends across sectors in the past 10 years
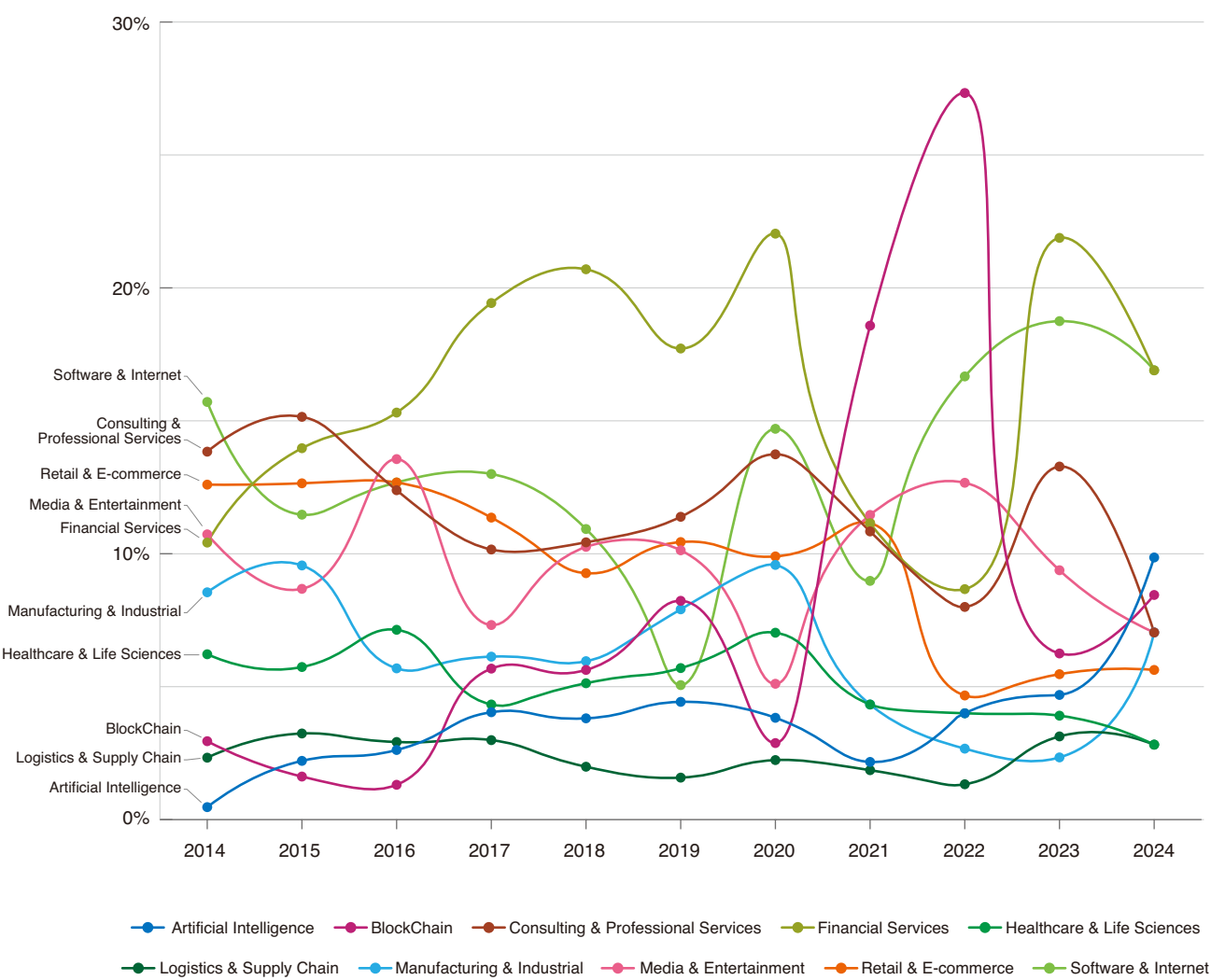
Source: Crunchbase

3. Hong Kong and the GBA in the Global Innovation Landscape

Taking a historical view of the role of Hong Kong in the GBA, the city has been and will continue to be an important contributor to the regional ecosystem. The Shenzhen-Hong Kong-Guangzhou cluster ranks #1 globally in the WIPO Global Innovation Index 2025, contributing 2.4% of global academic publications and 9–10% of PCT patent filings (Figure 10).

Despite this, Hong Kong's and the GBA's per capita innovation output trails leading clusters such as Cambridge (UK) and San Jose (USA). According to the OECD, Hong Kong produces 1.2 PCT applications per 1,000 residents, compared to 3.8 in Cambridge and 4.2 in Silicon Valley. This gap underscores the challenge of converting research excellence into commercially viable startups and sustained innovation.

Figure 10. GBA ranks #1 globally in the WIPO Global Innovation Index 2025

Rank	Cluster name	Global share of publications	Global share of PCT filings	Global share of VC deals
1	Shenzhen–Hong Kong–Guangzhou	2.4%	9.0%	2.9%
2	Tokyo–Yokohama	1.4%	10.3%	2.2%
3	San Jose–San Francisco	0.7%	3.9%	6.9%
4	Beijing	4.0%	3.8%	2.9%
5	Seoul	1.7%	5.4%	3.1%
6	Shanghai–Suzhou	2.5%	3.3%	3.7%
7	New York City	0.9%	1.0%	4.8%
8	London	0.7%	0.5%	4.4%
9	Boston–Cambridge	0.9%	1.5%	2.0%
10	Los Angeles	0.5%	0.9%	2.5%

Global share range

0.5%   10.3%

Source: WIPO Statistics Database, May 2025.

3.1 Hong Kong and its GBA Peers

According to PitchBook, between Q3 2018 and Q2 2024, Hong Kong startups secured US$16.6 billion in financing, accounting for a significant share of the US$83 billion total deal value in the GBA (Figure 11). While this demonstrates Hong Kong's strong position as a regional financial centre, it is notably less than the US$41.8 billion raised by Shenzhen startups during the same period. This disparity highlights Hong Kong's shifting secondary role within the GBA's innovation cluster, particularly in terms of deep-tech and large-scale technology financing, but points to shifting trends that could be leveraged to the benefit of Hong Kong and GBA ecosystems.

Figure 11. Hong Kong and GBA startup ecosystem
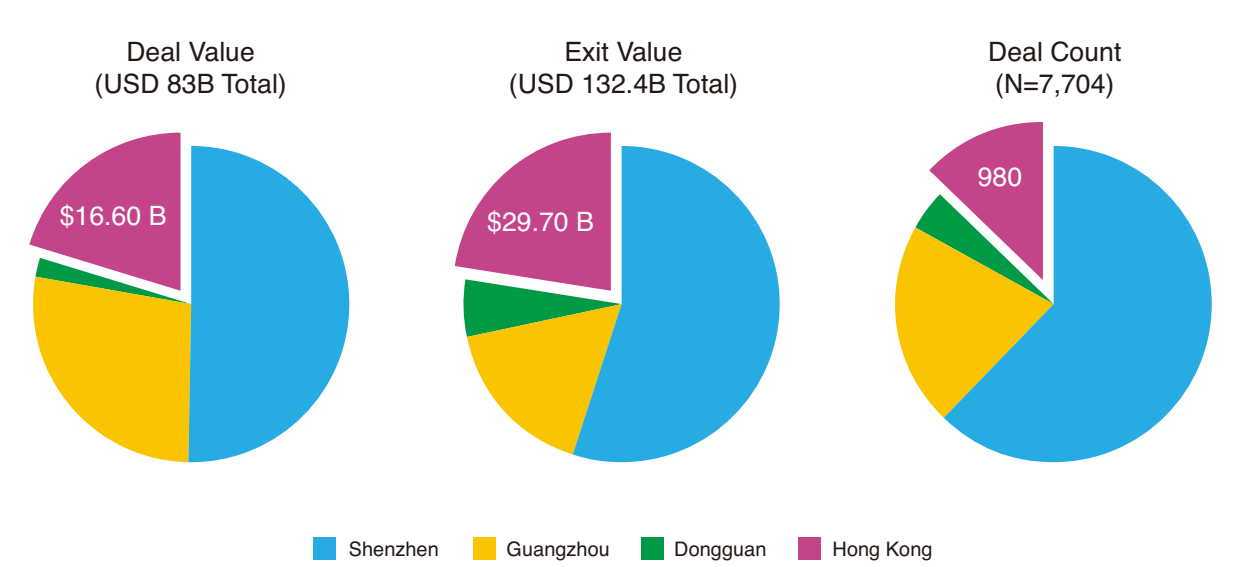
Source: PitchBook, all data Q3 2018-Q2 2024

Hong Kong's startup exit values between 2018 and 2024 totalled US$29.7 billion (Figure 11), again trailing Shenzhen's US$72.9 billion, which suggests that while the city provides robust exit opportunities, particularly through its stock exchange, it has yet to establish itself as the premier destination for tech startup IPOs or mergers and acquisitions in the region.

Quantitative comparisons reveal that although Hong Kong's startup formation has grown over the past decade, cities such as Shenzhen and Guangzhou have outpaced it both in the number of startups and in total secured financing. These cities have leveraged their extensive supply chain networks, advanced manufacturing capabilities, and deep pools of tech talent to nurture a vibrant ecosystem of rapidly scaling technology companies.

Ultimately, Hong Kong's role within the GBA remains distinctive. It continues to serve as a gateway for international capital and legal structuring, leveraging its common law system and status as a global financial centre. However, its contribution to rapid technology scaling, especially in sectors such as deep tech and advanced manufacturing, is currently less pronounced compared to Shenzhen's robust platform companies (e.g., Tencent, Huawei and DJI), which provide extensive supply and industry support to local startups. We believe this is an opportunity for Hong Kong to step in and contribute to the GBA startup ecosystem.

4. Key Policy Recommendations

As mentioned earlier, the slowdown in Hong Kong startup formation and activity is due to both changes in the macroeconomic environment and a structural shift in the region's startup ecosystem towards the GBA. This transition period presents an opportunity to realign and reinvigorate the combined ecosystem in a more organised and productive way. In this section, we describe potential initiatives to drive this realignment.

4.1 Better Aligned Sector and Vertical Orientation

Hong Kong's startup ecosystem is strongly represented in fintech, logistics, and digital finance, leveraging the city's established financial infrastructure and trade networks. Companies like Lalamove (logistics) and Futu (digital finance) exemplify this trend.

But competition is intensifying, and to maintain its edge, Hong Kong must diversify into emerging sectors such as AI, green technology, and health tech. According to Startup Genome, AI and data analytics ventures in Hong Kong grew by 35% annually between 2020 and 2023, while health tech saw a 28% increase. Despite these gains, the ecosystem remains less diversified than top global hubs, and therefore, more support is needed for deep tech and advanced manufacturing.

Acknowledging that Hong Kong's domestic market is limited by its population size and geography, startups must quickly access regional or international markets to achieve scale. This requires sophisticated market understanding and a global business model design. High costs—especially for office space, housing, and talent—raise barriers for early-stage founders and increase the risk profile for investors.

Recent trends, such as the rise of Real World Asset (RWA) tokenisation and digital finance, highlight Hong Kong's potential to lead in financial innovation and regulatory technology (regtech). By aligning fintech development with legal and compliance expertise, Hong Kong can simultaneously attract overseas investment and support GBA corporates in business transformation.

4.2 Stronger Internationalisation and Talent Acquisition

Hong Kong positions itself as a global hub for international founders and venture capitalists, benefiting from its open economy, robust legal protections, and world-class connectivity. While the city attracts talented students from the Chinese Mainland and abroad—especially to its world-renowned universities—retaining these talents after graduation remains a challenge. Many STEM graduates and high-tech professionals seek opportunities in the Chinese Mainland or other regional centres, attracted by larger markets and more vibrant startup ecosystems.

According to the Hong Kong government's 2023 labour statistics, 32% of STEM graduates seek employment outside Hong Kong, primarily in the Chinese Mainland, Singapore, and the United States. The Hong Kong government's 2025 Policy Address emphasised increasing the number of non-local students at local universities, but there is a pressing need for enhanced career support and clear pathways for these graduates to anchor their innovation and R&D activities within Hong Kong and GBA ecosystems.

4.3 Rethinking the Financing and Exit Environment

While seed and early-stage funding are relatively accessible in Hong Kong, there is a pronounced scarcity of growth-stage and late-stage capital compared to tech hubs in Silicon Valley or Shenzhen. This funding gap impedes a startup's ability to scale, invest in R&D, and compete internationally.

Growth-stage and late-stage funding remain major bottlenecks, with institutional investors in Hong Kong, such as pension funds and insurance companies, allocating only a small fraction of their portfolios to venture capital and private equity. This is in contrast to Silicon Valley, where institutional venture capital investment is a cornerstone of ecosystem scale-up.

Hong Kong's stock exchange offers robust IPO and M&A opportunities, but it is perceived as less attractive for high-growth technology startups than the US NASDAQ or Shanghai's STAR Market. As a result, some of the city's most promising ventures seek exits or secondary listings abroad, diluting the impact of local innovation.

Exit options are robust in financial and logistics sectors, but the Hong Kong Stock Exchange is perceived as less attractive for deep-tech and high-growth technology IPOs. The regulatory environment, while stable, is seen as less flexible than the US or Chinese Mainland markets. Consequently, several promising Hong Kong startups have sought exits or secondary listings elsewhere.

4.4   Better Alignment Between Early-Stage Innovation and Market Environment

Despite the presence of world-class universities and research institutes, Hong Kong's per capita scientific output and patenting activity remain below those of leading global innovation hubs. This gap limits the pipeline of deep tech ventures and reduces the ecosystem's capacity to generate high-impact startups. Furthermore, relatively few startups transition from small teams to large employers or 'unicorns', indicating challenges in business model scalability and market adoption.

Two areas are suggested as the focus for innovation and technology development in Hong Kong. First, while Hong Kong has a strong international university cluster and robust R&D from academic and research institutes, the ecosystem lacks market understanding—locally, nationally, and globally—as well as insight into investment trends. Business model design and planning that enable projects to scale up could be aligned to allow early coordination between industry, academia, and policy guidance to unleash startup potential.

Second, the availability of a flexible and deep industry and supply chain has been key to rapid innovation and technology development in the Chinese Mainland. Hong Kong needs to support startups in connecting to the supply chain and industry chain in the GBA as a critical step for project implementation and advanced manufacturing, as well as supporting Chinese corporates in their overseas expansion strategies.

4.5   Closing the Gap Between Academia and Market Needs

Hong Kong has several top global universities with strong research output in both quality and quantity. However, to achieve successful technology transfer and market penetration, there needs to be market research on industry pain points and user requirements, converting research into market demand.

Early industry involvement could play a key role. In China, BAT (Baidu, Alibaba, Tencent) are giants not only because of their market share, but also because they have empowered new startups through investments and resources. These companies' platforms, user bases, and data have helped startups establish themselves. New big-tech platforms such as Pinduoduo, Meituan, and Bytedance (Tiktok), as well as advanced AI and robotics companies like Game Science, DeepSeek, Unitree Robotics, DEEP Robotics, BrainCo, and Manycore Tech, have become important players.

The focus is not only to attract these companies to establish operations and business through Hong Kong, but also to encourage them to incubate local startups. Through collaboration with these large corporates, Hong Kong startups and innovation projects could gain access to a more complete ecosystem and comprehensive resources, beyond just financial support.

4.6 Closing the Knowledge Gap Between Hong Kong Startups and the Mainland Market

Both startups and established businesses, including corporates and SMEs, face the challenge of Hong Kong's market being too small to sustain or scale their businesses. The Chinese Mainland market, particularly the GBA, is the key target after proof-of-concept is achieved in Hong Kong.

There are cultural and user behaviour differences. Most products and services—including digital marketing strategies—cannot be directly transferred across the border. Many businesses are unaccustomed to the Chinese Mainland business environment. It is critical that businesses learn about the Chinese Mainland market, especially the GBA, and develop the mentality and capability to adapt their products, services, business models, logistics, and marketing accordingly.

4.7 Closing the Knowledge Gap Between Hong Kong Startups and the Global Market

Hong Kong has long been the direct channel between China and the rest of the world, with its robust financial and legal system and the "One Country, Two Systems" policy. The innovation ecosystem in Hong Kong has to play this role now more than ever. There are two key needs: First, local startups need to better understand international trends, standards, investment flows, and regulatory environments to inform their long-term business scaling plans. Second, Hong Kong businesses should further establish themselves as a catalytic force in the value chain of innovation projects across industries, positioning Hong Kong as a global innovation gateway connecting China's domestic supply chain with global markets.

This aligns with national policy directions such as the Belt & Road Initiative, as well as expansion into Africa and Latin America. These efforts can be supported by research and insights from research institutes, trade departments, and local trade associations.

4.8 Providing Value-Added Services that Play to Hong Kong's Strengths

A strategic direction for Hong Kong would be to develop "innovation services" within the value chain. This could be possible if Hong Kong aligns its innovation and entrepreneurship development plan by leveraging China's strength in domestic industrial supply and value chains.

While manufacturing is concentrated in the Chinese Mainland, Hong Kong can provide creative and professional services—such as design, IP management, finance, and legal support—as high-value services for innovation projects. Supply-chain finance and serving as a hub for attracting foreign capital can further strengthen Hong Kong's position as an international financial centre. In the long term, Hong Kong should foster talent development related to supply chain and value chain innovation,

including industrial digitalisation and entrepreneurial engineering. This can be achieved through relevant program development and training collaborations with industry.

## 4.9   Integrating the Northern Metropolis and Startup Development Policies

In the Chief Executive's 2025 Policy Address, significant attention was given to the development and acceleration of the Northern Metropolis, particularly regarding the establishment of a dedicated working group, the streamlining of administrative procedures, and infrastructure development. Alongside the focus on attracting research talent and the aim to establish an international innovation and technology centre, these initiatives set the stage in terms of hardware and software for promoting innovation and entrepreneurship.

Hong Kong has extensive experience in urban planning and infrastructure development, especially with previous satellite towns in the New Territories; relatively recent examples being Tuen Mun, Tseung Kwan O, and Tin Shui Wai. In the areas of research and development, the Hong Kong government has a strong track record of supporting university-based research but these efforts require more collaboration to fully unlock the potential of the Northern Metropolis.

To ensure the success of the Northern Metropolis, planning must be aligned with the goal of establishing it as an innovation centre, and this requires the engagement of several critical stakeholders in addition to those already involved.

First and foremost, strong engagement with industry players is essential. A key aspect of innovation is market implementation and scaling-up, which means that industry presence—including their supply chain and value chain—must be integrated. This involves more than just offices and laboratories; it requires the formation of clusters of related sectors and businesses. Corporate participation in R&D can improve commercialisation rates and facilitate mass production and market adoption, bridging a critical gap for many startups in Hong Kong. These efforts can be further supported by developing a robust industry feedback and insight response mechanism.

Despite these initiatives, the Northern Metropolis within Hong Kong remains limited in terms of available land. Therefore, integration with Shenzhen and within the GBA is both necessary and imminent. Increased cross-border coordination will allow for optimal use of resources, including land, enabling efficient co-development between Hong Kong and Shenzhen. This can be further enhanced through consistent policy alignment and a unified governance framework, which could be extended beyond the Northern Metropolis to include the greater region, all the way to Qianhai.
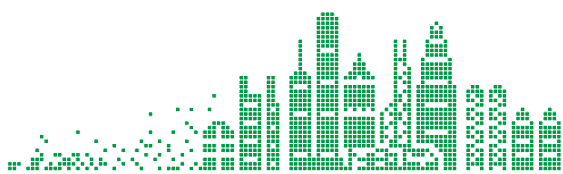
The Applications of Blockchain in Green Finance: Hong Kong's Experience and Opportunities

The Applications of Blockchain in Green Finance:
Hong Kong's Experience and Opportunities

Dragon Tang[1]

Abstract

This paper examines the application of blockchain technology in green finance, with a particular focus on Hong Kong's pioneering initiatives. It shows how blockchain's key features—immutability, transparency, and traceability—address critical challenges such as greenwashing, fragmented data, and limited retail access. The analysis highlights Hong Kong's world-first sovereign tokenised green bonds and innovative projects such as Genesis and Ensemble, which streamline issuance, enable real-time impact tracking, and facilitate integration with carbon markets. Through a global comparison with jurisdictions including Singapore and the European Union, the paper positions Hong Kong as a leading hub that leverages blockchain to enhance market efficiency and trust. It concludes by outlining future opportunities for standardisation and cross-border integration to advance sustainable finance.

1.　Introduction

Climate change has made green finance a policy priority worldwide, channeling capital toward sustainable development projects such as climate-change mitigation and resource conservation. However, the field faces persistent challenges, including verification of the use of proceeds, the risk of greenwashing, fragmented data, and limited access for retail investors. Recent advances in blockchain and Web3 technologies, which are decentralised, immutable, and traceable by design, are widely regarded as promising tools to address these issues. Hong Kong, as a leading international financial hub, has become a focal point for government and industry stakeholders who are actively exploring how these technologies can accelerate climate-related financing and improve market transparency.

Green finance refers to loans, bonds, and investments directed toward projects that benefit the environment or mitigate climate change, including renewable energy development, energy-efficiency

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improvements, pollution reduction, and climate-change adaptation measures. Rigorous disclosure of fund allocation and environmental outcomes is essential to prevent "greenwashing". In practice, however, tracking capital flows and verifying environmental performance are costly and often hindered by a lack of standardized methodologies, which undermines investor confidence and market transparency.

Blockchain technology offers practical solutions to these challenges. As a distributed ledger, it synchronises transaction records across multiple nodes, ensuring data immutability and traceability. Once financial flows and environmental data are recorded on-chain, all participants can access the same verified information, reducing information asymmetry and the risk of tampering. Smart contracts further enable automated fund disbursement and data updates based on predefined conditions, such as releasing payments only when environmental targets are met. This automation lowers monitoring costs and minimises human error or fraud.

Beyond the base-layer ledger infrastructure, Web3 can be understood as the broader application and user-facing layer built on top of blockchain. In this paper, we use the term to encompass programmable digital assets, decentralised applications, and wallet-based identity systems that allow investors, issuers, and service providers to interact directly on-chain. For green finance, these Web3 components shape how users access tokenised products, exercise governance rights, and consent to the sharing and verification of sustainability data. For example, tokenised deposits, central bank digital currencies, and other programmable forms of money provide alternative rails for allocating capital and settling transactions, while decentralised identity and verifiable credentials can support secure, privacy-preserving ESG disclosure. In Hong Kong, such Web3 building blocks are increasingly embedded in policy initiatives on virtual assets, e-HKD experimentation, and tokenised bond infrastructure, reinforcing the link between digital-asset development and sustainable finance.

Tokenisation extends these benefits by converting assets such as bonds, carbon credits, or renewable energy certificates into digital tokens. This process makes traditionally illiquid, high-minimum-investment green assets more divisible and tradeable, expanding access for investors with shallow pockets. For example, while conventional green bonds may require minimum investments exceeding USD 10,000, tokenised versions can be purchased in much smaller fractions, thereby broadening market participation.

Finally, blockchain's openness fosters collaboration and data sharing among governments, banks, firms, and certification bodies. By recording updates on a shared ledger, stakeholders can avoid fragmented data silos and improve information alignment. In cross-border contexts, such as linking carbon markets or financing global projects, decentralised systems reduce reliance on intermediaries and enhance coordination efficiency. In short, blockchain technology provides a technical foundation to enhance transparency, trust, and inclusiveness in green finance.

In this report, we first examine the typical applications of blockchain in green finance, with a particular focus on Hong Kong. We then analyse selected international cases to place these developments in a global context. Finally, we discuss future opportunities and potential pathways for green finance in Hong Kong.

2.   Application of Blockchain in Green Finance

In this section, we review the major applications of blockchain in green finance, including green bonds, carbon markets, supply chain certification, and renewable energy trading. Among these domains, the green bond market provides the most concrete evidence that blockchain can enhance transparency and trust, particularly in issuance, settlement, and post-issuance reporting.

2.1   Issuance and Tracking of Green Bonds

Green bonds raise funds for environmentally beneficial projects, but the complexity of traditional issuance and investment procedures—spanning multiple parties and stages—limits investors' visibility into fund allocation and realized environmental outcomes. Disclosure typically relies on periodic, self-reported issuer documents, which impedes independent verification and heightens greenwashing risk. Blockchain can mitigate these limitations by enabling tokenized issuance and near real-time, tamper-evident tracking of both financial flows and environmental performance metrics. A comparison of traditional and tokenised bond issuance and tracking is presented in **Figure 1**.

Figure 1: Comparison of traditional and tokenised bond market structures.

This figure illustrates how blockchain can streamline capital markets by replacing multiple intermediaries in traditional bond issuance with a unified distributed ledger and smart contract system. The tokenised bond model enables direct interaction between issuers and investors through automated lifecycle management and on-chain settlement. (Source: Tran Linh, 2024, Obligate and InvestaX)

Hong Kong's recent experience provides a pioneering example. In February 2023, the Hong Kong Special Administrative Region (HKSAR) Government issued the world's first sovereign tokenised green bond, totaling HKD 800 million with a 1-year maturity and a 4.05% coupon.[2] These bonds were issued on a permissioned blockchain platform governed by Hong Kong law, and their entire lifecycle was managed on-chain. Market participants, including the issuer, underwriters, custodians, and paying agents, interacted on a unified digital platform rather than through separate systems (Lok, 2024). Settlement of the primary issuance was completed on a delivery-versus-payment (DvP) basis using tokens: investors received security tokens representing the bond, and payment was made with Hong Kong Monetary Authority (HKMA)-issued cash tokens representing Hong Kong dollars, enabling atomic settlement on T+1 instead of the typical T+5. Subsequent processes—such as coupon payments, secondary trading settlement, and final maturity redemption—were executed via smart contracts on the blockchain, demonstrating end-to-end digital lifecycle management. Integration with the Hong Kong Monetary Authority's Central Moneymarkets Unit (CMU) provided statutory settlement finality for on-chain transactions, indicating that Hong Kong's legal and regulatory framework can accommodate distributed ledger technology (DLT)-based securities issuance.

In February 2024, Hong Kong issued a second and larger tokenised green bond of approximately HKD 6 billion (USD 750 million), with tranches in four currencies (HKD, RMB, USD, EUR).[3] This multi-currency digital green bond, the first of its kind globally, was comparable in scale to conventional benchmark issuances, marking a transition of tokenized bonds from pilot projects to mainstream implementation. The 2-year bond attracted a diverse set of global institutional investors, including asset managers, banks, insurers, and corporates. The second issuance incorporated several technological innovations and achieved new milestones in broadening investor participation and streamlining the issuance process. A hybrid access model allowed investors to participate either directly on the digital platform or via existing market infrastructure. The bonds were cleared through the HKMA's CMU, with links to Euroclear and Clearstream, enabling investors to use their regular custodian channels without opening new wallets. This interoperability reduced technological frictions and encouraged adoption. The issuance was also the first to be natively digital, with securities created directly on-chain rather than through a global note. Key bond documentation, including term sheets and green certification reports, was recorded on-chain, thereby enhancing transparency.

The 2024 multi-currency digital bond also demonstrated that tokenised securities can be integrated with secondary markets. The large issuance size and diverse investor base led to active post-issuance trading. Notably, two banks conducted Hong Kong's first repo transaction using a digital bond as collateral in 2024, marking a significant milestone. This repo transaction showed that digital bonds

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2   Hong Kong Monetary Authority (February 16, 2023). *HKSAR Government's inaugural tokenised green bond offering. Hong Kong Monetary Authority.* https://www.hkma.gov.hk/eng/news-and-media/press-releases/2023/02/20230216-3

3   Hong Kong Monetary Authority (February 07, 2024). *HKSAR Government's Digital Green Bonds Offering.* https://www.hkma.gov.hk/eng/news-and-media/press-releases/2024/02/20240207-6/

can function like traditional bonds in financing operations, settling smoothly on the DLT platform. Such developments enhance liquidity, making digital bonds more appealing to a wider range of investors and dealers by enabling trading, lending, and repo transactions.

Additionally, blockchain strengthens the traceability of green bond proceeds and their environmental impact. Future issuances may integrate the Internet of Things (IoT) with blockchain to enable real-time reporting. For example, in the Project Genesis pilot by the HKMA and the Bank for International Settlements (BIS), data on solar-panel output and associated carbon-emission reductions were recorded on-chain and linked to a mobile application, allowing investors to monitor clean-energy generation in near real time. The pilot also demonstrated that tokenisation can substantially lower minimum investment sizes from HKD 10,000 to HKD 100 by dividing the bond into digital units. Although tested in a prototype environment, these features suggest the potential for platforms that provide greater transparency and inclusiveness. As illustrated in **Figure 2** using the Octopus app prototype, investors could purchase fractional green bonds and monitor renewable-energy generation or emissions reductions in real time, thereby lowering greenwashing risks and enhancing investor engagement. By combining immutable records, smart contracts, and external data feeds, blockchain can strengthen trust in green bonds and help ensure that funds are allocated to legitimate green projects with transparent impact tracking.

Figure 2: Prototype interface of the Octopus app.

This figure illustrates potential displays of clean energy generation and CO_2 reduction from green bond projects. In the Project Genesis proof-of-concept, blockchain and IoT data feeds enabled investors to visualize the environmental impact of their investments in near real time. (Source: Kitano, Yohei, 2024, Nomura Insights; pilot demonstration only)
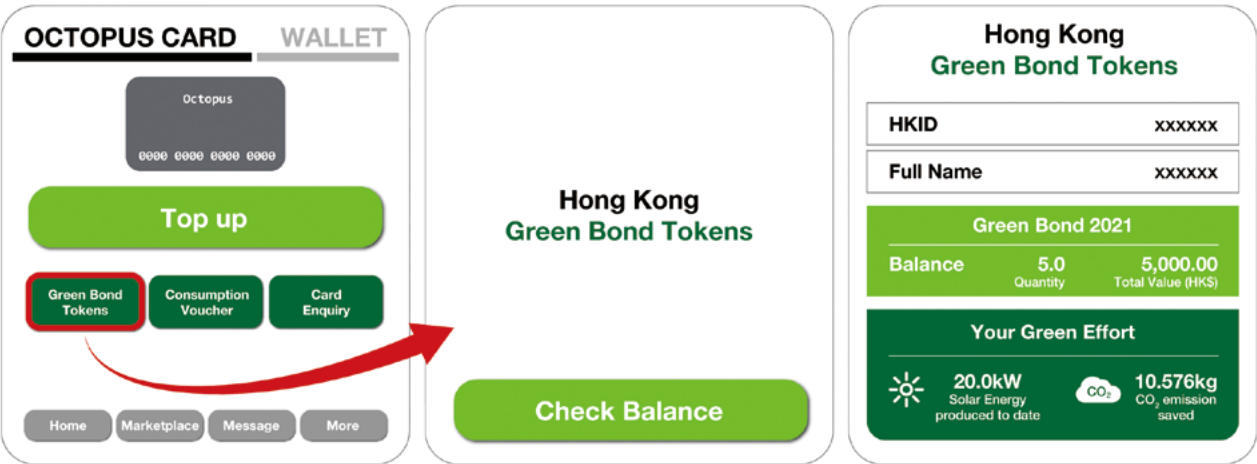
2.2   Carbon Markets and Carbon Credit Systems

Carbon markets, including compliance cap-and-trade systems and voluntary offset programs, rely on accurate emissions data and credible credit verification. Traditional arrangements, however, suffer from opacity, double counting, and limited liquidity, which undermine confidence in using carbon credits to meet climate goals (McLellan, 2022). Blockchain's transparency, traceability, and immutability make it well-suited for tracking carbon credits, ensuring that each tonne of CO_2 reduced is uniquely issued, transferable, and permanently retired.

Hong Kong has begun developing such infrastructure. In October 2022, the HKEX launched Core Climate, a voluntary carbon marketplace offering trading, custody, and settlement services. [4] By mid-2024, Core Climate had more than 80 participants and credits from over 50 projects across Asia, Africa, and South America, verified under standards such as Verra's VCS. In 2024, the HKMA established Project Ensemble to pilot tokenised green assets, including carbon credits. In May 2025, Northern Trust and several other institutions conducted cross-border tokenised carbon-credit transactions to test peer-to-peer trading with near-instant settlement.

Blockchain also enables innovative carbon-credit products linked to green finance instruments. One such concept, explored in the Mitigation Outcome Interest (MOI), is a tokenised co-benefit linked to a green bond and developed under Project Genesis 2.0 by the BIS Innovation Hub and the HKMA. As shown in **Figure 3**, investors receive conventional coupon payments and, if the financed project achieves verified emissions reductions, they also receive carbon credits or similar environmental assets. Smart contracts automatically deliver these credits to investors' digital wallets once third-party verification is completed. By linking part of investors' returns to verified mitigation outcomes in the form of carbon credits, MOIs can lower issuers' cash funding costs, provide investors with near real-time visibility into project impacts, and guard against double counting through shared-ledger ownership records. [5] Although still at the prototype stage, MOIs demonstrate how blockchain can link green finance with carbon markets. In the future, platforms such as Core Climate could integrate with tokenised bond ledgers so that purchasing a green bond automatically allocates associated carbon credits to investors, thereby broadening the investor base and increasing carbon-market liquidity.

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4   HKEX (October 28, 2022). *HKEX Launches Core Climate, Hong Kong's International Carbon Marketplace, supporting Global Transition to Net Zero*. https://www.hkex.com.hk/News/News-Release/2022/221028news?sc_lang=en

5   BIS Innovation Hub (October 24, 2022). Genesis 2.0: smart contract-based carbon credits attached to green bonds. https://www.bis.org/about/bisih/topics/green_finance/genesis_2.htm

Figure 3: Illustration of the MOI mechanism.

This figure illustrates the MOI mechanism, under which investors receive carbon credits alongside bond coupons, with smart contracts ensuring transparent allocation and preventing double counting. (Source: Kitano, Y., 2024, Nomura Insights)
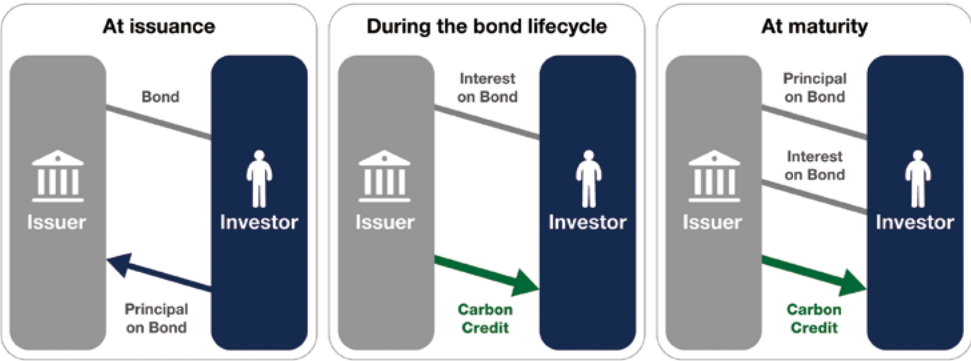

Blockchain also strengthens trust and efficiency in carbon-credit systems. Each carbon-credit token contains auditable metadata on its origin and certification, and all transactions are immutable and time-stamped, facilitating oversight. Smart contracts can encode market rules and automate compliance. **Figure 4** illustrates the detailed process. Overall, these features reduce fraud, double counting, and transaction costs, encouraging broader participation in carbon offsetting and strengthening the credibility of carbon trading as a mechanism for achieving climate goals. Taken together with parallel developments worldwide, Hong Kong's initiatives are setting the stage for interconnected carbon ledgers and reinforcing the credibility of carbon trading as a tool for addressing climate change.

Figure 4: Process of Base Carbon Tonne (BCT) on the Toucan Carbon Bridge.

This figure shows how verified carbon offsets from different projects are bridged on-chain, fractionalised into project-specific tokens (TCO2), and deposited into a Base Carbon Pool. Smart contracts automate issuance and retirement, while blockchain records ensure transparency, auditability, and the prevention of double counting. (Source: Toucan Protocol, 2023)
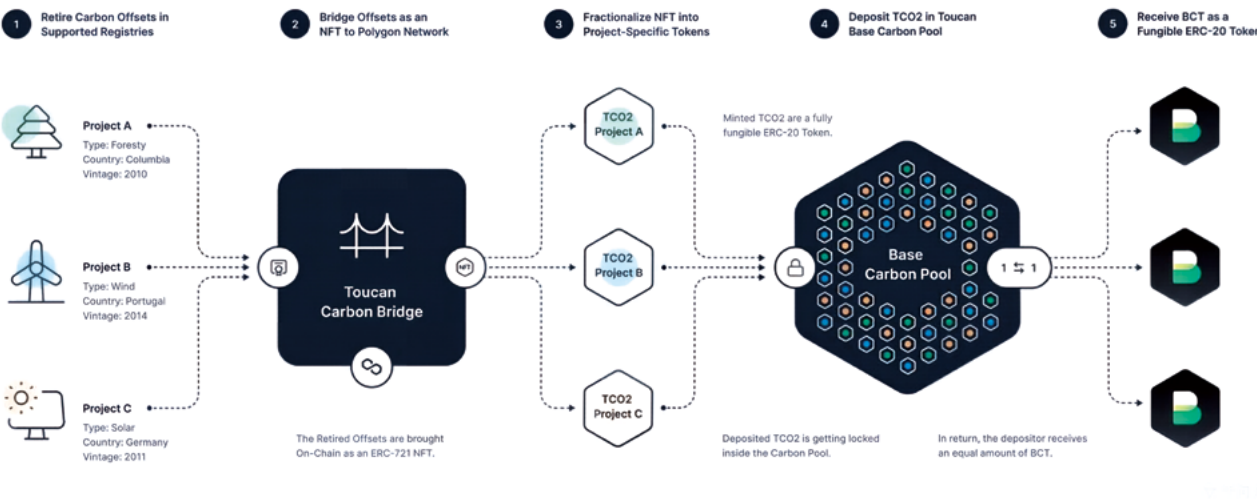
2.3 Sustainable Supply Chain Finance

Blockchain's benefits for transparency and decentralised verification extend beyond financial instruments to supply chain management and energy markets, both of which are crucial for sustainability. In supply chains, firms and regulators require reliable data on environmental footprints, including carbon emissions, water use, and labour practices. Under traditional arrangements, records are siloed within firms, which impedes the verification of environmental claims. A shared blockchain ledger can allow suppliers to upload verified data and create an immutable audit trail. For example, a European pilot tracked sustainably-caught tuna on Ethereum, assuring buyers of product origin. Manufacturers in Hong Kong and mainland China could adopt similar systems to log product-level carbon footprints.

Sustainable supply chain finance aims to provide funding to firms and their upstream suppliers that meet defined ESG objectives. In traditional supply chains, however, information asymmetry across multiple tiers and the limited financing capacity of smaller suppliers make it difficult to assess and reward sustainability performance. Blockchain can address these gaps by providing a decentralised, tamper-resistant ledger that records transactions and ESG attributes in real time, so all participants and lenders can access verifiable data. On this basis, banks can offer green supply chain finance products with preferential terms to low-emission or certified suppliers, while instant verification reduces the scope for greenwashing and facilitates compliance with emerging rules such as the EU Carbon Border Adjustment Mechanism (CBAM).

A typical example is the Contour platform, a blockchain network developed in 2019 by eight major banks including the Hongkong and Shanghai Banking Corporation (HSBC), Standard Chartered Bank, and BNP Paribas. Built on distributed ledger technology, it digitalises trade finance instruments such as letters of credit and guarantees, allowing all participants to share secure, real-time transaction data. **Figure 5** compares traditional and blockchain-based letter of credit processes. By replacing paper-based procedures, Contour shortens settlement times, reduces fraud risk, and enhances transparency. Its smart contract functions enable ESG criteria, such as certified suppliers or low-emission logistics, to be automatically verified within the financing workflow. In a 2020 pilot led by the Asian Development Bank, the Contour platform facilitated a letter of credit transaction for a US$50,000 shipment of plastics from Thailand's SCG Plastics Co. Ltd. to Vietnam's Opec Plastics Joint Stock Company. This marked ADB's first use of distributed ledger technology to issue a blockchain-based credit guarantee for trade finance. [6]

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6   ADB News Release (September 11, 2020). *ADB Conducts its First Credit Guarantee Using Distributed Ledger Technology for Trade Finance*. https://www.adb.org/news/adb-conducts-its-first-credit-guarantee-using-distributed-ledger-technology-trade-finance

Figure 5: Comparison of traditional and blockchain-based letter of credit process.

This figure illustrates how blockchain streamlines trade finance by replacing manual document exchanges with a shared, permissioned ledger. The blockchain model enables encrypted data sharing and smart contract automation between importers, exporters, and banks. (Source: S&P Global Mart Intelligence, 2022)
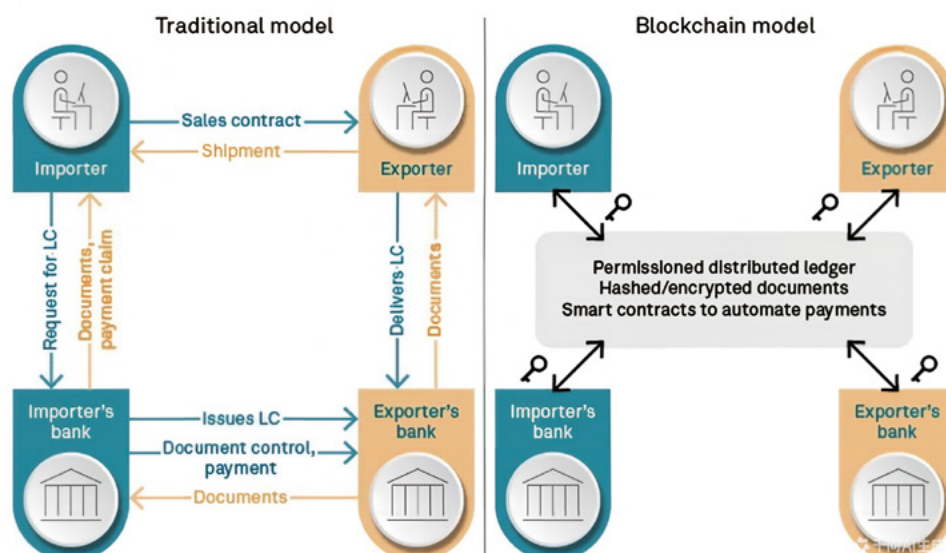

2.4 Renewable Energy Certification and Trading

In renewable energy markets, blockchain has enabled peer-to-peer energy trading and improved the traceability of renewable energy certificates (RECs). A well-known example is the Brooklyn Microgrid, where households can sell excess solar power locally on a blockchain platform, reducing reliance on traditional utility intermediaries (**Figure 6**). Blockchain has also been used to manage RECs by tokenising each certificate, allowing cross-border trading with full provenance. Very Clean Planet (VCP) is the world's first blockchain-enabled platform on which renewable energy certificates can be traced end to end. In April 2022, VCP facilitated an inaugural over-the-counter International-REC (I-REC) trade between Hebei Construction and Investment Group Co., Ltd. and BroadVision Hong Kong Ltd. The platform provides detailed and verifiable information on each I-REC, including its origin, generation process, timing, and other environmental attributes, helping organisations meet stringent ESG and disclosure requirements while reducing the risk of double counting. Singapore's SP Group, for instance, launched a blockchain platform for REC trading that enables small solar installations to sell directly to corporate buyers. Hong Kong could adapt this model to connect corporate renewable-procurement programs with local generation.

Figure 6: Brooklyn Microgrid application interfaces.

This figure consists of two subfigures: (a) feed view, showing energy-sharing options and community participation prompts; (b) map view, visualising local solar generation sites and enabling peer-to-peer electricity trading. (Source: Brooklyn Microgrid, LO3 Energy)
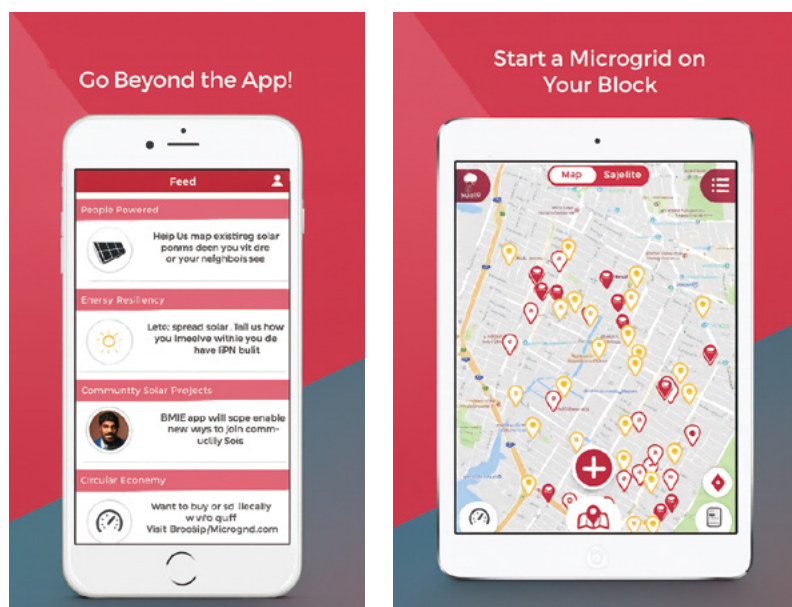
Although most blockchain energy projects remain at pilot scale, they point to a future in which clean energy is more democratised and efficiently allocated. Electric-vehicle owners, for example, could purchase renewable power from nearby producers at the point of charging, with settlement on a blockchain and tokenised RECs credited to buyers. As technology matures, smart grids could process large volumes of micro-transactions while maintaining a trustworthy record for environmental reporting. By aligning financial incentives with sustainable behaviour, blockchain supports business models that reward green-energy producers and hold consumers accountable for their carbon footprints. With strong fintech capabilities and stated carbon-neutrality goals, Hong Kong is well positioned to adopt and scale these innovations. **Table 1** summarises the main application domains of blockchain in green finance and highlights corresponding Hong Kong and international examples.

3.   Hong Kong's Experience

As an international financial centre, Hong Kong has actively integrated blockchain and Web3 into green finance. In the Hong Kong policy discourse, Web3 typically refers to a regulated digital-asset ecosystem that combines tokenised securities, virtual assets, and wallet-based market access on top of distributed-ledger infrastructure. In recent years, the government and financial regulators have moved beyond theory, launching pioneering initiatives supported by a robust legal and infrastructural framework. Hong Kong's experience is reflected in government-led bond issuances, innovative pilots, and supportive regulation.

3.1   Government Tokenised Green Bonds

In February 2023, the Hong Kong government issued its first tokenised green bond under the Government Green Bond Programme, building on the earlier Project Genesis proof-of-concept, and became the world's first sovereign issuer of a digital green bond. The HKD 800 million (about USD 100 million) issuance confirmed that bonds could be validly issued, cleared, and settled on a blockchain under Hong Kong law. Placed with institutional investors, the one-year bond ran smoothly, demonstrating faster settlement and reduced paperwork. Regulators later published a detailed report providing guidance for future issuances.

In February 2024, Hong Kong launched its second tokenised green bond, this time a much larger HKD 6 billion-equivalent offering with multi-currency tranches in HKD, USD, EUR, and RMB—the world's first multi-currency digital bond (Chan, 2025). Issued on HSBC's Orion DLT and cleared via the HKMA's CMU, it gave international investors access through either Euroclear, Clearstream, or directly on the platform, thereby broadening participation. It was also the first to adopt ICMA's Bond Data Taxonomy, embedding standardised machine-readable terms into legal documents and linking its green bond framework and external review reports directly on-chain for greater transparency. These issuances established Hong Kong not only as a first mover but also as a leader in setting practical standards for tokenised sovereign green finance.

By 2025, Hong Kong had signaled that tokenised issuance was shifting from pilot to routine practice. Authorities announced preparations for a third batch of tokenised green bonds, potentially adding new features based on market feedback, and confirmed that regular digital bond offerings would run alongside traditional ones. This batch was designed to explore tokenisation on both the asset and capital sides, with the capital side linked to CBDC, marking a move from one-off trials to institutionalised issuance. To further support adoption, the government considered incentives such as waiving stamp duty on secondary trading of tokenised bonds or other digital securities, thereby lowering transaction costs and aligning them with conventional instruments. Hong Kong's commitment to Web3 in capital markets has been emphasised at the highest level: in early 2025, Financial Secretary Paul Chan highlighted the city's achievements in issuing tokenised green bonds and reaffirmed its goal of building

a robust digital asset ecosystem under clear regulation. These steps indicate that Hong Kong views blockchain-based green finance as a long-term strategic advantage and underscore the government's commitment to leveraging blockchain for market efficiency.

In November 2025, the HKSAR Government completed a third digital green bond issuance under the Government Sustainable Bond Programme. The offering totalled around HKD 10 billion equivalent across four currencies (HKD, RMB, USD, and EUR), making it the largest digital bond issuance globally to date. The transaction retained the key features of the 2024 deal—native digital issuance on the HSBC Orion platform, clearing and settlement through the HKMA's CMU, listing on HKEX, and the option for investors to access the bonds either directly on the digital platform or via existing market infrastructure—but also introduced several important enhancements. For both the HKD and RMB tranches, investors were given the option to settle primary issuance using tokenised central bank money in the form of eHKD and eCNY alongside traditional settlement rails, further shortening settlement time and reducing costs and counterparty credit risk. The issuance attracted total subscriptions exceeding HKD 130 billion across the four tranches and extended tenors to up to five years; thereby scaling up the market for tokenised sovereign green bonds and broadening the investor base to include a larger number of first-time digital bond investors. To advance the adoption of global standards, Digital Token Identifiers (DTIs) were obtained for all tranches under the ISO 24165 standard and directly linked to the bonds' ISINs and the issuer's Legal Entity Identifier (LEI). The deal also expanded the use of ICMA's Bond Data Taxonomy to support machine-readable, end-to-end automation of issuance information and green bond disclosures. [7]

3.2   Innovative Projects: Genesis, Evergreen, and Ensemble

Hong Kong's leadership in blockchain and green finance is built on iterative innovation—testing new ideas in pilots and scaling those that prove effective. Three flagship HKMA initiatives illustrate this approach: Project Genesis, Project Evergreen, and Project Ensemble.

Project Genesis (2021–2022) was a proof-of-concept jointly developed by the HKMA and the BIS Innovation Hub to explore tokenised green bonds. It consisted of two phases. The first phase focused on the tokenisation of green bonds with the aim of promoting sustainable investment and addressing transparency concerns. In this phase, two prototype platforms were developed—one on a private blockchain and the other on a public blockchain—so that their performances could be compared. The prototypes also incorporated Internet of Things (IoT) data feeds to track solar power generation and were integrated with the Octopus e-wallet to enhance retail-level visibility. [8]

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7   Hong Kong Monetary Authority. (November 11, 2025). *HKSAR Government's third digital green bonds offering*. https://www.hkma.gov.hk/eng/news-and-media/press-releases/2025/11/20251111-6/

8   BIS Innovation Hub (November 4, 2021). *Project Genesis 1.0: prototype digital platforms for green bond tokenization*. https://www.bis.org/about/bisih/topics/green_finance/green_bonds.htm

The second phase, Project Genesis 2.0, explored the use of blockchain, smart contracts, and related technologies to demonstrate the technical feasibility of tracking, delivering, and transferring digitised carbon forwards to enhance the transparency, objectivity, and environmental integrity of the green-bond market. This phase proposed a new green-bond structure that adds Mitigation Outcome Interests (MOIs), under which part of the bond's future payments to investors can be made in the form of carbon credits largely generated by the activities financed by the original green bond. The project highlighted several design insights: permissioned distributed-ledger technology is generally better suited to bond markets because of privacy requirements; smart contracts can automate complex workflows such as coupon payments; and interoperability with existing payment systems is essential. Project Genesis provided important technical and architectural lessons for Hong Kong's subsequent live tokenised-bond issuances.

Project Evergreen (2021–present) operationalised tokenised bonds, serving as the backbone for the world's first sovereign digital green bond. It moved from "concept to application" by building market infrastructure and incentives, including a Digital Bond Grant Scheme (subsidising issuers' costs) and a knowledge-sharing hub (EvergreenHub). Evergreen developed a hybrid issuance model linking a private blockchain platform with the HKMA's CMU, allowing investors to hold bonds either on-chain or through custodians. This flexibility broadened access and boosted confidence. The model proved effective: the second government issuance in 2024 saw active secondary trading and even repo transactions, demonstrating interoperability with existing markets. By late 2024, Evergreen had moved beyond proof-of-concept, laying the foundation for routine issuance and broader adoption by corporates.

Project Ensemble (2024–present) represents the next stage: cross-border and multi-asset tokenisation. Launched as an HKMA sandbox, it allows banks, asset managers, and infrastructure providers to experiment with tokenised bonds, deposits, trade finance assets, funds, and carbon credits. One trial tested settling tokenised bond trades with tokenised bank deposits, simulating a future of atomic settlement between securities and digital money. Another involved Northern Trust and others trading tokenised carbon credits, addressing cross-border regulatory recognition. By engaging international institutions, Ensemble positions Hong Kong as a hub for developing tokenisation standards while enabling regulators to adapt oversight as needed. Together, Evergreen and Ensemble complement each other: Evergreen drives real-world implementation, while Ensemble fosters experimentation across asset classes. This two-track approach ensures that Hong Kong remains at the forefront of green fintech innovation while managing risks prudently. **Table 2** provides an overview of Hong Kong's key blockchain and green finance initiatives, from pilots to live issuances.

3.3 Financial Infrastructure and Regulatory Support

Hong Kong's progress in blockchain-based green finance rests not only on projects and bond issuances but also on a supportive policy environment and strong market infrastructure. Regulators apply the principle of "same activity, same risk, same regulation," ensuring that fintech and Web3 innovations operate within established frameworks that underpin Hong Kong's reputation as a trusted financial centre.

A key element is regulatory clarity. In 2022, the government released a Policy Statement on Virtual Assets, committing to the responsible adoption of Web3 and tokenisation. Since then, Hong Kong has launched a licensing regime for virtual asset trading platforms (with the first licenses granted in 2023) and has implemented stablecoin rules in 2025. For green finance, the Cross-Agency Steering Group coordinates taxonomy development, mandatory climate disclosures, and incentives, aligning blockchain-based products with global standards. The Centre for Green and Sustainable Finance, established in 2020, supports data and capacity building, with its repositories and frameworks complementing blockchain by feeding trusted ESG data into DLT systems.

Market infrastructure has also been upgraded. HKEX introduced a Sustainable Bond Market and the Core Climate carbon trading platform, providing venues for both conventional and digital green instruments. The government's 2024 tokenised green bonds were listed directly on HKEX markets, demonstrating integration with mainstream exchanges. The HKMA's CMU has been enhanced to link with DLT platforms, as demonstrated in Project Evergreen, and this integration will deepen with the planned e-HKD, which could serve as the settlement leg for tokenised transactions.

In addition to government-led initiatives, Hong Kong has seen the emergence of private, technology-driven infrastructure. Allinfra Climate (**Figure 7**), developed by Allinfra, is a blockchain-enabled environmental data platform that offers end-to-end services to collect, store, use, and monetise verifiable and auditable sustainability data. It gathers climate-relevant information from smart devices across an asset portfolio and creates an immutable, reliable data repository that can be used to calculate carbon footprints, report environmental performance to stakeholders, support green financing, and generate digital environmental products such as renewable energy certificates or emissions-reduction units. By ensuring data integrity and transparency, the platform helps to reduce greenwashing risks and strengthens carbon-emissions tracking for green-finance activities. When integrated with Allinfra Digital, the firm's asset-tokenisation platform, users can mint and manage environmental tokens through a unified interface and rely on secure storage functions that support the full lifecycle of tokenised sustainability assets.

Figure 7: Allinfra Climate platform.

This figure illustrates how the core Allinfra Climate platform combines blockchain, IoT, and other technologies to deliver a robust climate data tool that increases the reliability, transparency, and timeliness of climate data. (Source: Allinfra Climate blog post, August 07, 2022)
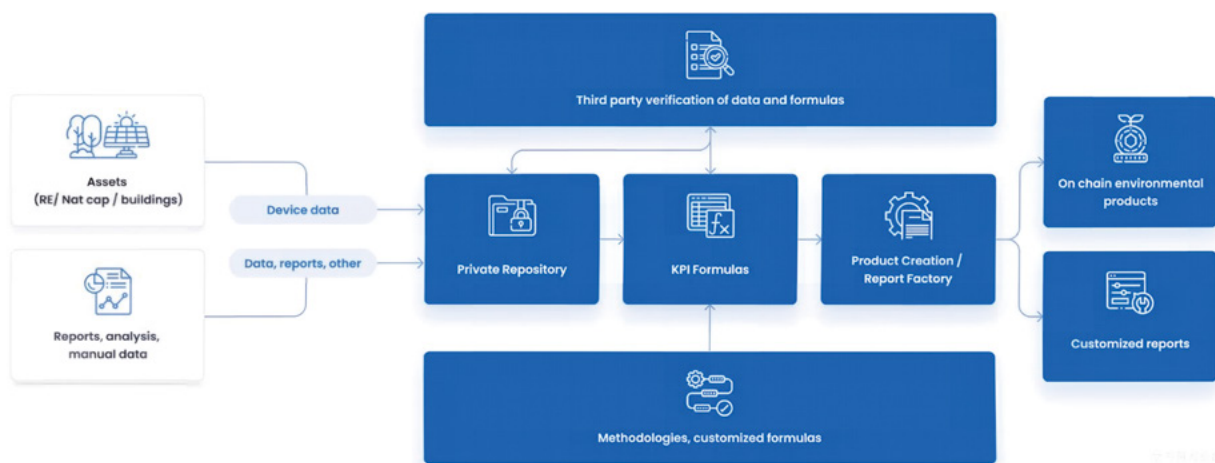
Talent and ecosystem development are another pillar. Authorities work with hubs such as Cyberport and Science Park to incubate blockchain, carbon tech, and green fintech startups, supported by grants and industry programs. International collaboration is also prioritised, with Hong Kong participating in BIS Innovation Hub projects, G20 sustainable finance groups, and cross-border partnerships with markets such as Singapore. This global engagement helps Hong Kong align with international standards while also shaping emerging ones.

In summary, Hong Kong has adopted a holistic approach that combines pilot projects, live market transactions, regulatory clarification, infrastructure enhancement, and talent development. By institutionalising tokenised issuance and embedding blockchain within a transparent and predictable framework, Hong Kong demonstrates how an international financial centre can leverage digital technology to support sustainable finance. This balanced emphasis on innovation and prudence provides a reference model for other markets seeking to promote green finance through digitalisation.

4. International Comparison: Global Cases of Blockchain in Green Finance

4.1 Singapore

Singapore has emerged as a leading jurisdiction in applying blockchain to green finance, particularly in asset tokenisation, carbon markets, renewable energy, and ESG data infrastructure. In May 2022, the MAS launched Project Guardian to explore the use of tokenisation and interoperable networks in future financial infrastructure. Under this initiative, in March 2023 the National University of Singapore (NUS), in collaboration with Northern Trust Corporation and United Overseas Bank (UOB), piloted a tokenised green bond. [9] The issuance comprised SGD 340 million of 10-year notes with a 3.268% coupon. ESG reporting and impact data were delivered to investors as verifiable on-chain credentials, enabling tamper-evident tracking of the use of proceeds and environmental performance and ensuring that this information remained attached to the bond during secondary-market transfers. This design safeguarded data integrity and allowed investors to access secure and immutable impact information for independent evaluation and portfolio-level sustainability disclosures, with all investors receiving an identical and consistent data set over the life of the bond.

Singapore has also taken a leading role in applying blockchain technology to carbon markets. In 2021, SGX, Temasek, DBS, and Standard Chartered launched Climate Impact X (CIX), a voluntary carbon exchange that has since moved into full commercial operation. With technology support from Nasdaq, CIX ensures the authenticity of carbon credits and prevents double counting. Within just four months of launching its spot trading platform in 2023, it cleared over one million tons of credits, and total transactions have now surpassed two million tonnes, with daily bids of about 40,000 tonnes. By creating a transparent and trusted marketplace, CIX reduces fragmentation in the voluntary carbon market, deters low-quality credits, and provides companies with a reliable avenue for carbon-neutral commitments.

Meanwhile, in October 2019, Singapore launched the AirCarbon Exchange (ACX), a blockchain-based carbon marketplace that provides airlines and other corporate buyers with a venue to trade tokenised carbon credits. [10] The carbon credits are securitised into tokens on a 1:1 basis, so that each ACX token corresponds to one certified carbon credit, typically representing one metric tonne of CO_2 reduced or removed. This structure makes the credits more liquid and easily transferable and allows users to buy,

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9   NUS (March 2023). *National University of Singapore (NUS) Green Bond Tokenization*. https://www.unesco.org/en/dtc-financing-toolkit/national-university-singapore-nus-green-bond-tokenization

10   The Straits Times (October 31, 2019). *Singapore sees world's first digital exchange platform for airlines to trade carbon credits*. https://www.straitstimes.com/business/economy/singapore-sees-worlds-first-digital-exchange-for-airlines-to-trade-carbon-credits

sell, and retire them on a transparent platform. By recording transactions on-chain and automating post-trade processes, ACX reduces settlement risk and shortens settlement from days to minutes, while lowering transaction costs compared with traditional over-the-counter carbon markets. The exchange lists credits issued under major standards, including Verra and the Gold Standard, enabling participants to access high-quality environmental assets with price transparency and traceable retirement.

Singapore has also innovated in renewable energy trading. In 2018, SP Group introduced one of the world's first blockchain-based renewable energy certificate (REC) platforms, allowing producers to tokenise and sell certificates directly to corporate buyers such as City Developments Limited and DBS. Blockchain's immutable ledger streamlines verification, reduces administrative costs, and enables even small-scale rooftop solar producers to participate. The platform ensures that corporate sustainability spending flows directly to clean energy generation, lowering transaction costs and encouraging wider adoption of renewables.

In terms of solar energy tokenisation, renewable energy investment company Fracsio launched its SEA Solar Token Series 1,30 $SSOL1, which is the first in a series of solar-asset-collateralised ESG security tokens on the IX Swap Launchpad. $SSOL1 aims to generate stable returns for investors and focuses on ESG mandates that directly address rising climate challenges. This as the issuer aims to help asset owners transform their illiquid assets into liquid, financially sustainable, socially and environmentally responsible investments that are accessible to every investor. SEA Solar Series 1 is an ESG-focused, solar-collateralised security token addressing key global challenges. By leveraging tokenisation, Fracsio enabled investors to participate in the economic interest of solar power generation projects in Southeast Asia.

At the infrastructure level, the Monetary Authority of Singapore (MAS) launched Project Greenprint in 2021, which includes ESGpedia (**Figure 8**), a blockchain-based registry developed with fintech firm STACS. ESGpedia aggregates verified sustainability data, such as emissions, renewable generation, and building certifications, into a shared, tamper-proof repository accessible to banks and investors. Major institutions including Citi, UBS, and DBS have tested the platform, which aims to break down data silos and improve trust in ESG certifications. By improving data quality and accessibility, ESGpedia enhances due diligence, helps financial institutions allocate green capital more effectively, and provides regulators and the public with clearer insights into environmental outcomes.

Figure 8: ESGpedia dashboard interface.

This figure illustrates a blockchain-based ESG data registry under Singapore's Project Greenprint, aggregating verified sustainability metrics (e.g., emissions, renewables generation, certifications) into a tamper-proof platform for financial institutions and investors. (Source: ESGpedia / Project Greenprint)
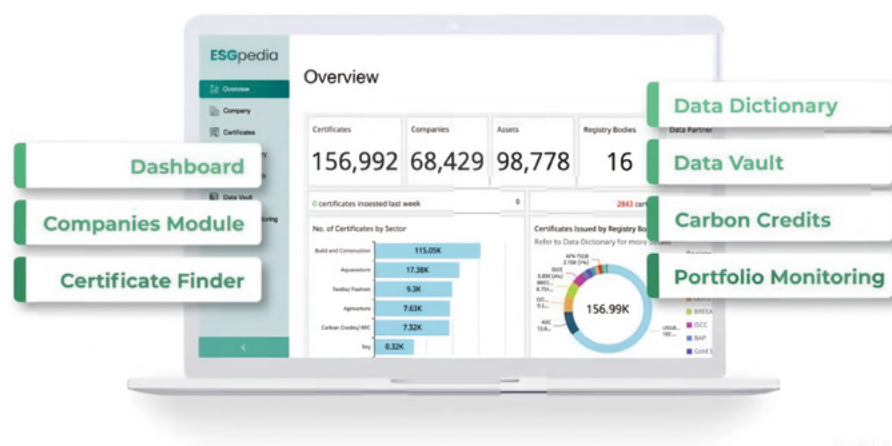
4.2 Europe

Europe's engagement with blockchain in green finance began in bond markets. In February 2019, the Spanish bank Banco Bilbao Vizcaya Argentaria, S.A. (BBVA) arranged a €35 million, six-year green bond issuance for Mutualidad de la Agrupación de Propietarios de Fincas Rústicas de España, Sociedad Anónima (MAPFRE) using its in-house blockchain platform, marking the region's first blockchain-supported green bond. Negotiation and execution were recorded immutably on a distributed ledger, shortening timelines and reducing manual reconciliation. Issued under BBVA's sustainable finance framework and backed by a Second Party Opinion confirming its green credentials, this transaction demonstrated how distributed ledger technology can reduce issuance costs by an order of magnitude (Reyes and Argüello, 2022), enhance efficiency, and strengthen confidence in the use of proceeds. BBVA has since expanded the use of blockchain in other sustainable finance deals, moving beyond pilot projects.

On June 19, 2023, the European Investment Bank (EIB) issued a SEK 1 billion, two-year digital climate awareness bond on so|bond, a sustainable, open digital bond platform based on a public, permissioned blockchain and launched by Crédit Agricole CIB and SEB.[11] The bond, issued under Luxembourg law,

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11 European Investment Bank. (June 19, 2023). EIB issues its first ever digital Climate Awareness Bond and Swedish Krona transaction. https://www.eib.org/en/investor-relations/press/all/fi-2023-09-eib-sek-digital-bond-due-2025

carried a 3.638% fixed coupon. Crédit Agricole CIB acted as central account keeper, while CACEIS and SEB provided custody for their investor clients, with CACEIS also serving as paying agent. The so|bond platform uses the proof of climate awareness protocol, designed to keep energy use at a level comparable to non-blockchain systems and to encourage participants to operate in a more sustainable way. Each validator node is assessed under ISO life-cycle standards, and nodes with a lower environmental footprint receive higher rewards.

On June 10, 2025, Italy's Cassa Depositi e Prestiti issued an eight-year, EUR 500 million green bond with a fixed coupon of 3.25%, reserved for institutional investors.[12] Blockchain will be used to tokenise the reporting process so that investors can independently verify the allocation of proceeds and associated environmental impacts, thereby enhancing transparency, data integrity, and reliability. The bond is reported as the first in Europe to incorporate blockchain-based reporting. The proceeds will finance projects with positive environmental effects, including renewable energy and sustainable mobility infrastructure. The issuance was jointly managed by Banca Akros, BofA Securities, BNP Paribas, Intesa Sanpaolo (IMI CIB Division), Santander Corporate & Investment Banking, and UniCredit. This transaction strengthens CDP's role in promoting sustainable finance and supporting Italy's energy transition and climate adaptation investments.

Blockchain has also been applied in Europe's carbon and energy markets. Launched in 2020, the Port of Rotterdam's Distro project established one of Europe's first blockchain-enabled energy marketplaces to support automated, high-frequency peer-to-peer trading within an industrial microgrid.[13] On this transparent platform, buyers and sellers of renewable power can trade and access dynamic local prices that reflect real-time supply and demand. Developed by a consortium of 32 companies, the system integrates blockchain, AI, and IoT to enable decentralised and autonomous coordination of energy flows. Using predictive algorithms and smart contracts, participants can plan and execute trades up to 48 hours in advance based on pricing rules and real-time data. The pilot phase delivered measurable benefits, including an 11% reduction in energy costs for consumers, a 14% increase in revenues for local renewable producers, and 92% on-site solar consumption, as 32 commercial users employed the automated marketplace to balance local electricity demand and supply. These results highlight the platform's potential to improve economic performance and energy self-sufficiency in port and industrial environments.

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12 CDP Press releases (June 10, 2025). *CDP issues its second Green Bond for 500 million euro. First issuance in Europe with blockchain-based reporting*. https://www.cdp.it/sitointernet/page/en/cdp_issues_its_second_green_bond_for_500_million_euro_first_issuance_in_europe_with_blockchain_based_reporting?contentId=CSA51339

13 S&P Global Platts (October 5, 2020). *World's First High-Frequency Decentralized Energy Market Helps Drive Port of Rotterdam's Energy Transition*. https://press.spglobal.com/2020-10-05-Worlds-First-High-Frequency-Decentralized-Energy-Market-Helps-Drive-Port-of-Rotterdams-Energy-Transition

Furthermore, European members have been active in multilateral initiatives. Since 2020, several have participated in the World Bank's Climate Warehouse project, which uses blockchain to link national carbon registries and prevent double counting under Article 6 of the Paris Agreement. In the private sector, the European Power Exchange (EPEX SPOT), a French-based power exchange serving Germany, the United Kingdom, the Netherlands, Belgium, Austria, Switzerland, and Luxembourg, enables cross-border trading of short-term electricity. In 2021, EPEX SPOT partnered with the U.S. firm LO3 Energy to test a blockchain-based platform that links local, peer-to-peer energy markets with wider power networks (De, 2021). These pilots demonstrated that blockchain can support more decentralized and transparent energy markets in Europe.

Europe has also pioneered blockchain in supply chain traceability. In 2016, UK startup Provenance piloted tracking Indonesian tuna on Ethereum, recording the journey from catch to retail to assure sustainable sourcing. This early use of tokenizsed supply chain data gave consumers immutable proof of origin (Turns, 2021). Similar projects, such as Everledger's tracing of conflict-free diamonds and minerals, showed the feasibility of using blockchain to support sustainability claims. While many of these efforts remain pilots, they reflect Europe's regulatory drive—from anti-deforestation rules to due diligence laws—where blockchain can underpin accountability. Together, these initiatives underscore Europe's cautious but meaningful progress in embedding blockchain into green finance and sustainability.

4.3 Mainland China

In Mainland China, blockchain applications in green finance have focused primarily on credit monitoring and internal systems management. Banks such as Ping An Bank have piloted DLT-based platforms to track the disbursement and use of green loans in real time, with smart contracts flagging potential misuse of funds. This ensures that capital earmarked for environmental projects is not diverted to non-green purposes. In the bond market, the Bank of China developed a blockchain-based bond book-building and custody system as early as 2017, which has been used in several offerings to improve transparency and settlement efficiency. According to KPMG International Limited, Chinese financial institutions are actively integrating blockchain, AI, and big data into green products to strengthen data reliability and traceability. However, unlike Hong Kong, Mainland China has not issued large-scale blockchain-based government or corporate green bonds; efforts remain largely at the pilot stage, with an emphasis on reporting systems, registries, and verification tools to support one of the world's largest green bond markets.

China's carbon trading system has also seen early blockchain pilots. Before the launch of China's national Emissions Trading System (ETS) in 2021, the Beijing Energy-Blockchain Lab and IBM developed a prototype carbon trading platform on Hyperledger Fabric in 2017, described as the

world's first blockchain "green asset" management platform. [14] It enabled end-to-end tracking of carbon credits—from issuance and trading to retirement—cutting costs and time for developing carbon assets by an estimated 20–30%. Although the unified ETS did not adopt this system, the pilot demonstrated how immutable ledgers and smart contracts could prevent double counting and reduce greenwashing risk. At the consumer level, cities such as Shanghai, Shenzhen, and Wuhan have experimented with personal "carbon credit" programmes, in which individuals earn points for low-carbon actions. Some trials considered recording these points on blockchain to ensure transparency and potentially allow tokenised rewards or marketplace exchanges, aligning with China's "carbon inclusiveness" strategy.

China is also actively exploring blockchain-based carbon-data networks. In June 2023, the China Academy of Information and Communications Technology (CAICT) launched a carbon data service network called Carbon Data Reliable Circulation (CRC). The CRC network integrates technologies such as logo analysis, distributed digital identity, smart contracts, privacy computing, and industrial big data to provide a comprehensive and reliable solution for digitally capturing and verifying the carbon footprint of products. It is designed to ensure that carbon data can be transmitted, authenticated, and used in a secure and trustworthy manner. Core functions include carbon data monitoring, carbon footprint and emission accounting and analysis, carbon asset management, and dual-carbon pathway planning.

As a global manufacturing hub, China is also testing blockchain in green supply chain finance. For example, Ant Group's AntChain has been applied to share ESG data—such as energy usage or emissions—across suppliers and banks. In one pilot, suppliers with lower carbon footprints, verified via blockchain-based systems, gained access to preferential loan rates. These initiatives aim to provide a trusted source of ESG information for lenders and buyers while preventing fraudulent claims by suppliers. Current trials in industries such as textiles and electronics focus on logging verified sustainability data, sometimes via IoT sensors, directly onto distributed ledgers. While still at an early stage, such pilots reflect China's push for greener supply chains and could lay the groundwork for national platforms covering carbon footprint tracking, green labelling, and export compliance.

Overall, China's use of blockchain in green finance has been incremental and pragmatic, focusing on improving monitoring, data quality, and verification. This pattern reflects a cautious but strategic approach to embedding blockchain within the country's broader sustainability agenda.

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14   IBM (March 20, 2017). *Energy-Blockchain Labs and IBM Create Carbon Credit Management Platform Using Hyperledger Fabric on the IBM Cloud.* https://www.prnewswire.com/news-releases/energy-blockchain-labs-and-ibm-create-carbon-credit-management-platform-using-hyperledger-fabric-on-the-ibm-cloud-300425910.html

4.4　United States

In the United States, blockchain and green finance have largely developed through bottom-up experiments led by startups and local utilities. A seminal case is the Brooklyn Microgrid in 2016, mentioned above, where residents tokenised and traded rooftop solar power directly on Ethereum. One transaction involved about 195 kWh credits at 7 cents each, demonstrating that neighbors could securely trade energy without a central utility. Although initially small, the pilot by LO3 Energy and ConsenSys showed how smart metres, smart contracts, and blockchain could support peer-to-peer energy markets. Other trials followed, such as a 2018 project in Santa Clara, California, where the municipal utility partnered with Power Ledger to link solar panels and EV chargers to a blockchain system. Each kilowatt-hour of solar used for charging generated a "low carbon credit" token, later sold to corporates seeking offsets, creating a micro carbon market tied to local clean energy.

Blockchain has also been applied to the verification and lifecycle management of voluntary carbon credits. Northern Trust, headquartered in Chicago, launched the Carbon Ecosystem, a blockchain-based platform enabling near-real-time issuance, verification, and settlement of voluntary carbon credits. The system allows project developers to create and register carbon credits with detailed, auditable attributes—such as CO_2 captured, energy consumption, and project location—and to transact them directly with buyers, thereby reducing reliance on intermediaries. Smart legal contracts, executed via Avvoka, ensure legal enforceability and automate documentation for each transaction. By recording trades on a distributed ledger and enabling fast settlement, the platform enhances transparency, reduces friction, and strengthens trust in voluntary carbon markets.

Blockchain has also been tested in renewable energy certificate tokenisation. Around 2018, PJM Environmental Information Services and the Energy Web Foundation built a blockchain platform that allowed RECs to be tracked down to the kilowatt-hour. Instead of bulk 1 MWh units, the system issued fractional certificates with unique identities, enabling even household-scale solar producers to participate. Each token carried metadata on the source and time of generation, ensuring provenance and building trust. These pilots illustrated how blockchain could democratise REC markets and make green power procurement more accessible.

Beyond energy and carbon markets, blockchain has been used to enhance traceability in sustainable supply chains. Walmart's pilots with IBM (2017–2018) used Hyperledger to trace pork in China and mangoes in the Americas. Blockchain reduced the time to track a mango batch from 7 days to 2.2 seconds (Kamath, 2018), cutting waste from recalls and providing end-to-end transparency. This not only improved food safety but also strengthened sustainability claims by ensuring that produce was sourced from certified farms and deterring mislabeling. Following these successes, Walmart and other retailers expanded blockchain traceability to products such as coffee, milk, and eggs, often citing environmental and consumer-trust benefits.

Overall, U.S. blockchain-for-green initiatives have been localised and experimental, without a federal mandate or large-scale regulatory push. Financial authorities remain cautious about digital assets, slowing institutional uptake compared with Europe or Singapore. Still, the accumulation of community energy pilots, granular carbon-tracking systems, and supply chain traceability projects demonstrate the technical feasibility of blockchain for decentralised sustainability markets. Some states and cities have explored extending these models—for example, in Texas (ERCOT) for REC trading and in California's Central Valley for water rights—but scaling will depend on clearer market rules and interoperability standards.

4.5   Canada

In Canada, the use of blockchain in green finance has primarily focused on improving supply chain transparency and supporting circular economy initiatives. An example is the IBM–Plastic Bank blockchain platform launched in 2017. It is a token reward system covering the entire value chain of recycled plastics, from collection and compensation to delivery for reuse by manufacturers. Built on IBM's blockchain infrastructure, the system issues digital tokens that serve both as a record of micro-level transactions and as a form of payment for plastic collectors. Through the Plastic Bank mobile application, collectors use a digital wallet to receive and store tokens that can be exchanged for goods and services. The application runs on IBM's LinuxONE servers, which track trade data and secure token storage. See **Figure 9** for detailed information on Plastic Bank's business model. This model transforms plastic waste into a tradeable asset, reduces risks associated with handling cash, and fosters financial inclusion. The transparent and verifiable nature of blockchain builds trust among collectors, corporate partners, and investors, demonstrating how digital tokens can link environmental action to tangible economic value.

Figure 9: The business model of Plastic Bank.

This figure depicts how Plastic Bank connects collectors, processing centres, partner enterprises, and consumers through a blockchain-based system. Collectors exchange plastic waste for digital tokens, which are tracked and processed into social plastic products, promoting both environmental sustainability and social inclusion (Source: Gong et al. (2022) Blockchain application in circular marine plastic debris management).
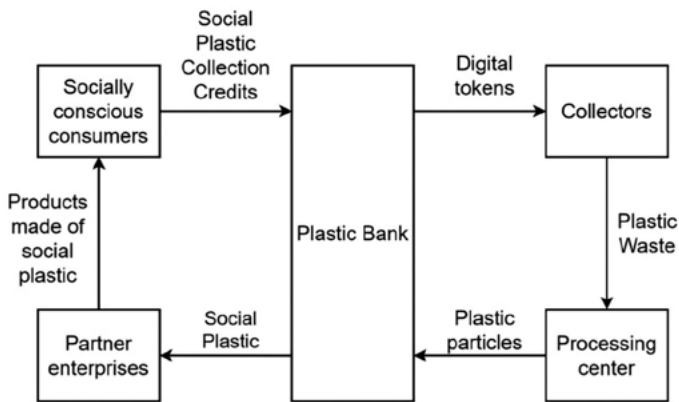
Several Canadian initiatives have piloted blockchain to enable distributed energy resources (DERs) to participate in local energy markets. One example is the "Transactive Grid – Enabling End-to-End Market Services Framework," funded by Natural Resources Canada (2018), which developed a blockchain-based platform called GridExchange to allow small renewable generators to sell into local markets.[15] Through GridExchange, utilities can engage customer-owned DERs to meet system needs and reduce greenhouse gas emissions. In the pilot, Alectra used the app to send dispatch requests ahead of expected high electricity demand, and participants provided simulated market services such as managed EV charging, solar PV generation to reduce emissions, and energy storage for grid balancing, demonstrating the practical value of customer energy resources for the distribution grid. Although blockchain applications in green finance remain relatively limited in Canada, these initiatives demonstrate the country's commitment to using distributed-ledger technologies to enhance sustainability, improve environmental data integrity, and support the transition toward a low-carbon and circular economy.

4.6 Australia

Australia has been an active testing ground for blockchain in distributed energy and carbon markets, driven by high rooftop solar penetration and supportive innovation funding. A landmark case was the RENēW Nexus trial in Fremantle (2018–2020), run by Power Ledger, where households traded rooftop solar peer-to-peer on a blockchain platform. At its peak, about 48 households were conducting over 50,000 transactions per month, exchanging more than 4 MWh of energy. Participants could set their own prices, with trades settled automatically every 30 minutes via smart metres. The project showed that blockchain could handle micro-transactions at scale and act as a virtual power plant (VPP), reducing reliance on the main grid by up to 30–68%. Customers welcomed the added control and ability to monetise solar generation, though the trial highlighted the need for tariff reform, such as dynamic pricing, to improve economic viability.

In 2023, Australia carried out the world's first transaction linking its demonstration Central Bank Digital Currency (CBDC) with a tokenised carbon credit, showcasing the potential for interoperability between CBDC and carbon markets. **Figure 10** illustrates Powerledger's broader architecture, which underpins many of these applications, including P2P energy trading and tokenised carbon markets. Although Australia's compliance carbon market (Australian Carbon Credit Units, ACCUs) has not adopted blockchain, regulatory agencies such as the Clean Energy Regulator and CSIRO are assessing its potential applications. Government-supported initiatives, including the Fremantle Nexus project co-funded by ARENA, have explored how blockchain could reduce transaction costs, improve market transparency, and empower consumers in future carbon and renewable energy systems.

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15 Alectra Utilities Corporation (December 23, 2024). *The Transactive Grid – Enabling an End-To-End Market Services Framework Using Blockchain*. https://natural-resources.canada.ca/funding-partnerships/transactive-grid-enabling-end-end-market-services-framework-blockchain?utm_source

Figure 10: Powerledger conceptual diagram for P2P energy, EV charging, REC use cases.

This figure illustrates Powerledger's blockchain-based framework, highlighting key applications such as peer-to-peer electricity trading, electric vehicle charging, carbon markets, microgrid management, asset creation, and distributed market optimisation.

A representative case in sustainable supply chains is the collaboration between BHP Group Limited, one of the world's largest mining companies, and the blockchain platform MineHub in 2020. The partnership digitalised the end-to-end trading process for commodities such as copper concentrate and iron ore, recording trade data on a shared ledger accessible to all parties. The platform embeds verified ESG information, including mineral origin, carbon emissions, and labour compliance, into each transaction, ensuring full traceability and accountability. By linking on-chain ESG verification with trade documentation, this system enables transactions to qualify for sustainable finance.

At the policy level, blockchain is included in the national Blockchain Roadmap, which highlights energy and sustainability as priority areas. [16] Regulatory sandboxes run by the Australian Energy Market Commission have allowed P2P trading pilots such as RENēW Nexus to test models outside strict market rules. The success of these trials could lead to new policies formally recognising local energy trading. Similarly, if exchanges like ACX build credibility, they may shape the evolution of voluntary carbon markets alongside the compliance system.

Overall, Australia has progressed from pilots to live implementations, with residents now regularly buying and selling solar energy via blockchain. The government remains cautious but supportive, funding research while learning from trials. With abundant renewables and the need to integrate distributed assets into the grid, blockchain could become a cornerstone of Australia's transition toward a more resilient, consumer-driven clean energy system.

4.7 Africa

Africa is emerging as a key region for blockchain-enabled carbon markets, aiming to improve transparency and attract climate finance. A notable initiative is African Carbon Coin (ACC), which tokenises carbon credits generated from forestry and renewable energy projects. These credits are linked to internationally recognised standards, ensuring compliance and credibility. ACC's model seeks to address Africa's current under-representation in global carbon markets, where the continent accounts for only about 2% of voluntary carbon credits. It aims to create a secure, traceable system that can unlock an estimated USD 40 billion annually by 2030. Tokenisation allows fractional ownership of credits, enabling smaller investors and local communities to participate in climate finance while reducing the risks of double counting and fraud. As illustrated in **Figure 11**, ACC's workflow integrates data collection, verification, token issuance, and market trading through a transparent blockchain-based system.

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16 Department of Industry, Science, Energy and Resources (March 18, 2019). *The national blockchain roadmap: Progressing towards a blockchain-empowered future*. https://trustalliance.co.nz/wp-content/uploads/2024/05/Australia-National-Blockchain-Roadmap.pdf

Figure 11: ACC - NFT Network Workflow.

This figure shows the workflow of Africa Carbon Coin (ACC), where renewable energy data from solar miners is collected and stored through distributed systems, then processed via the ACC network and blockchain APIs. Verified data is used to issue ACC-based NFTs, which can be listed and traded on the NFT market or redeemed for climate action badges. The platform also integrates with decentralised exchanges for buying, selling, and offsetting carbon credits, ensuring transparency and traceability across the entire lifecycle. (Source: Africa Carbon Coin.com)
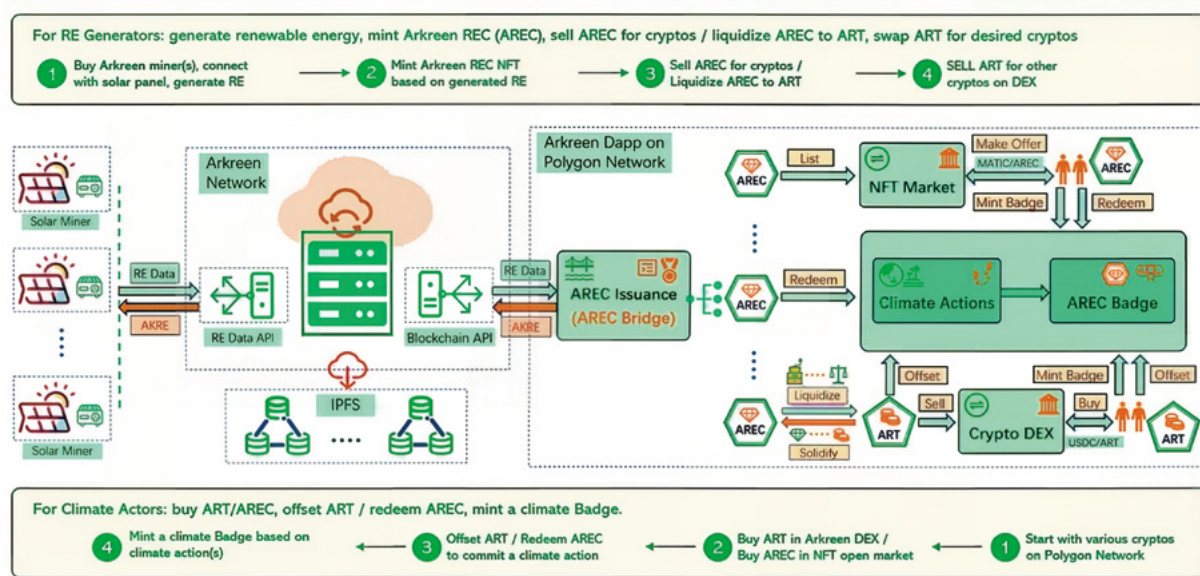
The platform leverages blockchain to provide immutable records of credit issuance, transfer, and retirement, ensuring that each unit is unique and auditable. Smart contracts automate compliance checks and settlement, reducing transaction costs and improving market integrity. By integrating with digital wallets, ACC also facilitates cross-border transactions, making African carbon credits accessible to global buyers. This approach not only enhances liquidity but also channels revenue to local conservation projects, aligning financial incentives with sustainable land-use practices.

These developments illustrate how blockchain can serve as a foundational technology for high-integrity carbon markets in Africa. By combining tokenisation with transparent governance, the region is positioning itself as a credible player in the global carbon economy and creating new pathways for climate finance to reach underserved communities. A notable example is Zimbabwe's launch of the Zimbabwe Carbon Registry (ZCR) in 2025, the world's first national carbon registry fully powered by blockchain. Developed in partnership with A6 Labs and governed by the Zimbabwe Carbon Markets

Authority (ZiCMA), the ZCR aligns with Article 6 of the Paris Agreement and aims to restore trust in Zimbabwe's carbon market. The registry uses blockchain to record the issuance, transfer, and retirement of carbon credits with full transparency and immutability.[17] It also integrates geospatial tools and AI for real-time monitoring of emissions reductions, enhancing the credibility of credits issued.

The ZCR operates as a self-service platform, allowing project developers to manage their credits independently, while smart contracts automate compliance and credit retirement. The first credits issued through the registry came from Cicada Carbon's "Clean Cooking Zimbabwe" initiative, which distributed over 100,000 clean cookstoves to rural households. This not only reduced deforestation but also improved health outcomes, demonstrating the registry's efforts to link green finance with tangible social impacts.

Zimbabwe's blockchain registry is supported by a robust legal framework, including the Zimbabwe Carbon Markets Policy Framework and Statutory Instrument 48 of 2025, which set technical standards and investor protections. By combining digital infrastructure with regulatory clarity, Zimbabwe is positioning itself as a regional leader in climate finance innovation. The ZCR serves as a scaleable model for other African nations seeking to modernise their carbon markets and unlock the potential of green finance through blockchain technology.

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17   Zimbabwe Carbon Markets Authority (2024). *Official Website* – Zimbabwe Carbon Market Portal. https://zicma.org.zw/

4.8 Middle East

Blockchain technology is emerging as a transformative tool for green finance in the Middle East, driven by the region's commitment to sustainability and economic diversification. Countries such as the United Arab Emirates (UAE) and Saudi Arabia have integrated blockchain into their climate strategies to enhance transparency, efficiency, and trust in green financial instruments. This aligns with national visions such as Saudi Vision 2030 and the UAE Net Zero by 2050 initiative, which prioritise renewable energy and carbon neutrality.[18]

One of the most notable applications of blockchain in green finance is in carbon credit trading and emissions tracking. The UAE has taken a pioneering step by launching a national blockchain-based carbon credit registry through a partnership between the Ministry of Climate Change and Environment, and Venom Foundation,[19] formalised through an MoU between the two parties. This system leverages blockchain's immutable ledger to ensure that every carbon credit issued, transferred, or retired is securely recorded and auditable. By embedding transparency and traceability into the process, the registry reduces the risk of double counting and greenwashing, which are common challenges in carbon markets.

In parallel, Abu Dhabi's Technology Innovation Institute (TII) introduced a blockchain-powered platform during COP28 to enable global carbon token trading. This platform integrates digital monitoring, reporting, and verification tools, ensuring that emissions reductions are accurately measured and validated before credits are tokenised and traded. The use of smart contracts automates compliance checks and settlement processes, making transactions faster and more reliable. These initiatives not only strengthen investor confidence but also position the UAE as a regional hub for transparent and technology-driven carbon markets.

Additionally, blockchain is increasingly being leveraged to finance renewable energy projects in the Middle East, offering transparency and efficiency. A leading example is SunMoney Solar Group, headquartered in Dubai. The company uses asset-backed tokens linked to operational solar plants, enabling individuals and institutional investors to participate in clean energy projects without owning physical infrastructure. These tokens, such as the SDBN series, are issued on blockchain and stored in non-custodial wallets, ensuring secure, decentralised ownership and monthly payouts from electricity sales. This approach makes renewable energy investments more accessible to investors and accelerates capital flows into solar projects, while ensuring transparent records of energy production and financial returns.

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18   UAE Government (October 6, 2025). *The UAE Net Zero 2050 Strategy*. https://u.ae/en/about-the-uae/strategies-initiatives-and-awards/strategies-plans-and-visions/environment-and-energy/the-uae-net-zero-2050-strategy

19   UAE Ministry of Climate Change and Environment (August 7, 2023). *MoCCAE Signs MoU to Create National System for Carbon Credits Using Blockchain*. https://www.moccae.gov.ae/en/media-center/news/7/8/2023/moccae-signs-mou-to-create-national-system-for-carbon-credits-using-blockchain-8642692f

Despite these advancements, challenges remain. Regulatory fragmentation across Middle Eastern countries, concerns over blockchain's energy consumption, and the absence of standardised ESG taxonomies pose barriers to widespread adoption. However, with supportive policy frameworks such as the UAE Sustainable Finance Framework 2021–2031, blockchain is poised to play a central role in accelerating the region's transition to a low-carbon economy. [20]

4.9   Global Trends

By analysing practices across various countries and regions, we observe that the application of blockchain in green finance has evolved from early proof-of-concept trials (2015–2018), to regulator-backed pilots (2019–2021), and, since 2022, to real market adoption in leading financial hubs. As summarised in **Table 3**, major regions have adopted diverse blockchain-enabled green finance initiatives that form the basis for these global trends. Different regions exhibit distinct strengths. Specifically, Hong Kong focuses on government-led adoption, combining tokenised green bonds with innovative projects such as Project Genesis and energy-trading platforms. Singapore represents policy-driven fintech leadership, building interoperable infrastructure for tokenised bonds, carbon credits, and ESG data while scaling live markets such as CIX and ACX.

Europe leads in capital-market integration, using blockchain to issue green and climate bonds under clear legal frameworks and linking it to environmental integrity through energy-efficient consensus and transparent impact reporting. Mainland China primarily emphasises data governance and credibility, applying blockchain to carbon data networks and regulatory monitoring systems. In contrast to these markets, the United States, Canada, and Australia advance blockchain and green finance through bottom-up innovation, where startups and local firms pioneer renewable energy and voluntary carbon market experiments. Africa is using blockchain to create inclusive carbon markets that channel climate finance to local communities, while the Middle East focuses on building tech-driven carbon trading hubs and tokenized renewable energy investments. Despite these differences, global efforts are converging toward three goals: standardisation, interoperability, and high-integrity ESG and carbon data infrastructures that support scalable sustainable finance.

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20   UAE Ministry of Climate Change & Environment (2021). *UAE Sustainable Finance Framework*. https://www.investuae.gov. ae/assets/663b7aab52cc952b74457b84_UAE_Sustainable_framework_21.pdf

5. Future Opportunities and Prospects

While blockchain technology holds considerable potential to advance green finance in Hong Kong, its practical implementation faces several challenges. Limited interoperability between blockchain platforms and existing financial infrastructure hampers cross-market transactions. Current scalability constraints mean that efficiency declines as volumes increase, making real-time settlement for tokenized assets difficult. In carbon markets, fragmented registries and inconsistent data and verification standards remain major bottlenecks. Concerns over data privacy and cybersecurity also restrict broader use in sustainable supply chain finance and energy-trading applications. **Table 4** summarises the key challenges facing blockchain-enabled green finance in Hong Kong and outlines potential responses and policy directions.

To address these issues, the next phase of blockchain development in green finance will depend on progress in three areas: standardisation, scalability, and security. Clear regulatory frameworks and common technical protocols are needed to provide legal certainty and interoperability across platforms, and collaboration among regulators, technology providers, and energy-market participants can align rules for tokenization, REC management, and decentralised trading. Within this broader effort, Hong Kong is well positioned to lead in setting regional standards for tokenised green assets, on-chain carbon verification, and disclosure, thereby helping to prevent market fragmentation. Cross-border integration will also be crucial, as climate finance is inherently international. Blockchain could connect Hong Kong's Core Climate platform with Mainland China's ETS and with voluntary markets in Singapore and Europe, while recent multi-currency pilots demonstrate that on-chain automated settlement can facilitate Belt and Road renewable projects at lower cost.

Improving scaleability and operational efficiency will determine whether blockchain can serve real financial markets. As transaction volumes grow, layer-2 solutions and sharding technologies can expand network capacity and reduce congestion without sacrificing security (see, e.g., Cole (2024) and Gangwal, Gangavalli, and Thirupathi (2022)). This scaleability will be critical for tokenised bond issuance and cross-border payments that require near-real-time settlement. Meanwhile, tokenisation also enables broader retail participation by lowering investment thresholds, allowing individuals to buy fractional green bonds or carbon credits through mobile platforms. Projects in Hong Kong such as Genesis have already shown that transparent, automated processes can make green finance more inclusive.

Strengthening data privacy, cybersecurity, and technological integration is key to maintaining trust. Governments and technology firms should jointly develop privacy-preserving architectures, robust encryption, and recovery mechanisms to protect sensitive financial and sustainability data. Moreover, by integrating with emerging technologies such as IoT sensors and AI analytics, blockchain can provide continuous, real-time tracking of environmental performance and enable data-driven assessments of green assets. This combination of transparency, security, and automation will lay the foundation for a resilient and interactive green-finance ecosystem.

In summary, blockchain has already demonstrated value in green bonds, carbon markets, sustainable supply chains, and renewable energy by improving transparency, lowering transaction costs, and widening access. Hong Kong's tokenised government bond issuances and pilots in real-time impact tracking position it among the world's leading financial hubs in this field. Meanwhile, meeting global climate goals requires large-scale investment and international cooperation. Blockchain is not a panacea, but it can serve as a powerful enabler for mobilising capital, strengthening trust, and supporting cross-border collaboration. With sustained policy support, coordinated standards, and participation from both public and private sectors, blockchain can play an essential role in advancing green finance and achieving carbon neutrality.

References

1. Chan, Paul. (2025). HK committed to Web3 ecosystem. news.gov.hk. https://www.news.gov.hk/eng/2025/02/20250219/20250219_143244_326.html

2. Cole (2024). The Role of Web3 in Renewable Energy Markets. https://blockapps.net/blog/the-role-of-web3-in-renewable-energy-markets/

3. De, Nikhilesh (2021). Blockchain Startup LO3 Partners With Power Exchange. https://www.coindesk.com/markets/2017/12/13/blockchain-startup-lo3-partners-with-power-exchange

4. Gangwal, Ankit, Haripriya Ravali Gangavalli, and Apoorva Thirupathi (2022). A Survey of Layer-Two Blockchain Protocols. https://arxiv.org/pdf/2204.08032.pdf

5. Kamath, R. (2018). Food traceability on blockchain: Walmart's pork and mango pilots with IBM. The Journal of Blockchain and Business Applications, 1(1). https://jbba.scholasticahq.com/article/3712-food-traceability-on-blockchain-walmart-s-pork-and-mango-pilots-with-ibm/attachment/20459.pdf

6. Lok, Georgina (2024). Hong Kong's tokenised green bonds: Thought Leadership in International Capital Markets (73), International Capital Market Association. https://www.icmagroup.org/assets/documents/Regulatory/Quarterly_Reports/Articles/ICMA-Quarterly-Report-article-Hong-Kong-tokenised-green-bonds-April-2024-100624.pdf

7. McLellan, L. (2022). BIS turns to blockchain to drive a new type of green bond. OMFIF. https://www.omfif.org/2022/04/bis-turns-to-blockchain-to-drive-a-new-type-of-green-bond/

8. Reyes, S., & Argüello, C. R. (2022). Four benefits brought by using blockchain in capital markets. Inter-American Development Bank. https://idbinvest.org/en/blog/digitization-and-connectivity/four-benefits-brought-using-blockchain-capital-markets

9. Turns, Anna. (2021). Hook to plate: How blockchain tech could turn the tide for sustainable fishing. The Guardian. https://www.theguardian.com/environment/2021/jun/09/hook-to-plate-how-blockchain-tech-can-turn-the-tide-for-sustainable-fishing-aoe

Table 1: Summary of Blockchain Applications in Green Finance

| Application domain	Main problems in traditional approach	Blockchain-based solution and example
Green bond issuance and tracking	Complex multi-party processes and slow settlement; limited transparency on use of proceeds and impact; high minimum investment thresholds.	Tokenised green bonds with on-chain lifecycle management and smart contracts; HKSAR's 2023 and 2024 sovereign tokenised green bonds and the Project Genesis prototype with IoT data and retail access via the Octopus app.
Carbon markets and carbon credit systems	Opacity, double counting risks, fragmented registries, and limited liquidity undermine confidence in carbon credits.	Tokenised carbon credits recorded on a shared ledger with verifiable issuance, transfer, and retirement; Hong Kong's Core Climate voluntary carbon marketplace, Project Ensemble pilots, and the MOI structure in Project Genesis 2.0.
Sustainable supply chain finance and trade finance	ESG and emissions data are siloed; high verification costs and information asymmetry; small suppliers struggle to obtain green financing.	Permissioned blockchain platforms that share transaction and ESG data and automate verification; the Contour trade finance platform and the 2020 Asian Development Bank pilot using blockchain-based guarantees.
Renewable energy certification and P2P energy trade	Difficulty verifying the provenance of renewable energy certificates (RECs); risk of double counting; limited participation by small producers.	Tokenised RECs and peer-to-peer energy trading with full provenance records; examples include the Brooklyn Microgrid, Very Clean Planet's I-REC platform, and SP Group's blockchain-based REC trading platform.
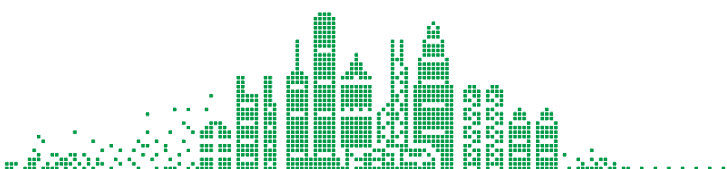
Table 2: Hong Kong's Blockchain-Green Finance Initiatives

Initiative / Project	Timeframe	Description and Objectives
Project Genesis (HKMA & BIS)	2021–2022 (prototype, two-phased study)	Proof-of-concept by HKMA and BIS to simulate tokenised green bonds. Tested features like app-based access and real-time impact tracking. Introduced Mitigation Outcome Interests (MOIs). Insights informed later live trials.
Project Evergreen (HKMA)	2021–present	HKMA's initiative to enable tokenised bond issuances. Provided infrastructure for Hong Kong's 2023-2024 digital green bonds, offering subsidies and best practice sharing through EvergreenHub. Integrated private blockchain with CMU for broader access.
HKSAR Tokenized Green Bond (1st issue)	Feb 2023	Hong Kong's inaugural tokenised green bond (HK$800 million). World's first sovereign tokenised green bond, issued on a permissioned blockchain with T+1 settlement. Established legal validity for tokenised bonds in Hong Kong.
HKSAR Tokenized Green Bond (2nd issue)	Feb 2024	Second tokenised green bond (~HK$6 billion). First multi-currency digital bond fully issued on blockchain. Integrated with CMU, Euroclear, and Clearstream for seamless access. Standardized terms via ICMA's Bond Data Taxonomy.
Project Ensemble (HKMA)	2024–present (sandbox)	Regulatory sandbox to experiment with tokenisation across asset classes, including green finance and tokenised carbon credits. Focuses on cross-border interoperability and technical challenges for new digital markets.
HKSAR Tokenised Green Bond (3rd issue)	Nov 2025	Third digital green bond issuance (~HKD 10 billion equivalent) under the Government Sustainable Bond Programme, with four currency tranches (HKD, RMB, USD, EUR). Largest digital bond issuance globally to date, and the first to integrate tokenised central bank money (eHKD and eCNY) into the primary settlement process. Retains native digital issuance via HSBC Orion and CMU clearing, while expanding tenors to up to five years, broadening the investor base, and advancing the adoption of global standards through Digital Token Identifiers (DTIs) and wider use of ICMA's Bond Data Taxonomy.

Table 3: International Examples of Blockchain in Green Finance

Region	Initiatives (Year)	Focus Areas
Singapore	CIX (2021), SP Group REC (2018), Project Greenprint/ESGpedia (2021)	Carbon credits, RECs, and ESG data
Europe	BBVA green bond (2019), EIB digital climate awareness bond (2023), Distro microgrid project, Provenance (2016)	Bonds, energy trading, and supply chain transparency.
Mainland China	DLT green loan tracking; BoC issuance infra (2017); Energy-Blockchain Labs (2017); AntChain ESG	Monitoring, registries, and supply chain finance.
United States	Brooklyn Microgrid (2016); PJM/Energy Web RECs (2018); Walmart–IBM (2017)	P2P energy trading, granular RECs, and blockchainbased supply chain traceability.
Canada	IBM-Plastic Bank (2017); GridExchange (2018)	Supply chain and energy trading.
Australia	RENeW Nexus (2018–2020); BHP-MineHub (2020)	Distributed energy, carbon trading, and supply chain finance.
Africa	Africa Carbon Coin (2024); Zimbabwe Carbon Registry (2025)	Carbon Trading, registries, and ESG data
Middle East	UAE national blockchain-based carbon credit registry (2023); TII Carbon Token Trading Platform (2023); SDBN (2022, 2023)	Registries, energy trading, and supply chain finance

Table 4: Key Challenges and Future Directions for Blockchain-Based Green Finance in Hong Kong

Challenge area	Issues at the current stage	Future directions and opportunities for Hong Kong
Interoperability and standardisation	Fragmented blockchain platforms and carbon registries; limited interoperability with existing financial infrastructure; inconsistent data and verification standards.	Develop clear regulatory and technical standards for tokenised green assets and on-chain carbon verification; use platforms such as Core Climate and Project Ensemble to link Hong Kong's markets with Mainland China's ETS and overseas voluntary markets.
Scaleability and operational efficiency	Current scalability constraints make real-time settlement for tokenised assets difficult; many implementations remain pilots rather than routine market practice.	Adopt more scaleable architectures and automation for high-volume use cases; continue regular tokenised green bond issuances and deepen the use of tokenised central bank money (eHKD and eCNY) to enable near real-time, atomic settlement.
Data privacy, cybersecurity, and data trust	Sensitive financial and environmental data raise privacy and cybersecurity concerns; the quality and reliability of ESG and carbon data can be uneven.	Design privacy-preserving, secure blockchain architectures and robust governance; integrate trusted ESG and climate data (including IoT- and AI-based monitoring) to strengthen data integrity and reduce greenwashing.
Retail participation and inclusiveness	Conventional green finance products often have high minimum investment thresholds and complex access channels, limiting retail participation and engagement.	Use tokenisation and mobile platforms to enable fractional investment in green bonds and carbon credits; build on the Project Genesis prototype (e.g. Octopus-based access and HKD 100 minimum) under clear investor-protection and disclosure rules.

Can Hong Kong be an IP Hub for Future Labubu? An Overview of Hong Kong's IP Industry

Can Hong Kong be an IP Hub for Future Labubu? An Overview of Hong Kong's IP Industry

Tingting Fan   **Heiwai Tang**

Labubu, a popular designer of art-toy characters produced by the Beijing-based company Pop Mart, has experienced an extraordinary surge in popularity and commercial success throughout 2024 and 2025. By mid-2025, the "Monsters" series, featuring Labubu, generated US$677 million in just six months, and international sales surged by 400%. Driven by Labubu's success by mid-2025, Pop Mart reported US$1.94 billion in revenue—a 204% increase year-on-year—and net profits of US$641 million. A major growth engine is from overseas markets, including Southeast Asia, North America, and Europe. By mid-2025, Pop Mart's international revenue surged 440% with the Americas market alone growing more than 1,100%.[1]

The phenomenal success of Labubu and Pop Mart has spotlighted the growing importance of the intellectual property (IP) industry. Their popularity underscores the commercial potential of IP-driven products, not only inspiring more creators and businesses to invest in branding, licensing, and cross-border collaborations, but also attracting policymakers' attention to the emerging IP sector as a key driver of innovation and economic growth.

Yet, examining the history of Labubu and Pop Mart raises important questions about Hong Kong's role in the IP industry. As one of the world's leading international business hubs, Hong Kong (also referred to as the HKSAR) has long served as a bridge between mainland China and global markets. The rationale behind choosing Singapore instead of Hong Kong for its overseas IP registration needs further investigation.

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1   https://www.scmp.com/business/china-business/article/3322488/mini-labubus-are-coming-after-your-mobile-phone-pop-mart-aims-double-2025-sales & https://www.thestandard.com.hk/wealth-and-investment/article/314717/Pop-Mart-Q3-revenue-surges-despite-investor-concerns-over-growth-sustainability

In addition, HKSAR has a long-standing history in the toy art industry, dating back to the 1960s. Many iconic designs originated from Hong Kong artists, including Pop Mart's first commercially successful IP, Molly, and its most famous IP, Labubu. Yet, these creations remained niche until Pop Mart transformed them into global commercial successes. This raises a critical question: given Hong Kong's rich heritage in toy art and its status as a leading international business hub, why have local companies not managed to turn these homegrown IPs into major business triumphs?

The question has led to the broader question of whether or not the HKSAR can capitalize on the rapidly growing IP industry. If so, what are its unique advantages, and what are the challenges it must overcome? Furthermore, what strategies should the HKSAR adopt to elevate its local IPs from creative concepts to ensure commercial success? This article explores these issues and concludes with actionable recommendations for shaping Hong Kong's future IP policy.

The IP Industry

First and foremost, IP refers to creations of the mind that have commercial value and are protected by law.[2] These include:

- Patents – Protect inventions and technological innovations.
- Copyrights – Protect original works like books, music, films, and software.
- Trademarks – Protect brand names, logos, and symbols.
- Trade Secrets – Protect confidential business information.
- Industrial Designs and Geographical Indications – Protect aesthetic designs and origin-based product qualities.
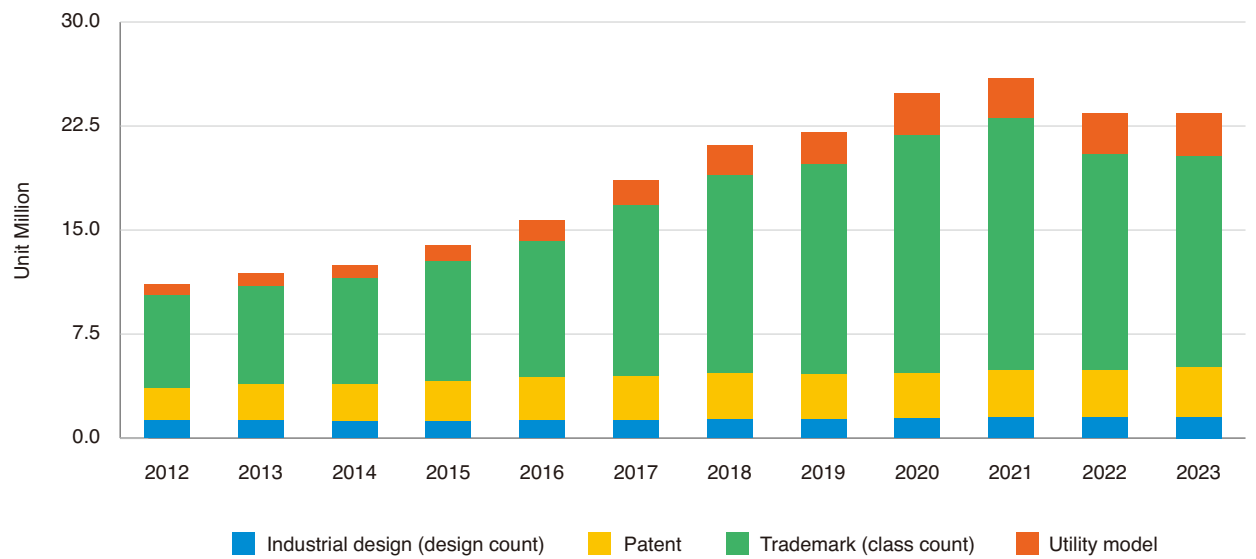
The IP industry encompasses:

- Legal and consulting services for IP protection, management, and enforcement.
- IP valuation and licensing for monetizing intangible assets.
- Technology-driven IP solutions like AI-based patent analytics and infringement detection.
- Industries that are heavily reliant on IP, such as technology, pharmaceuticals, media, and consumer goods.

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2   https://www.wipo.int/en/web/about-ip/

The global IP market was valued at approximately $13.54 billion in 2024 and is projected to grow to $19.12 billion by 2033, reflecting a compound annual growth rate (CAGR) of about 3.9%. This growth is fueled by several key factors: a surge in patent filings (3.46 million in 2023), a rise in trademark applications (18.1 million in 2023), and the rapid expansion of IP-intensive sectors such as artificial intelligence, biotechnology, and digital content (see Figures 1 and 2). Additionally, increasing globalization and the need for robust cross-border IP enforcement are further accelerating market demands.[3]

As shown in Figures 3 and 4, the United States dominates the global IP market in terms of services and licensing revenue, with its IP licensing sector alone valued at $62.18 billion in 2023.[4] IP-intensive industries in the U.S. contribute approximately 41% of GDP and 33% of total employment.[5] On the other hand, China leads in patent filings, recording 1.58 million applications in 2023, and the Nation plays a pivotal role in driving IP-related legal and consulting services. Europe follows closely, with the European Patent Office (EPO) receiving 199,275 filings in 2023,[6] while Japan remains a key player, leveraging strong IP monetization in sectors such as electronics and automotive.[7]
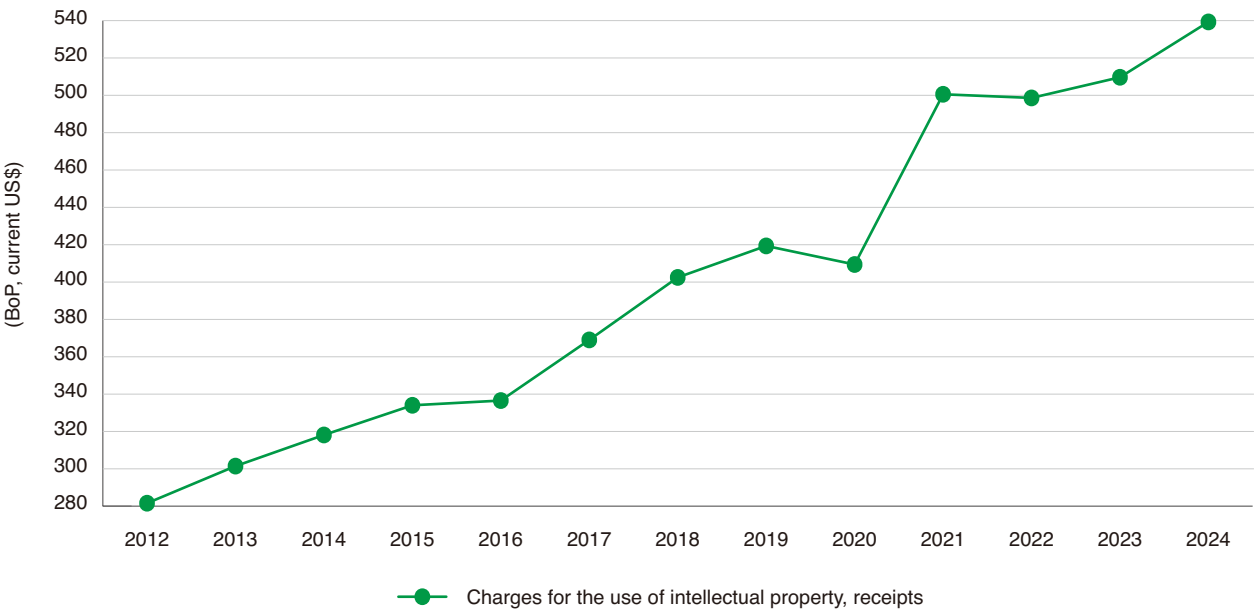
Figure 1: Types of IP Applications globally (2012-2023)

Data Source: WIPO statistics database (Last updated: May 2025). https://www3.wipo.int/ipstats/keysearch.htm?keyId=201

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3   https://www.marketgrowthreports.com/market-reports/intellectual-property-ip-market-113355

4   https://virtuemarketresearch.com/report/intellectual-property-services-market

5   https://www.wipo.int/web-publications/world-intellectual-property-indicators-2024-highlights/en/patents-highlights.html

6   https://markwideresearch.com/intellectual-property-market/

7   https://www.marketgrowthreports.com/market-reports/intellectual-property-ip-market-113355

Figure 2: IP trade, 2012-2023 in terms of value globally

Data Source: The World Bank, Charges for the use of intellectual property, receipts (BoP, current US $)
https://data.worldbank.org/indicator/BX.GSR.ROYL.CD?end=2021&start=2012

Figure 3: Regional IP Applications (2012 & 2023)

Data Source: WIPO statistics database (Last updated: May 2025). https://www3.wipo.int/ipstats/keysearch.htm?keyId=203
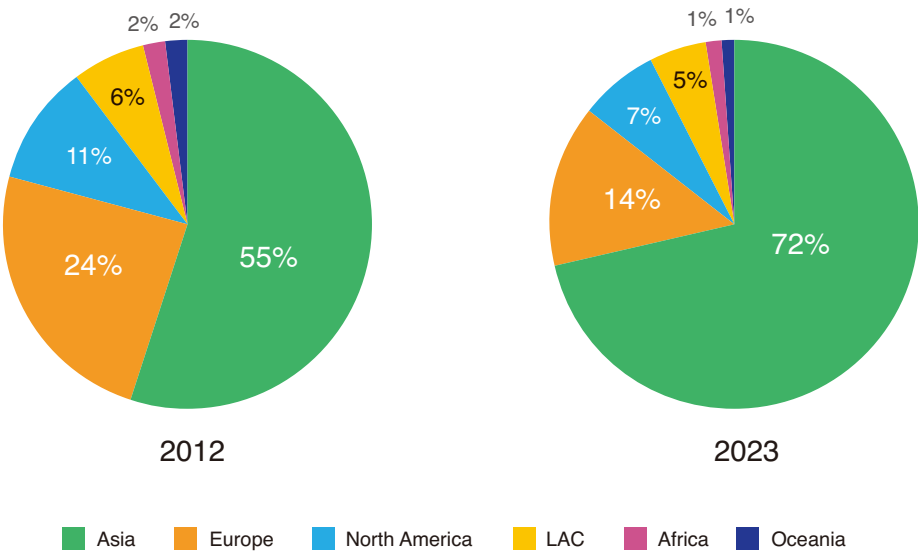
Figure 4: Patent Applications for Top 20 IP Offices during the same period
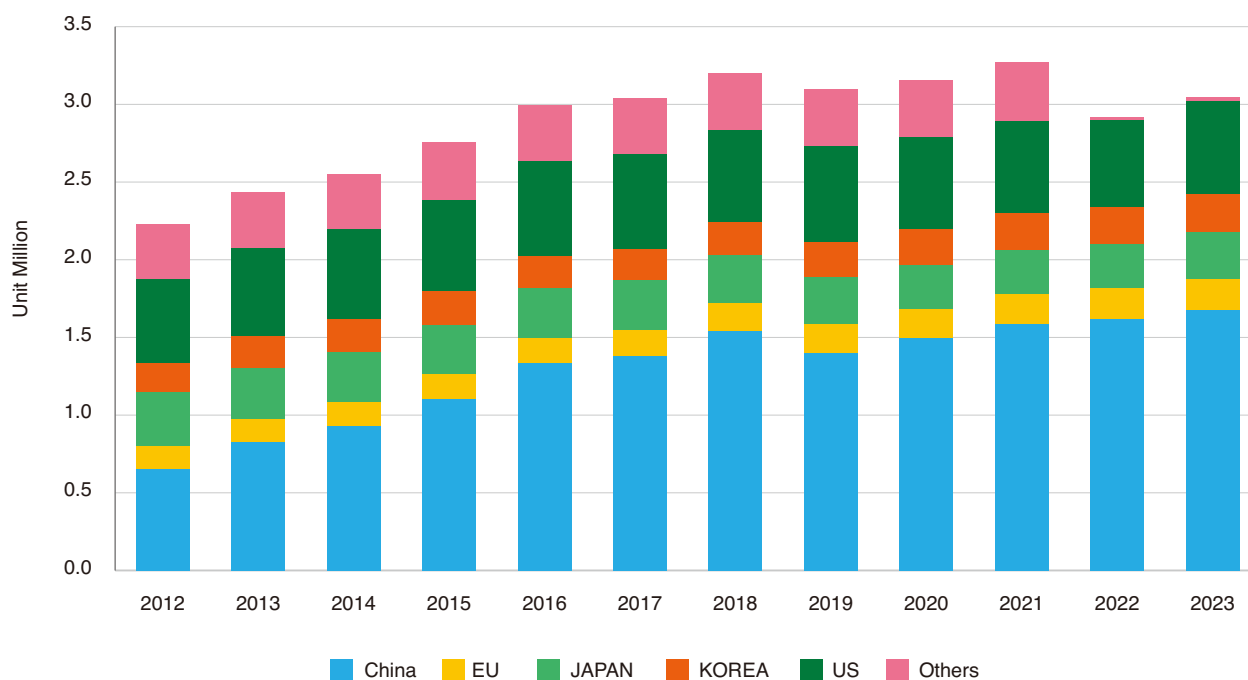
Data Source: WIPO statistics database (Last updated: May 2025). https://www3.wipo.int/ipstats/keysearch.htm?keyId=221
Noted: Data for some countries under 'others' for 2022 and 2023 were not publicly available.

IP Industry in Hong Kong: Landscape, Advantages and Challenges

The IP industry plays a vital role in HKSAR's economy. According to a study released by the Intellectual Property Department (IPD) in December 2023, IP-intensive industries accounted for an average of 32.7% of Hong Kong's GDP and 29.1% of total employment between 2019 and 2021.[8]

The city's IP filings have remained robust, reflecting its role as a regional IP hub (Figure 5). For trademarks, applications totaled 35,240 in 2021, dipped to 29,432 in 2022, and rebounded to 33,149 in 2024, with over 496,000 trademarks currently in force. Short-term patent applications increased from 552 in 2021 to 813 in 2024, indicating strong interest in rapid protection for innovations. Design filings also grew, with 2,228 applications covering 4,582 designs in 2024, up from 1,882 applications in 2021.[9]

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8   https://www.ip.gov.hk/filemanager/ip/en/content_150/Study-on-IP-Intensive-Industries-to-HK-Economy-e.pdf
9   https://www.ipd.gov.hk/filemanager/ipd/common/tools-resources/ip-statistics/IPD_D1_D28-Statistics_eng.pdf

As the IP industry's role has become more important in Hong Kong's economy, the government is committed to fostering its continued growth and development. In the Chief Executive's 2024 Policy Address, the clear stated goal was to position the HKSAR as a regional IP trading center.[10] This initiative seeks to leverage Hong Kong's unique advantages to build a highly valued economic pillar that supports the Chinese Mainland's innovation goals, and to facilitate global IP commerce. To achieve this objective, the Hong Kong government has been actively implementing measures to support the development of the IP industry (Figure 6).

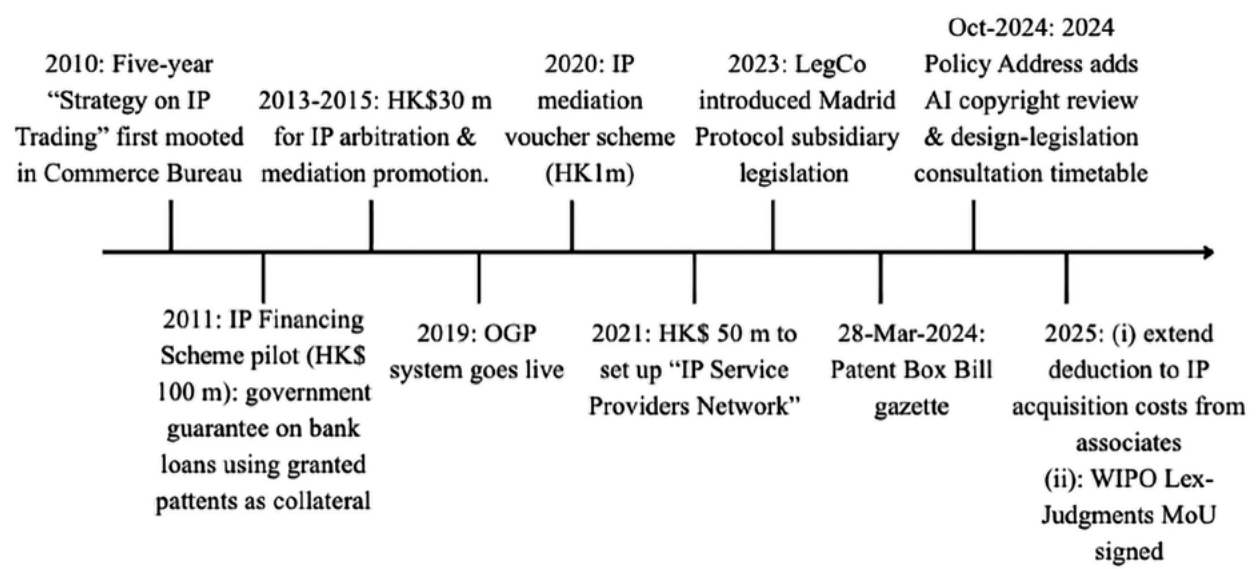**Figure 5: Amount of IP filings in Hong Kong. (2016-2023)**
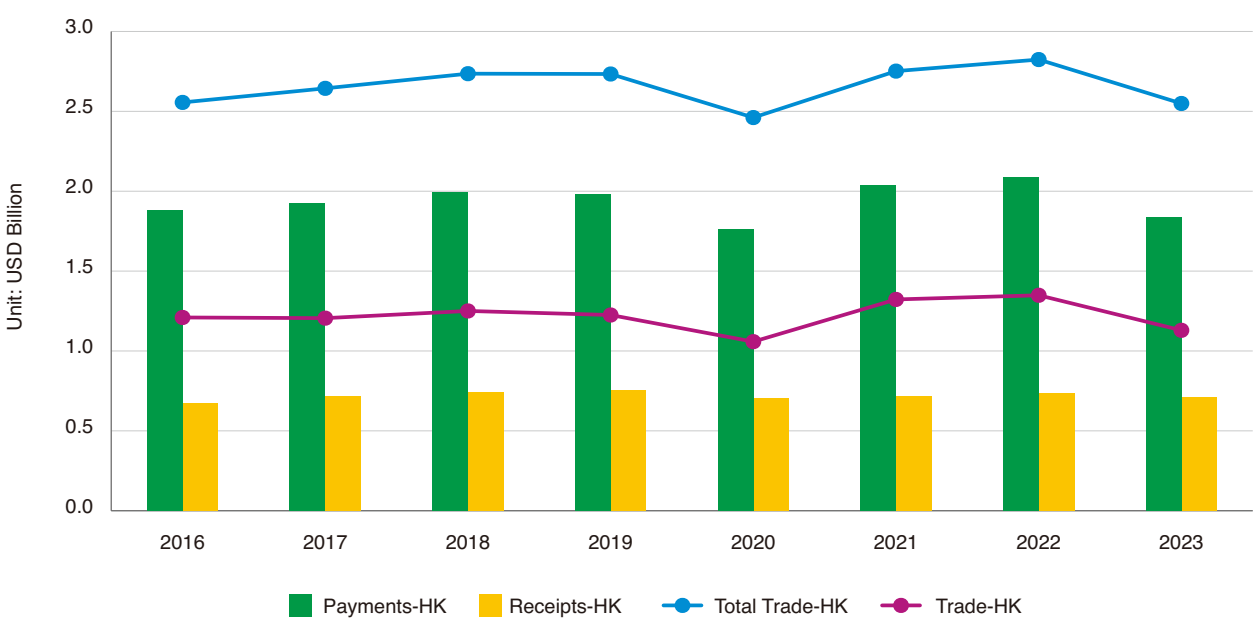
Data Source: The World Bank, Charges for the use of intellectual property, receipts & payments (BoP, current US$), https://data.worldbank.org/indicator/BM.GSR.ROYL.CD?locations=HK & https://data.worldbank.org/indicator/BX.GSR.ROYL.CD?locations=HK

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10   https://www.ipd.gov.hk/en/ip-overview/ip-in-hong-kong/2024-policy-address/index.html

Figure 6: Timeline of HK government's IP industry development policies

The HKSAR has a distinct advantage in becoming a regional center for IP trading, particularly due to its favorable legal and regulatory environment, strong innovation inputs, and ability to attract global talent. Hong Kong consistently earns high ratings for the quality of its legal and regulatory environment. In the 2024 World Competitiveness Yearbook by the International Institute for Management Development, the HKSAR was ranked 8th worldwide for "intellectual property rights."[11] Additionally, in the Global Innovation Index (GII) 2024, Hong Kong secured the 9th position for innovation inputs, which include factors such as institutional stability, regulatory quality, and market sophistication.

Given Pop Mart's decision to register its overseas IP in Singapore, we acknowledge that Hong Kong still has room for improvement. Although the HKSAR ranked among the top 10 globally for innovation inputs in the Global Innovation Index (GII) 2024, its performance in innovation outputs—measured by indicators such as patent filings and creative goods exports—was significantly lower, at 31st place. This contrasts sharply with South Korea, a global innovation leader that ranks 4th in outputs and 6th in inputs, reflecting a highly efficient system for transforming R&D investments into tangible, marketable IP.[12]

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11 https://productivity.gov.ng/wp-content/uploads/2025/03/WCY_Bookletv1_2024-1.pdf

12 https://www.wipo.int/web-publications/global-innovation-index 2024/assets/67729/2000%20Global%20Innovation%20 Index%202024_WEB3lite.pdf

Singapore has been a member of the Madrid System since 2000. This is an international treaty administered by the World Intellectual Property Organization (WIPO) that enables companies to secure trademark protection across multiple jurisdictions (including the U.S., U.K., Europe, and Southeast Asia) through a single application. In comparison, Hong Kong has yet to fully implement the Madrid Protocol. Like the HKSAR, Singapore offers robust legal protections, attractive tax policies, and strategic access to the Southeast Asian market, making it an appealing hub for IP registration.

HKSAR's Improvements in the IP Industry

In recognition of these areas for improvement, the government of the HKSAR recently enhanced legal support, introduced tax incentives, and brought talent development initiatives to strengthen the city's IP industry.

- **Legal Support**: In September 2025, Hong Kong joined the World Intellectual Property Organization (WIPO) Lex-Judgments Database, contributing key IP case precedents from local courts to showcase the quality of its judicial decisions to the international community. Hong Kong became the first city in the Greater Bay Area to participate in the database. Furthermore, starting from October 2025, the HKSAR's High Court introduced streamlined IP litigation procedures, unifying processes for trademarks, patents, and design cases to enhance efficiency and case management.[13]

- **Tax Benefits**: Since July 2024, the Hong Kong government introduced the Patent Box Regime, offering a reduced profits tax rate of 5% (compared to the standard 16.5%) on qualifying income from patents, copyrighted software, and new plant-variety rights.[14] Additionally, as of late 2025, the government implemented a one-off tax deduction for lump-sum IP licensing fees and related acquisition costs.[15]

- **Talent Development**: In 2025, the government introduced the Innovation and Technology Talents Exchange Scheme to promote cross-sector collaboration by facilitating the exchange of talent between academia and industry. Concurrently, the government continues to engage with the patent agent sector and relevant stakeholders to develop regulatory arrangements for local patent agent services. These plans cover areas such as qualification requirements, registration processes, and service standards, with the goal of nurturing professional talent and enhancing the overall quality of services.

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13   https://www.cedb.gov.hk/en/news/press_release/2025/pr23052025a.html

14   https://www.elegislation.gov.hk/hk/2024/17!en; https://www.china-briefing.com/news/hong-kongs-new-patent-box-regime-a-5-tax-concession-for-qualified-ip-income/

15   https://www.ey.com/en_gl/technical/tax-alerts/hong-kong-announces-2025-26-budget-proposing-favorable-tax-measures-for-specific-sectors

The IP Industry in Hong Kong: Opportunities in the Greater Bay Area (GBA)

Hong Kong's most distinctive advantage lies in its position as a central hub within the GBA's IP economy. In the Global Innovation Index (GII) 2025, the Shenzhen–Hong Kong–Guangzhou cluster ranked No. 1 globally, surpassing the Tokyo–Yokohama cluster.[16] In 2023, Guangdong filed over 28,000 international patent applications through WIPO's PCT system, representing 10% of global filings and 40% of China's total. Notably, six GBA companies—Huawei Technologies, BOE Technology, Contemporary Amperex Technology (CATL), Oppo Mobile Telecommunications, ZTE, and Vivo Mobile Communication—ranked among the world's top-20 PCT applicants.[17]

While IP filings representing the first step toward commercialization in GBA have surged, converting them into economic value requires multiple stages. These include valuation, licensing, investment, and legal protection. As GBA firms expand globally, many are licensing or selling their IP in markets such as Southeast Asia and the Middle East. Simultaneously, the GBA is actively acquiring high-value IP from overseas to support strategic industries like artificial intelligence, biomedicine, new materials, integrated circuits, and renewable energy. However, Chinese companies face significant challenges in these regional IP transactions, as there are mismatches in legal systems, financial markets variety, currency controls, regulatory uncertainties, language barriers, and inconsistent IP valuation standards.

Hong Kong's Major Role as a Two-way, Full-service IP Channel

Since the aforementioned obstacles for Chinese companies seeking to trade IP internationally exist, they present opportunities for the HKSAR to serve as a two-way, full-service IP corridor between mainland China and the global market. Some ways to overcome these obstacles are:

(1) Hong Kong boasts the region's most developed IP-trading infrastructure, including Patent Cooperation Treaty (PCT) international patent filings, overseas trademark registrations IP due diligence, tax-efficient financing (e.g., patent box tax incentives[18] and foreign-sourced income exemptions[19]), insurance and re-insurance, helping businesses mitigate international IP risks, and boosting their global competitiveness.

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16   https://www.wipo.int/pressroom/en/articles/2025/article_0008.html

17   https://www.wipo.int/edocs/pctndocs/en/2024/pct_news_2024_3.pdf

18   https://www.mayerbrown.com/en/insights/publications/2024/10/patent-box-tax-incentive-takes-effect

19   https://taxsummaries.pwc.com/hong-kong-sar/corporate/taxes-on-corporate-income#:~:text=The%20'nexus%20approach'%20endorsed%20by,for%20the%20preferential%20tax%20treatment.
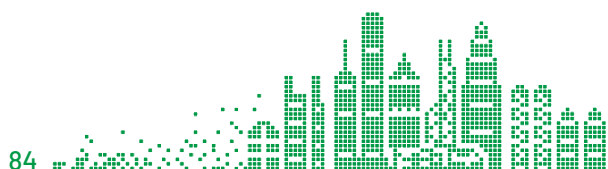
(2) Hong Kong's common-law, bilingual legal system is trusted by foreign investors and fully enforceable in the Chinese Mainland under the 2019 Arrangement on Reciprocal Recognition and Enforcement of Judgments. The HKSAR is also actively positioning itself as an international hub for legal and dispute resolution services, particularly in handling cross-border IP disputes. This dependable legal support facilitates both Chinese and foreign companies to engage in intellectual property transactions in Hong Kong.

(3) The HKSAR hosts significant capital reserves, including the Hong Kong Stock Exchange (HKEX), private equity firms, and family offices. These financial resources facilitate the monetization of IP—such as patents, trademarks, and copyrights—through mechanisms like securitization, Special Purpose Acquisition Companies (SPACs), and its role as the world's largest offshore RMB liquidity hub.

(4) Hong Kong provides a competitive tax regime, featuring an 8.25% profits tax on qualifying IP-derived income and a 0% withholding tax on royalties. This positions it as the most cost-efficient jurisdiction in Greater China for managing and channeling IP assets.

(5) HKSAR acts as a strategic gateway under the Mainland–Hong Kong Closer Economic Partnership Arrangement (CEPA), allowing foreign companies to register their IP and immediately benefit from national treatment when licensing or litigating in Mainland China.

(6) Hong Kong's talent pool has climbed to 4th place globally in the IMD World Talent Ranking 2025—the highest in Asia, and a notable leap from 9th place in 2024. This underscores Hong Kong's rapid emergence as an innovation and technology hub, attracting top global talent to build their careers.[20]

In summary, the HKSAR is a lot more than just a filing destination; it functions as an RMB-denominated, rule-of-law gateway that converts Chinese IP into global revenue, while opening the Chinese market to international IP. Increasingly, multinational corporations and leading Chinese Mainland enterprises are setting up regional headquarters or IP-holding entities in Hong Kong to manage and commercialize high-value patents, trademarks, and copyrights (Figure 7). In 2023, Hong Kong ranked 13th globally for patent applications, with non-resident filings making up about 97%, primarily from the US, Mainland China, Japan, Switzerland, and the UK.[21]

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20   https://www.humanresourcesonline.net/global-talent-rankings-2025-hong-kong-and-singapore-secure-top-10-spots

21   https://research.hktdc.com/en/article/MzExMTM0MzQ0

Figure 7: Foreign-affiliated Companies in Hong Kong

Overview		^
Regional Headquarters, Regional Offices and Local Offices in Hong Kong with Parent Companies Located outside Hong Kong	**2023**	**2024**
Number of Regional headquarters	1 336	1 410
Number of Regional offices	2 311	2 410
Number of Local offices	5 392	6 140
Foreign affiliates statistics of Hong Kong – Business receipts and other income	**2022**	**2023**
Industrial sector (HK$ billion)	122.9	182.2
Building and construction sectors (HK$ billion)	117.0	133.2
Import/export, wholesale and retail trades, and accommodation and food services sectors (HK$ billion)	2,596.0	2,884.5
Transportation, storage and courier services, and information and communications services sectors (HK$ billion)	717.9	502.6
Financing and insurance, real estate, professional and business services sectors (HK$ billion)	1,643.6	1,779.6
Total of industry groupings above (HK$ billion) (1)	5,197.5	5,482.2

Source: https://www.censtatd.gov.hk/en/scode360.html

Policy support in the GBA

With the increasing volume of IP filings and transactions in the GBA, a notable concentration of high-end IP services—including agency, valuation, trading, legal, and consulting—has occurred, particularly in Guangzhou, Shenzhen, and Hong Kong. This expanding IP service industry chain is becoming a key driver for the structural advancement of regional economies.

To support this advancement, Guangdong, Hong Kong, and Macao have progressively enhanced their cooperation frameworks recently. For example, through the Greater Bay Area IP Cooperation Mechanism and the GBA IP Information Exchange Platform (see Table 1).

In 2023, Guangdong Province enacted the Copyright Regulation, marking China's first local law aimed at fostering the high-quality development of the copyright industry. This regulation highlights the importance of coordinated growth within the copyright sector across the GBA and promotes collaboration among Guangdong, Hong Kong, and Macao in critical areas such as film, television, music, animation, gaming, and software. The HKSAR has also been designated as a regional IP trading center in China's 14th Five-Year Plan,[22] aimed at transforming the region's scientific and technological output into economic value.

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22   Greater Bay Area, Intellectual Property. https://www.bayarea.gov.hk/gbais/en/development/intellectual-property/

Table 1 An overview of the policies related to IP Industry in Greater Bay Area

Title of policy/platform	Launch time	Purpose
《粵港澳大灣區發展規劃綱要》[23] The State Council for the Guangdong-Hong Kong-Macao Greater Bay Area	2019	Issued by the State Council of China, it emphasizes leveraging Hong Kong's strengths in IP protection and professional services to support its role as a regional IP trading center. It also advocates for cross-border collaboration in IP enforcement and technology transfer.
《關於構建知識產權保護司法協作機制的框架協議》[24] An Integrated Judicial Protection Platform for Intellectual Property in the Greater Bay Area	2023	Signed by the courts of Nansha (Guangzhou), Qianhai (Shenzhen), and Hengqin (Zhuhai), it establishes a unified platform for cross-border IP case handling, including joint evidence preservation, technical expertise sharing, and standardized adjudication criteria. It also promotes the recognition of mediation results from Hong Kong and Macao.
《關於促進粵港澳大灣區數據跨境流動的合作備忘錄》[25] Agreement framework of Memorandum of Understanding on Facilitating Cross-boundary Data Flow Within the Guangdong-Hong Kong-Macao Greater Bay Area	2023	Co-signed by China's Cyberspace Administration and Hong Kong's Innovation, Technology and Industry Bureau, it establishes security protocols for cross-border data flows, crucial for AI and digital innovation while safeguarding privacy.
南沙知識產權綜合服務平台 [26] Nansha District Market Supervision Administration	2023	This platform integrates patent databases from the Chinese Mainland, Hong Kong, and Macao (over 70 million trademarks), providing one-stop services for IP registration, enforcement, and commercialization. It also hosts 30+ regional IP service institutions.

23   State Council, Outline Development Plan of the Central Government and the State Council for the Guangdong-Hong Kong-Macao Greater Bay Area. https://www.gov.cn/gongbao/content/2019/content_5370836.htm?eqid=8758bd1b0000ce80000000036472c674

24   People's Daily, Nansha, Qianhai, and Hengqin Join Forces to Build an Integrated Judicial Protection Platform for Intellectual Property in the Greater Bay Area. https://paper.people.com.cn/rmrb/html/2023-04/27/nw.D110000renmrb_20230427_6-11.htm

25   Agreement framework of Memorandum of Understanding on Facilitating Cross-boundary Data Flow Within the Guangdong-Hong Kong-Macao Greater Bay Area, https://www.digitalpolicy.gov.hk/tc/our_work/digital_infrastructure/mainland/gbacbdf/

26   Nansha District Market Supervision Administration, Guangzhou City, Building a Strong Intellectual Property Zone to Support High-Quality Development Guangdong-Hong Kong-Macao Innovation and Entrepreneurship Intellectual Property Comprehensive Service Platform Officially Launched. https://www.gzns.gov.cn/gznsscjg/gkmlpt/content/8/8950/post_8950954.html#9860

Title of policy/platform	Launch time	Purpose
粵港知識產權合作計劃 [27] New Round of Guangdong-Hong Kong Intellectual Property Cooperation Plan Officially Signed	2024-2025	The 20th iteration of this annual plan focuses on enhancing IP protection in the Hetao Shenzhen-Hong Kong Innovation and Technology Park, facilitating patent cross-recognition, and organizing joint training programs for IP professionals.
前海知識產權金融服務聯盟 [28] Qianhai Forges a New Vision for Intellectual Property Protection	2025	This alliance supports IP securitization and pledge financing, with an initial 80 million RMB fund targeting tech small- and medium-sized enterprises (SMEs) in Qianhai. It also offers fast-track patent pre-examination for Hong Kong applicants, reducing authorization time from 2–3 years to just months.

27   Ministry of Commerce People's Republic of China, *New Round of Guangdong-Hong Kong Intellectual Property Cooperation Plan Officially Signed*. https://ipr.mofcom.gov.cn/article/gnxw/zfbm/zfbmdf/gd/202501/1989873.html

28   Qianhai Shenzhen, *Qianhai Forges a New Vision for Intellectual Property Protection*. https://qh.sz.gov.cn/sygnan/qhzx/dtzx/content/post_12187650.html
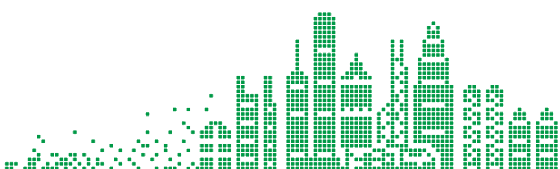
Promoting HKSAR's Local IP

Serving as a regional IP trading center not only strengthens Hong Kong's IP economy but also elevates its homegrown IP. For example, Pop Mart's first hit character, Molly, originated in Hong Kong—an example of the city's rich pool of locally recognized IP and its thriving creative industry. Other examples follow:

- **Ocean Park Hong Kong**: Established in January 1977, it is one of Asia's largest marine-themed amusement parks at the time, blending entertainment, education, and conservation. Ocean Park is famous for its beloved animal ambassadors, including giant pandas such as Ying Ying and Le Le, and mascots like Whiskers the sea lion and his friends, alongside themed characters like Goldie the goldfish and Later Gator the alligator. The Park reached its peak attendance with over 7.7 million visitors in 2014[29]. However, in the 2023-2024 fiscal year, the number of visitors decreased to 3.14 million visitors, and the park was struggling with a net deficit of HK$71.6 million (US$9.2 million).[30]

- **Television Broadcasts Limited (TVB)**: Founded in 1967 as Hong Kong's first free-to-air television station, TVB has been a cultural powerhouse in the Chinese-speaking world for decades. During its peak years in the 1980s and 1990s, TVB dominated local ratings with iconic variety shows like *Enjoy Yourself Tonight* and drama series such as *The Greed of Man*, *Moonlight Resonance*, and *Journey to the West*, while its *Miss Hong Kong Pageant* became a major annual event. These programs not only shaped Hong Kong's pop culture but also launched the careers of stars like Andy Lau, Tony Leung, and Maggie Cheung. At its peak, TVB dramas were exported globally, influencing Chinese communities across Asia, North America, and Europe. However, TVB has recently experienced a decline in viewership and persistent financial challenges. In 2022, TVB reported its largest loss of HK$807 million, followed by HK$763 million in 2023 and HK$491 million in 2024.[31] [32]

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29 Ocean Park Hong Kong, Ocean Park Marks Year of New Beginnings with Second Highest-ever Annual Attendance of 7.6 Million Guests New Highs of $633 Million in EBITDA and $2.0 Billion in Revenue for Fiscal Year Ending 30 June 2014. https://www.oceanpark.com.hk/en/press-release/ocean-park-marks-year-of-new-beginnings-second-highest-ever-annual-attendance-of-76

30 Ocean Park Hong Kong, Ocean Park Visitor Numbers and Revenue Reach a Five-year High Seizing the Opportunity from Panda Fever to Drive Business Momentum. https://www.oceanpark.com.hk/en/press-release/ocean-park-visitor-numbers-and-revenue-reach-a-five-year-high-seizing-opportunity

31 Television Broadcasts Limited, *TVB Announces 2024 Annual Results Significantly Positive EBITDA of HK$295 Million Positive Adjusted Net Profit Attributable to Equity Holders Achieves HK$53 Million in the 2H 2024.* https://corporate.tvb.com/article/ab03013a372e2772750a643e8698bca6.html

32 Yau, C., Hong Kong broadcaster TVB slashes net losses by 65% year on year to HK$143 million. South China Morning Post. https://www.scmp.com/news/hong-kong/hong-kong-economy/article/3275358/hong-kong-broadcaster-tvb-slashes-year-year-net-losses-65-hk143-million

- **Art Toy**: Hong Kong's art toy industry traces its origins to the city's legacy as a global toy manufacturing hub in the mid-20th Century, when it was the world's largest exporter of toys. In the late 1990s, Hong Kong pioneered the designer-toy movement with Michael Lau—dubbed the "Godfather of Designer Toys"—introducing his iconic Gardener series and creating the "urban vinyl" style that fused street culture with collectable art. Today, Hong Kong remains a global hub for collectable art toys, with its Toys & Hobby market generating around HKD 1.14 billion in 2025.[33] The industry thrives on limited-edition releases and collaborations. Famous Hong Kong designers include Michael Lau, Eric So, and Winson Ma, alongside emerging talents such as Helen Tam, known for food-inspired characters; Bee Wong, creator of the Fire Panda brand; Joseph Tang of PLANET-X with sci-fi themes; and Ryan Lee, whose Rumbbell series reflects his "Muscle Mind" philosophy.

The examples of Hong Kong's local IP highlight several commercialization challenges:

- **Intense Competition**: Ocean Park exemplifies the challenge of intensifying competition, facing not only its local rival Hong Kong Disneyland but also major regional players such as Chimelong International Ocean Tourist Resort in Guangzhou and Zhuhai.

- **Fast-changing Consumer Preferences**: TVB and Ocean Park exemplify how shifting consumer preferences challenge traditional entertainment brands. As younger audiences migrate to streaming platforms and short-form video apps, TVB now struggles with declining linear TV viewership. Similarly, Ocean Park faces mounting challenges as younger consumers seek more immersive and Instagram-worthy experiences rather than traditional rides.

- **Minute Scalability**: Although the global art toy market reached US$6.07 billion in 2025, Hong Kong's local market is too small for local artists to sustain production. If IP creators solely focus on Hong Kong's local market, they cannot generate the revenue needed for successful commercialization.

To address current challenges and strengthen Hong Kong's local IP, we can take valuable lessons from TVB's prime-time strategy:

- **Differentiation**: Uniqueness is the cornerstone of standing out in a competitive market. While Pop Mart secures exclusivity through artist collaborations, Hong Kong's local IP can only win by creating and investing in distinctive, original content. This approach mirrors TVB's prime-time strategy in the 1980s. Iconic dramas such as *The Bund* and *Legend of the Condor Heroes*

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33 https://www.statista.com/outlook/cmo/toys-hobby/hong-kong?srsltid=AfmBOorISL60BZnYUXyLYJK6H3J5eb8XVkKBK oCmF_57R1uqQDFdWtG4

broke rating records because they reflected local culture and deeply resonated with audiences. These unique cultural narratives not only differentiated TVB but also forged strong emotional connections, a critical driver of long-term brand loyalty.

- **Globalization**: Commercialization thrives on economies of scale, and Hong Kong's local market alone is too small to sustain IP success. To grow, Hong Kong IP must look beyond its borders—just as TVB did in the mid-1980s, when they expanded globally through multiple strategies: launching cable services in Los Angeles, Taiwan, and Europe; licensing programs to Malaysia and Singapore; renting videos in the UK and other European cities; and even circulating content informally via videotapes and later through provincial TV stations in the Chinese Mainland.[34] These efforts made Hong Kong pop culture a powerful influence across Southern China and among overseas Chinese communities. The lesson is clear: global reach and diversified expansion channels are essential for long-term IP growth.

- **Monetization**: IP commercialisation demands significant financial investment, making diversified monetization essential for sustainability. Hong Kong's IP should adopt multiple revenue streams, just as TVB did in the 1980s. TVB capitalized on high-margin advertising in Hong Kong, licensed programs to Malaysia and Singapore, offered video rentals across Europe, and introduced subscription services in the U.S. By the mid-1980s, following its 1984 HKSE listing, TVB's annual turnover was estimated at HK$1–2 billion.[35] These revenues fueled the continuous development and promotion of its IP, reinforcing its market leadership.

34   https://www1.hkexnews.hk/listedco/listconews/sehk/2018/0418/00511_3299061/e106.pdf

35   https://thebambooworks.com/beating-its-rivals-but-losing-to-the-times-tvb-fades-on-hong-kong-entertainment-stage/

Summary

The Hong Kong government aims to position the city as a leading regional IP trading center. To succeed, this vision requires coordinated efforts from IP developers, entrepreneurs, government agencies, and industry institutions. Key focus areas include:

1. **Build a Robust IP Financing Ecosystem:**

   As Asia's top financial hub and the world's third-ranked international financial center,[36] the HKSAR is uniquely positioned to lead in IP-backed financing ecosystem that requires:

   (1)   IP-backed financing mechanisms such as:

   ➤   Leveraging the existing financial ecosystem to utilize Hong Kong's mature financial markets, incubation programs, and venture capital networks to support IP-backed financing for startups and scale-ups.

   ➤   Issuing IP bonds. The Hong Kong government can replicate its green finance model by issuing IP bonds to attract global investors.

   ➤   Incentivizing banks, by encouraging banks to accept IP as collateral for loans and providing incentives or regulatory mandates for IP-related lending.

   ➤   Insurance schemes that collaborate with insurance companies to create protection schemes that reduce downside risks for IP investments.

   (2)   Low costs and risks of IP valuation:

   ➤   Standardized valuation frameworks that develop clear, consistent methodologies for IP valuation to improve transparency.

   ➤   Create IP trading platforms that enhance platforms like Asia IP Exchange to include valuation tools, pricing information, and matchmaking services for buyers, sellers, and service providers.

   (3)   Support advanced industries:

   ➤   Align IP financing with Hong Kong's Innovation & Technology Development Blueprint.

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36   https://www.news.gov.hk/eng/2025/03/20250320/20250320_173128_257.html

2.   Enhance Infrastructure and Platforms:

Developing a regional IP trading center requires robust infrastructure to support seamless transactions and trust. The HKSAR should prioritize building specialized platforms and institutions that enable transparency and efficiency in IP trading. For example, establish a WIPO Technology & Innovation Support Centre and expand platforms like Asia IP Exchange, and creating similar digital marketplaces. These initiatives will not only enhance accessibility but also position the city as a leading hub for IP commercialization and cross-border innovation.

## 3.   Develop Talent and Professional Services:

Building a robust IP trading center requires a comprehensive ecosystem of professional services—from IP legal advisory and valuation to IP insurance and risk management. These specialized capabilities are critical for enabling smooth transactions and protecting IP assets. To meet this demand, Hong Kong could invest in cultivating local talent through targeted IP training programs across legal, financial, and technology sectors. At the same time, attracting top international professionals is crucial. Global experts bring cross-border expertise that facilitates complex IP transactions and ensures efficient dispute resolution, strengthening Hong Kong's position as a trusted regional IP hub.

4.   Promote IP in the GBA:

Hong Kong's creative industries—spanning TV shows, films, music, design, and theme parks—have produced numerous successful IPs over the decades. Building on this rich legacy, Hong Kong can provide financial incentives (e.g., expand the "Patent Box" tax regime) to encourage global commercialization of its own creative IP. Concurrently, Hong Kong should leverage the technological strength of the GBA by implementing cross-boundary IP cooperation measures with innovation hubs like Shenzhen and Qianhai. This integration will position HKSAR as a vital gateway for the Chinese Mainland's IP to reach global markets, combining creative excellence with technological innovation to create a dynamic, future-ready IP ecosystem.

5.   Strengthening IP Protection and Legal Framework:

One of Hong Kong's strongest advantages in becoming a regional IP trading hub is its internationally recognized legal system. This is a critical foundation for cross-border IP transactions. To reinforce this strength, the HKSAR should deepen its participation in international IP treaties and establish more cross-border protection agreements to attract global IP contracts. Streamlining IP litigation processes for faster dispute resolution and enhancing enforcement mechanisms will further boost confidence among international stakeholders. Hong Kong must modernize its Copyright and Design Laws to address emerging technologies such as AI-generated works and digital content, ensuring its legal framework remains future-ready and competitive.
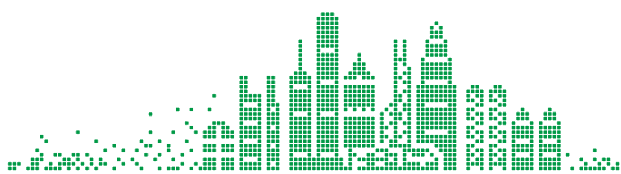
Thematic Research: Maximisation of Social Value and Shareholder Value – Insights from Hong Kong-Listed Companies Across Sectors

Thematic Research: Maximisation of Social Value and Shareholder Value – Insights from Hong Kong-Listed Companies Across Sectors

Sean Chang

Abstract

This thematic research explores the optimisation of socially responsible impact alongside corporate finance decision-making within Hong Kong's unique socio-political and regulatory environment.

As global economies increasingly prioritise sustainable finance, Hong Kong's strategic position as a major financial hub presents opportunities and challenges in integrating socially responsible investment considerations into its corporate financing strategies.

This paper uses a triangulation research approach to examine how social policies, international frameworks, and corporate social responsibility influence financial decisions, particularly in a company's valuation and capital budgeting decisions.

The findings reveal that while direct effects of corporate social responsibility on financing decisions may be limited, the associated socially responsible investing factors are significantly affected by corporate risk assessment or their companies' valuation, and stock performances.

Moreover, Hong Kong-specific social values play a crucial role in shaping preferences for socially responsible investments, with implications for finance managers in tailoring financial solutions and regulatory standards in the sector.

This thematic research contributes to understanding how Hong Kong-listed companies can balance financial performance with corporate social responsibility and disclosure standards to enhance sustainable corporate growth. The study provides valuable insights for stakeholders aiming to align financial objectives with broader social impact goals in Hong Kong, as Asia's leading financial centre.

This research article examines the integration of social value and corporate social responsibility into capital budgeting decisions among Hong Kong-listed companies, addressing whether a company's value maximisation remains the sole criterion or if social responsibility and impact factors are equally vital.

Drawing on empirical evidence from across nine sectors, namely, transport, utilities, financial, banking, conglomerate, tech, real estate, consumer, and hotel servicing in Hong Kong, we analyse corporate social responsibility and socially responsible investment practices of listed companies. Those that submit sustainable report, the Hong Kong Exchanges and Clearing Limited's (HKEX) 2025 ESG Reporting Code, and financial statements are studied and examined.

Our findings reveal that while conventional metrics dominate, incorporating social value enhances long-term firm value via reduced risks and stakeholder trust. Core social values such as equality, anti-discrimination, human rights protection, health and work safety, and sustainability are sector-specific yet universal.

Impactful decisions leverage integrated international frameworks like UN Sustainable Development Goals, aligned scenario analysis, yielding dual maximisation of financial and social outcomes. Policy implications for Hong Kong's sustainable finance hub are discussed.

Keywords: Corporate finance decision, capital budgeting, social value, corporate social responsibility, socially responsible investment, firm value, Hong Kong-listed companies, and ESG integration.

1.   From Profit to Purpose: The Evolution of Capital Budgeting in Hong Kong

In the evolving landscape of corporate finance, capital budgeting encompasses decisions on investments like infrastructure, technology, or R&D. Traditionally, it prioritises metrics such as Net Present Value (NPV), Internal Rate of Return (IRR), and payback periods to maximise shareholder value.

However, amid global pressures for sustainability, Hong Kong's financial ecosystem, governed by the HKEX, mandates ESG disclosures [1] under its 2025 Climate-Related Reporting Framework, compelling firms to weigh social impacts alongside financial returns.

This study addresses three pivotal questions in the context of Hong Kong large-cap companies: (a) Is the firm's value maximisation the only driver for capital finance decisions [2], or do social responsibility and impact matter? (b) What core social value must Hong Kong-listed corporates consider across key sectors? [3] (c) How can firms make impactful decisions that optimise their value and social value?

2. Beyond Shareholder Value: Theoretical Foundations of Dual Maximisation

2.1 Theoretical Foundations

Social value, as shared normative principles: equality, sustainability per SDGs, extends beyond profit maximisation [4] to stakeholder theory [5], positing that addressing societal expectations enhances resilience.

In capital budgeting, traditional models overlook externalities [6]; CSR and SRI integration, per HKEX guidelines, incorporates them via adjusted NPV, such as discounting social costs.

Empirical evidence from Hong Kong-listed companies shows ESG disclosure positively correlates with financial performance, with a relationship: net present value after social costs plus impact premiums.

Our research on Hong Kong-listed companies across different industries affirms that CSR boosts net social value, as shown in our studies, which are based on social return on investment (SROI).

2.2 Hong Kong Specific Context in Social Value

HKEX's ESG Code mandates [7] "comply-or-explain" disclosures on social aspects, such as labour standards, community engagement from financial year (FY) 2025, with Task Force on Climate Related Disclosure (TCFD) aligned climate reporting mandatory for large-cap stocks. According to PwC's 2024 study [8] of 300 Hong Kong-listed companies, more than 80% disclosed social KPIs like supply chain management, up from 60% in 2023. Sector variations exist in that utility companies emphasise emissions, while tech companies focus on data privacy.

Key social values are also outlined in the 2025 Policy Address of the Hong Kong Chief Executive [9]. Delivered by Chief Executive (CE) John Lee Ka-chiu on September 17, 2025, the Hong Kong SAR Government emphasises a people-oriented governance approach that safeguards and promotes core social values [10-13].

These values are positioned as foundational to stability, prosperity, and well-being, with the government committing to oversee their implementation through reforms, accountability mechanisms, and multi-pronged strategies [10]. The address and its supplement highlight how these values are challenged amid complications like demographic shifts, economic pressures, technological disruptions, and security risks.

2.3   Social Values Amplified by the Hong Kong SAR

With its focus on human rights , equality is framed as a core value to eliminate discrimination and foster a harmonious, caring society, with targeted support for vulnerable groups amid challenges like ageing, ethnic minority integration, and gender disparities [10]. This aligns with human rights protections, including privacy and anti-discrimination ordinances.

With equality as one of the key social values in the CE's policy [9], the Equal Opportunities Commission (EOC) is responsible for upholding the anti-discrimination laws and promoting education for inclusivity. The EOC's measures include boosting support for ethnic minorities, via measures such as setting up new interpretation centres, youth networks, and Chinese language training, which are highlighted in the policy and address social value [9-11].

As for women's empowerment, the CE's policy announced the increase in the Women Empowerment Fund to HK$30 million annually [9].

Other social values espoused by the Hong Kong SAR as spelt out in the CE's policy include promoting equitable access to subsidised housing. Public rental housing quotas adjusted from the Green Form: White Form ratio will be increased to 50:50 to promote equitable access, reducing waiting times to 4.5 years by 2026-27 [9].

Innovation and technological advancement are also recognised as core areas. With the policy address's emphasis on Smart City & AI, innovation is valued as a driver of efficiency and future-proofing society. At the same time, AI is positioned to enhance public services while mitigating risks like data privacy breaches [9-13].

As CE Lee stated, "This Policy Address serves as a roadmap for Hong Kong to strive for a vibrant economy, pursue development, and improve people's livelihood." The ultimate objective is "to improve people's livelihood" amid challenges like ageing and global uncertainties [9-13].

Our research examines how corporate social responsibility (CSR) and socially responsible investment (SRI) practices in Hong Kong are contextualised by mapping them against both Hong Kong's social norms and international standards. This mapping serves two purposes: (i) it highlights the alignment of Hong Kong-listed firms with global frameworks such as UN Sustainable Development Goals (SDGs), International Covenant on Civil and Political Rights (ICCPR) and International Covenant on Economic, Social and Cultural Rights (ICESCR), thereby enhancing international comparability and investor confidence; and (ii) it identifies areas where local social values (equality, housing access, technological innovation) diverge, offering insights into how firms tailor their CSR strategies to Hong Kong's socio-political context. This dual mapping strengthens the legitimacy of Hong Kong's ESG disclosures and supports the arguments that CSR/SRI integration enhances firm resilience and valuation [14-16].

The social values outlined in Chief Executive John Lee Ka-chiu's 2025 Policy Address—such as equality, economic prosperity, and AI/smart city innovation—draw from Hong Kong's Basic Law, which incorporates key international human rights instruments [12] like the ICCPR [14] and the ICESCR [15], extended from the UK in 1976 and listed in Basic Law Annex III. These align with broader UN frameworks, including the Universal Declaration of Human Rights (UDHR) and the UN-SDGs [15-17].

2.4 Mapping Hong Kong's Social Value and International Standards

Hong Kong's Equal Opportunities Commission (EOC), through its enforcement of anti-discrimination ordinances, provides a practical domestic mechanism that operationalises international conventions such as the Universal Declaration of Human Rights (UDHR) and ICCPR. For listed companies, this means CSR reporting must incorporate equality and inclusivity metrics, ensuring that corporate practices are not only legally compliant but also aligned with global human rights standards. This linkage illustrates how regulatory institutions embed international norms into corporate finance decisions, reinforcing the credibility of Hong Kong's ESG ecosystem. [12-14]

International conventions like the International Convention on the Elimination of All Forms of Racial Discrimination [13-15] require equitable access to housing and education, as seen in CE's policy address on public rental quotas and disability service expansions. Those social value mapping the SDG 5 (Gender Equality) and SDG 10 (Reduced Inequalities) set benchmarks for reducing disparities, with Hong Kong's fertility incentives and child allowances advancing SDG 1 (No Poverty) by addressing intergenerational issues [15-17].

Hong Kong's initiatives under SDG 8 (Decent Work and Economic Growth) include policies such as quota of 50,000 talent visas and IPO market enhancements. While the visas primarily attract foreign professionals, they indirectly contribute to youth employment by expanding sectors such as technology and finance, creating spill-over opportunities for local graduates. This reflects a broader strategy where international talent inflows and capital market growth enhance domestic employment prospects. Thus, the policy does not directly "solve" youth unemployment but instead reinforces sectoral expansion, which in turn supports domestic employment prospects. SDG 11 in mapping Hong Kong social value in sustainable cities underpins housing initiatives for 189,000 units by 2030, promoting inclusive urbanisation. Broader social values include equitable resource distribution to prevent inequality, per SDG 10 [15-17].

2.5 Broad Definition of Social Value Beyond Hong Kong

Social values are the collectively-endorsed principles that define a society's moral identity, guide its institutions, and shape the behaviour of its members toward a common vision of the good life [21-22].

Social values are the shared beliefs, principles, and standards that a society collectively considers important, desirable, and worth upholding to guide individual behaviour, shape institutions, and maintain social order and cohesion [21-22].

They function as the moral and cultural compass of a community, influencing laws, policies, education, family structures, economic systems, and interpersonal relationships [21-22].

2.6 Social Value Versus Shareholders' Value

While social values are widely supported by the finance community, the ambiguity in their definition can lead to managerial discretion without accountability [7-8].

Anecdotal evidence suggested that upholding social value may have a negative impact on corporate profits, thereby affecting the return for shareholders. The perspective of stakeholders could be too narrow, for situations exist where non-economic values are also relevant to the company. However, the concept of social value is theoretically fragmented, which weakens its practical application [7-10].

3. Measuring Impact: Constructing Social Return On Investment Frameworks

Using secondary data from HKEX filings, sustainability reports, and academic studies [7-8], we illustrate with sector examples. Our analysis employs a mixed-method approach in the quantitative SROI-financial performance correlations and qualitative case studies with the companies' stock performances.

Comparative statistics on SRI in Hong Kong-listed companies across the major sectors, drawing on empirical evidence from nine sectors, include MTR Corporation from the transport industry; HK Electric from the utility industry; HSBC from the financial industry; China Construction Bank from the banking industry; CK Hutchison from the conglomerate industry; Tencent from the tech industry; Sun Hung Kai from the real estate industry; Li Ning from the consumer industry, and Shangri-La from the hotel servicing industry[7-8].

Our analysis of CSR practices under HKEX's 2025 ESG Reporting Code [7], shows that while traditional metrics dominate, incorporating social value enhances long-term firm value via reduced risks. This is represented by the standard deviation of companies' shares, and builds stakeholder trust.

Core social values such as equality, human rights, privacy, work safety, and sustainability are universal principles. However, their operationalisation is sector-specific. For instance, work safety in the transport sector emphasises accident prevention and passenger security, while in the technology sector it focuses on date protection and digital well-being. Our research standardises these sectoral manifestations into a Hong Kong-specific CSR framework, enabling comparability across industries while standardising these into the social value in the Hong Kong-specific context. This approach reflects the broader literature on "shared value" creation, where universal principles are embedded in industry-specific practices to maximise both social and shareholder value [11-12]. SRI, often aligned with ESG criteria, shows varying scales and growth across these sectors.

Our research builds a comprehensive, actionable CSR mapping model that benchmarks Hong Kong social value against international standards, which analyses against those listed companies' CSR targets.

The model also includes those key performance indicators (KPIs) with quantifiable metrics and applying industry-specific standards for reporting. They make references to the global reporting standards Global Reporting Initiative (GRI), Sustainability Accounting Standards Board (SASB), UN SDGs, and HKEX ESG [13-18]. Those listing companies' CSR mapping model that reflects the Hong Kong social value and their quantifiable corporate goals [17-18].

Table – CSR Mapping Model for Social Value

Corporate Social Responsibility	HKSAR CE's Policy Address on Social Value 2025	International Convention
Equality	Women empowerment	ICCPR
Anti-discrimination	New interpretation centres	UDHR
Human rights protection	Disability services	SDG
Privacy enhancement	Cyber threat via legislation change	ICESCR
Work safety & Healthcare	Occupational safety with an enhanced tech platform	SDG
Decent work & Economic growth	Employee Training Board to improve training	SDG
Technology and AI	Industry innovation infrastructure	SDG

Source: HKSAR CE Policy Address, ICCPR, ICESCR, SDG.

4. Unveiling the Link between the SROI and Stock Returns

SRI often encompasses Environmental, Social, and Governance (ESG) factors, which have seen robust growth in Hong Kong, driven by regulatory enhancements, government initiatives like the Green and Sustainable Finance Grant Scheme (extended to 2027) [7-9], and increasing investor demand.

Hong Kong positions itself as Asia's leading hub for green and sustainable finance, with over one-third of Asia's green and sustainable bond issuances arranged here. Key statistics highlight that there is an upward trend, financing from fund management as indicated by the growth in asset under management, fund registrations, debt issuance, and disclosure improvements. These data primarily cover 2022–2024, with projections and early 2025 indicators showing continued momentum [7-9].

SRI in Hong Kong, increasingly integrated with international frameworks, reflects evolving social value. These are tracked through HKEX-mandated disclosures, financial statements, and a sustainable report with impact metrics [11-14].

Our research applies the Social Value International's (SVI) model for calculating the social value created by Hong Kong's listed companies.

Hong Kong's social value factors from the 2025 Policy Address can be mapped to those listed companies' CSR goals that are quantifiable, measurable, and aligned with the SVI's framework for calculating social value [13].

In our research, we also adopt a comparative case study design across nine sectors, selecting examples by market cap of the Hang Seng Index constituents.

Data sources include the 2024 Sustainability Reports and HKEX filings. Quantitative analysis: Correlation between SROI and financial metrics, including stock return, ROA, and market value via regression (2019–2024) [7].

Qualitative approaches in the thematic coding of capital budgeting disclosures, NPV adjustments for social ROI. We experimented on 50 companies across nine sectors, and our conclusive analysis highlighted the leading companies, representing more than HK$1.5 trillion of market cap [7].

5. Empirical Analysis and Findings

5.1 Question (i): Beyond Firm Value Maximisation—Role of Social Responsibility

The company's value maximisation via the function internal rate of return (IRR) is greater than the weighted average cost of capital (WACC). That is foundational for corporate finance decisions, but that would be insufficient in Hong Kong's CSR/ESG-mandated ecosystem [7-8].

Our research shows that social factors mitigate risks, for example, from reputational damage due to poor labour practices, to unlocking opportunities, such as issuing green bonds that are priced at lower yields.

5.2 Question (ii): Core Social Value for Hong Kong-Listed Corporations

HKEX's ESG Code includes factors such as employment, health/safety, development/product responsibility, supply chain, community/product responsibility [7-9].

Core values, according to PwC 2024, include equality (diversity), community harmony (engagement), ethical governance (transparency), and sustainability (inclusivity) [7-9].

Our research in the sector-specific analysis on these core values:

In the transport and utility industry, the safety/reliability factor in MTRC has shown a statistically positive correlation in its stock performances, while HKE, which receives subsidies for the elderly, demonstrated similarly positive results that translate into its performances [7-9].

In the financial/banking industry, the ethical lending of HSBC in its environmental climate change policy and China Construction Bank's lending and finance practices have shown a positive statistical relationship to their corporate performances in terms of profitability and stock price return [7-9].

In the conglomerate industry, supply chain leaders in their ethics, CK Hutchison's audits across ports/retail have also gained positively in the statistical relationship in its earnings [7-9].

While in the tech industry, in terms of data privacy/inclusion, Tencent's AI ethics has a positive response rate that translates into its higher earnings driver [7-9].

Last but not least, in the real estate/consumer/hotel industry, in the community integration, leaders such as Sun Hung Kai's housing strategy, Li Ning's fair labour practices, and Shangri-La's local sourcing control, are also statistically positively correlated with their share prices[7-9].

5.3 Question (ii): Impactful Corporate Finance Decisions

Impactful decisions integrate CSR via the adjusted metrics in social NPV, which is equal to the conventional NPV - social costs + SROI premium.

Table – Social Return On Investment vs Social Value [19]

Listed Company / (HK$ in billion)	CSR	SRI	Monetised Value	Net Value after Adjustments	SROI ratio	Adjusted SROI
MTR	Reliable railway system	$1.5	$10	$6.4	4.27	5:1
HKE	Clean energy transition	$2.0	$1.515	$0.742	0.37	3:1
HSBC	Sustainable finance	$25	$50	$24	0.96	4:1
China Construction Bank	Green and community	$20	$12	$6.3	0.32	3:1
CK Hutchison	Green port and audit	$1.0	$4.0	$1.95	1.95	3:1
Tencent	Digital inclusion social	$10	$20	$8.5	0.85	6:1
Sun Hung Kai	Urban Sustainability	$3.0	$5.0	$3.2	1.07	4:1
Li Ning	Supply chain sustainability	$0.5	$1.0	$0.49	0.98	2:1
Shangri-La	Eco and water efficiency	$0.8	$1.5	$0.675	0.84	3:1

Source: HKEX's sustainability report, green finance report.

All values are expressed in Hong Kong dollars (HK$) billions, representing aggregate project-level investments and monetised social value. Values are derived from FY2024 sustainability reports and HKEX filings, with projections into early 2025.

6. When Social Value Pays: Insights from Leading Hong Kong Companies

Findings affirm social responsibility as a positive driver, which listed companies report enhanced performance via SROI, and sector-specific core values from the listed companies are positively correlated with the listed companies' shareholders' value [20-22].

For Hong Kong's social value-specific factors, corporate finance decisions in their SRI executed their CSR projects, which indicated that their project NPV minus social costs plus SRI premium are positive and significant [20-22].

Corporate finance decisions could also be made with the view of creating social value through CSR projects, which companies can finance through SRI bonds. This could cut funding costs after reducing those risks from reputational damage due to poor labour practices involving penalties and lawsuits, impact on work safety, and public health indemnity issues [20-22].

Chart – Volumes of Socially Responsible Bonds issued in Hong Kong
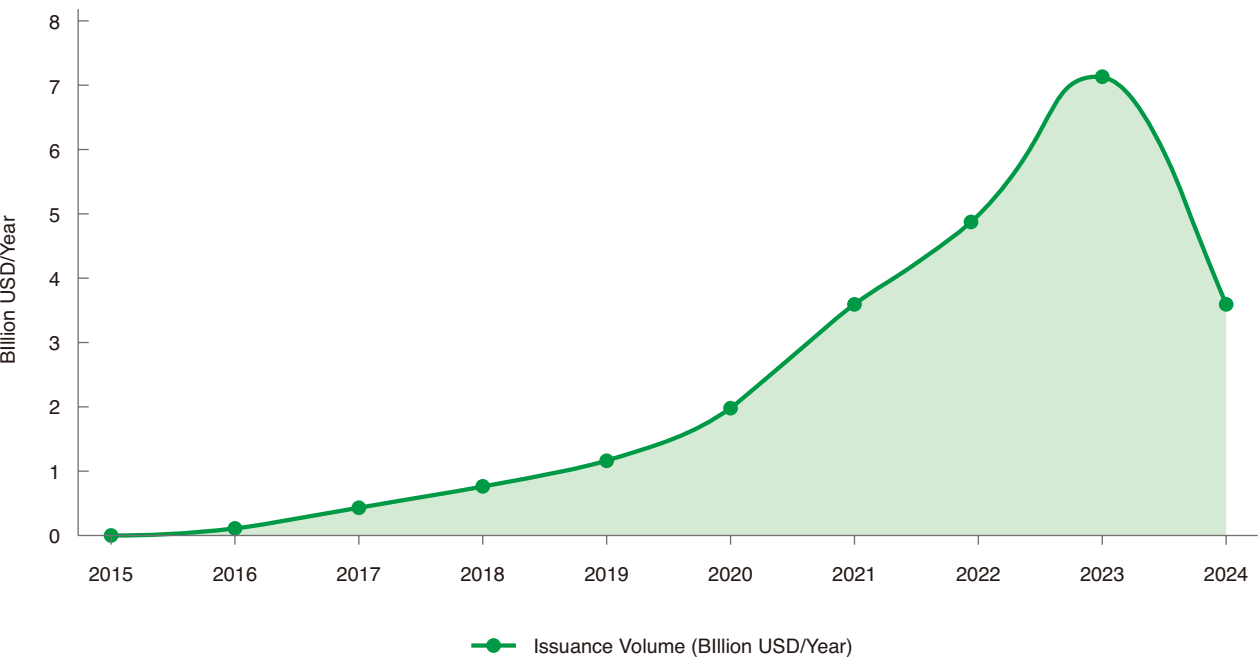
7. Conclusion

Firm value maximisation is increasingly recognised as an imperative that incorporates social value, as evidenced by the SRI mandate for companies listed in Hong Kong [23]. This evolution reflects a growing consensus in both academic literature and business practice that prioritising corporate social responsibilities can enhance long-term corporate success [24].

Our analysis of the returns on socially responsible investments of Hong Kong-listed companies reveals that core values such as equality and sustainability are becoming essential components of corporate strategies. These principles not only influence stakeholder perceptions but also drive operational efficiencies and consumer loyalty [25].

Additionally, tailored sectoral approaches can facilitate impactful budgeting through the use of integrated financial management tools. For instance, companies that align their budgeting processes with social value objectives can identify areas where investments yield both economic returns and positive societal impacts [5]. This integrated approach allows corporate organizations to assess their financial and social performance simultaneously, fostering greater accountability and transparency [26].

In a landscape where consumers and investors are increasingly valuing corporate social responsibility, businesses that prioritise social value alongside financial performance are better-positioned to thrive [27].

The socially responsible investment mandate thus serves as a catalyst for transformative change in corporate governance, steering companies towards practices that not only contribute to shareholder wealth but also promote the greater good.

This shift signifies a profound rethinking of traditional business models, underscoring the imperative for firms to adopt a holistic view that integrates both economic and social outcomes, ultimately leading to enhanced firm reputation and resilience in a competitive marketplace [28].

Based on our analysis of the social return on investment of the Hong Kong-listed companies, core values like equality and sustainability, tailored sectorally, enable impactful budgeting via integrated tools.

We examined a total of 50 Hong Kong-listed firms across nine sectors. We found that CSR leaders like MTR, HSBC, and Tencent exemplify dual gains in their corporate earnings or shareholders' value, and positioning as corporate socially responsible, and socially responsible investment leaders [7-9].

Hong Kong-listed companies should carry forward this momentum, as the challenge is not just to make capital budget decisions, but to align them with values that endure.

Reference and Bibliography

1. Chung, Ricky; Bayne, Lyndie; and Birt, Jacqueline. 2023. "The Impact of ESG Disclosure on Firm Financial Performance: Evidence from Hong Kong." Sept 2023, Asian Review of Accounting, Vol . 32 (1). https://doi.org/10.1108/ARA-07-2022-0165?urlappend=%3Futm_source%3Dresearchgate.net%26medium%3Darticle

2. Climate Bonds Initiative and Hong Kong Monetary Authority (HKMA). Various years. *Reports on Green Finance and Climate Bond Certification*. https://www.climatebonds.net

3. Ferrarini, Guido. 2023. "Firm Value versus Social Value: Dealing with the Trade-offs." *ECGI Law Working Paper No. 686/2023*. https://www.ecgi.global/sites/default/files/working_papers/documents/ firmvalueversussocialvaluedealingwiththetradeoffs.pdf.

4. Friedman, Milton. 1970. "The Social Responsibility of Business Is to Increase Its Profits." *The New York Times Magazine*, September 13. https://www.nytimes.com/1970/09/13/archives/a-friedman-doctrine-the-social-responsibility-of-business-is-to.html

5. Freeman, R. Edward. 1984. *Strategic Management: A Stakeholder Approach*. Boston: Pitman. SBN (Electronic) 9781139192675

6. Haralambos, Michael. 1990. *Sociology: Themes and Perspectives*. London: Unwin Hyman. https://archive.org/details/sociologythemesp0000hara_z9h3

7. HKEX (Hong Kong Exchanges and Clearing Limited). 2025. *ESG Reporting Code (Appendix C2)*. https://www.hkex.com.hk

8. PwC. 2024. *ESG Reporting Study for Hong Kong Listed Companies*. PricewaterhouseCoopers Hong Kong. https://www.pwchk.com

9. Hong Kong SAR Government. 1990. *The Basic Law of the Hong Kong Special Administrative Region of the People's Republic of China*. https://www.basiclaw.gov.hk

10. Inglehart, Ronald. 2018. *Cultural Evolution: People's Motivations Are Changing, and Reshaping the World*. Cambridge: Cambridge University Press. https://academic.oup.com/sf/article/98/4/1/5549799

11. Jara, Marcelo de la Cruz, and Jelena Spanjol. 2024. "Understanding Multiple Perspectives on Social Value in Business." *Journal of Business Ethics* 198. https://doi.org/10.1007/s10551-024-05692-1

12. Kluckhohn, Clyde. 1951. "Value and Value-Orientations in the Theory of Action." In *Toward a General Theory of Action*, edited by Talcott Parsons and Edward A. Shils, 388–433. Cambridge, MA: Harvard University Press.

13. Hong Kong SAR Government. 2025. The Chief Executive's 2025 Policy Address: Deepening Reforms for Our People, Leveraging Our Strengths for a Brighter Future. Hong Kong: Government Printer. Accessed November 13, 2025.

14. United Nations. 1966. *International Covenant on Civil and Political Rights*. https://www.ohchr.org/en/instruments-mechanisms/instruments/international-covenant-civil-and-political-rights

15. United Nations. 1966. *International Covenant on Economic, Social, and Cultural Rights*. https://www.ohchr.org/en/instruments-mechanisms/instruments/international-covenant-economic-social-and-cultural-rights

16. United Nations. *Transforming Our World: The 2030 Agenda for Sustainable Development*. New York: United Nations, 2015. https://sdgs.un.org/2030agenda

17. Leslie, G.R., R.F. Larson, and H.L. Gorman. 1985. *Introductory Sociology*. New York: Oxford University Press

18. Rochet, Jean-Charles, Michael Magill, and Martine Quinzii. 2013. "A Critique of Shareholder Value Maximization." *University of Edinburgh Working Paper*. https://edwebcontent.ed.ac.uk/sites/default/files/imports/fileManager/JC_Rochet.pdf

19. Social Value International. 2023. *Guide to Social Return on Investment (SROI)*. https://www.socialvalueint.org.

20. UNESCO. 2021. *Recommendation on the Ethics of Artificial Intelligence*. https://unesdoc.unesco.org/ark:/48223/pf0000380455

21. Worsley, Peter. 1970. *The Concept of Culture*. London: Tavistock Publications.

22. Young, Kimball, and Raymond W. Mack. 1959. "Social Problems in America: Conditions, Controversies and Solutions". New York: American Book Company.

23. Cheng, Beiting, Ioannis Ioannou, and George Serafeim. 2013. "Corporate Social Responsibility and Access to Finance." *Strategic Management Journal*, Vol. 35, No. 1, pp. 1–23. https://sms.onlinelibrary.wiley.com/doi/10.1002/smj.2131

24. Eccles, Robert G., Ioannis Ioannou, and George Serafeim. 2014. "The Impact of Corporate Sustainability on Organizational Processes and Performance." *Management Science,* Vol. 60, No. 11 (2014): 2835–2857. https://pubsonline.informs.org/doi/10.1287/mnsc.2014.1984

25. Porter, Michael E., and Mark R. Kramer. 2011. "Creating Shared Value: How to Reinvent Capitalism—and Unleash a Wave of Innovation and Growth." *Harvard Business Review* 89, No. 1–2, pp. 62–77. https://hbr.org/2011/01/the-big-idea-creating-shared-value

26. Kolk, Ans, and Rob van Tulder. 2010. "International Business, Corporate Social Responsibility and Sustainable Development." International Business Review 19, No. 2, pp. 119–125. https://www.sciencedirect.com/science/article/abs/pii/S0969593109001474?via=ihub

27. Renneboog, Luc, Jenke Ter Horst, and Chendi Zhang. 2008. "Socially Responsible Investments: Institutional Aspects, Performance, and Investor Behavior." *Journal of Banking & Finance*, Vol. 32, No. 9, pp. 1723–1742. https://www.sciencedirect.com/science/article/abs/pii/S0378426607004220?via=ihub

28. Mackey, Alison, Tyson B. Mackey, and Jay B. Barney. 2007. "Corporate Social Responsibility and Firm Performance: Investor Preferences and Corporate Strategies." *Academy of Management Review* Vol. 32, No. 3, pp. 817–835. https://journals.aom.org/doi/10.5465/amr.2007.25275676

Appendix

Social Return on Investment Calculation [19]

Investment based on ESG-related capex according to the company's sustainable report

Gross value from SRI is based on the result of the SRI monetisation, such as savings, loss mitigation, etc.

Adjustments in the social value that are attributed to the company's share.

SROI Ratio = Net Social Value / Socially Responsible Investment

Or SROI Ratio = (Total Present Value of Social + Environmental + Economic Benefit) / Total Investment Cost

Adjusted SROI is for including the attribution and deadweight.
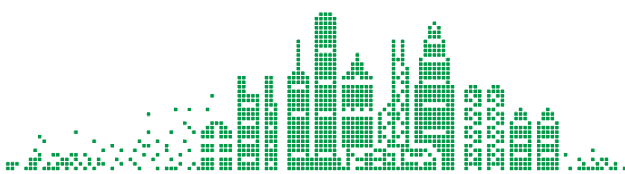
Housing Affordability and Homeownership in Hong Kong, 1985-2023

Housing Affordability and Homeownership in Hong Kong, 1985-2023

Allen W. Huang   **Alex Ngau**   **Michael B. Wong**

Abstract

Between 1985 and 2002, homeownership and housing affordability in Hong Kong greatly increased, due to a large expansion of subsidised homeownership. However, since 2002, homeownership and housing affordability have fallen, in large part due to the Government's retreat from subsidising homeownership. Private-sector rents are now highly unaffordable for the median-income household. Means-tested public rental housing is the only affordable option for a large majority of the population. This situation has created a strong incentive for the population to opt for lower-paying or part-time work, artificially reducing labour supply and human capital investment. Hong Kong must enact housing reforms, including a large expansion of its subsidised homeownership programme, to secure a better future for ensuing generations.

Introduction

Shortages of affordable housing are contributing to socioeconomic inequality and hindering productivity growth in many urban centres around the globe (Glaeser and Gyourko 2018; Hsieh and Moretti 2019; Dustmann, Fitzenberger and Zimmermann 2022; Baum-Snow 2023). Hong Kong is a leading example, having been consecutively ranked the least affordable housing market in the world for the past fifteen years (Demographia 2025). In this article, we quantify the trends in housing affordability, homeownership, and housing assistance provision in Hong Kong between 1985 and

2023. We bring together individual-level microdata from 152 waves of the General Household Survey with rent, price, and construction datasets to assess how the city's housing policy has mediated these trends. We document that prior to the major repositioning of housing policy in 2002, homeownership and affordability were on the rise, driven largely by a major expansion of subsidised homeownership. However, after 2002, homeownership and affordability fell, in particular for later birth cohorts, in part due to the retreat of the government from promoting subsidised homeownership. The dramatic reductions in youth homeownership and housing affordability have yet to be reversed.

Housing construction, especially of subsidised ownership units, remains much lower than the levels prior to 2002. The supply of subsidised ownership units is also deeply depressed relative to demand. There is a very wide gap between public-and private-sector rental prices. Private-sector rents for small units in more remote areas are unaffordable for the median-income household, leaving public rental housing as the only affordable option for a large majority of the population. These trends explain a growing sentiment among local youth: that reducing labour supply to successfully obtain public rental housing represents their best opportunity to "win" in life. Hong Kong must enact housing reforms, including a large expansion of its subsidised homeownership programmes, to secure a better future for its upcoming generations.

Background: A Brief History of Hong Kong Housing Policy

Hong Kong's public housing system originated in the 1950s to resettle a large population of refugees living in squatter settlements. In the aftermath of the 1967 riots, Governor Murray MacLehose launched an ambitious urban development programme in 1972 aimed at addressing widespread housing shortages and social discontent. This initiative included the development of rural areas into "New Towns" and a major expansion of the Public Rental Housing (PRH) programme, which provided subsidised rental accommodation. Around the same period, the Home Ownership Scheme (HOS) was introduced to promote subsidised homeownership and broaden access to affordable housing.

The Government's aggressive expansion of public housing lasted through the 1980s and 1990s. The 1987 Long Term Housing Strategy (LTHS) aimed to provide an annual average of 72,333 domestic housing units, encompassing both public and private sector supply. Following the 1997 handover, the Government conducted a public consultation and subsequently launched a revised LTHS in 1998, which raised the housing supply target to no fewer than 85,000 units per year.

However, the Government repositioned its housing policy in 2002, after the 1998 Asian Financial Crisis precipitated a severe recession and a sharp decline in property prices. Land auctions were halted and the HOS was suspended in an effort to stabilise the property market.

Figure 1: Trend in Completion of Housing Units

Figure 1 shows the trend in domestic housing units completed in Hong Kong from 1985 to 2024, based on data compiled by the Census and Statistics Department. The production of Home Ownership Scheme flats (HOS) was suspended in November 2002. Completed HOS flats have since been recorded as housing production based on their actual use at the time of disposal, rather than their original classification at completion.
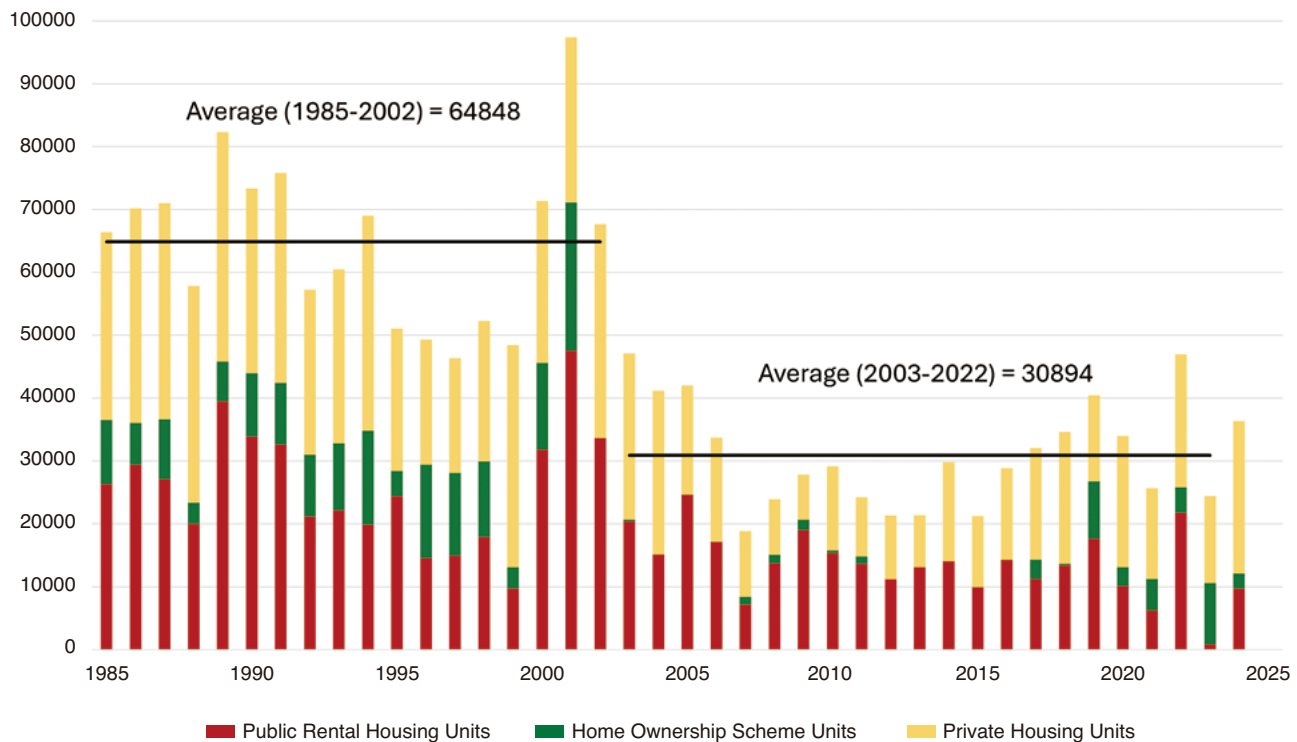

Figure 1 shows the trend in unit completions between 1985 and 2024. Between 1985 and 2002, an annual average of around 64,800 public and private units was completed. Between 2003 and 2023, housing completions were much lower, averaging around 30,900 units per year. The construction of HOS units was almost entirely suspended, with only 6,010 units completed between 2002 and 2016.

Figure 2 shows the trend in lottery-winning probabilities for White Form applicants under the HOS. These refer to non-PRH residents who are eligible to apply for subsidised housing. Since the number of applicants has typically exceeded the available supply, allocation is determined through a lottery system. During 1985-2002, the average winning probability for White Form applicants was 17%. During 2003-2023, after the 2002 housing policy repositioning, winning probabilities averaged only 3%.

Figure 2: Annual probability of HOS White Form Lottery Win

Figure 2 plots the HOS White Form lottery winning probability from 1985 to 2024 based on data from the Hong Kong Housing Authority. For years with multiple HOS sales schemes, we assume that the same applicant applies for each scheme, and calculate the lottery winning probability as the combined probability of winning at least once in that year. For years without any HOS sale, the probability is assigned as 0%.
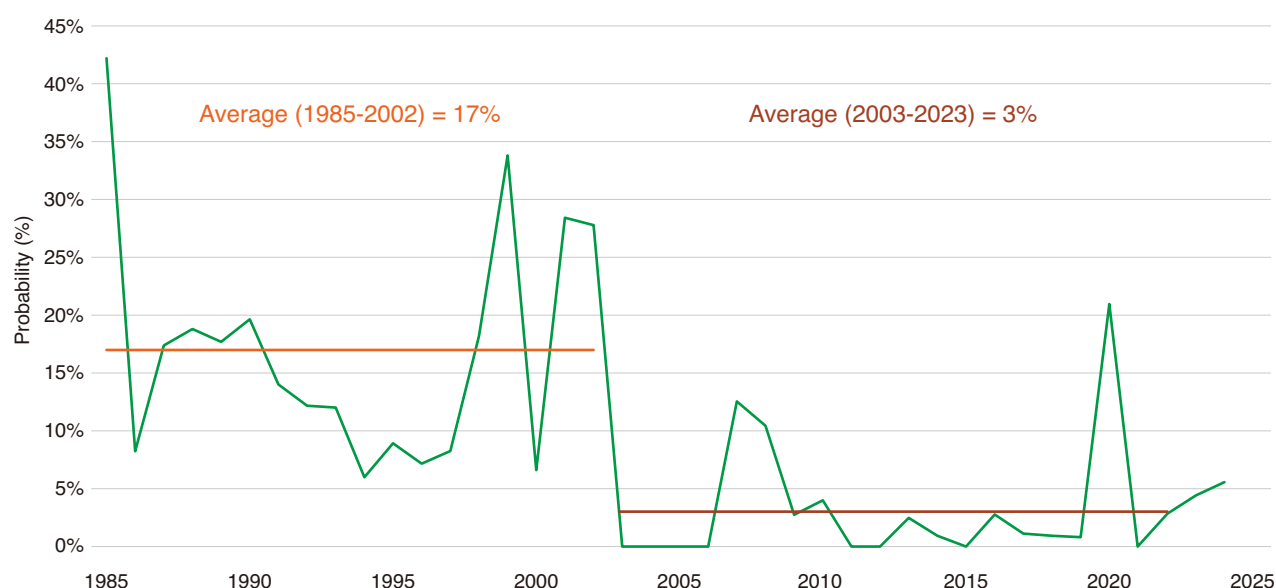
The Government's housing supply target remains depressed today. According to the 2025 LTHS Annual Progress Report, the Government has set a 10-year housing supply target of 420,000 units for the period 2026/27 to 2035/36. Of these, 294,000 units (70%) are designated for public housing, and 126,000 units (30%) for private housing, equivalent to an average annual supply of about 42,000 units. Although this planned output is roughly 22% higher than that of the previous decade, it is still much lower than the 1985–2002 levels.

Homeownership and Housing Assistance Provision

In this section, we document the trends in homeownership and housing assistance provision. To do so, we draw on individual-level microdata from the General Household Survey (GHS), spanning 1985 to 2023. Although the GHS is primarily used to monitor labour market trends, it is suitable for historical housing research for two key reasons. First, it is a high-frequency, representative, and historically comprehensive dataset, collected quarterly by the Census and Statistics Department since the first wave conducted in 1981. Second, it contains detailed variables on both housing type and demographic characteristics.

We classify Hong Kong's housing stock into four tenure types:

- **Public renters** live in PRH units, which are owned and managed by the Hong Kong Housing Authority and the Hong Kong Housing Society. As of 2024, 30% of households resided in around 866,000 PRH units. Each of these units typically range between 300 and 400 square feet in size. Applicants must satisfy specific income and asset eligibility criteria. Allocations are generally made on a first-come, first-served basis through a central waiting list. Existing tenants are subject to periodic means testing, and those whose income exceeds the prescribed thresholds are required to pay 2.5 to 4.5 times the base rent under the latest Well-off Tenant Policy. Adjustments to nominal rents are linked to overall income growth and are capped at 10% every two years.

- **Public owners** live in subsidised homeownership units. As of 2024, 15.4% of households lived in about 454,000 such units across Hong Kong. The majority of these households occupy HOS flats, which typically range from 500 to 700 square feet each. They are sold at 30–50% below market value. Allocation is conducted through a lottery system open to eligible applicants who meet specific income and asset criteria. Another segment of public owners resides in Tenant Purchase Scheme (TPS) flats—former PRH units sold to sitting PRH tenants at substantial discounts between 1998 and 2006. To obtain the right to resell or lease their units on the private market, owners of subsidised flats must repay the original discount at current market value. Once this repayment is made, they are reclassified as private homeowners.

- **Private owners** purchase their homes directly from private-sector developers. As of 2024, 35.3% of households in Hong Kong owned private housing units.

- **Private renters** rent directly from private-sector owners. They accounted for 18.5% of households as of 2024.

Figure 3 plots the trends in housing tenure shares among working-age adults in Hong Kong from 1985 to 2023, using quarterly data from the GHS.

As shown in Figure 3, the 1985-2002 period was characterised by rapid growth of subsidised homeownership. The share of public owners increased from 2.9% in 1985 to 18.7% in 2002 (around 16 percentage points, or p.p.). The private owner share increased more modestly, from 31.1% in 1985 to 35.4% in 2002 (around +4 p.p.). Overall, homeownership rates increased from 34.0% in 1985 to 54.1% in 2002 (around +20 p.p.). These shifts reflect the Government's aggressive promotion of homeownership through the expansion of the HOS and TPS.

As homeownership rose, renter shares fell correspondingly. The drop in total renter share was accounted for by similar declines in the public and private sectors. Private renter shares declined from 23.2% in 1985 to 12.7% in 2002 (around -11 p.p.). Public renter shares also contracted from 42.7% in 1985 to 33.2% in 2002 (around -10 p.p.).

Figure 3: Housing Tenure Shares over Time

Figure 3 shows the trend in the shares of individuals aged 20+ in each housing tenure type, between 1985 and 2023. Data are from the Hong Kong General Household Survey.
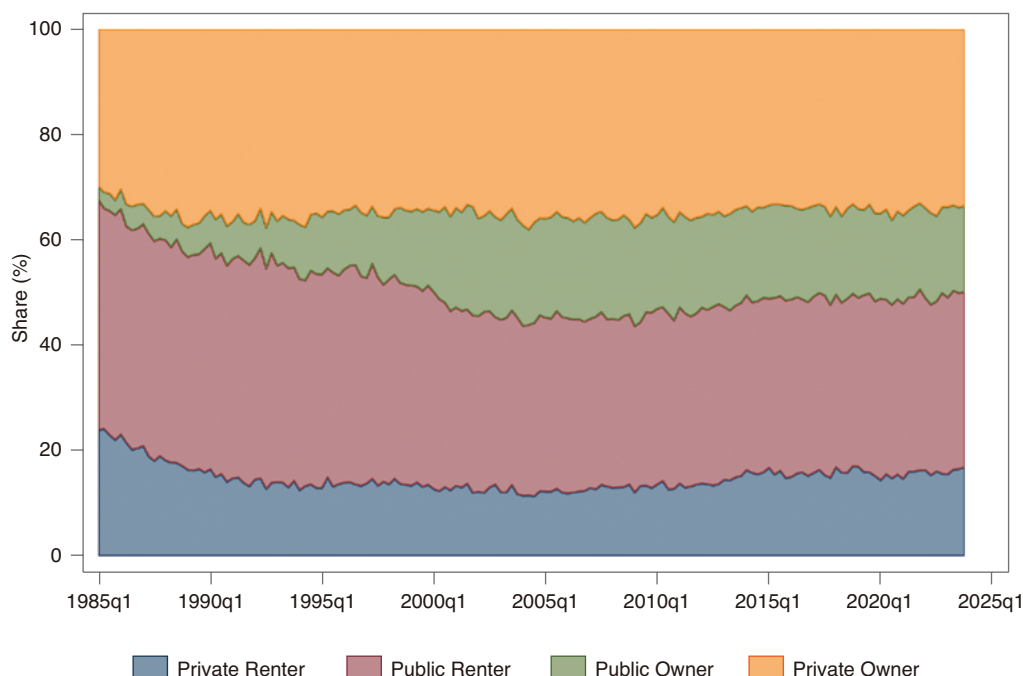

During 2002-2023, the increases in homeownership stalled and began to fall instead. The public owner share fell from 18.7% in 2002 to 16.5% in 2023 (-2.2 p.p.). The drop in private owner share was more modest, from 35.4% in 2002 to 33.6% in 2023 (-1.8 p.p.). Overall, homeownership rates decreased from 54.1% in 2002 to 50.1% in 2023 (-4 p.p.).

The decline in homeownership coincided with an increase in renter shares. The rise in renter share was entirely accounted for by the expansion in private renter. The share of this segment increased from 12.7% in 2002 to 16.3% in 2023, largely matching the gain in overall renter shares from 45.9% to 49.8% in the same period. In comparison, the public renter share rose slightly from 33.2% in 2002 to 33.5% in 2023.

Figure 4 summarises the changes in housing tenure shares in two periods: 1985-2002 and 2002-2023; confirming a dramatic reversal in the evolution of Hong Kong's housing system. The earlier period was marked by a massive expansion of homeownership, and the later period by a mild contraction of homeownership.

Figure 4: Change in Housing Tenure Shares

Figure 4 shows the percentage-point changes in housing tenure shares in Hong Kong between two periods: (a) 1985-2002 and (b) 2002-2023. Data are from the Hong Kong General Household Survey. The sample includes all working-age individuals (aged 20+).
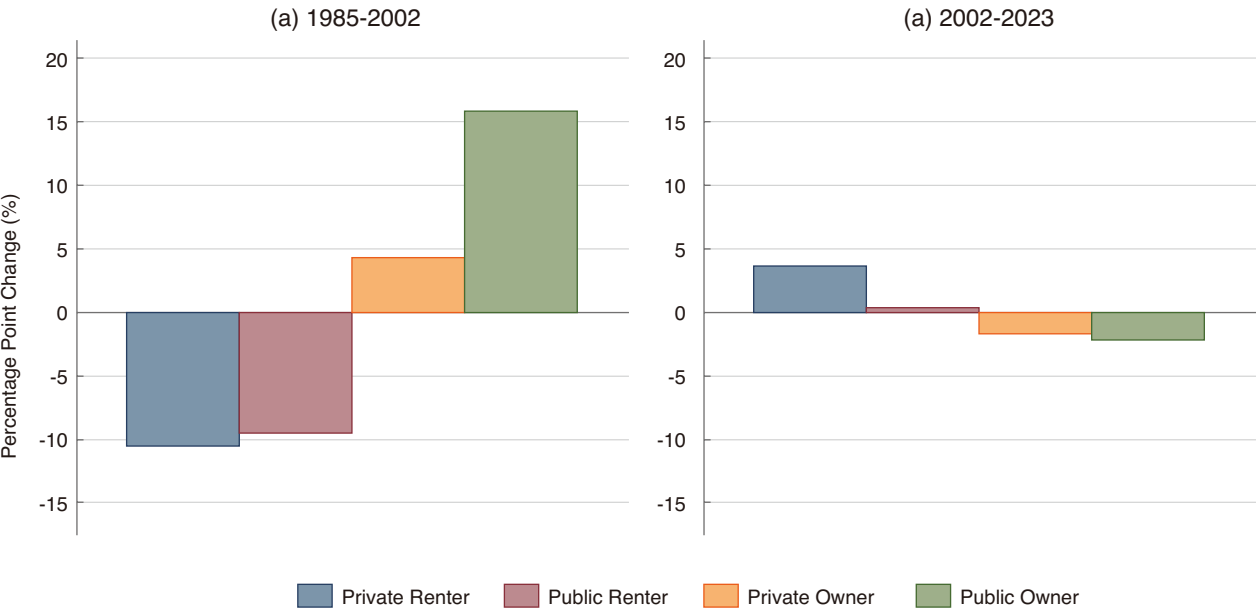

As shown in Figure 4, the 1985-2002 period was dominated by subsidised homeownership expansion. Public ownership surged by 15.8 p.p.—nearly four times the 4.3 p.p. gain in private ownership—demonstrating that Government programmes, rather than private market purchases, drove the homeownership boom. These gains drew roughly equally from both rental sectors, which declined by approximately 10 p.p. each.

During 2002-2023, these trends reversed: Homeownership contracted—the public owner share by 2.2 p.p. and the private owner share by 1.8 p.p.—while the total rental share expanded by 4 p.p., driven by increases in private rental (+3.6 p.p.). This period marked the end of sustained homeownership growth and the rise of private renting as the tenure option for working-age adults.

Figure 5 shows the trends in housing tenure shares by age group in Hong Kong from 1993 to 2023. Individuals who live with their parents are classified as a separate and mutually exclusive category alongside the four independent housing tenure categories (private renter, public renter, private owner, and public owner). The figure reveals substantial generational differences in access to public housing assistance: younger cohorts experiencing declining housing assistance over time while older groups have maintained their access to subsidised housing.

Figure 5: Housing Tenure Shares by Age Group

Figure 5 shows the evolution of housing tenure composition in Hong Kong from 1993 to 2023 by age group, using stacked area representation. Data are from the Hong Kong General Household Survey.
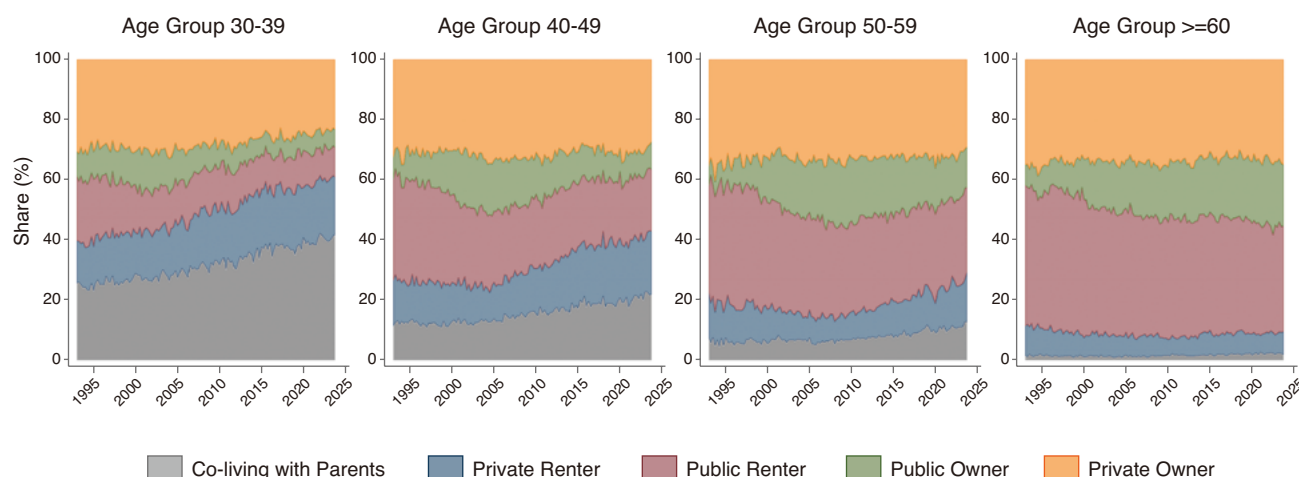

For the 30-39 age group, public housing assistance contracted sharply between 1993 and 2023. The public renter share declined from 20.9% to 9.9% (-11 p.p.), while the public owner share fell from 9.1% to 6.2% (around -3 p.p.). Overall, total public housing access declined from 30.1% to 16.1% (-14 p.p.). Private ownership also fell dramatically, declining from 30.7% to 23.4% (around -7 p.p.). As access to both public housing and private ownership diminished, younger adults increasingly relied on two alternatives: the private renter share rose from 14.1% in 1993 to 20.0% in 2023 (around +6 p.p.), while the co-living share increased from 25.1% in 1993 to 40.5% in 2023 (around +15 p.p.).

The 40-49 age group exhibited similar patterns of declining housing assistance between 1993 and 2023. The public renter share contracted from 34.7% to 20.9% (around -14 p.p.), while the public owner share increased only marginally from 7.7% to 8.1% (+0.4 p.p.). Overall, total public housing access declined from 42.4% to 29.0% (around -13 p.p.). Private ownership declined modestly from 30.5% to 28.8% (around -2 p.p.). The private renter share increased from 14.9% to 20.0% (around +5 p.p.), while co-living with parents rose from 12.1% to 22.1% (+10 p.p.).

For the 50-59 age group, the decline in public renting between 1993 and 2023 was substantially offset by gains in public ownership. The public renter share fell from 38.3% to 29.1% (around -9 p.p.), but the public owner share increased from 5.9% to 14.2% (around +8 p.p.). Overall, total public housing access remained relatively stable, declining only slightly from 44.2% to 43.3% (around -1 p.p.). Private ownership declined from 36.2% to 30.0% (around -6 p.p.), while the private renter share increased slightly from 13.4% to 14.9% (around +2 p.p.).

Figure 6: Change in Housing Tenure Shares by Age Group

Figure 6 shows the percentage point changes in housing tenure shares by age group in Hong Kong between 1993 and 2023. Data are from the Hong Kong General Household Survey.
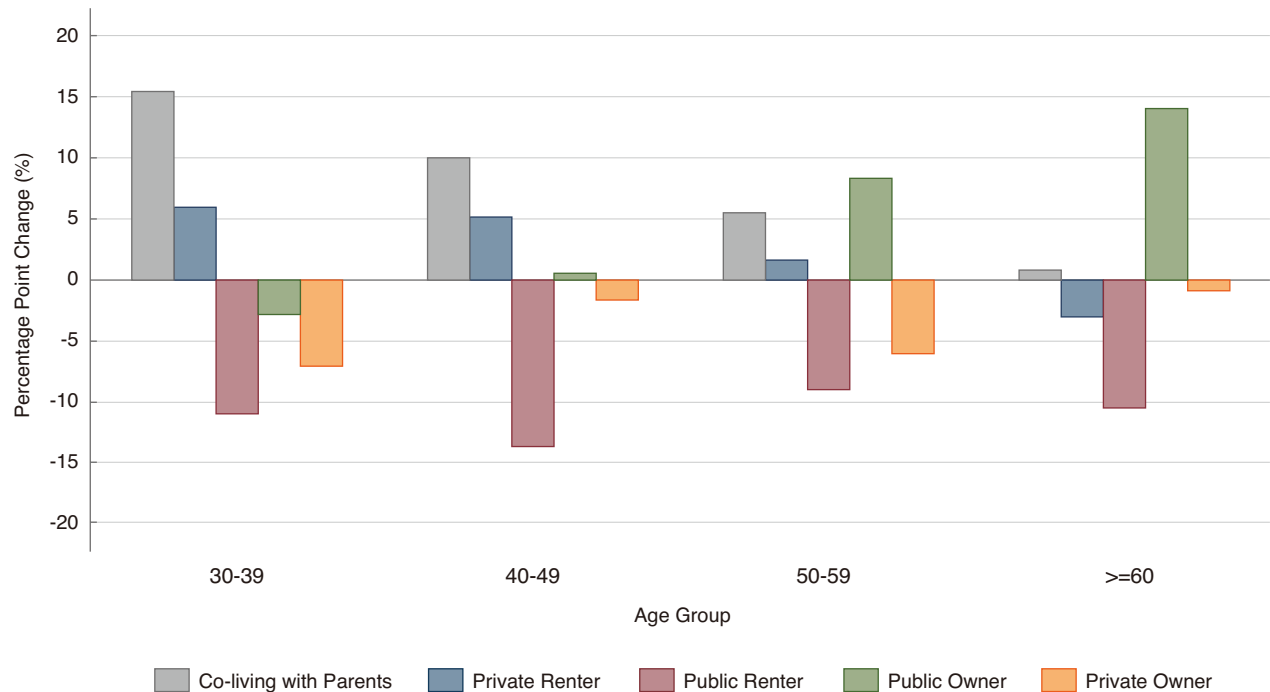

The 60+ age group enjoyed the most from the expansion in public housing between 1993 and 2023. The public renter share declined from 46.1% to 35.6% (around -10 p.p.), but the public owner share increased substantially from 7.1% to 21.0% (around +14 p.p.). Overall, total public housing access increased from 53.2% to 56.6% (around +3 p.p.). Private ownership remained relatively stable, declining slightly from 35.2% to 34.2% (-1 p.p.).

Figure 6 summarises the changes in housing tenure shares by age group between 1993 and 2023, confirming a dramatic generational divide in housing opportunities. Younger age cohorts increasingly rely on parental co-residence and private rental markets. For the 30-39 age group, co-living with parents surged by around 15 p.p.—the largest increase across all categories—while private renting rose by approximately 6 p.p.. These increases coincided with declining access to subsidised housing and homeownership: public renting fell by approximately 11 p.p, private ownership declined by around 7 p.p., and public ownership dropped by around 3 p.p.. The 40-49 age group exhibited similar patterns.

Figure 7: Housing Tenure Share by Birth Cohort and Age Group

Figure 7 shows the life-cycle housing tenure profiles by birth cohort in Hong Kong from 1993 to 2023. Data are from the Hong Kong General Household Survey. The sample includes working-age individuals (20-59). Individuals living with parents are excluded from the four tenure categories shown. Missing data points indicate cohorts not observed at those ages during the survey period.
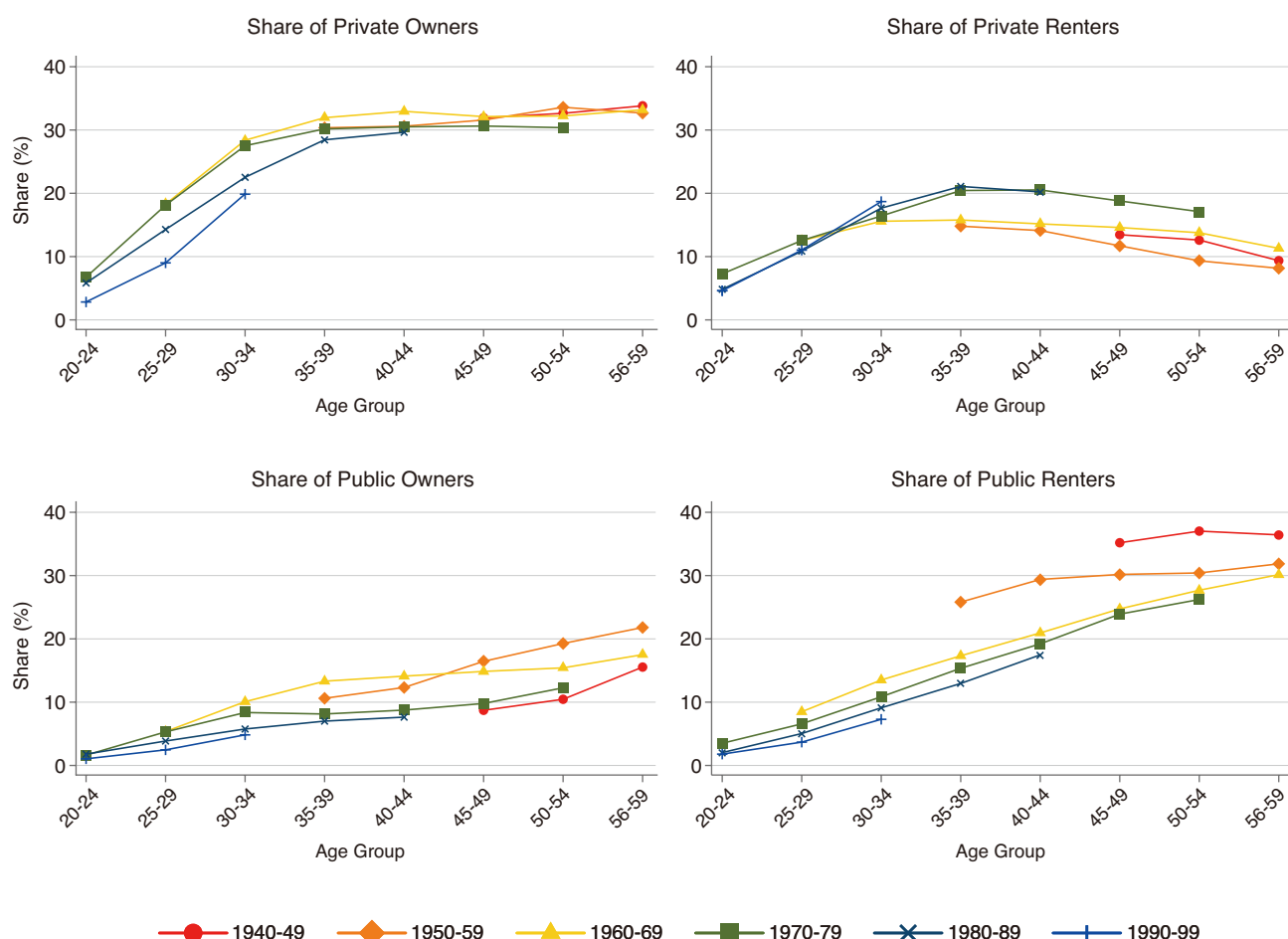
In contrast, older age cohorts, particularly those 60+, benefited from expanding access to subsidised homeownership. The 50-59 age group saw public ownership increase by approximately 8 p.p., partially offsetting declines in public renting (around 9 p.p.) and private ownership (around 6 p.p.). The 60+ age group experienced a large increase in public ownership (of about 14 p.p.), which fully offset the decline in public renting and private ownership combined (around 11 p.p.), suggesting successful transitions from public renting to subsidised homeownership.

Figure 7 presents the evolution of housing shares by age group across different generations in Hong Kong, tracking 10-year cohorts from the 1940s through the 1990s. The figures reveal a stark generational divide in housing shares, with more recent cohorts experiencing systematically lower rates of homeownership and public housing access throughout their lives compared to earlier generations.

Private ownership is much lower for younger birth cohorts. The 1960-69 and 1970-79 cohorts achieved 28.4% and 27.5%, private ownership respectively at ages 30-34. However, more recent cohorts show markedly lower rates at comparable ages. By ages 30-34, the 1980-89 cohort achieved just 22.5% and the 1990-99 cohort reached only 19.8%. These declining trajectories indicate that younger generations cannot afford to buy homes at the same life stages as earlier generations did.

Instead of buying, younger birth cohorts increasingly rent in the private market during their early working years. At ages 35-39, 14.8% of the 1950-59 cohort were private renters and 15.8% of the 1960-69 cohort were private renters at the same age. However, for the 1970-1979 and 1980-89 cohorts, the shares increased to 20.5% and 21.1% respectively, around 5 p.p. higher than earlier cohorts. The share of private renters for the 1970-1979 cohort was also consistently higher than that for earlier cohorts at older ages.

For younger cohorts, public ownership has also fallen. At ages 30-34, the 1960-69 cohort had achieved 10.1% public ownership, and the 1970-79 cohort 8.3%. In contrast, at ages 30-34, the 1980-89 cohort achieved just 5.7% and the 1990-99 cohort reached only 4.8%. This trend continued through ages 35-39 and 40-44, reflecting the Government's scaling back of subsidised homeownership programmes after 2002.

Public rental declined for younger cohorts. At ages 25-29, the 1960-69 cohort had 8.5% in public renting, while the 1970-79 cohort had 6.6% at the same age. In contrast, the 1980-89 cohort had only approximately 5.1% at ages 25-29, and the 1990-99 cohort just 3.7%.

Overall, younger cohorts have much lower access to public housing in early adulthood. This is likely in large part driven by slow construction of public housing. The consequence is greater difficulty for younger cohorts to achieve housing independence.

Housing Affordability

The previous section documented that younger cohorts in Hong Kong are experiencing reduced homeownership and greater reliance on private renting. This section examines the trends in rental and ownership housing affordability in Hong Kong from 1985 to 2024.

Rental affordability

Rental affordability is measured using the rent-to-income ratio (RIR) for median-income households renting a typical 400-sq-ft unit. This indicator measures the share of household income devoted to rent payments. This indicator is widely used internationally. According to the UN-Habitat and World Bank, housing is considered affordable when housing expenditures account for less than 30% of household income, while levels above this threshold indicate unaffordability.

Figure 8: Monthly Burden of Median-Income Households for Renting a 400 sq ft Unit

Figure 8 presents the trends of monthly rental burden (rent-to-income ratio) for median-income households renting a 400 sq ft unit, between 1985 and 2024. Data derived from the Census and Statistics Department, Rating and Valuation Department and Housing Authority. Due to definitional differences in district boundaries, data for Kowloon between 1985 and 1989 do not cover all areas within the district.
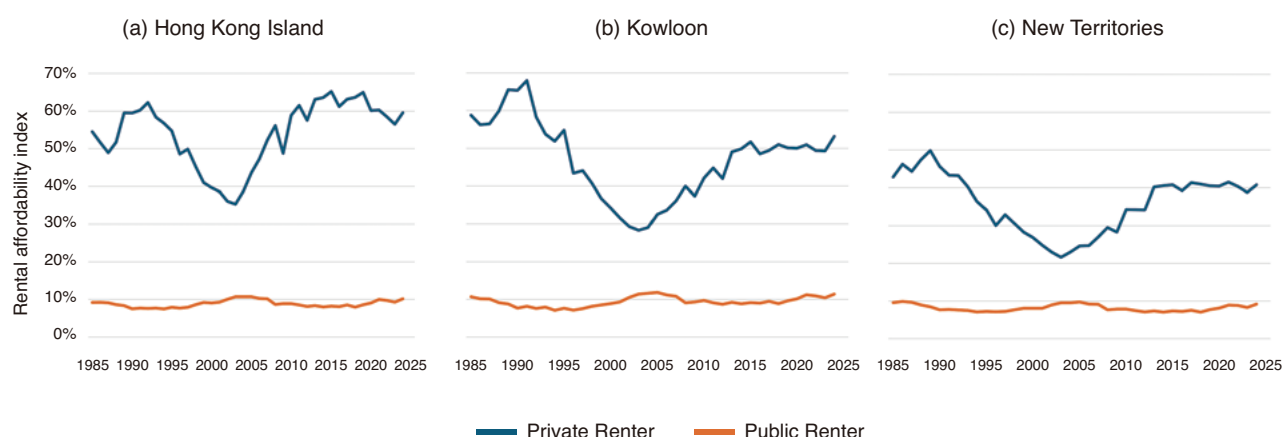
Between 1985 and 1990, private rental housing became increasingly unaffordable for median-income households across all regions of Hong Kong. As shown in Figure 8, the RIR for a typical 400-sq-ft private unit rose from 55% to 59% on Hong Kong Island (+4 p.p.), from 59% to 65% in Kowloon (+6 p.p.), and from 43% to 46% in the New Territories (+3 p.p.). These increases represent a noticeable deterioration in rental affordability.

Between 1990 and 2003, private rental affordability improved. The RIR declined from 59% to 35% on Hong Kong Island (-24 p.p.) from 65% to 28% in Kowloon (-37 p.p.) and from 46% to 22% in the New Territories (-24 p.p.). RIR in New Territories averaged 28% between 1995-2003, below the commonly accepted affordability threshold, indicating sustained affordability benefits during this period.

Between 2003 and 2024, private rental affordability deteriorated sharply again across all regions. Particularly, on Hong Kong Island, the RIR increased sharply from 35% in 2003 to 60% in 2024 (+25 p.p.), peaking at 65% in both 2015 and 2019. In Kowloon, the RIR increased from 28% in 2003 to 53% in 2024 (+25 p.p.). In New Territories, the RIR rose from 22% to 41% (+19 p.p.), indicating a long-term shift back towards unaffordability.

Compared with similarly-sized private units, public housing rents are dramatically more affordable. For median-income households, public housing rents accounted for approximately 7%-11% of household income between 1985 and 2024.

Figure 9: Years of Median Household Income Required to Purchase a 500 sq ft Unit

Figure 9 presents the trend in the years of median household income required to purchase a 500 sq ft unit, between 1985 and 2024. Data are derived from the Rating and Valuation Department and the Housing Authority. Due to definitional differences in district boundaries, data for Kowloon between 1985 and 1989 do not cover all areas within the district.
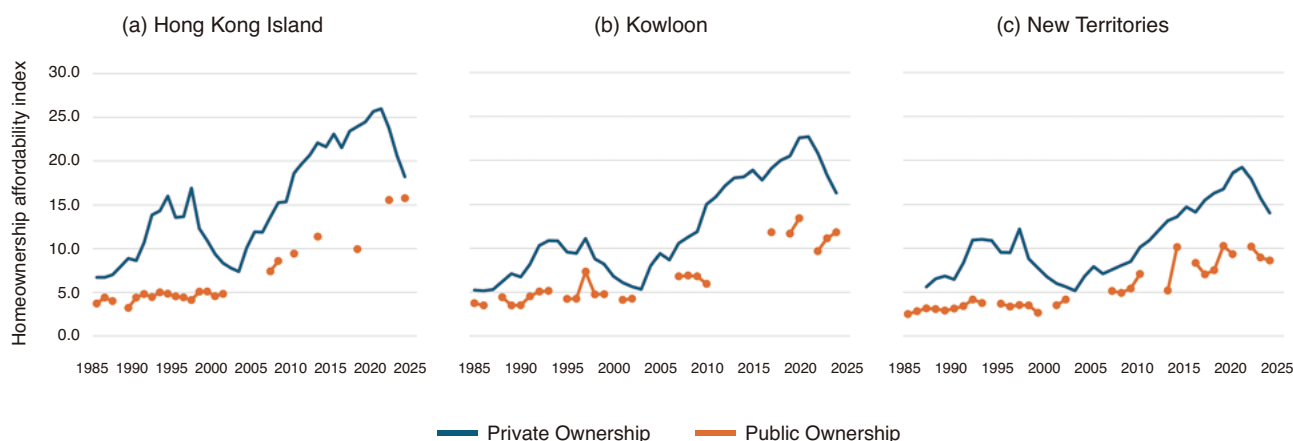
Homeownership affordability

Homeownership affordability is measured using the median multiple, defined here as the median price of a 500-sq-ft unit divided by median household income. This indicator is widely recognised and adopted by international organisations, including the World Bank, the United Nations, the Organisation for Economic Co-operation and Development (OECD), and Demographia. Following Demographia's (2025) classification, this study adopts its framework as the standard benchmark for cross-national housing affordability comparison. Under this classification, a median multiple of ≤3.0 indicates an affordable housing market, 3.1-4.0 is moderately unaffordable, 4.1-5.0 is seriously unaffordable, 5.1-8.9 is severely unaffordable, and 9.0 or above is deemed impossibly unaffordable.

Between 1985 and 1997, Hong Kong's private ownership market was largely unaffordable across all regions. As shown in Figure 9, the median multiple for a standard 500-sq-ft private unit rose from 6.7 to 16.9 years on Hong Kong Island (+152%) and from 5.2 to 11.1 years in Kowloon (+113%). In the New Territories, it increased from 5.6 to 12.2 years between 1987 and 1997. These large increases indicate a substantial deterioration in homeownership affordability. According to Demographia's benchmark, the market shifted from severely unaffordable to impossibly unaffordable by the mid-1990s.

Between 1997 and 2003, private ownership affordability improved significantly following a sharp fall in housing prices. The median multiple dropped from 16.9 to 7.4 years on Hong Kong Island (−56%), from 11.1 to 5.3 years in Kowloon (−52%), and from 12.2 to 5.2 years in the New Territories (−57%). By 2003, homeownership affordability had returned to near 1980s levels.

Between 2004 and 2024, private ownership affordability worsened dramatically again. The median multiple exceeded its 1997 peak in all regions after 2010 on Hong Kong Island and Kowloon, and after 2013 in New Territories. By 2024, it had risen from 7.4 to 18.2 years on Hong Kong Island (+146%), from 5.3 to 16.3 years in Kowloon (+209%) and from 5.2 to 14.0 years in New Territories (+169%). All regions have once again fallen into the impossibly unaffordable category, with affordability conditions worse than in the 1990s.

Compared with similarly-sized private units, public ownership remained substantially more affordable between 1985 and 2002. The median multiple for HOS units increased from 3.7 to 4.8 years on Hong Kong Island (+30%), from 3.7 to 4.2 years in Kowloon (+14%), and from 2.5 to 4.2 years in the New Territories (+68%). Affordability shifted from affordable to seriously unaffordable over this period, yet HOS units remained more affordable than private homeownership.

However, following the suspension of HOS production in 2002, public ownership affordability deteriorated too, mirroring private ownership trends. Between 2007 and 2024, the median multiple of HOS units increased from 7.4 to 15.8 years on Hong Kong Island (+114%), from 6.8 to 11.8 years in Kowloon (+74%), and from 5.1 to 8.6 years in the New Territories (+69%). Consequently, HOS units became severely to impossibly unaffordable on Hong Kong Island and in Kowloon, while the New Territories remained severely unaffordable.

Table 1: Years of Median Household Income Needed to Purchase a Unit in Kowloon by Unit Size and Tenure Type

Table 1 shows the trends in the number of years of median household income required to purchase units of different sizes in Kowloon in selected years. Data derived from the Rating and Valuation Department and Housing Authority. Due to definitional differences in district boundaries, data for Kowloon in 1985 do not cover all areas within the district. "-" indicates years with no HOS sales. Figures in **bold** indicate impossibly unaffordable, as defined according to international standards**.**

Year	Public Ownership	Private Ownership			
	500 sq ft	500 sq ft	900 sq ft	1400 sq ft	2100 sq ft
1985	3.7	5.2	**11.6**	**18.3**	**22.3**
1990	3.5	6.7	**14.1**	**20.9**	**28.2**
1995	4.2	**9.6**	**21.6**	**32.1**	**44.6**
2000	-	6.8	**14.9**	**28.1**	**42.7**
2005	-	**9.4**	**24.6**	**49.5**	**65.5**
2010	5.9	**15.0**	**41.6**	**80.5**	**99.7**
2015	-	**18.9**	**41.9**	**73.0**	**90.2**
2020	**13.4**	**22.6**	**47.6**	**77.4**	**99.7**
2024	**11.8**	**16.3**	**37.1**	**64.0**	**71.8**

The Shifting Housing Landscape for Young Adults

In this section, we summarise changes in housing tenure and housing affordability to understand how the housing landscape for young adults has shifted over the past three decades.

What did the housing market look like for young adults in 1993? Private homeownership accounted for 31% of individuals aged 30–39. As shown in Table 1, for private owners, a 500-sq-ft private-sector unit in Kowloon cost 10.9 years of median household income. Public ownership accounted for another 9%. For public owners, a 500-sq-ft HOS unit in Kowloon cost 5.1 years of median household income, and White Form wait times averaged roughly 8 years.[1] Public rental accounted for another 21% of this cohort. As shown in Table 2, for public renters, rent was only 8% of median household income. Private renters accounted for another 14% of the cohort. Private rental of a 400-sq-ft unit in Kowloon required 58% of median household income. The remaining 25% lived with parents.

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1   The White Form lottery winning probability was 12%, so if a household entered the lottery once every year, on average they would have to wait 1/0.12 = 8.3 years.

Table 2: Rental Burden for Median-Income Households in Kowloon by Unit Size and Tenure Type

Table 2 shows monthly rental burden (rent-to-income ratio) for median-income households renting units of different sizes in Kowloon in selected years. Data are compiled from the Rating and Valuation Department and the Hong Kong Housing Authority. Due to definitional differences in district boundaries, data for Kowloon in 1985 do not cover all areas within the district. Figures in **bold** indicate greater than 50%**.**

Year	Public renter	Private renter			
	400 sq ft	400 sq ft	600 sq ft	900 sq ft	1400 sq ft
1985	11%	**59%**	**73%**	**122%**	**173%**
1990	8%	**65%**	**77%**	**135%**	**209%**
1995	8%	**55%**	**76%**	**127%**	**209%**
2000	9%	34%	46%	**80%**	**141%**
2005	12%	33%	**51%**	**101%**	**167%**
2010	10%	42%	**67%**	**129%**	**207%**
2015	9%	**52%**	**73%**	**120%**	**183%**
2020	10%	**50%**	**67%**	**106%**	**161%**
2024	10%	**53%**	**67%**	**103%**	**155%**

By 2002, homeownership and affordability for young adults both increased. Private homeownership accounted for 31.3% of individuals aged 30-39 (+1% from 1993). As shown in Table 1, for private owners, a 500-sq-ft private-sector unit in Kowloon cost 5.6 years of median household income (-48.6% from 1993). Public ownership now accounted for another 12.4% (+38% from 1993). For public owners, a 500-sq-ft HOS unit in Kowloon cost 4.2 years of median household income (-17.6% from 1993), and White Form wait times averaged 3.6 years.[2] Public rental accounted for another 13.7% of this cohort (-34.8% from 1993). As shown in Table 2, for public renters, rent was only 10% of median household income. Private renters accounted for another 15.8% of the cohort (-2% from 1993). Private rental of a 400-sq-ft unit in Kowloon required 29% of median household income (-50% from 1993). The remaining 26.7% lived with parents (+6.8% from 1993).

By 2023, homeownership and affordability for young adults dramatically declined. Private ownership accounted for 23.4% of individuals aged 30–39 (-25% from 2002). As shown in Table 1, for private

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2   The White Form lottery winning probability was 28%, so if a household entered the lottery once every year, on average they would have to wait 1/0.28 = 3.6 years.

owners, a 500-sq-ft private-sector unit cost 18.4 years of median household income (+229% from 2002). Public ownership accounted for another 6.2% (-50% from 2002). For public owners, a 500-sq-ft HOS unit in Kowloon cost 11.1 years of median household income (+163% from 2002), and White Form wait times averaged 25 years.[3] Public rental accounted for another 9.9% of this cohort (-38.4% from 2002). As shown in Table 2, for public renters, rent was only 10% of median household income. Private renters accounted for another 20.0% of the cohort (+26.6% from 2002). Private rental of a 400-sq-ft unit in Kowloon required 49% of median household income (+68.3% from 2002). The remaining 40.5% lived with parents (+49.8% from 2002).

These numbers indicate that private-sector housing of even basic quality has become impossibly unaffordable for the median household in Hong Kong. For the vast majority of Hong Kong residents, the only affordable option available is to obtain public rental units. Unsurprisingly, a prevalent sentiment among young people today is to view obtaining public rental units as "winning in life." Anecdotes abound that young people are strategically taking on low-paying or part-time employment to meet the eligibility criteria for public housing. While such behaviour constrains both individual career development and aggregate labour supply, it reflects a rational response to a distorted housing system.

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3   The White Form lottery winning probability was 4%, so if a household entered the lottery once every year, on average they would have to wait 1/0.04 = 25 years.

Policy Recommendations

This paper has documented trends in homeownership and housing affordability in Hong Kong between 1985 and 2023. We find that the large expansion of subsidised ownership housing in the 1980s and 1990s coincided with a dramatic increase in homeownership and housing affordability, with major benefits to Hong Kong's post-war baby boomer generation. However, Hong Kong retreated from the construction of subsidised ownership housing beginning in 2002. Correspondingly, housing assistance and homeownership of recent birth cohorts are much lower than previous generations. Today, Hong Kong's youth face impossibly unaffordable rents and prices, leaving means-tested public rental housing as the only affordable option. This housing situation has demoralising impacts on the population's enterprise and upward mobility.

Below are three specific policy changes that we recommend.

1.   Increase production of higher-quality public ownership units

The current Long-term Housing Strategy, established in 2014, plans housing supply targets by counting the number of housing units demanded by the population, according to projected population growth and housing reconstruction. Since this methodology does not account for unit quality, it biases Hong Kong towards supplying small units. The result is that the housing supply has not been able to meet the needs of Hong Kong's high-income population, which requires much more than a basic minimum quality of housing.

Hong Kong's persistent undersupply of higher-quality housing and deepening affordability problems is a direct consequence of the current flawed planning methodology. Given this methodology, it is unsurprising that average new unit size has declined in recent years. Although Hong Kong has somewhat increased its housing supply targets in recent years, these increases are small. They also focus excessively on building small public rental housing units rather than higher-quality subsidised homes. As such, the current policy fails to help younger households above the PRH limit to afford units that are of higher quality than PRH units.

We recommend substantially increasing the supply of higher-quality ownership housing. Doing so is revenue-positive and fiscally prudent, since subsidised ownership housing can be sold to eligible households for substantially more than their construction cost. It will also help to meet rising residential demand and help attract talent and investment to the city.

2.   Remove restrictions on the circulation of subsidised sale flats

In addition to increasing the supply of subsidised sale flats (SSF), we recommend relaxing the restrictions on circulation within the existing public housing stock. Currently, restrictions on resale and leasing limit the circulation of subsidised sale flats. For example, the transactions in the HOS Secondary Market (HOSSM) are restricted by quotas. In 2024, the estimated average wait time for White Form applicants applying each year to obtain permission to purchase second-hand units is around 5.7 years.[4] Another example is a pilot scheme that allows SSF owners to lease their units to White Form applicants. However, this scheme is subject to a quota of 3,000. These resale and leasing restrictions limit opportunities for existing owners to trade up and for non-owners to move onto the housing ladder.

Given such restrictions, it is natural that public ownership units have low turnover. In 2024, there were more than 454,000 subsidised ownership units, yet there were only 4,435 transactions in the secondary market, representing circulation of just 1% of units. This rate is less than half that of the private secondary market (2.2%) and only one-seventh of the private market average between 2004-2010. Residential mobility in public ownership housing is also much lower than similar private housing (Lui and Suen 2011). In other words, public owners are prevented from upgrading to larger flats, while those outside the public system are unable to climb the housing ladder by purchasing or renting second-hand subsidised flats.

In the 2025 Policy Address, the Government adopted several measures to relax leasing and resale restrictions. These measures are encouraging, but they do not as yet go far enough (Wong, Ngau and Sung 2025). We recommend further relaxing leasing and resale restrictions on the circulation of subsidised sale flats. Doing so can increase access to housing and improve the chances for youth to move up the housing ladder.

3.   Adopt housing price and affordability targets, instead of supply targets, and use more responsive mechanisms to determine housing supply

Although we recommend substantially increasing housing supply beyond current production targets, an expansion of the housing stock may dampen real estate prices. This concern is especially important, since integration with the Mainland and higher US interest rates put downward pressure on real estate prices.

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4   The HOSSM lottery winning probability was 17.65%, so if a household entered the lottery once every year, on average they would have to wait 1/0.1765 = 5.67 years.

We recommend that Hong Kong establish housing price and affordability targets, rather than supply targets, and use dynamic mechanisms for balancing housing demand and supply. Singapore's "build-to-order" model—where public housing construction proceeds only after sufficient eligible households place confirmed orders—is an example of a more dynamic and responsive approach that can prevent large swings in prices and affordability. Compared to Hong Kong's current methodology of directly estimating housing demand based on rudimentary population and building statistics, a more responsive mechanism will be much better at ensuring price stability in both periods of high demand and those of low demand.

References

1. Baum-Snow, Nathaniel. 2023. "Constraints on City and Neighborhood Growth: The Central Role of Housing Supply." *Journal of Economic Perspectives* 37 (2): 53–74.

2. Cox, Wendell. 2025. "Demographia International Housing Affordability: 2025 Edition." *Chapman University Center for Demographics & Policy*.

3. Dustmann, C., Fitzenberger, B. & Zimmermann, M. 2022. "Housing Expenditure and Income Inequality." *The Economic Journal*, Vol. 132, No. 645, p. 1709-1736.

4. Glaeser, Edward, and Joseph Gyourko. 2018. "The Economic Implications of Housing Supply." *Journal of Economic Perspectives* 32 (1): 3–30.

5. Hsieh, Chang-Tai, and Enrico Moretti. 2019. "Housing Constraints and Spatial Misallocation." *American Economic Journal: Macroeconomics* 11 (2): 1–39.

6. Lui, Hon-Kwong & Suen, Wing. (2011). "The effects of public housing on internal mobility in Hong Kong." *Journal of Housing Economics*. 20. 15-29.

7. UN-Habitat, "The global housing affordability challenge: a more comprehensive understanding of the housing sector." *Urban Data Digest, version 2, May 2019*. 4-6.

8. Wong, Michael B., Ngau, Chi-Hang and Sung, Yun-Wing. (2025). "施政報告扶助置業方向正確 惜力度不足." Ming Pao.
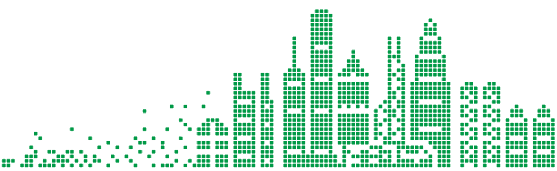
Beyond Crisis Management: Structural Reform for the Overcrowding in Hong Kong's Emergency Departments

Beyond Crisis Management: Structural Reform for the Overcrowding in Hong Kong's Emergency Departments

Huiyin Ouyang   **Yiran Zhang**

1. The Scale of the Crisis: A System at its Breaking Point

Hong Kong's public emergency departments (EDs) are often operating beyond their breaking point. The system is strained by a relentless and growing demand that is exacerbated by a profound demographic shift. In the 2023-24 period alone, the Hospital Authority's 18 public EDs managed over 2.14 million attendances, which translates to approximately 5,900 visits every day. Each of the four major hospitals (Queen Mary, Queen Elizabeth, Prince of Wales, and Tuen Mun) regularly process 400-500 patients daily during peak periods, operating at 150-200% of their designed capacity.

This overwhelming volume is not a temporary surge; it is a structural crisis accelerated by Hong Kong's rapid ageing (Yip et al., 2015). The proportion of the population aged 65 and above reached 22.8% in 2024 and is on a clear trajectory to exceed 30% by 2036. This demographic is not just a number; it represents a fundamental shift in healthcare needs. Elderly patients are disproportionately represented in higher-acuity triage categories and present with more complex, multi-morbidity conditions, leading to extended lengths of stay and the consumption of more resources.

This relentless operational pressure has created a parallel, and equally urgent, human resource crisis. The staff, the system's most critical asset, are being stretched to their limits. A 2022 survey of Hong Kong emergency medicine physicians and nurses found that an alarming 82.2% reported symptoms of burnout in at least one domain (Chan et al., 2024). This is not a sustainable footing for a service that depends on a highly-skilled, alert, and resilient workforce.
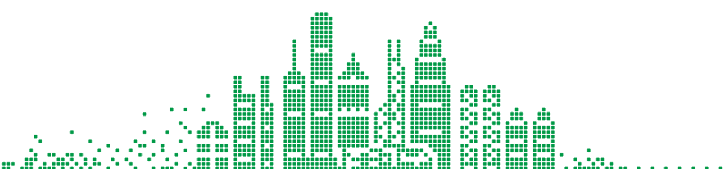
Figure 1. Emergency Department Attendance Trends and Population Ageing (2014-2046).

The green line shows total annual ED attendances at Hospital Authority facilities, demonstrating structural demand despite the COVID-19 pandemic disruption (gray shaded area, 2019-2022). ED attendances recovered to 2.14 million by 2023-24, approaching pre-pandemic levels. The solid orange line shows Hong Kong's rapidly ageing population, and the dashed line represents data from projections. Source: Hospital Authority annual reports and Hong Kong Census and Statistics Department population projections.
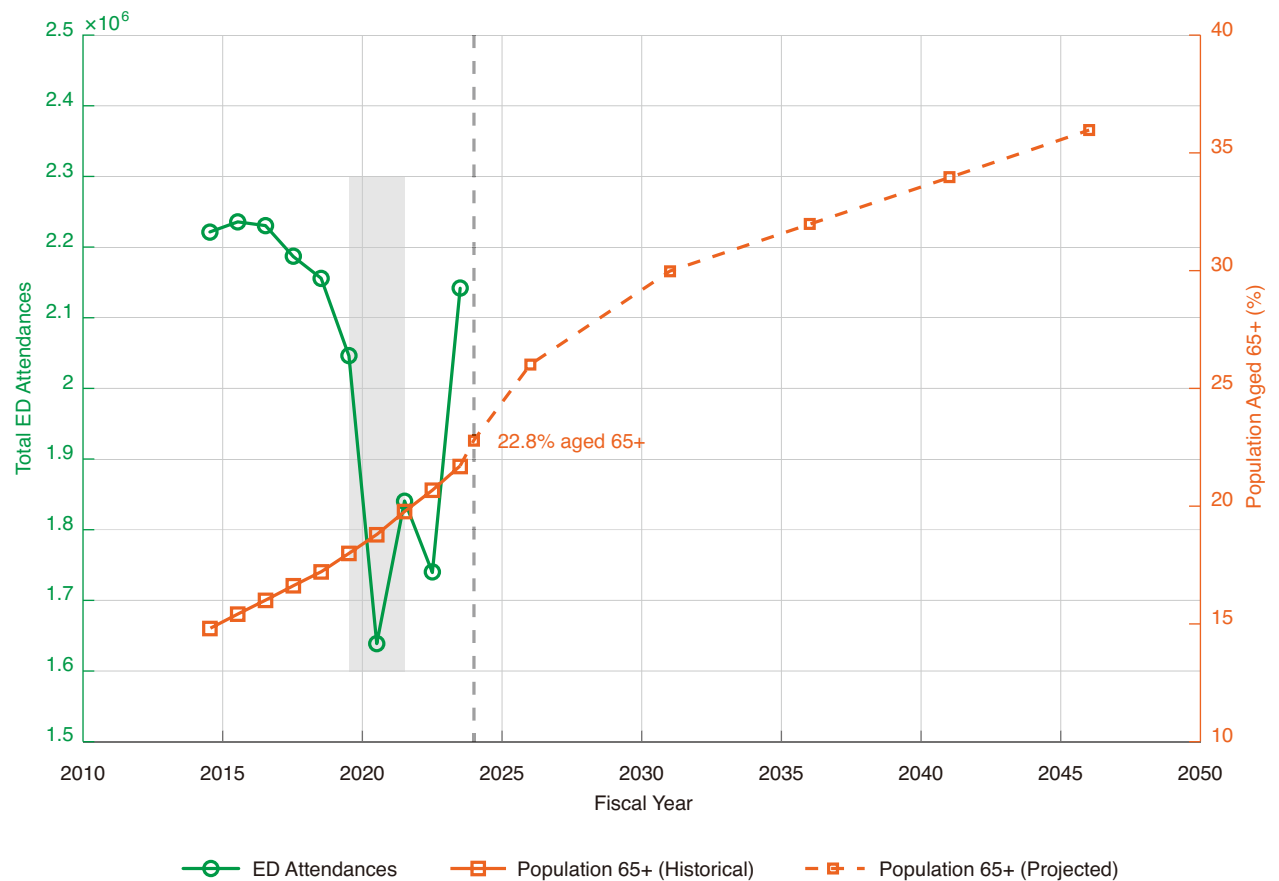
2.   The Core Problem: A Structural Mismatch of Demand

While chronic crowding is the most visible symptom, it is not the root diagnosis. The core problem is a structural mismatch between fluctuating patient demand and available service capacity. Hong Kong's EDs are designed and staffed for *emergencies*, but they are increasingly being used for *everything else*.

This is the "Acuity Paradox" of Hong Kong's public healthcare system. Despite the intense needs of the elderly and critically ill, the overwhelming majority of ED attendances are for non-emergency conditions. Data from 2023 illustrates this starkly that only 1.8% of patients fell into Category 1 (Critical) and 7.6% of patients in Category 2 (Emergency). This means the remaining 90.6% of all patients fell into Categories 3 (Urgent), 4 (Semi-urgent), and 5 (Non-urgent). This distribution creates a fundamental operational conflict.

Approximately 69% of attendances occur between 8am and 8pm, with weekends and Mondays showing consistently higher volumes than midweek days: these patterns are more consistent with primary care access issues than genuine emergency demand. The system's resources are consumed by conditions that, while deeply concerning to the patients, do not require emergency-level intervention. Instead, they can be appropriately managed in a primary care setting, if this was accessible, affordable, and available.

The pricing structure reveals the problem: a visit to the public ED costs HK$180 including all investigations and medications, while private GP consultations typically cost HK$200-500 with additional charges for tests and drugs. Combined with the long waiting times at the public hospital specialist outpatient system for non-urgent conditions, patients face strong incentives to use EDs as their primary access point to comprehensive, affordable and faster medical assessment.

This points to the system's failure to provide alternatives. The result is a system where everyone suffers: the critically ill wait longer while staff are allocated to manage the less urgent, and the staff become demoralized and burnt out from being unable to provide the right care at the right time. A 2022 physician survey found that 55.6% reported admitting or discharging patients just to manage ED volume at least a few times per week, and 43.2% acknowledged not fully discussing treatment options or answering patients' questions. These provide direct evidence of how system constraints are forcing staff to compromise on care, in turn creating potential trouble down the road for the clinicians who made such decisions.

3. Charting a Path Forward: Comprehensive Strategies for Demand Management and Supply Expansion

The data paints a clear picture: Hong Kong's emergency care system is trapped in a structural imbalance, struggling with demand it was never designed to meet. Solving this crisis requires more than good intentions or incremental adjustments. Given the fundamental mismatch between what EDs were built for and what they're actually made to do, a sustainable solution needs a multi-faceted approach. We can't simply build more capacity and hope the problem resolves itself. We need to manage existing resources more intelligently while addressing the root causes driving non-urgent patients to EDs in the first place.

This paper explores three key strategies that together could reshape Hong Kong's emergency care landscape. First, we'll examine how EDs can work more effectively from within, drawing from our published research on wait time information systems. Our simulation study demonstrated how strategic use of information can influence patient flow and reduce overcrowding—showing that sometimes the most powerful interventions come from working smarter, not just harder (Zou et al., 2024).

Second, we'll propose evaluating fee adjustments as a way to rebalance demand patterns. This isn't about punishing patients or creating barriers to care. It's about creating economic incentives that gently guide people toward the right care in the right setting, while ensuring those with genuine emergencies face no obstacles.

Finally, we'll explore how artificial intelligence could become a crucial ally in addressing both performance gaps and the staff shortage crisis. AI isn't a replacement for skilled emergency physicians and nurses. It's a tool to support them, reduce their burden, and help them focus on what they do best.

These three strategies aren't isolated fixes. They're complementary pieces of a larger reform that Hong Kong's emergency system desperately needs. Together, they offer a realistic path toward a system that works better for patients and the dedicated professionals trying to care for them.

3.1 Effective Management: Using Information Systems Wisely

Given the system's severe constraints, particularly finite budgets and a workforce at its breaking point, the most immediate and high-impact interventions must come from improving operational efficiency. The key is not simply to adopt new technology, but to use it wisely. Our research provides critical insights in this area.

Many hospital systems, including Hong Kong's, have implemented patient wait time information systems to manage patient expectations and redistribute demand. The logic seems straightforward: if non-urgent patients see a long wait, they may choose an alternative ED. However, our simulation

study, calibrated with data from three metropolitan EDs in Hong Kong representing 317,519 visits in 2019, reveals that this is a dangerous oversimplification. The effectiveness of these systems is entirely dependent on their prediction accuracy and update frequency, and when these factors aren't right, the systems can make things worse.

Our research demonstrates a critical paradox: while accurate information consistently improves system performance, inaccurate information can make congestion worse than providing no information at all. When wait time announcements are based on simple historical averages (like the rolling average method used in numerous US systems) or the 95th percentile approach currently deployed across Hong Kong's 18 public hospitals, they fail to capture the real-time volatility of an ED. This inaccurate information actively misleads patients. If enough patients follow this flawed guidance, it worsens crowding by creating self-fulfilling prophecies, driving patient surges to hospitals that are, by then, already overwhelmed.

The numbers tell a troubling story. In our simulations, when inaccurate prediction methods like the 95th percentile were combined with high patient adoption rates, average wait times increased by 96% compared to having no information system at all. These methods exhibited U-shaped performance curves, initially helpful at low adoption rates but dramatically harmful when widely used. The left-without-being-seen rate similarly worsened under these conditions, meaning more patients abandoned care entirely because they were misdirected to already-congested facilities.

Figure 2: Performance of Wait Time Prediction Methods Across Patient Adoption Rates.

Simulation results show that inaccurate prediction methods (95P - Hong Kong's previous approach, RA - Rolling Average) exhibit U-shaped performance curves, initially helpful at low adoption but harmful at high adoption rates. Accurate methods (LR - Linear Regression, NN - Neural Network) show consistent improvements. This demonstrates that poorly designed information systems can worsen the problems they aim to solve.
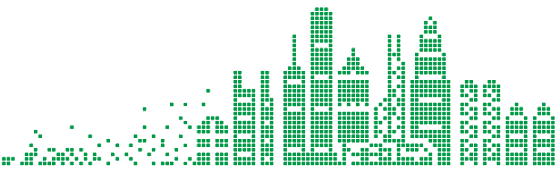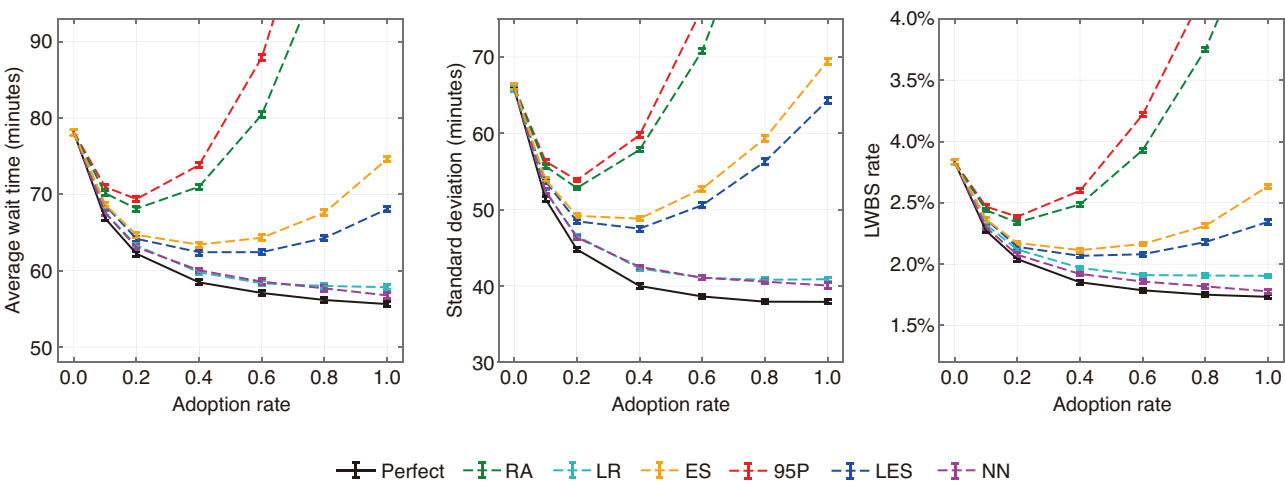
Conversely, our study shows that when wait time predictions are highly accurate (using methods like linear regression or neural networks) and updated frequently, they become a powerful tool for load balancing. Machine learning approaches with moderate accuracy enabled substantial improvements across all patient adoption levels, achieving up to 29% reductions in average wait times when widely adopted, along with a 42% reduction in wait time variability and a 39% drop in patients leaving without being seen. These methods successfully redistributed patient load across the ED network, with the most congested facility seeing a 39% reduction in average wait time and a 52% reduction in patients leaving without care.

Update frequency matters, but less than you might think once you reach reasonable accuracy. Our analysis reveals diminishing returns for increasing update frequency. For accurate prediction methods, 5-minute update intervals achieved performance nearly identical to real-time updates, with less than 2% deviation in key metrics across all levels of patient adoption. Even 15-minute intervals maintained substantial benefits. This finding is operationally significant: healthcare systems don't need to invest in complex real-time infrastructure if they can achieve reasonable prediction accuracy with moderate update frequencies.

This forms the foundation for a true decision support system. Such a system can help streamline patient flow by guiding patients toward less congested facilities when they have genuine choices. It can optimize capacity arrangements based on accurate surge predictions, allowing administrators to reallocate staff proactively rather than reactively. And it can guide patients to the most appropriate care setting, reducing the burden on EDs serving patients who don't require emergency-level care.

The practical implications are immediate and serious. Many systems currently deployed, including Hong Kong's own 95th percentile approach and the rolling averages used across numerous international healthcare systems, fall into the "problematic" category that our research identified. When patient adoption is high, these systems are likely to increase congestion, though administrators may not recognize this effect because the relationship isn't obvious without careful analysis. Healthcare systems should establish accuracy validation before deploying or promoting wait time information systems. Our results suggest that systems failing to achieve reasonable prediction accuracy should not be promoted for widespread patient use. Doing so risks making overcrowding worse while creating the illusion of progress.

Figure 3. Displayed waiting time information before and after changes on HA website and APP.

The left panel shows the previous system (before October 2024) which displayed only a single reference waiting time estimate based on the 95th percentile of historical data, aggregated across all triage categories. The right panel shows the updated system which provides stratified information by triage category (I through IV & V), displaying both median (50th percentile) and 95th percentile waiting times for each urgency level.

Hospital	Reference waiting time	Hospital	Triage Category I	Triage Category II	Triage Category III	Triage Category IV & V
Hong Kong Island		Hong Kong Island				
Pamela Youde Nethersole Eastern Hospital	Over 4 hours	Pamela Youde Nethersole Eastern Hospital	0 minute	less than 15 mintes	34 minutes (62 minutes)	3.5 hours (6 hours)
Queen Mary Hospital	Over 5 hours	Queen Mary Hospital	0 minute	less than 15 mintes	27 minutes (46 minutes)	3 hours (4.5 hours)
Ruttonjee Hospital	Over 6 hours	Ruttonjee Hospital	0 minute	less than 15 mintes	22 minutes (49 minutes)	4.5 hours (6 hours)
Kowloon		Kowloon				
Caritas Medical Centre	Over 5 hours	Caritas Medical Centre	0 minute	less than 15 mintes	19 minutes (47 minutes)	1.5 hours (3.5 hours)
Kwong Wah Hospital	Over 4 hours	Kwong Wah Hospital	0 minute	less than 15 mintes	25 minutes (72 minutes)	4 hours (6 hours)
Queen Elizabeth Hospital	Over 5 hours	Queen Elizabeth Hospital	0 minute	less than 15 mintes	8 minutes (17 minutes)	1 hours (2 hours)
United Christian Hospital	Over 6 hours	United Christian Hospital	Managing multiple resuscitation cases		19 minutes (43 minutes)	3.5 hours (5 hours)
New Territories		New Territories				
Alice Ho Miu Ling Nethersole Hospital	Over 2 hours	Alice Ho Miu Ling Nethersole Hospital	0 minute	less than 15 mintes	19 minutes (53 minutes)	1.5 hours (3.5 hours)
North District Hospital	Over 6 hours	North District Hospital	0 minute	less than 15 mintes	19 minutes (48 minutes)	1 hours (2.5 hours)
North Lantau Hospital	Around 1 hour	North Lantau Hospital	0 minute	less than 15 mintes	16 minutes (31 minutes)	2.5 hours (4.5 hours)
Pok Oi Hospital	Over 6 hours	Pok Oi Hospital	0 minute	less than 15 mintes	16 minutes (29 minutes)	2 hours (4 hours)
Prince of Wales Hospital	Over 4 hours	Prince of Wales Hospital	0 minute	less than 15 mintes	21 minutes (45 minutes)	2.5 hours (5 hours)
Princess Margaret Hospital	Over 3 hours	Princess Margaret Hospital	0 minute	less than 15 mintes	25 minutes (51 minutes)	2.5 hours (5.5 hours)
St John Hospital	Around 1 hour	St John Hospital	0 minute	less than 15 mintes	16 minutes (28 minutes)	0.5 hours (1.5 hours)
Tin Shui Wai Hospital	Over 4 hours	Tin Shui Wai Hospital	0 minute	less than 15 mintes	14 minutes (27 minutes)	3 hours (5 hours)
Tseung Kwan O Hospital	Over 7 hours	Tseung Kwan O Hospital	0 minute	less than 15 mintes	22 minutes (38 minutes)	2.5 hours (4.5 hours)
Tuen Mun Hospital	Over 4 hours	Tuen Mun Hospital	0 minute	less than 15 mintes	12 minutes (23 minutes)	3 hours (5.5 hours)
Yan Chai Hospital	Around 1 hour	Yan Chai Hospital	0 minute	less than 15 mintes	15 minutes (30 minutes)	2.5 hours (3.5 hours)
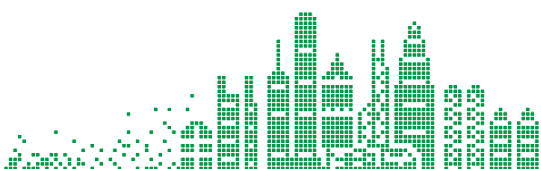
Following our research findings and suggestions, Hong Kong's emergency department waiting time system has recently been updated to display both 50th percentile (median) and 95th percentile information, with separate estimations for different urgency levels. This represents a significant shift from the previous approach of showing only the 95th percentile. By providing both median and upper-bound estimates stratified by triage category, the system provides patients with more nuanced information that better reflects the range of possible wait times they might experience based on their condition's urgency. We believe this dual-metric approach could offer better load balancing across the hospital network by giving patients a more realistic picture of what to expect, potentially reducing the misdirection problem we identified in our simulations. However, further study using actual patient flow data following this implementation will be essential to validate whether these changes achieve the intended improvements in practice.

The potential for decision analytics extends far beyond wait time prediction systems. This same framework of data-driven optimization can be applied across multiple operational domains within emergency departments. Physician scheduling and rostering problems, for instance, could benefit from predictive models that anticipate surge patterns and match staffing levels to expected demand, reducing both idle time and dangerous understaffing periods. Patient flow analysis tools could identify bottlenecks in diagnostic pathways or treatment protocols, revealing where small process changes yield disproportionate improvements. Resource allocation policies governing everything from examination room assignments to portable equipment distribution could be optimized using real-time operational data rather than historical rules of thumb. Each of these applications shares a common thread: they leverage existing data and computational tools to extract greater efficiency from constrained resources. In a system where budget limitations and workforce shortages make capacity expansion difficult, these incremental efficiency gains compound into meaningful improvements in patient outcomes and staff wellbeing. The question is not whether Hong Kong's EDs can afford to invest in these analytical capabilities, but whether they can afford not to.

3.2   Fee Adjustment: A Necessary but Insufficient Intervention

Improving ED efficiency is a critical supply-side fix, but it does not address the fundamental demand-side problem. In January 2026, the Hospital Authority will implement its first fee adjustment since 2017, a reform aimed at addressing the fundamental demand-supply mismatch that plagues Hong Kong's EDs. The intent behind this reform is sound and necessary. By raising ED fees from HK$180 to HK$400 (while exempting Categories 1 and 2 patients with critical and emergency conditions), the policy seeks to redirect non-urgent patients toward more appropriate care settings. The reform also includes enhanced protections: an expanded medical fee waiver mechanism covering over 1.4 million people, an annual spending cap of HK$10,000 on public healthcare services, and relaxed eligibility criteria for the Samaritan Fund safety net. These measures acknowledge that financial barriers should not prevent those who genuinely need emergency care from accessing it.

Table 1 Hong Kong Public Healthcare Fee Reform Major Changes (2026).

Service Item	Current Fee (HKD)	New Fees (from Jan 1, 2026)
A&E Units	180	Free (urgent) 400 (less urgent)
Inpatient Beds (per day)	100-120	200-300
General Outpatient Clinics	50	150
Specialist Outpatient Clinics	80-135	250
Drugs at Specialist Outpatient Clinics	15 (16-week supply)	20 (4-week supply)
Drugs at General Outpatient Clinics	No seperate charge	5 (4-week supply)
Pathology Testing at Specialist Clinics	No seperate charge	0-200
Non-emergency Radiological Imaging	No seperate charge	0-500

Source: HA website

However, the reform's success hinges on assumptions about patient behavior that deserve careful scrutiny, particularly regarding how different population segments will respond to the same price signal. The underlying theory is straightforward: higher ED fees will discourage patients with minor ailments from seeking emergency care, thereby reducing the 90.6% of visits currently classified as semi-urgent or non-urgent. Yet this theory overlooks the reality that price sensitivity varies dramatically across patient populations, creating potential equity concerns that may undermine the reform's effectiveness.

The first critical issue is the differential impact on patients who fall into what we might call the "coverage gap": those whose incomes exceed the fee waiver eligibility threshold but who remain highly sensitive to out-of-pocket healthcare costs. While over 1.4 million people qualify for enhanced protections under the expanded waiver mechanism, Hong Kong is home to millions more who earn modest incomes who won't qualify for assistance (Zhang et al., 2025). For a family of four with a monthly household income just above the waiver threshold, a HK$400 emergency department fee represents a meaningful expense, particularly when multiplied across several family members over time. These are often the same families already struggling with rising housing costs, education expenses, and other financial pressures. This creates an equity paradox. The fee increase is meant to deter inappropriate utilization, but its deterrent effect will be felt most strongly by price-sensitive populations who may not always be those making inappropriate visits. Consider an elderly patient with multiple chronic conditions
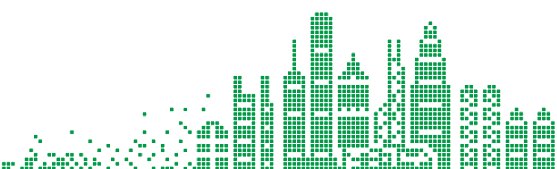
who experiences new symptoms. If they have modest savings that disqualify them from fee waivers but live on a fixed pension, the HK$400 charge may influence their decision to seek evaluation. They face genuine uncertainty about whether their symptoms represent a serious deterioration requiring emergency care or a minor issue that could wait. Unlike wealthier patients who can afford to "err on the side of caution" and visit the ED regardless of cost, this price-sensitive patient must weigh financial considerations against health risks. The result is that the fee structure may inadvertently create a two-tiered decision-making process: affluent patients who continue to use EDs based purely on medical judgment, while lower-middle-income patients who factor cost into their care-seeking decisions in ways that could delay necessary treatment. Similarly, working-class families with young children present another vulnerable group. A parent dealing with a child's high fever at 9pm faces limited options. They could wait until morning and take the child to a general outpatient clinic for HK$50, gambling that the condition isn't serious. They could visit a private doctor charging HK$300-500 plus additional costs for tests and medications. Or they could go to the ED for HK$400, where comprehensive evaluation is included. For families already operating on tight budgets, this decision becomes fraught with financial anxiety layered atop genuine concern for their child's wellbeing. Wealthier families, by contrast, might visit the ED without hesitation, absorb the HK$400 cost, and proceed with their lives. The same price point thus functions as a meaningful barrier for some while representing a negligible consideration for others.

The fee structure's reliance on post-arrival triage classification creates additional inequities. Patients only learn their triage category after arriving at the emergency department and being assessed by medical professionals. Category 1 and 2 patients pay nothing; Category 3, 4, and 5 patients pay HK$400. For price-insensitive patients, this uncertainty poses no deterrent. They will seek care when concerned, confident they can afford whatever fee applies. But for price-sensitive patients, particularly those who have previously visited emergency departments for symptoms that turned out to be non-urgent, this uncertainty becomes a psychological burden. They may remember being triaged as Category 4 for what they considered serious symptoms, learning afterward that their concern was medically unfounded. The next time they experience worrying symptoms, they face a dilemma: Is this serious enough to justify a potential HK$400 charge? The inability to know in advance creates a chilling effect specifically for those who cannot easily absorb the cost, even when their symptoms may ultimately warrant emergency evaluation.

The reform also assumes that affordable alternatives exist for patients diverted from EDs. In reality, the options are limited and increasingly expensive. Family medicine outpatient services through the Hospital Authority now charge HK$150 per visit (up from HK$135), with General Outpatient Clinics charging HK$50. But these services operate on limited hours and require advance booking, making them unsuitable for acute symptoms that develop outside business hours. Private general practitioners typically charge HK$200 to HK$500 per consultation, with additional fees for diagnostic tests and medications that are bundled into the HK$400 emergency department charge. For price-sensitive working families dealing with acute symptoms at 8pm on a weekday, the emergency department

remains the most accessible option despite the higher fee, because the alternatives simply aren't available when they're needed. Wealthier patients, meanwhile, can more easily afford private urgent care or even retain family doctors who provide after-hours access, creating a divergence in care pathways driven by ability to pay rather than medical need.

A further complication that deserves attention is the potential ripple effect of public sector fee increases on private healthcare pricing. When the Hospital Authority raises emergency department fees from HK$180 to HK$400, private clinics and care providers may view this as a signal to adjust their pricing upward. From a market perspective, if the public "competitor" has raised prices substantially, private providers face reduced pressure to keep their fees competitive. A private general practitioner currently charging HK$300 for an evening consultation might feel justified raising fees to HK$400 or HK$450, reasoning that patients now face comparable costs in the public ED. Similarly, private urgent care centers that previously positioned themselves as premium alternatives to public EDs at HK$500-600 might increase to HK$700-800, maintaining their price premium relative to the new public baseline. This cascading price effect would be particularly damaging to price-sensitive patients in the coverage gap: those who don't qualify for public fee waivers but who relied on moderately-priced private alternatives for after-hours care. If both public and private fees rise in tandem, these patients find themselves squeezed from both sides, with fewer affordable options for acute care outside regular clinic hours. The reform's architects may have assumed that higher public fees would drive some patients toward private alternatives, creating competitive pressure to keep private fees stable. But market dynamics in healthcare rarely work so simply, especially in a system where public and private sectors serve somewhat different patient populations with different price sensitivities. Without monitoring and potentially regulating private sector pricing responses to public fee reforms, the intended rebalancing of demand across sectors could instead result in across-the-board price increases that harm precisely the vulnerable middle-income populations the reform's protections were meant to shield.

There are also legitimate concerns about differential health outcomes across socioeconomic groups under this fee structure. International evidence on emergency department cost-sharing reveals a troubling pattern: while higher fees do reduce overall utilisation, they reduce both appropriate and inappropriate visits, with the reduction concentrated among price-sensitive populations (Selby et al., 1996). The new cost mechanisms may disproportionately affect low-income and chronically-ill patients, leading to delayed care for serious conditions, resulting in worse health outcomes and, paradoxically, higher total healthcare costs when patients eventually require more intensive treatment. A price-sensitive patient who delays seeking care for what they hope is a minor infection, only to possibly develop sepsis requiring ICU admission, generates far greater costs to the system than if they had been evaluated and treated early in an ED.

The fee adjustment must therefore be understood not as a standalone solution, but as one component of a broader restructuring of Hong Kong's entire healthcare delivery system. For this reform to achieve its intended goals without exacerbating health inequities, several critical considerations must be addressed.
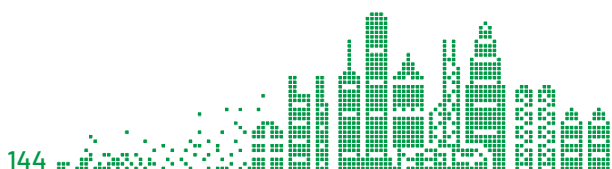
First, the public must have genuine access to alternative care pathways that can accommodate acute but non-emergency needs outside of regular business hours, with pricing structures accessible to price-sensitive populations. This requires a substantial expansion of after-hours primary care services. The Government's recent establishment of District Health Centres is a step in the right direction, but their limited operating hours and service scope do not yet provide a true alternative to EDs for patients experiencing acute symptoms in the evenings or on weekends. A network of extended-hours urgent care centers, positioned between EDs and traditional primary care, could absorb much of the semi-urgent demand currently overwhelming EDs. These facilities could operate with lower overhead costs than full EDs while still providing immediate assessment and treatment for conditions like minor injuries, simple infections, and exacerbations of chronic diseases. Critically, these urgent care centres should maintain fee structures significantly below the HK$400 emergency department charge to provide a genuine financial incentive for appropriate utilisation.

Second, and perhaps more importantly, the Hospital Authority and Health Bureau must establish robust systems for monitoring the real-world effects of these fee changes as they unfold, with particular attention to differential impacts across socioeconomic groups. This is not a policy that can be implemented and assumed to work as intended. The reform creates opportunities for rigorous evaluation using the Hospital Authority's extensive administrative data. Comprehensive, data-driven research needs to be conducted to understand the true impact of this fee reform on patient behaviour, health outcomes, and system efficiency across different population segments. Such evaluation should examine several critical dimensions. First, how do ED utilization patterns change after the fee increase across different patient populations? Second, what happens to health outcomes, particularly whether we see increases in complications from delayed care concentrated among vulnerable groups? Third, what are the downstream effects on other parts of the healthcare system. Can primary care services absorb diverted demand, and do waiting times increase in ways that disproportionately affect price-sensitive patients? Fourth, are the enhanced protections (fee waivers, spending caps, and Samaritan Fund expansions) actually reaching their intended beneficiaries, or do administrative barriers prevent uptake?

Critically, monitoring must extend beyond the public sector to track pricing responses in private healthcare following the public fee reform, examining whether private fees increase in tandem and how such increases affect access to care for middle-income families who fall in the coverage gap. Without such monitoring, the reform's intended rebalancing of demand across public and private sectors could instead result in across-the-board price increases that harm precisely the populations the reform's protections were meant to shield.

The Hospital Authority's commitment that all additional revenue from fee adjustments will support medical services, particularly for critically-ill patients requiring expensive treatments, is laudable. This promise need to be made transparent and verifiable through public reporting. With this accountability, the reform would be perceived by the public as a genuine restructuring of healthcare delivery rather than a revenue-raising exercise.

The fee adjustment is a necessary intervention in a system where the current pricing structure has created unsustainable distortions in demand. But it is not sufficient on its own, and its impact will vary dramatically across different patient populations. Unless accompanied by genuine expansion of alternative care pathways accessible to price-sensitive populations, proactive outreach to ensure vulnerable groups access available protections, careful monitoring of differential impacts across socioeconomic groups and private sector pricing responses, and willingness to adjust course based on evidence, the reform may simply shift the crisis from overcrowded EDs to inequitable access. This could delay treatment for vulnerable populations, and worsen health outcomes among those least able to afford the consequences.

The principle that no person should be denied adequate medical treatment through lack of means must remain central not just in policy statements, but in operational reality. And that reality can only be verified through rigorous, ongoing evaluation of how this reform actually affects the different groups of people it is meant to serve. Such evidence-based assessment will be essential to ensure that the fee adjustment achieves its efficiency goals without sacrificing the equity that has long been the foundation of Hong Kong's public healthcare system.

3.3 Artificial Intelligence and Digital Health: Technology as an Enabler of System Reform

The global healthcare sector stands at the threshold of what many describe as an artificial intelligence revolution. From diagnostic algorithms that can detect cancers in medical images with accuracy rivaling specialist radiologists, to predictive models that identify patients at risk of clinical deterioration hours before traditional warning signs emerge, to large language models that can synthesize medical literature and assist in clinical decision-making, AI applications in healthcare have proliferated at remarkable speed. Major healthcare systems worldwide, from the United Kingdom's National Health Service to Singapore's integrated health networks to leading American academic medical centers, are investing billions in AI infrastructure, betting that these technologies will address the twin challenges that plague modern healthcare: rising demand and constrained resources. Figure 4 illustrates an overview of how AI applications can address bottlenecks across the entire care continuum, from pre-hospital access through post-discharge follow-up.

Figure 4. AI Applications Across the Healthcare Delivery Spectrum.

AI technologies can address specific bottlenecks at each stage of the patient journey, from pre-hospital triage and telemedicine through ED resource optimization, clinical decision support, and post-discharge monitoring.
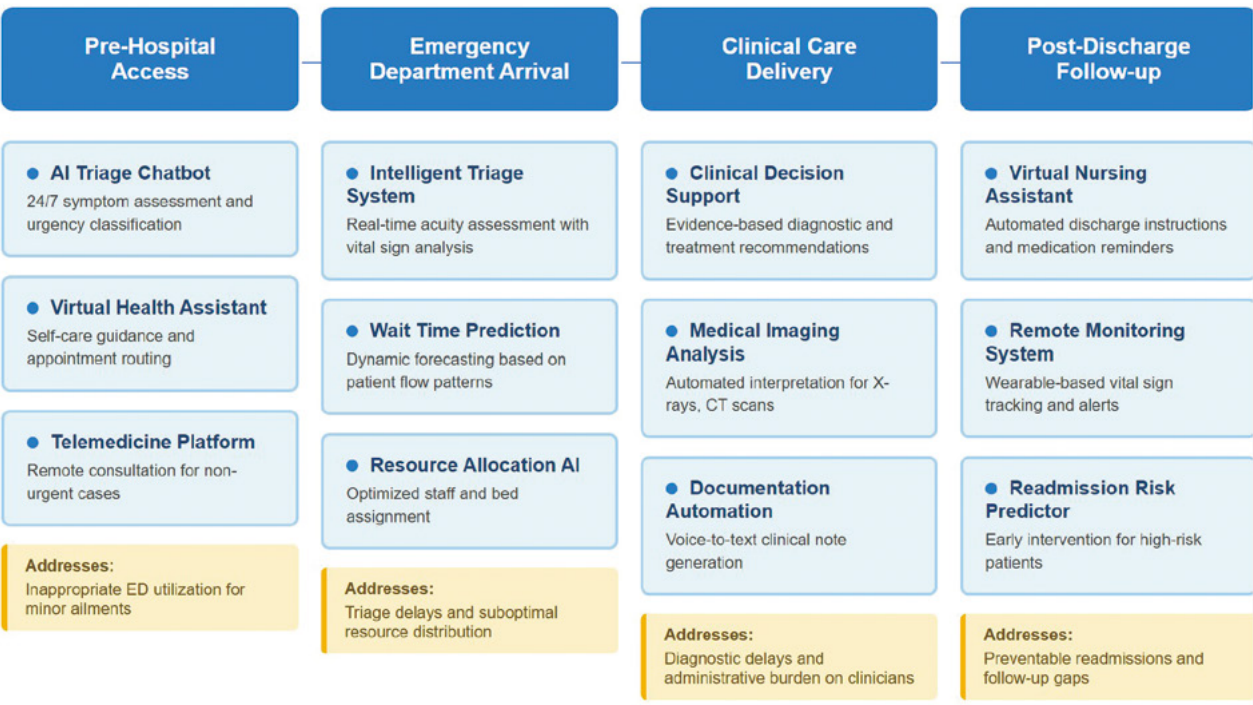

For Hong Kong, grappling with ED overcrowding, workforce shortages, and an aging population placing unprecedented strain on public healthcare services, the promise of AI is particularly compelling. If algorithms can triage patients more efficiently, if virtual assistants can handle routine inquiries that currently consume nursing time, if telemedicine platforms powered by AI can provide accessible alternatives to ED visits, then perhaps technology offers a path toward sustainability that doesn't require either massive workforce expansion or politically fraught service rationing. This optimism is not entirely misplaced as AI does offer genuine capabilities that could meaningfully improve healthcare delivery. But the gap between technological potential and operational reality in complex healthcare systems is substantial, and Hong Kong's specific context presents both opportunities and obstacles that demand careful consideration.

AI-Augmented Workforce: Addressing the Shortage Through Technology

The workforce crisis, including thousands of nursing vacancies, physicians stretched beyond sustainable workloads, recruitment failing to keep pace with demand, creates an obvious case for AI as a workforce multiplier. Clinical documentation automation offers one of the most immediate opportunities. Physicians and nurses spend 30-40% of their working time on documentation (De Groot et al., 2022; Joukes et al., 2018). Natural language processing systems can now transcribe and structure clinical conversations, automatically generating documentation from physician-patient interactions. Deployed in EDs, such systems could reduce the time physicians spend at computer terminals and increase time available for direct patient care, effectively increasing capacity without hiring additional staff. Virtual nursing assistants and AI chatbots represent another application aimed at reducing demand on human healthcare workers. Rather than nurses spending time answering routine patient questions about visiting hours, medication schedules, or post-discharge instructions, AI-powered virtual assistants could handle these information-provision tasks, allowing nurses to focus on clinical assessment and complex care. Some hospitals internationally have deployed "AI nurses" that conduct routine patient check-ins and escalate to human nurses only when responses indicate problems requiring intervention.

AI-powered clinical decision support represents another workforce augmentation opportunity. ED physicians managing high patient volumes under time pressure could benefit from AI systems that synthesize patient data, flag potential diagnoses, suggest appropriate diagnostic workups, and identify treatment options. Such systems function as cognitive assistants, helping clinicians avoid oversights and consider alternatives they might not immediately recognize. International examples include AI tools that recommend optimal antibiotic selection based on patient factors and local resistance patterns, or algorithms that identify patients with chest pain who are safe for early discharge versus those requiring extended observation.

Yet several limitations constrain this potential. Current AI chatbots cannot reliably handle the full range of patient questions and concerns that arise in hospital settings. They excel at retrieving standardized information but struggle with nuanced clinical questions requiring judgment. Moreover, nursing work involves not just information provision but emotional support, reassurance, and the ability to detect subtle changes in patient condition through observation—dimensions of care that resist automation. In Hong Kong's context, where significant portions of the patient population are elderly and may have limited comfort with technology, virtual nursing assistants might serve some patients well while creating additional barriers for others, potentially exacerbating rather than reducing disparities in care quality.
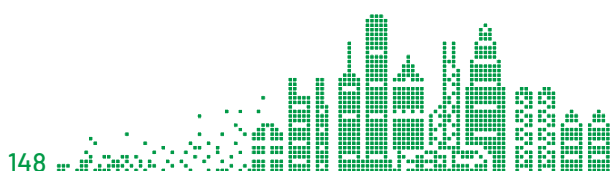
AI-Enhanced Demand Management

Section 3.2 outlined how fee increases alone cannot resolve ED overcrowding without expanding accessible alternatives where diverted patients can receive appropriate care. AI-powered telemedicine and self-triage tools could provide precisely such alternatives, offering convenient, affordable access to assessment and advice for patients with non-urgent concerns who currently default to emergency departments.

Telemedicine platforms enhanced with AI capabilities could function as a first line of virtual care, accessible 24/7 via smartphone or computer. AI-powered triage chatbots could conduct initial symptom assessment, gathering information about patient complaints through natural language conversation. For straightforward cases, the AI might provide self-care recommendations. For more concerning presentations, the AI would immediately connect the patient to a physician or nurse for virtual consultation. For clearly emergent conditions, the AI would direct patients to immediately proceed to the nearest ED. International examples demonstrate this model's potential. The United Kingdom's NHS has deployed AI-powered symptom checkers and telemedicine platforms that handle millions of consultations annually, successfully diverting low-acuity patients from emergency departments. Singapore's HealthHub app integrates AI-powered health advice with telemedicine, appointment booking, and medical record access, creating a comprehensive digital front door to the healthcare system.

For Hong Kong, deploying a similar public telemedicine platform could provide the affordable alternative care pathways essential to the fee reform's success. A patient experiencing symptoms at 10pm on a Saturday could access a subsidized telemedicine service for, say, HK$100-150, rather than defaulting to the ED charging HK$400. However, realizing this potential requires confronting substantial implementation challenges.

First, Hong Kong's regulatory environment for telemedicine remains ambiguous. Regulations don't clearly address AI-enhanced triage or liability allocation when AI triage recommendations lead to adverse outcomes. Second, the effectiveness of AI triage tools depends critically on their accuracy and safety, domains where current evidence reveals concerning limitations. Multiple studies evaluating commercially available symptom checker applications have found highly variable performance, with some systems failing to identify serious conditions that should prompt emergency care while others over-triage minor complaints (Yu et al., 2020; Schmieding et al., 2022; Wallace et al., 2022). Third, equity considerations demand attention. Technology-based solutions risk exacerbating disparities if not designed inclusively. AI-powered telemedicine requires smartphone access, internet connectivity, and digital literacy, resources unevenly distributed across Hong Kong's population. Elderly residents, low-income families, and recent immigrants may face barriers accessing digital health tools. Addressing these equity concerns requires ensuring telemedicine platforms function on basic smartphones, providing multilingual support, offering telephone-based access for users uncomfortable with applications, and subsidizing devices and internet access to underserved populations.

Hong Kong's Readiness: Infrastructure, Data, and Governance Gaps

Beyond specific applications, Hong Kong's readiness to leverage AI in healthcare depends on foundational infrastructure, data ecosystems, and governance frameworks that currently present significant gaps.

Hong Kong's healthcare data landscape is characterized by profound fragmentation that the Hospital Authority manages data for public facilities while private hospitals and practices operate largely separate systems with minimal interoperability. For AI systems that depend on large, diverse datasets for training and validation, particularly algorithms designed to predict patient outcomes or optimize clinical decisions, this fragmentation creates a fundamental barrier. The problem extends beyond technical interoperability to the sensitivity of personal health data, raising profound privacy concerns about accessing comprehensive patient information across care settings. International healthcare systems that have deployed AI most successfully have confronted this challenge through clear legal frameworks, robust technical safeguards, and transparent governance. Hong Kong currently lacks this integrated infrastructure and accompanying governance framework. The Personal Data (Privacy) Ordinance provides general principles but lacks healthcare-specific provisions addressing the unique sensitivities of medical data. The first step toward successful AI deployment must therefore be creating this integrated data infrastructure as the foundation for both the sophistication of models that can be developed and the insights they can generate, requiring coordinated investment in Hospital Authority IT infrastructure, healthcare-specific amendments to privacy legislation, and establishment of a health data governance body to oversee access while maintaining public trust.

Regulatory frameworks present additional challenges beyond data governance. The deployment of AI in clinical decision-making raises questions that Hong Kong's current medical device and healthcare regulations do not adequately address. When should an AI diagnostic algorithm be classified as a medical device requiring regulatory approval? What standards must it meet for validation before clinical deployment? How is liability allocated when an AI system recommends a treatment that possibly causes patient harm? These questions lack clear answers in Hong Kong's current regulatory environment, creating risk aversion among healthcare administrators and clinicians hesitant to deploy AI tools without regulatory clarity.

Workforce readiness represents another dimension where gaps are evident and often underestimated. For AI to genuinely improve healthcare delivery rather than simply adding technological complexity, clinicians must understand how to use these tools effectively, interpreting AI recommendations in clinical context and knowing when to trust versus override algorithmic suggestions. This requires integrating AI literacy into medical and nursing education, designing curricula that incorporate clinical informatics, machine learning, or digital health. Existing healthcare workers need continuing education to develop competencies in working with AI systems. Without this human capital development, deploying sophisticated AI tools may simply add to workflow complexity rather than improving
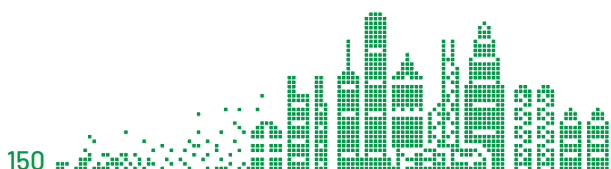
efficiency or outcomes, with clinicians spending more time questioning systems than they would have spent making decisions without algorithmic support, or developing alert fatigue where excessive AI-generated warnings lead to ignoring all alerts.

Addressing these infrastructural, regulatory, and workforce gaps requires substantial investment and sustained commitment. The revenue from fee increases discussed in Section 3.2 could strategically support this foundational development: upgrading Hospital Authority IT systems, establishing secure data infrastructure with robust privacy protections, developing regulatory frameworks, and implementing workforce training programs. These investments will not yield immediate relief for emergency department overcrowding, as building integrated data infrastructure takes years, developing regulatory frameworks requires extensive consultation, and training thousands of healthcare workers demands sustained effort. With proper foundations carefully constructed, AI could genuinely contribute to a more sustainable, efficient, and equitable healthcare system. But without these foundations, AI deployment in Hong Kong's healthcare system will remain piecemeal and limited in impact.

4. Conclusion and Policy Recommendations

The chronic overcrowding in Hong Kong's EDs is not an isolated operational problem but a symptom of deep structural imbalances in the healthcare system. It represents the logical outcome of a system where inappropriate demand has overwhelmed services designed for genuine emergencies, a problem accelerated by demographic aging, facilitated by perverse price incentives, and exacerbated by a healthcare workforce stretched beyond sustainable limits. The 2.14 million annual ED visits reveal a striking pattern: Category 1 (critical) and Category 2 (emergency) patients account for less than 10% of cases, while Category 4 (semi-urgent) and Category 5 (non-urgent) patients occupy more than 50% of emergency department capacity. This imbalance reflects rational patient behaviour within a system that makes EDs the most accessible, affordable, and convenient option for immediate medical attention. Patients are not abusing the system; they are responding predictably to the incentive structures and access barriers the system has created.

Resolving this crisis requires moving beyond reactive crisis management toward comprehensive structural reform that addresses both demand and supply simultaneously. On the demand side, this means implementing strategic fee reform that creates meaningful economic signals to discourage inappropriate emergency department use while carefully avoiding barriers to genuinely urgent care. The fee structure outlined in Section 3.2, maintaining free or minimal-cost access for truly emergent cases while charging HK$400 to 500 for non-urgent visits, provides one such framework, but its success depends absolutely on pairing price signals with expanded alternatives. Fee increases without accessible alternatives simply create access barriers and shift costs onto the most vulnerable. The Government must therefore simultaneously invest substantially in building out these alternatives: subsidized telemedicine platforms providing convenient 24/7 access to medical consultation;

expanded general outpatient clinic capacity with extended hours and rapid appointment availability; and mobile primary care services reaching underserved communities. These investments represent essential complements to fee reform, not optional additions. Furthermore, intelligent decision support systems validated through rigorous research can guide patients toward appropriate care settings, but only if those appropriate settings exist and remain genuinely accessible.

On the supply side, addressing workforce constraints requires both immediate interventions and long-term capacity building. While initiatives like establishing a third medical school address physician supply in the 2030s and beyond, the current crisis demands more urgent action focused on the nursing shortage that often represents the true bottleneck in ED patient flow. This means competitive compensation to retain experienced nurses, streamlined foreign credential recognition to expand the talent pool, optimized skill-mix models that allow nurses to practice at the top of their licenses with administrative tasks delegated to support staff, and deployment of AI and automation technologies to reduce documentation burden and cognitive load. These technologies should be understood not as replacements for human healthcare workers but as force multipliers that allow constrained workforce capacity to serve more patients more effectively. However, realizing this potential requires the foundational investments in data infrastructure, regulatory clarity, and workforce training detailed in Section 3.3. Without these foundations, technology deployment risks adding complexity rather than delivering value.

The path forward requires integrated policy action across multiple domains, implemented with both decisiveness and adaptability. First, the government should implement tiered emergency department fees as outlined in Section 3.2, with careful exemptions for vulnerable populations and mechanisms to ensure fees do not deter genuinely urgent care. Revenue from these fees should be explicitly earmarked for expanding alternative care pathways rather than absorbed into general Hospital Authority budgets. Second, substantial public investment must immediately expand telemedicine infrastructure and primary care capacity, creating genuine alternatives before fee increases take full effect. Third, aggressive workforce initiatives should address the nursing shortage through enhanced compensation, streamlined recruitment, and retention programs, while beginning the longer term work of expanding medical education capacity. Fourth, strategic investment in AI infrastructure should focus on foundational elements: integrated data systems, regulatory frameworks, and workforce training, recognizing that technology can support but never replace the human judgment, compassion, and expertise that define excellent healthcare.

Critically, all these interventions must be implemented with robust evaluation frameworks that allow for evidence-based course correction. The fee reform should be introduced as a carefully monitored natural experiment with systematic data collection on ED utilization patterns, patient outcomes, equity impacts, and downstream effects on primary care and specialist services. Telemedicine and AI deployments similarly require rigorous evaluation of effectiveness, safety, and equity implications. Hong Kong's policy culture too often implements initiatives without systematic evaluation, making

evidence-based refinement impossible. Breaking this pattern represents an essential meta-reform that enables all other reforms to succeed.

The ED crisis has persisted for years, worsening incrementally as temporary measures and incremental adjustments failed to address root causes. The temptation to continue this pattern of adding a few more hospital beds here, recruiting a few more nurses there, and implementing small fee adjustments that generate revenue without changing behavior must be resisted. Half-measures that address symptoms while leaving structural problems intact will perpetuate the crisis, consuming resources without delivering sustainable improvement. What the moment demands is comprehensive structural reform that confronts uncomfortable realities: that universal healthcare access with no meaningful price signals generates unsustainable demand; that workforce expansion alone cannot keep pace with demographic pressures; that technology offers genuine potential but requires foundational investment to deliver value; and that effective policy requires not just implementation but systematic evaluation and evidence-based refinement.

Hong Kong has the financial resources, technical expertise, and institutional capacity to build a sustainable emergency care system that provides timely, high-quality care for genuine emergencies while ensuring all residents can access appropriate medical attention through diverse, accessible pathways. Achieving this vision requires political courage to implement fee reforms that will face public resistance, sustained commitment to invest in alternatives and workforce development even when fiscal pressures create competing demands, and intellectual honesty to evaluate interventions rigorously and adapt based on evidence rather than ideology. The crisis is urgent, but the solution requires patient, strategic work building foundations that will serve Hong Kong for decades. This paper has outlined a comprehensive framework for that work, integrating demand management through strategic pricing, supply expansion through workforce development and technological innovation, and system-wide reform through data infrastructure and evidence-based governance. The question now is whether Hong Kong's policymakers possess the vision to recognize that incremental adjustments have failed, the courage to implement reforms that will face resistance, and the discipline to evaluate outcomes rigorously and adapt based on evidence. The crisis is no longer coming. It has arrived. The choice is between comprehensive structural reform now, or continued deterioration until external forces impose even more painful adjustments.

References

1. Chan TK, Lui CT, Wu WYC, Rainer T, Leung CS (2024) Burnout in emergency physicians in Hong Kong—A cross-sectional study on its prevalence, associated factors, and impact. *Hong Kong j. emerg. med.* 31(3):130–142.

2. De Groot K, De Veer AJE, Munster AM, Francke AL, Paans W (2022) Nursing documentation and its relationship with perceived nursing workload: a mixed-methods study among community nurses. *BMC Nurs* 21(1):34.

3. Joukes E, Abu-Hanna A, Cornet R, De Keizer N (2018) Time Spent on Dedicated Patient Care and Documentation Tasks Before and After the Introduction of a Structured and Standardized Electronic Health Record. *Appl Clin Inform* 09(01):046–053.

4. Park, E., Ouyang, H., Wang, J., Savin, S., Leung, S. C., & Rainer, T. H. (2025). Patient sensitivity to emergency department waiting time announcements. *Manufacturing & Service Operations Management*, *27*(6), 1740-1759.

5. Schmieding ML, Kopka M, Schmidt K, Schulz-Niethammer S, Balzer F, Feufel MA (2022) Triage Accuracy of Symptom Checker Apps: 5-Year Follow-up Evaluation. *J Med Internet Res* 24(5):e31810.

6. Selby JV, Fireman BH, Swain BE (1996) Effect of a Copayment on Use of the Emergency Department in a Health Maintenance Organization. *N Engl J Med* 334(10):635–642.

7. Wallace W, Chan C, Chidambaram S, Hanna L, Iqbal FM, Acharya A, Normahani P, et al. (2022) The diagnostic and triage accuracy of digital and online symptom checker tools: a systematic review. *npj Digit. Med.* 5(1):118.

8. Yip WL, Fan KL, Lui CT, Leung LP, Ng F, Tsui KL (2015) Utilization of the Accident & Emergency Departments by Chinese elderly in Hong Kong. *World Journal of Emergency Medicine* 6(4):283.

9. Yu SWY, Ma A, Tsang VHM, Chung LSW, Leung SC, Leung LP (2020) Triage accuracy of online symptom checkers for Accident and Emergency Department patients. *Hong Kong Journal of Emergency Medicine* 27(4):217–222.

10. Zhang Q, Wang JSH, He AJ, Peng C, Abe A, Ku I, Ng IYH, Zhao X (2025) Providing financial protection in health for low-income populations: a comparison of health financing designs in East Asia. *Int J Equity Health* 24(1):215.

11. Zou C, Zhang Y, Ouyang H, Sun Z (2025). Impact of Announced Wait Time Information on Emergency Department Overcrowding Mitigation: A Simulation Study. Journal of the American Medical Informatics Association under revision.

Initial Efforts to Empirically Measure AI Activity and its Impacts on Hong Kong's Labour Market

Initial Efforts to Empirically Measure AI Activity and its Impacts on Hong Kong's Labour Market

Alan Kwan   Mingzhu Tai   Zihan Wang

Introduction

Generative AI (GenAI) and large language models are spreading swiftly through organisations and workflows that depend on coding, content creation, customer service, and analytical tasks. This has created widespread debate over whether GenAI will augment or displace workers. Based on the Occupational Informational Network (ONET) taxonomy, Eloundou et al. (2023) estimate that about 19 percent of workers in the United States could find at least half their tasks affected by large language models. Although occupations and their tasks will invariably shift, some view this as early warning signs of potential job impacts from GenAI.

These concerns have been corroborated with recent evidence from academic studies, at least for certain occupations and demographics. Brynjolfsson, Chandar, and Chen (2025) demonstrate that GenAI adoption is associated with notable, seniority-biased changes in the labour market. Their research, drawn from payroll data covering roughly a fifth of U.S. employment at firms with fifty or more employees, reveals that in occupations exposed to AI, there is a striking reduction in the headcount for younger workers. Compared to the fourth quarter of 2022—just before the launch of ChatGPT—employment of workers under 25 in roles such as customer service and software development is nearly 20 percent lower, while those aged 30 to 45 see only modest increases. Similarly, Lichtinger and Hosseini Maasoum (2025), analyzing LinkedIn data from 62 million résumés across 285,000 firms, confirm these trends: companies recruiting "GenAI integrators" have seen substantial declines in junior staff, while their senior ranks have remained steady or even grown.

These studies are among the earliest to shed light on the effects of AI in the labor market, prompting an urgent question: what is happening globally, and in particular, how is Hong Kong faring? This is especially important for international financial hubs like Hong Kong, where differences in economic structure, regulation, and labour market realities may produce outcomes distinct from those seen in Western economies.

To address this, this chapter brings together several data sources to examine how Hong Kong ranks in terms of GenAI exposure, adoption, and capability. We utilise LinkedIn data via Revelio Labs, patent records from the USPTO, and academic publication trends from OpenAlex, and digitalisation indicators from BuiltWith. While none of these sources is perfect—and the AI landscape itself is evolving rapidly—their combined breadth offers the most complete view yet of Hong Kong's labour market and AI activity.

Based on measures constructed upon the abovementioned databases, our results indicate that Hong Kong's occupational structure leaves it highly exposed to GenAI, with a large share of its workforce in roles identified by existing research as vulnerable to AI. Nonetheless, observable AI adoption and innovation—measured by "GenAI integrator" hiring in job postings, patents, and research output—are mostly concentrated among a select group of firms, many of which are multinationals. In general, Hong Kong trails leading AI centers like the US and Singapore in these areas. Drawing on LinkedIn-based worker histories, we have constructed time-series panels of workforce composition for Hong Kong, organised according to standard GenAI exposure metrics. This enables us to track trends in employment in AI-exposed roles as firms begin advertising for AI-related jobs, and to compare these shifts to those in peer economies. While the mix of occupations in Hong Kong suggests a high level of AI exposure—on par with other advanced economies—the actual employment adjustments in exposed fields have been less dramatic, likely complicated by factors such as ongoing COVID-19 disruptions, episodes of social unrest, and migration patterns.

This paper also speaks to the expanding literature on AI's labour market effects. For instance, Humlum and Vestergaard (2025) find that, in Denmark, the impact has so far been mild, possibly because of institutions, labour regulations, or the presence of complementary skills that dampen AI's potential for

disruption. Similarly, research by Klein Teeselink (2025) in the UK illustrates that although some jobs are displaced, new tasks and complementarities often offset such shifts.

Finally, we draw out several policy implications relevant to Hong Kong and similar economies. In particular, we highlight the need to adapt education, skills policy, data infrastructure, and labour-market institutions, so that the productivity gains of GenAI can be realised without unduly harming certain groups or amplifying transitional costs.

Labour market and AI in Hong Kong

So far, the labour market impact of AI in Hong Kong seems understudied. The Hong Kong SAR government does not produce high quality longitudinal occupation level data available to academic researchers. Thus, for labour market data, we use Revelio Labs' harmonised workforce data which is assembled from LinkedIn. They pull regularly updated worker histories and augment the data with job titles, job descriptions, start/end dates, occupation/title taxonomies, estimated seniority based on job title, skills, and geographies, as well as educational history and demographics. This harmonisation allows us to create firm-by-time panels of workforce composition for Hong Kong and to align roles with GenAI exposure categories used in the literature. These ingredients enable the construction of time-varying indicators of occupational mix, junior-versus-senior shares, and exposure-linked groupings, which we can then examine around external adoption signals (e.g., text-identified adoption in job postings or firm communications).

There are a few caveats. First, Hong Kong's coverage of LinkedIn could be substantially different. For example, the platform may be underused by Chinese firms as its adoption or presence in the mainland varied over time. Second, the composition of the Hong Kong labour force could be quite different. For example, although heavily exposed, Hong Kong has a high proportion of finance or managerial talents which are harder to displace, or features older or more elite trends (the fair comparison perhaps being New York). Meanwhile, much of the impact of GenAI is on the less elite and younger populations. Third, adoption rates and depth by Hong Kong firms could be slower. However, we do not think that the biases in our sample data should be correlated with the emergence of ChatGPT nor specific to GenAI-affected occupations.

For measures of AI exposure and adoption (i.e., integration), there are two data sources: (1) general occupation-level exposure indices, which assume implicitly that all firms adopt AI equally. This popular metric for occupation-level impact is produced by Eloundou et al (2025).[1] Second, there are firm-

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1   Revelio Labs assigns seniority scores using an ensemble model that combines three components: (1) current job information (title, company, industry), (2) job history details (previous employment duration and seniority), and (3) individual age. We define junior workers as levels 1-2 and senior workers as levels 4-7, excluding level 3 to maintain clear separation.

level signals of AI adoption, revealed via job postings. Specifically, Lichtinger and Hosseini (2025) implement a classifier of "integrators" or what we call "adopters" of LLMs who seek to integrate AI technologies into their workflows.

Turning to the first measure, we calculate the fraction of highly exposed jobs in Table 1. Exposed may mean augmented or displaced, but in general means affected. Examples of such jobs include financial analysts, customer service workers and software developers. Hong Kong does not rank particularly high among economies in terms of its share of high exposure based on this definition.

Table 1. Fraction of highly exposed jobs across markets

Market	High Exposure share	Rank
Germany	41.49	28
France	36.54	111
Switzerland	37.46	83
India	47.55	3
Hong Kong	**36.55**	**110**
Singapore	38.85	61
Japan	38.35	70
United States	35.34	142
United Kingdom	35.91	126
China Mainland	34.19	170

Next, we plot the 2016 normalised growth of exposed vs non-exposed occupations. We map AI exposure using GPT-4 ratings from Eloundou et al. (2023) at the O*NET SOC occupation level. Occupations are classified into exposure buckets based on percentile rankings: low exposure (0-25th percentile), medium exposure (25-75th percentile), and high exposure (75-100th percentile). This categorical approach captures non-linear effects while maintaining interpretability. The high exposure group corresponds to about 20% of all jobs in Hong Kong in Q4 of 2022. We plot semi-annually and the US and Singapore alongside for comparison. For Singapore and US, there is (1) a sharp growth in GenAI affected youth coincident with the release of ChatGPT. However, (2) while Hong Kong may or may not have had a decline, there seems to be an effect arising from the COVID-19 period. This could be due to restrictions or social protests leading to emigration. Thus, unlike in Singapore and US, there appears to be pre-trends, making the labour market effect of AI somewhat murkier. We attempt to later parse this out with firm-level analysis, whereby we exploit variation across firms as opposed to variation across occupations. However, the conclusion is clear – across advanced economies, there seems to be an effect from the rise of LLMs.

Figure 1. Growth rates of workers, by high v.s. low AI exposure
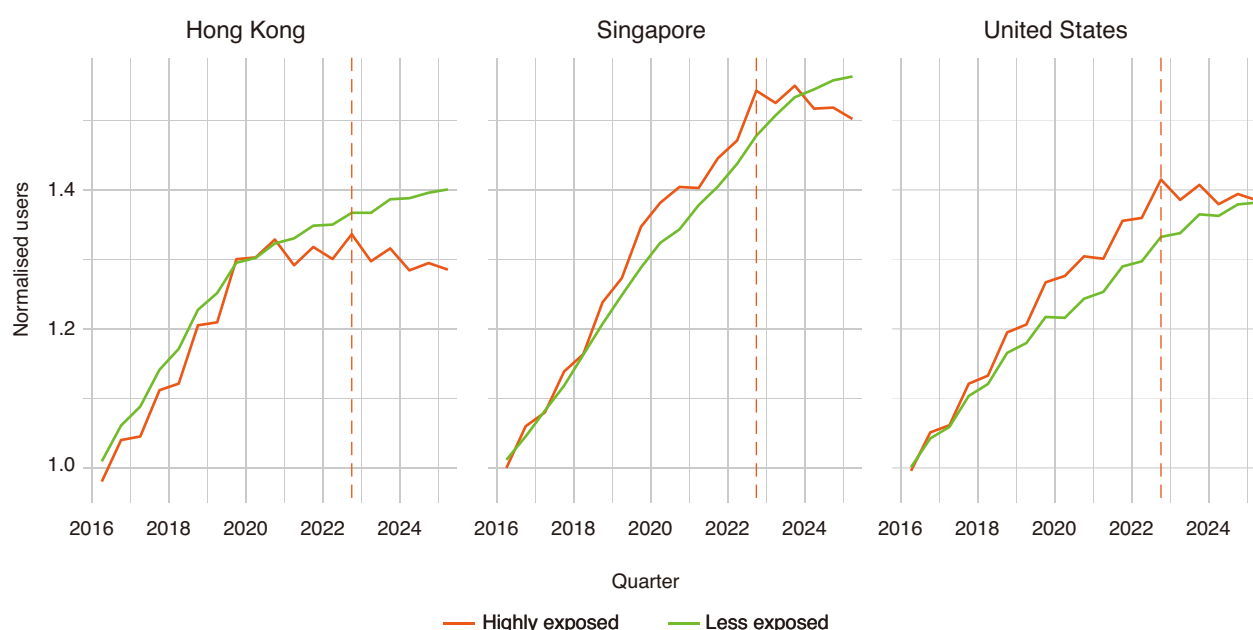
We now perform a regression analysis at the firm level to exploit firm level variation in AI exposure to better understand whether AI may have had an effect. This is because in aggregate, Hong Kong already seemed to exhibit a potential pre-trend in job decline. For our firm level sample, we include US firms as a comparison point to see if AI effects were larger or smaller in Hong Kong, giving us over 400,000 firms.

To isolate the effect of AI, we do three things. First, we control for the hiring growth in the 2020 -2022 period for each firm. Second, we look at cross-sectional variation in the share of firms pre-ChatGPT employment in vulnerable occupations (low seniority, high LLM impact). We also replicate Lichtinger and Hosseini (2025).[2] Interestingly, by this measure, adoption rates appear higher in Hong Kong. We report summary statistics in the Appendix.

Under this more scientific specification, we find that in Hong Kong, firms with a higher share of positions vulnerable to the AI shock experience lower headcount growth, especially compared to the US.[3] For example, in model 1, the dependent variable "Headcount growth" is defined as percentage change in headcount after v.s. before the AI shock. So coefficients are in percentage points. For firms in Hong

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2   Our replication appears successful as we find similar results in the US in terms of both the frequency of AI adoption rates as well as its labor market impact. We find similar effects in the US in terms of the impact of AI adoption on young people. However, the effect seems a little bit smaller in Hong Kong, and shows evidence of starting to occur before ChatGPT, echoing the results we find above in aggregate).

3   In unreported results, there seems to be an interaction effect among adopters with high share of vulnerable workers.

Kong, the marginal effect of Share vulnerable workers on Headcount Growth is the sum of the main effect and the interaction, $\beta_{Share\ vulnerable} + \beta_{InHK \times Share\ vulnerable}$ = -0.2122 + (-0.3670) = -0.5792 . This suggests that, if we compare a firm with 40% workers in positions vulnerable to the AI shock to a firm with only 20% vulnerable workers, the former's headcount growth is approximately 0.116 percentage point lower (-0.5792 * 0.2). Translating this into a change in the number of jobs, this is approximately –0.6 jobs for a median Hong Kong firm (headcount median pre-ChatGPT is ≈ 527) and –3.9 jobs for a mean-size Hong Kong firm (≈ 3,374).

One potential interpretation of the above result is that the labour market effect of AI is worse than in the US. If we consider (1) from summary statistics the average Hong Kong firm does adopt AI more (again, the usage of LinkedIn in Hong Kong may differ from the US), (2) during this period, Hong Kong's economy faced heavy mobility restrictions, (3) Hong Kong faced sagging Chinese economic conditions, then the point estimates suggest AI may have impacted Hong Kong more than the US. This makes sense as there is evidence to suggest that during bad times, firms restructure their production processes at an accelerated pace (Hershbein and Kahn 2018).

To help visualise the net effect, in the Appendix, we repeat Figure 1 overlaying adopters in exposed occupations/roles and adopters in non-exposed occupations. It appears adopters are slightly more likely to reduce headcount of exposed occupations, but (1) reallocate those headcounts elsewhere, and (2) the effects are likely quite similar across exposed occupations at "non-adopters". Overall, the results suggest that on a net basis, adopters shed headcount from exposed occupations slightly faster, but the aggregate effect is close to the effect seen from those who we classify as adopters.

Table 2. Regression analyses: Effects of AI adoption and exposure on the labour market

	(1) Headcount growth	(2) Job posting growth
Adopter	0.5940*** (0.0178)	6.115*** (0.1274)
In HK	-0.0985** (0.0498)	-0.4994*** (0.1768)
Share vulnerable workers	-0.2122*** (0.0211)	0.5170*** (0.0962)
Adopter x In HK	-0.2485*** (0.0548)	-4.467*** (0.3111)
Share vulnerable workers x In HK	-0.3670** (0.1791)	-1.084* (0.6151)
Controls	Yes	Yes
3-digit NAICS	Yes	Yes
HQ Country	Yes	Yes
Observations	461,614	461,614
R2	0.18979	0.11826

AI Innovation in Hong Kong

Albeit narrower, another aspect of AI adoption and capability is innovation. Two sources of generally selection-free innovation are available. We also obtain data from various sources, including academic publication on AI from OpenAlex and AI patenting from USPTO. OpenAlex is a comprehensive, open-source database of scholarly works, authors, institutions, and concepts. It serves as a free alternative to proprietary databases like Scopus and Web of Science. For this paper, we use OpenAlex to track the global landscape of AI research, identifying trends in publication output, international collaborations, and the focus of research across different countries and institutions. Its open nature allows for transparent and reproducible analysis of academic AI research.

The US Patent and Trademark Office (USPTO) maintains a dedicated dataset of patents related to AI. This database is curated using machine learning models to identify patents that include AI components. We leverage this data to analyse trends in AI-related innovation, specifically to identify the geographic distribution of inventors and assignees (companies) of AI patents. This provides a view into the commercialisation and corporate R&D side of AI development. We have linked inventors to Revelio through a joint collaboration with Revelio Labs.

Every year, we adjust the patent or publication based on its cohort-adjusted citations. Higher thresholds or numerical thresholds produce a similar pattern. In all variations, it seems like relative to its industry application, Hong Kong remains decisively research-first. As shown in Figures 2~4, cohort-adjusted OpenAlex ranks Hong Kong #3 globally in the top-decile AI papers per capita (~173 per million, 2015–2024), but for AI patents per capita, the city sits mid-pack (top 30).

Startups tell the same story, using data from Crunchbase. Crunchbase AI/ML organisations founded in the last 10 years place Hong Kong in the middle of the OECD on per-capita counts, and funded-startup density is similarly modest; capital raised is growing but trails Singapore/US trajectories. In short, Hong Kong over-indexes on publications and under-indexes on commercialisation—closing the translational gap (patents, funded AI/ML venture creation) is still quite important. Israel is a notable contrast, whereby its academic output is far lower than its commercialisation efforts. On both dimensions, the exemplary states are Switzerland, Singapore and US, which produce a great deal of startups as well as academic outputs.

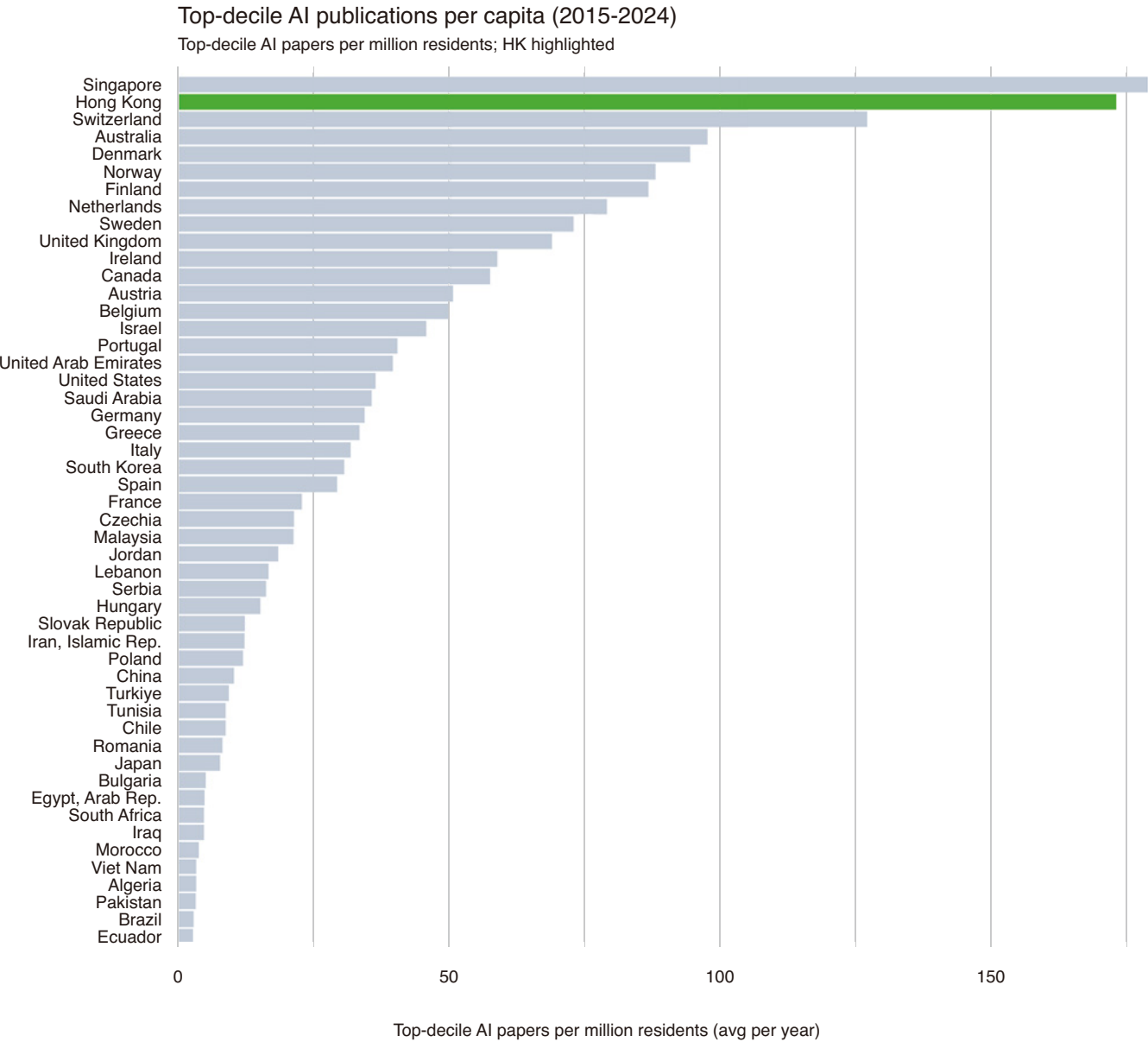**Figure 2. Academic publications on AI**

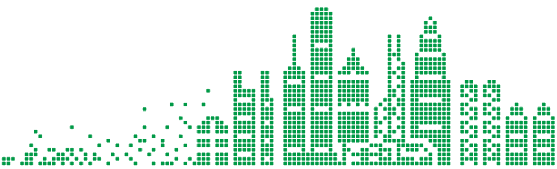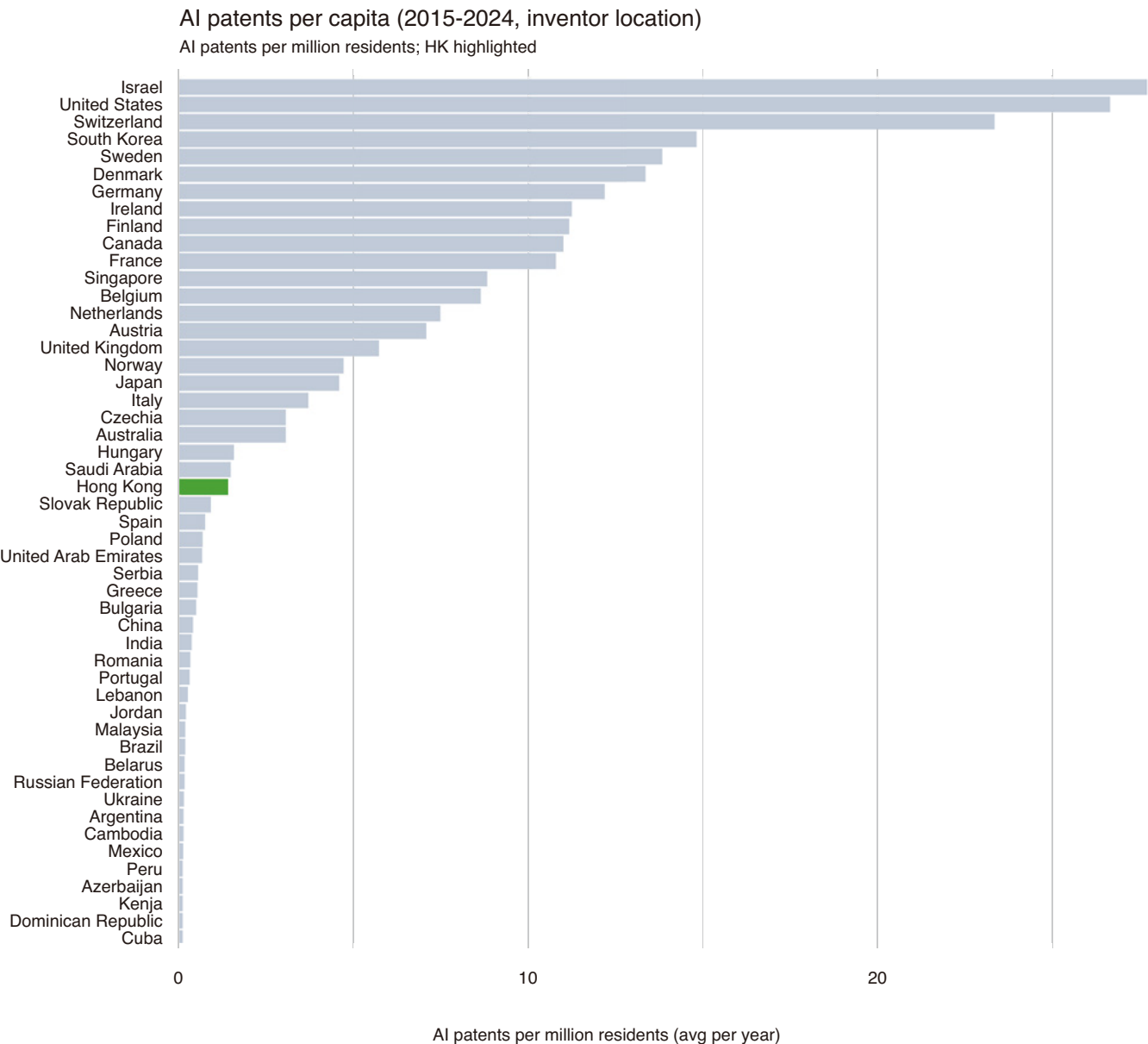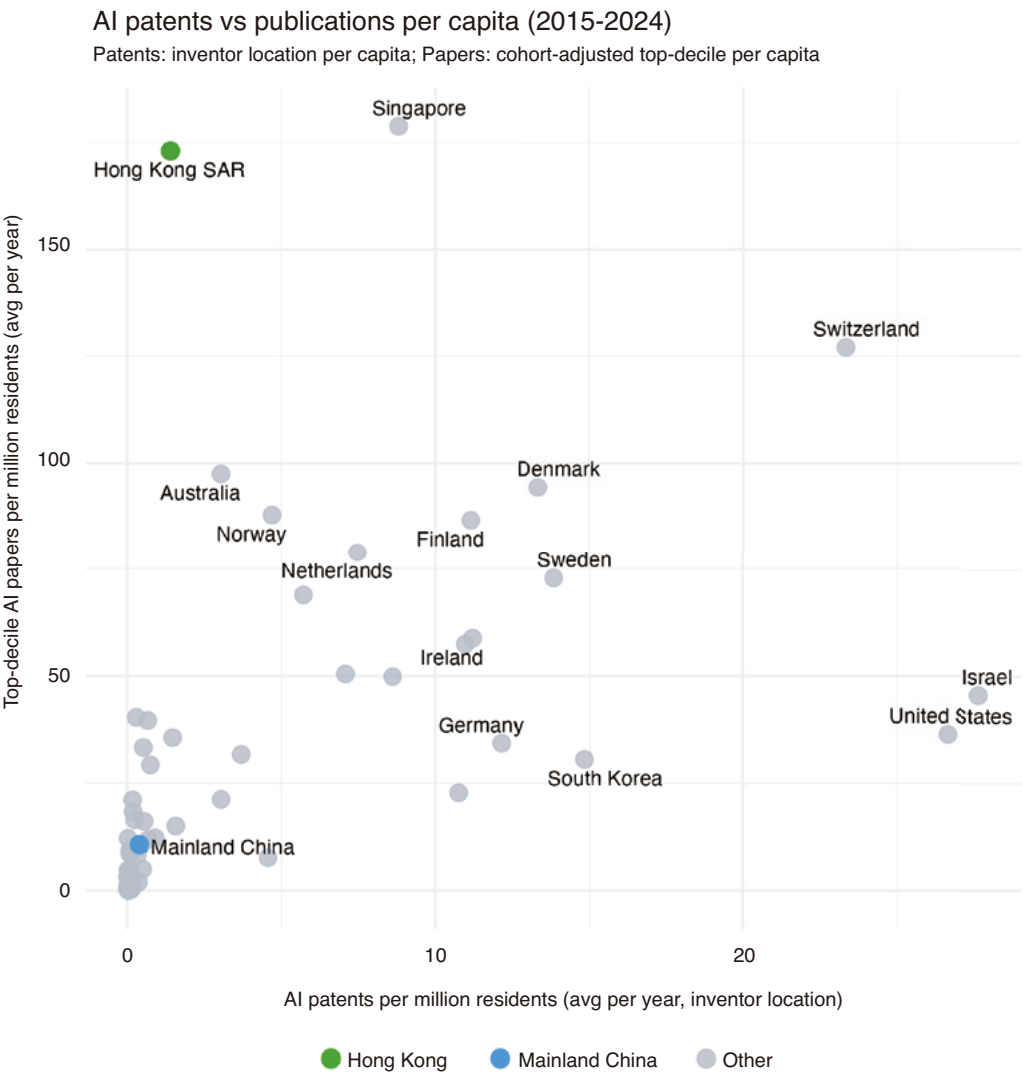## Top-decile AI publications per capita (2015-2024)

Top-decile AI papers per million residents; HK highlighted

Top-decile AI papers per million residents (avg per year)

Figure 3. Patents on AI

AI patents per capita (2015-2024, inventor location)
AI patents per million residents; HK highlighted

AI patents per million residents (avg per year)

Figure 4. Comparison of academic research and patents on AI

AI patents vs publications per capita (2015-2024)
Patents: inventor location per capita; Papers: cohort-adjusted top-decile per capita

Source: Revelio Labs, OpenAlex; population = World Bank 2015-2024 avg

Conclusions

Due to time constraints, we did not examine the startup ecosystem in Hong Kong. However, our results point to a number of policy implications. First, there appears to be some incremental effect of AI impact in Hong Kong, but the scale seems small. Does this mean that the AI effect here is smaller, and why? Is it that Hong Kong has poor data? We ask policymakers to produce more labour market statistics to track this, especially by occupation level. Whether constructed by agency employees or in collaboration with universities, Hong Kong sits on an inert gold mine of data from its tax filings that contain self-reported occupations. This data can be utilised easily to produce public statistics. With the help of local universities, Hong Kong can easily create a longitudinal dataset that can enable various research efforts and real-time policy monitoring.

Second, while Hong Kong's strong university system seems to produce world-class research, our research shows there is a big gap in commercialisation. Notable exceptions include SenseTime. There are several potential reasons for this, and may not be specific to AI. Hong Kong has made a proactive effort toward supporting the university system. However, there is a clear decoupling between the publication rate at universities and commercialisation. It is not clear if this implies the universities are not doing well in sharing knowledge with local industry, or there is a lack of innovation talents in local industry, or simply the length of gestation for basic research to translate to application.

It is also not clear that these statistics tell the whole story. As said earlier, the local industry is dominated by finance, and their capture of these technologies may not show up well in the statistics. Another possibility could be that the triumphs of the local industry could spill over to nearby cities such as Shenzhen, with DJI being a prime example.

However, the recent expansion of government initiatives is commendable. Hong Kong has already put in place several co-investment and public venture capital schemes – most notably the Innovation and Technology Venture Fund (ITVF), Hong Kong Science & Technology Parks Venture Fund, and the Cyberport Macro Fund – which operate on a matching basis with private investors. In particular, the ITVF Enhanced Scheme explicitly targets AI and data science. However, the scale of AI-focused capital and the depth of dedicated AI venture expertise remain modest relative to Hong Kong's research output.

Multiple official and quasi-official reviews characterise Hong Kong's innovation funding architecture as conservative and administratively onerous. The Advisory Committee on Innovation & Technology report highlights that private R&D investors in Hong Kong are "risk averse in I&T" and that the society is less tolerant of failure than peer economies. The Innovation, Technology and Industry Bureau and the Financial Services Development Council (2021, 2024) as well as Our Hong Kong Foundation point to under utilised public co-investment vehicles, a lack of risk appetite for earlystage financing, and a need for "more generous, less risk-averse government-led incubation programmes /grant schemes with streamlined administrative procedures." Policy should therefore focus less on creating co-investment from scratch and more on (i) expanding these vehicles, (ii) sharpening their mandate

around AI and other deep tech fields, and (iii) complementing them with true angel-level incentives, which Hong Kong currently lacks. However, policymakers should also pay special attention toward streamlining the administrative burden, coaching bureaucrats to be flexible and open-minded instead of career-concerned and risk-averse (such as pegging utilization as a KPI). Meanwhile, the university can do its part by encouraging entrepreneurship among student founders and faculty and examining whether KPI-driven exercises maximise the social return of its increasingly world-class researchers.

References

1. Abbas Nejad, K., Musillo, G., Wicker, T., & Zaccaria, N. (2025). Labour market signals: The role of large language models. CentER Discussion Paper No. 2025-003. Tilburg University.

2. Bick, A., Blandin, A., & Deming, D. J. (2024). The rapid adoption of generative AI (NBER Working Paper No. 32966). National Bureau of Economic Research.

3. Brynjolfsson, E., Chandar, B., & Chen, J. (2025). Canaries in the coal mine: Early warning effects of generative AI on labour markets. Working paper.

4. Brynjolfsson, E., Li, D., & Raymond, L. R. (2025). Generative AI at work. Quarterly Journal of Economics, 140(2), 889–942.

5. Chen, W. X., Srinivasan, S., & Zakerinia, S. (2025). Displacement or complementarity? The labour market impact of generative AI (HBS Working Paper No. 25-039). Harvard Business School.

6. Eloundou, T., Manning, S., Mishkin, P., & Rock, D. (2023). GPTs are GPTs: An early look at the labour market impact potential of large language models. arXiv preprint arXiv:2303.10130.

7. Gulati, P., Marchetti, A., Puranam, P., & Sevcenko, V. (2025). Generative AI adoption and higher order skills. INSEAD Working Paper.

8. Hershbein, B., & Kahn, L. B. (2018). Do recessions accelerate routine-biased technological change? Evidence from vacancy postings. American Economic Review, 108(7), 1737–1772.

9. Humlum, A., & Vestergaard, E. (2025). Large language models, small labour market effects (NBER Working Paper No. 33777). National Bureau of Economic Research.

10. Hui, X., Reshef, O., & Zhou, L. (2024). The short-term effects of generative artificial intelligence on employment: Evidence from an online labour market. Working Paper.

11. Klein Teeselink, B. (2025). Generative AI and labour market outcomes: Evidence from the United Kingdom. SSRN Working Paper.

12. Labaschin, B., Eloundou, T., Manning, S., Mishkin, P., & Rock, D. (2025). Extending "GPTs are GPTs" to firms. AEA Papers and Proceedings, 115, 51–55.

13. Lichtinger, A., & Hosseini Maasoum, M. (2025). Generative AI as seniority-biased technological change: Evidence from US résumé and job posting data. Working paper.

14. Liu, Y., Wang, H., & Yu, S. (2025). Labour demand in the age of generative AI: Early evidence from US job posting data. SSRN Working Paper.

15. Noy, S., & Zhang, W. (2023). Experimental evidence on the productivity effects of generative artificial intelligence. Science, 381(6654), 187–192.

16. Peng, S., Kalliamvakou, E., Cihon, P., & Demirer, M. (2023). The impact of AI on developer productivity: Evidence from GitHub Copilot. arXiv preprint arXiv:2302.06590.

17. Wiles, E. (van Inwegen), Munyikwa, Z. T., & Horton, J. J. (2023). Algorithmic writing assistance on jobseekers' resumes increases hires (NBER Working Paper No. 30886). National Bureau of Economic Research.

Appendix

Table A1. LinkedIn sample characteristics of Hong Kong/ US firms

Note: our notion of a firm is a firm-location (i.e. Goldman Sachs HK is diff from Goldman Sachs US and an employee in the US would contribute to the latter).

Metric	Hong Kong	United States	HK - US
Number of firms	6,609	476,661	-470052
Adoption rate	11.80%	2.70%	+9.0 pp
Avg pre headcount	62.3	116.2	-53.9
Median pre headcount	14.5	18.1	-3.6
Avg senior share (pre)	57.30%	47.30%	+10.0 pp
Avg high-prestige share (pre)	85.30%	36.20%	+49.0 pp
Avg high-exposure share (pre)	44.70%	37.70%	+7.0 pp
Avg high-education share (pre)	58.50%	24.10%	+34.4 pp
Mean firm age (years)	31.2	31.4	-0.3
Share HQ in North America	11.10%	91.70%	-80.6 pp
Share HQ in Europe	11.80%	2.80%	+8.9 pp
Mean total hires 2021-25	17.6	23.3	-5.7

Figure A1. Growth rates of workers,

by high v.s. low AI exposure and adopters v.s. non-adopters
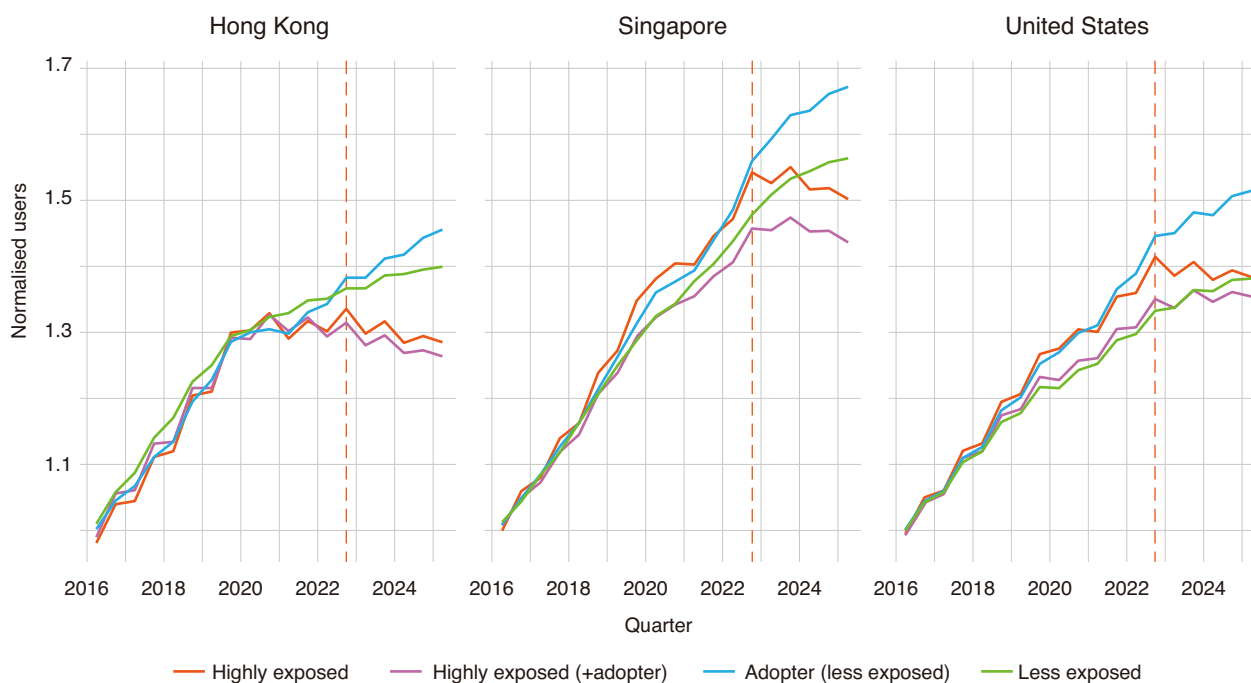
The Impact of Generative Artificial Intelligence on Cybersecurity in Hong Kong

The Impact of Generative Artificial Intelligence on Cybersecurity in Hong Kong

Michael Chau

1. Background

Digital infrastructures and data are becoming vital assets for many companies and organisations. Digital infrastructures encompass hardware (servers, data centres, networking equipment), cloud services, and software platforms that support digital activities. Data may include customers' private data and companies' internal data. Malfunctioning of these infrastructures or leakage of data may result in huge financial losses.

Cybersecurity incidents in Hong Kong have been affecting both public and private organisations. The observations from publicly reported cases between 2020 and 2025 indicate a consistent rise in the frequency, intensity, and complication of cybersecurity incidents. Recent major incidents include the cyberattack on a convenience-store chain in September 2025, which disrupted electronic payments at more than 400 retail sites,[1] and the data breach of a luxury fashion brand, which affected more than 400,000 individuals.[2] These incidents underscore the growing vulnerability of business activities and consumer data to security breaches. There are also multiple ransomware assaults aimed at non-government and cultural organisations. All these cases reveal how civil-society groups with minimal technical resources have become one of the primary targets for exploitation.

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1   https://www.scmp.com/news/hong-kong/hong-kong-economy/article/3327078/store-chain-circle-k-confirms-cyberattack-hong-kong-apologises-customers
2   https://www.reuters.com/sustainability/boards-policy-regulation/hong-kong-investigates-louis-vuitton-data-leak-affecting-419000-customers-2025-07-21/

At the same time, the Office of the Privacy Commissioner for Personal Data (PCPD) reported that several government agencies were involved in data leakages or data design flaw, affecting over thousands of individuals.[3,4] The Digital Policy Office (DPO) and the Office of the Government Chief Information Officer (OGCIO) also reveal that there were multiple ransomware incidents in government agencies in recent years. Though authorities claim no sensitive data was compromised, these repeated events reveal that stronger cybersecurity measures are needed for the public sector.

Cybersecurity has become a key governance issue requiring substantial attention and effort. Recent incidents underscore the persistent risk faced by both the public and private sectors due to reasons such as deficiencies in system design or oversight by humans. Both public agencies and private organisations need to strengthen their defence against cybersecurity incidents and take appropriate measures to get prepared, in order to improve accountability and mitigate financial and reputational threats.

The recent surge in the adoption of generative artificial intelligence (GenAI)—systems capable of producing human-like text, code, images, and audio—presents an opportunity for unparalleled productivity and innovation. However, this revolutionary technology simultaneously functions as a powerful, double-edged sword, profoundly reshaping the cyber threat landscape. For a highly concentrated and digitally dependent city like Hong Kong, the intersection of rapid GenAI adoption and cyber risk necessitates an urgent and strategic response.

3   https://www.pcpd.org.hk/english/news_events/media_statements/press_20250312.html
4   https://www.info.gov.hk/gia/general/202412/09/P2024120900460.htm

2.   Key Cybersecurity Threats in the GenAI Era

The primary GenAI-driven cybersecurity threats are characterised by their high efficiency, low cost of execution, and unprecedented ability to bypass human and automated security filters. These threats can be clustered into two major domains: the weaponisation of language models for psychological manipulation and the democratisation of advanced malicious code.

2.1   The Weaponisation of Social Engineering and Deepfakes

GenAI's ability to produce highly contextual and linguistically flawless content has fundamentally amplified the scale and effectiveness of social engineering attacks, moving beyond generic spam to highly targeted deception. Traditional phishing campaigns were often detectable by poor grammar, foreign language idioms, or generic requests. GenAI erases these red flags. Attackers can now leverage large language models (LLMs) to analyse vast amounts of publicly-available corporate and personal data—such as online profiles, press releases, and social media posts—to construct highly-personalised emails and messages.

For the private sector, especially financial institutions and law firms, this translates to refined attacks. GenAI can mimic a senior colleague's or client's tone, dialect, and communication patterns, making requests for wire transfers, data disclosure, or credential theft appear authentic. The volume of phishing incidents in Hong Kong, already escalating significantly, is poised to surge further, with the attacks becoming more functionally indistinguishable from legitimate communication, thereby eroding the reliability of human judgement as a primary security layer.

One of the most concerning GenAI-driven social engineering threats is the weaponisation of deepfakes—synthetic media (video, audio, or images) that convincingly replicate specific individuals. Hong Kong experienced a globally reported incident in January 2024 where an employee of a multinational company was duped into transferring approximately HK$200 million after participating in a video conference with deepfake replicas of the company's Chief Financial Officer and other colleagues.[5] This incident highlights several critical vulnerabilities for both the public and private sectors. Deepfakes bypass conventional human and technological identity verification processes (e.g., video calls, voice authentication for high-value transactions). The attacks exploit the inherent organisational trust and deference granted to senior management or government officials, especially in high-pressure financial or sensitive decision-making contexts. As GenAI tools become cheaper and more accessible, creating high-quality, convincing deepfakes is no longer limited to attackers with ample resources but is available to other criminal groups globally. This accessibility makes it easier to target employees in various public and private organizations.

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5   https://www.cnn.com/2024/02/04/asia/deepfake-cfo-scam-hong-kong-intl-hnk

2.2 Democratisation of Advanced Malware

GenAI is rapidly lowering the technical skill ceiling required for advanced cyber criminality, turning sophisticated attack methodologies into accessible services. Attackers are already utilising GenAI models, sometimes trained specifically on malicious datasets, such as WormGPT and DarkBard,[6] to generate malicious codes. These tools facilitate the creation of polymorphic malware—a code that autonomously changes its structure and signature with each instance or execution. This capability allows malicious payloads to evade traditional, signature-based antivirus and security systems, a core component of legacy defences still prevalent in many organisations. This threatens the public sector's operational resilience, particularly in managing critical infrastructure where stability and continuity are paramount. Attacks on systems controlling transport, energy distribution, and public healthcare could be executed by attackers with relatively less expertise.

2.3 LLM-Specific Vulnerabilities and Data Leakage

Beyond utilising GenAI to create external threats, organisations that deploy or use LLMs internally face inherent risks from the models themselves. One example of these model-specific vulnerabilities is prompt injection, where attackers can manipulate prompts and other model inputs to hijack the model's objective, causing it to reveal sensitive information, generate malicious code, or perform unauthorised actions. Attackers may also subtly corrupt the training data set of proprietary models, leading to biased, compromised, or exploitable model behaviour after deployment.

Another immediate risk in using LLM is unintentional data leakage. Employees using public GenAI tools for work, such as summarising documents or debugging codes, risk uploading confidential or sensitive data that is then processed and potentially used to refine the LLM, effectively leaking secrets or user privacy to third-party providers. A survey indicating that only a small percentage of enterprises in Hong Kong have established an AI security policy underscores this risk.[7]

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6   Schröer, S. L., Pajola, L., Castagnaro, A., Apruzzese, G., & Conti, M. (2025). Exploiting AI for Attacks: On the Interplay between Adversarial AI and Offensive AI. *IEEE Intelligent Systems*.

7   http://www.hkpc.org/en/about-us/media-centre/press-releases/2025/ai-readiness-in-workplace-survey-2025

3. Recommendations for Comprehensive Cyber Defence

Based on our analyses, we offer the following recommendations to strengthen cybersecurity in Hong Kong.

3.1 Using AI for Cyber Defence

It is important to leverage AI and machine learning to combat GenAI-powered cybersecurity threats. The government and the private sector should collaboratively invest in deploying machine learning and AI tools specifically designed for real-time threat detection and forensic analysis. These tools must be capable of analyzing behavioural anomalies and identifying sophisticated threats that bypass security systems. Funding should be provided to encourage and support research on using AI for cybersecurity defence.

The government should also consider mandating or incentivising the use of biometric verification and deepfake detection technologies, especially in areas involving critical infrastructure, high financial stakes, privileged access, or sensitive communication within both government and commercial environments. Deepfake detection systems based on biometrics can be designed to detect deepfake video or audio attempts at authentication, addressing the primary deepfake risk.

In addition, natural language process and GenAI can be employed to develop security tools specifically designed to analyse incoming communications (e.g., email, chat) for specific style or features, which may signal a GenAI-crafted spear-phishing attempt.

3.2 Preventing GenAI data leakage and threats

It is important to promote in both the public and private sectors the importance in using GenAI models responsibly and ensuring that they are well protected, to avoid being a source of data leakage. As the data used to train and fine-tune internal LLMs is a possible avenue of attack and data leakage, it is desirable to prioritise the use of anonymised or fully sanitised data sets for internal model training to minimise the risk associated with data poisoning attacks and data leakage. Data leakage prevention modules can also be directly integrated into all GenAI interfaces and pipelines. These modules should automatically mask or reject any personally identifiable information or confidential data before it can be inputted into an external LLM service.

In addition, GenAI and LLM deployment must adhere to the highest standards of secure software development. Before deploying any high-risk GenAI model, mandatory adversarial testing must be performed. This involves simulating attacks, including prompt injection, data poisoning, and attempts to extract sensitive training data. This will help identify and patch vulnerabilities proactively. Continuous

monitoring tools should be used to track the models' performance and output integrity. If a model's performance or compliance degrades over time, it may signal a subtle, ongoing adversarial attack or unintentional bias, necessitating immediate human intervention and recalibration. Such practices should be promoted and incentivised in both the public and private sectors.

3.3 Training and awareness

Because of the easy access to GenAI tools, many employees may attempt to use publicly-available GenAI tools rather than those approved by their employer. Clear policies need to be established to specify what tasks can use GenAI tools, what tools can be used, and what data can be provided to these tools.

In addition, since a majority of successful cyber attacks exploit human weakness, mandatory and continuous training is essential. Training must be dynamic, focusing on current threats such as recognising deepfake media and identifying highly-personalised phishing. Systematic training on responsible and ethical use of GenAI tools and the risks associated with the inappropriate use of such tools (e.g., the explicit danger of inputting confidential data into public LLMs) is also necessary.

Organisations must foster a supportive culture where employees feel safe and empowered to report suspicious activity or accidental data exposure without fear of immediate punitive action. This transforms the workforce from being a security vulnerability into a front-line defence layer.

It is noted that many organisations in Hong Kong, especially small-and-medium enterprises and non-government organisations, do not have the resources to conduct such training and security measures implementation. The government can provide assistance, which can include training workshops and funding focused on GenAI and cybersecurity.
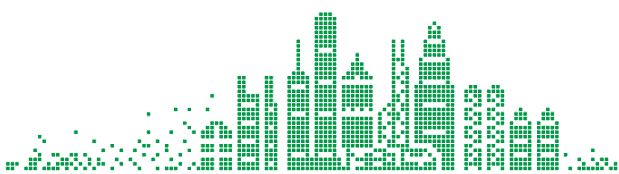
Hong Kong's Next Growth: Pioneering the Web 3.0 Ecosystem

# Hong Kong's Next Growth: Pioneering the Web 3.0 Ecosystem

Yulin Fang   Yangchen Mou

1.   Introduction

As of 2024, there were already 659 million cryptocurrency holders worldwide, making up about 8% of the global population (Crypto.com, 2024). By October 2025, the global cryptocurrency market had expanded significantly, reaching a total value of US$3.87 trillion (Forbes, 2025). As cryptocurrencies – some of the most well-known types of virtual assets in the Web 3.0 ecosystem – gained traction, related concepts such as blockchain, decentralization, smart contracts, and the broader Web 3.0 ecosystem began attracting attention from governments, businesses, and academic institutions. In a bold move to support Web 3.0, U.S. President Donald Trump even launched his own virtual asset called $TRUMP. According to Reuters, the coin quickly sparked market excitement and on 20 January 2025, it reached a $10 billion market capitalization (Howcroft & Conlin, 2025).

Despite its potential, Web 3.0 also brings risks to social and financial security. Previous research shows that since virtual asset transactions are anonymous and globally settled, they are often used by criminals for illegal activities such as scams, money laundering, and drug trafficking (Chainalysis, 2025; United Nations, 2021). Another major concern is the high volatility of virtual assets. For example, the value of $TRUMP dropped sharply to $1.22 billion by October 15, 2025, representing an 87.8% decline. Its unit price fell from $70 to just $6.10 for a 91.3% drop (OFFICIAL TRUMP, 2023). These risks highlight the need for governments and regulators to find a balance between encouraging innovation in Web 3.0 and ensuring proper oversight to protect users and maintain financial stability.

To fully embrace the fintech revolution driven by Web 3.0, Hong Kong's policymakers must take a balanced approach. On the one hand, they should leverage Hong Kong's strengths – such as its advanced financial infrastructure and global connectivity – to support innovation and growth. On the other hand, they must also take a proactive role in managing the risks associated with Web 3.0 technologies. It is important to note that different operation models under the Web 3.0 framework
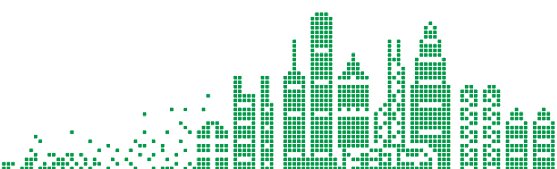
possess distinct characteristics. Therefore, Hong Kong's policymakers need to formulate differentiated strategies based on various Web 3.0 operational models to strike a balance between the development and regulation of Web 3.0.

In the following sections, we will explore the concept of Web 3.0, introduce three key operational models of Web 3.0 assets, outline the development advantages and achievements of Hong Kong's Web 3.0 industry, and finally put forward relevant recommendations for Hong Kong's Web 3.0 development.

2. Definition and Features of Web 3.0

2.1 What is Web 3.0?

To stay ahead in the wave of Web 3.0 development, it is essential to understand what Web 3.0 actually is. The term was first introduced in 2014 by Gavin Wood, co-founder of Ethereum, a cryptocurrency platform that lets developers build and run applications and smart contracts. In his vision, Web 3.0 represents a more democratic and decentralized version of the Internet, one that is governed collectively by its users rather than large corporations like Amazon or Microsoft (Kharpal, 2022).

As Web 3.0-related technology has evolved, "Web 3.0" has grown into a broad ecosystem concept that encompasses a wide range of applications. These typically rely on blockchain and virtual assets, covering areas such as cryptocurrencies, decentralized autonomous organizations (DAOs), non-fungible tokens (NFTs), and virtual environments like the metaverse (Wharton Initiative on Financial Policy and Regulation, 2024).

Note that the original Web 3.0 ecosystem concept is built on strong principles of decentralization. This feature makes it difficult to hold virtual asset transactions accountable, which is very different from how traditional finance (TradFi) operates.

Under global efforts to combat money laundering and maintain financial stability, the Web 3.0 financial system had to give up some of its decentralized and anonymous features to ensure compliance. This has led to the emergence of two more regulated models: Centralized Finance (CeFi) and the integration of Traditional Finance and Centralized Finance (TradFi-CeFi). In these two models, Web 3.0 service providers usually have legal identities and physical offices, making it easier for governments and regulators to supervise their operations and ensure financial stability. The original Web 3.0 networks that prioritize decentralization and anonymity are now referred to as Decentralized Finance (DeFi) to distinguish them from the more regulated models. These three frameworks leverage Web 3.0 technology at different levels and focus on distinct aspects of the financial ecosystem. While they operate in different ways, all three hold significant potential to transform the global market today (Hong Kong Institute for Monetary and Financial Research, 2024). In the following section, we will compare the key features of the three main Web 3.0 operational models.

2.2　Centralized Finance (CeFi)

As defined by the Financial Stability Board (FSB), CeFi involves centralized intermediaries to offer virtual asset finance services (Financial Stability Board, 2023). These intermediaries combine features from both DeFi and TradFi. On the one hand, they offer Web 3.0 financial services such as spot trading, order matching, and asset management – similar to what DeFi platforms provide. On the other hand, they operate through centralized structures and offer user-friendly interfaces, much like traditional financial institutions.

The significance of CeFi is that these CeFi institutions usually have legal status and physical presence while offering virtual assets finance services, which makes them easier for governments and regulators to monitor. Regulators can oversee them to ensure they follow legal requirements, protect investors' rights, and maintain market stability. As a result, CeFi services are often the primary focus of Web 3.0 regulatory frameworks in major financial markets such as the United States, Singapore, the European Union, and Hong Kong.

2.3　Integration of Traditional Finance and Centralized Finance (TradFi-CeFi)

Traditional financial institutions such as commercial banks, investment banks, and mutual funds are also actively entering the Web 3.0 field by developing financial products in partnership with licensed CeFi providers. These products are known as TradFi-CeFi products, which generally fall into two categories. The first type is issued within traditional financial markets but has its value linked to Web 3.0 assets, such as cryptocurrency ETFs. Meanwhile, the second type uses traditional financial valuation models but is issued on blockchain platforms, including Tokenized green bonds or stablecoins. Although these cross-market products operate across both traditional and Web 3.0 systems, they tend to have lower transparency and slower transaction speeds compared to standalone DeFi or CeFi solutions. Nevertheless, they allow traditional financial products to benefit from Web 3.0 technologies, helping to modernize the broader financial industry and drive the growth of the TradFi market.

2.4　Decentralized Finance (DeFi)

According to the definition of the Hong Kong Institute for Monetary and Financial Research (HKIMR), DeFi is a financial model that operates without any centralized intermediaries (Hong Kong Institute for Monetary and Financial Research, 2024). Instead, it uses blockchain technology and smart contracts to deliver financial services. Built on these smart contracts, DeFi platforms now offer a wide range of services, including lending, trading, staking, and derivatives.

DeFi has significant market potential. According to data from Statista, the number of DeFi users is expected to reach 213.23 million by 2026 (Statista, 2025). This rapid growth is driven by several factors. First, DeFi platforms often offer high returns, which attract users from traditional financial systems.

Second, improvements in user interfaces and the availability of educational resources have made it easier for new users to learn how to use DeFi platforms. Third, DeFi can provide financial services to underserved populations who lack access to the traditional banking system, helping to expand financial inclusion (*Financial Times*, 2019).

Notably, one of the key features of DeFi is that it relies on smart contracts that are self-governed and maintained by Decentralized Autonomous Organizations (DAOs). These DAOs operate without any central authority or hierarchy, which creates a major challenge for regulators. Because there is no identifiable institution in charge, it becomes extremely difficult for authorities to hold anyone accountable for DeFi transactions. This lack of identifiable accountability means that DeFi systems often operate outside the scope of existing institutional regulatory policies, ultimately exposing the ecosystem to substantial risks.

Table 1   Overview of Three Operation Models of Global Web 3.0 Financial Ecosystem

Operating System	Web 3.0 Financial Service Name	Service Description	Typical Cases
CeFi	Cryptocurrency Exchange	Instant online cryptocurrency exchange	Binance, HashKey, OSL
	Cryptocurrency Financial Services	Cryptocurrency mortgage and lending	Binance Lending
	Initial Coin Offering/ Security Token Offering (ICO/STO)	Issuing newly created cryptocurrencies to investors	Trump Coin Issuance
	Cryptocurrency ATM/Crypto Kiosk	Offline exchange of cryptocurrency and fiat cash	CoinUnit
TradFi-CeFi	Real-World Asset Tokenization (RWA)	Tokenized sale of ownership or disposal rights of real-world assets	GoldZip, Hong Kong Tokenized Green Bonds
	Fiat-Pegged Cryptocurrency Issuance	Hong Kong Dollar Stablecoin Issuance	JD Stable Hong Kong Dollar
	Cryptocurrency Fund	Listing cryptocurrency ETFs on stock exchanges	Bosera HashKey Bitcoin ETF
	Web 3.0 Asset-Based Wealth Management Products	Brokerage of Web 3.0 assets in licensed exchanges, designing and distributing Web 3.0 investment products	Tiger Brokers Bitcoin Trading, ZA Bank Bitcoin Trading
DeFi	Cryptocurrency Exchange	Instant online cryptocurrency exchange	UniSwap
	Cryptocurrency Financial Services	Cryptocurrency mortgage and lending	AAVE
	Initial Coin Offering (ICO)	Issuing newly created cryptocurrencies to investors	NEO ICO
	Cryptocurrency Financial Derivatives Contracts	Various cryptocurrency financial derivatives contracts enabled by oracles, such as forwards, wagers, options, etc	ChainLink, Pyth Network

2.5 Feature Comparison of the Three Models

In the development of Web 3.0 financial services, three models, CeFi, DeFi, and TradFi-CeFi, each exhibit unique advantages and disadvantages. To better understand how they perform, we can compare them across several key areas: business scope, user-friendliness, transaction costs, difficulty of regulation, and customer information management.

a) Business Scope

Both CeFi and DeFi offer basic functions such as cryptocurrency exchange and transfer. Furthermore, CeFi and DeFi users can also access more complex financial services, including lending, staking, and even customized derivative contracts. CeFi platforms, however, tend to provide faster and more stable services than DeFi because they rely on centralized liquidity pools. This allows for smoother operations in areas like crypto-to-fiat conversion and cross-chain asset trading.

In the TradFi-CeFi model, however, such a service is not applicable. TradFi-CeFi clients either purchase products that are linked to Web 3.0 assets through traditional financial institutions or hold traditional financial products issued via blockchain smart contracts. In both cases, these assets are not settled within their native Web 3.0 environments, which, at the current stage, makes it difficult for users to directly use these products for further exchange, remittances, staking, or other financial services. As a result, the business scope of the TradFi-CeFi model remains limited.

b) User-Friendliness

Since CeFi and DeFi are relatively new fintech models, users often need time to learn how to navigate blockchain-based transactions. In this context, CeFi platforms tend to be more user-friendly because they offer well-designed interfaces, technical support, and customer service to assist users (Kerner, 2023). By contrast, DeFi platforms usually require users to read technical documentation and tutorials on their own, which can be challenging for beginners.

TradFi-CeFi products, however, are often linked to familiar offerings from traditional financial institutions or CeFi providers. This allows users to apply their existing knowledge of TradFi – for example, understanding fiat currencies – to grasp how CeFi products like stablecoins work. Additionally, since these products are issued by established institutions, users can access customer support more easily, making TradFi-CeFi services highly user-friendly.
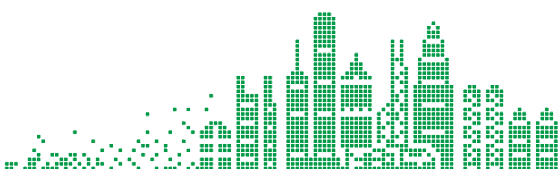
c) Transaction Costs

CeFi service providers usually maintain private pools of Web 3.0 assets, which allows them to control transaction fees directly. As a result, transaction costs on CeFi platforms tend to be more stable. However, TradFi-CeFi models involve transferring value between traditional financial markets and blockchain markets. Since these transactions pass through multiple financial service layers, they often come with higher costs than the CeFi services.

DeFi systems, by contrast, have more volatile transaction costs. For example, Uniswap, a leading DeFi platform, uses public liquidity pools, and fees depend on market conditions and asset liquidity (Uniswap Docs, 2025). This makes it difficult to directly compare DeFi transaction costs with those of CeFi or TradFi-CeFi models.

d) Difficulty of Regulation

Products in the TradFi-CeFi model often resemble traditional financial instruments, such as cryptocurrency ETFs and Tokenized bonds. Because these products share similar structures and pricing models with their conventional counterparts (e.g. traditional ETFs and bonds), regulators can adapt the existing financial regulations and make some minor modifications to oversee them effectively.

In comparison, although CeFi service providers operate under entirely new business models, their legal identity and physical presence make regulation feasible. Regulators still need to invest more effort into designing appropriate oversight mechanisms tailored to their operations.

DeFi ecosystems, on the other hand, present a much greater challenge. They are governed by DAOs, which are anonymous and lack a centralized structure. This makes it extremely difficult for regulators to track activities or hold any specific entity accountable. As a result, DeFi platforms often fall outside the scope of regulatory frameworks, exposing the system to significant risks.

e) Customer Information Management

Providers of TradFi-CeFi and CeFi services are required to conduct due diligence on customer information in accordance with anti-money laundering (AML) and Know Your Customer (KYC) provisions issued by local governments. When necessary, providers of TradFi-CeFi and CeFi services will be able to track the activities of users who have completed real-name verification.

However, some users may prefer to keep their financial activities private. These users often turn to DeFi platforms, which enable users to keep anonymous when trading with virtual assets. While this protects user privacy, it also makes it harder for governments to detect and stop illegal activities like money laundering (OSL Group, 2025a).

Table 2. Feature Comparison of Web 3.0 Models

Feature Comparison	CeFi	TradFi-CeFi	DeFi
Business Scope			
User-Friendliness			
Transaction Cost			(Unstable)
Difficulty of Regulation			
Customer Information Management			
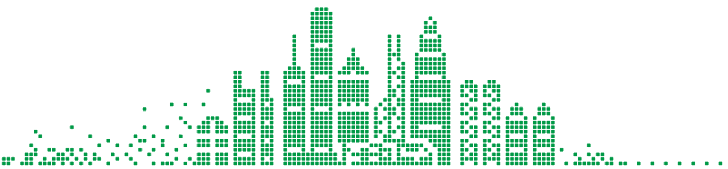
3. Development of Web 3.0 in Hong Kong

Looking back on the current state of Web 3.0 development in Hong Kong, we can find that the Hong Kong Government has taken active steps to support the growth of the local Web 3.0 ecosystem. By leveraging four key strengths – its strong financial environment, abundant human capital, robust regulatory framework, and supportive policies – Hong Kong is well-positioned for significant progress in this area. These pillars highlight Hong Kong's achievements in Web 3.0 development so far and will be discussed below.

3.1 Financial Environment

First, as a top-tier international financial center, Hong Kong offers a well-established ecosystem for global financial investments. According to the Global Financial Centres Index (GFCI), Hong Kong ranks third among global financial centers. Specifically, it holds the top position in key areas, including the business environment, infrastructure, and reputation (Wardle & Mainelli, 2025). This strong foundation creates fertile ground for fintech innovations, including those related to Web 3.0 development.

3.2 Human Capital Resources

Hong Kong offers strength in both new talent and professionals in Web 3.0. According to Coindesk's global ranking of blockchain universities, five Hong Kong-based universities are among the top 50 worldwide. Impressively, the Hong Kong Polytechnic University ranks as 1st in this list, demonstrating its outstanding capability in Web 3.0 education (The Research Centre for Blockchain Technology, 2022). This flourishing educational ecosystem not only provides a solid theoretical foundation but also offers hands-on training opportunities. It is evident that Hong Kong has a vibrant blockchain education community, which is capable of nurturing local talent for the Web 3.0 sector. In addition to offering strong resources for developing new Web 3.0 talent, Hong Kong also attracts skilled professionals from around the world. The Hong Kong Government actively supports global talent recruitment through its Talent List program, through which professionals with Web 3.0 expertise, including blockchain and distributed ledger technology, can apply for certification and enjoy immigration benefits (Talent List Hong Kong, 2025).

3.3 Regulatory Framework

The Hong Kong government has introduced a comprehensive regulatory framework to oversee institutions offering key CeFi and TradFi-CeFi services. In August 2025, the Hong Kong Monetary Authority (HKMA) introduced the Stablecoin Ordinance (Hong Kong Monetary Authority, 2025). This move supports the development of Hong Kong dollar-backed stablecoins, marking an important step toward advancing TradFi-CeFi integration in Hong Kong.

The Securities and Futures Commission of Hong Kong (HKSFC) released a licensing policy for virtual asset trading platforms (VATPs) in 2023. This policy acts as a guidebook for centralized Web3.0 asset exchanges, the main players in CeFi services, to ensure their transparent and compliant cryptocurrency trading practices (Securities and Futures Commission, 2025). As of October 2025, 11 CeFi institutions have obtained such licenses, allowing them to provide regulated cryptocurrency exchange services.

Moreover, the framework also includes rules for financial intermediaries engaged in TradFi-CeFi activities, such as managing virtual asset funds, offering investment advice, and distributing virtual asset-related products (Securities and Futures Commission, 2023a). These regulations enable traditional financial institutions to leverage their existing customer bases and legally offer Web 3.0 products and services.

3.4 Policy Support

The Hong Kong authorities have shown strong commitments to developing the Web 3.0 ecosystem. The Chief Executive, finance-related government departments, and the Legislative Council have all expressed strong support and introduced a series of measures to promote this sector.

In his 2025 Policy Address, the Chief Executive John Lee Ka-chiu proposed further promotion of the Tokenized asset market and the creation of a stable regulatory system for issuing Hong Kong dollar-backed stablecoins (Lee, 2025). Additionally, the Policy Statement 2.0 on Development of Virtual Assets in Hong Kong, released in 2025, outlined specific initiatives to support Web 3.0 development: regulation streamlining, development of Tokenized asset products, advancing use cases and collaboration, and talent sources and knowledge sharing (Financial Services and the Treasury Bureau, 2022). Furthermore, the Legislative Council also plays an active role in these initiatives. Its Subcommittee on Issues Relating to the Development of Web3 and Virtual Assets monitors progress and ensures that relevant authorities implement these measures effectively.

3.5 Achievements in Web 3.0 Development

Leveraging its four core strengths, Hong Kong's Web 3.0 industry has witnessed remarkable growth. According to Chainalysis' statistical charts, Hong Kong received approximately US$800 billion in cryptocurrency inflows between July 2023 and June 2024, ranking second among East Asian regions. Additionally, the cryptocurrency adoption index of Hong Kong surged by 85.6% year-on-year in June 2024, which is the highest growth rate in East Asia (Chainalysis, 2024). Furthermore, a research report from Multipolar reveals that Hong Kong's per capita virtual asset holdings reached US$97,531, placing it third globally (Multipolitan, 2025).

Beyond cryptocurrencies, other virtual assets based on the TradFi-CeFi model and related products in traditional financial markets have also flourished in the Hong Kong market. Hong Kong is now the largest market for virtual asset-based exchange-traded products in the Asia-Pacific region, with assets under management reaching HK$8.1 billion by September 2025 (Huang, 2025).

These achievements clearly position Hong Kong as a global leader in Web 3.0 development. However, to fully unlock its potential, additional policy support will be essential to sustain growth and drive innovation.

4. Policy Suggestions for Web 3.0 Development in Hong Kong

Figure 1. Summary of Suggestions for Hong Kong Web 3.0 Development

CeFi	TradFi-CeFi	DeFi
Regulatable Web 3.0 System	Empower Traditional Financial System	Difficult to Trace and Regulate
• Establish a Tailored Auditing Framework for CeFi Institutions • Build a Talented Certification System • Introducing Global Leading CeFi	• Upgrading Audit Frameworks for Traditional Enterprises • Upskilling TradFi Professionals for Web 3.0 Development	• Strengthening the Monitoring of DeFi System

Philippe Aghion and Peter Howitt, the 2025 Nobel laureates in Economics, argued in their work on "creative destruction" that new technologies often disrupt existing product markets (Aghion & Howitt, 1992). The Web 3.0 ecosystem stands as a prime example of such disruption for the traditional financial industry. To maximize social welfare across both sectors, policymakers should not only promote Web 3.0 development but also empower TradFi during this transition.

Against this backdrop, Hong Kong could adopt a two-pronged approach. One focus area is to use the CeFi model to guide the future development of Web 3.0 and explore new, untapped markets. Concurrently, Hong Kong could leverage the TradFi-CeFi model to build a bridge between TradFi and Web 3.0, enabling existing financial products to benefit from innovative technologies.

In the following sections, we present detailed recommendations based on the characteristics of these Web 3.0 operational models.

4.1 Suggestions for CeFi Development

a) Establish a Tailored Auditing Framework for CeFi Institutions

Auditing CeFi institutions is a crucial aspect of maintaining financial stability within the CeFi industry. Recognizing its importance, the Hong Kong government has placed strong emphasis on this area. According to the "Guidelines for Virtual Asset Trading Platform Operators" issued by the HKSFC, CeFi institutions are required to conduct regular audits to monitor and control their financial risks effectively (Securities and Futures Commission, 2023b).

Beyond being subject to government pressure, several leading local CeFi institutions, such as OSL, are already listed on the Hong Kong Stock Exchange. As public companies, they are obligated to disclose their operational and financial information. According to OSL's 2024 annual report, virtual assets make up around 45% of its total assets and are measured either as "inventory" or "intangible assets" (OSL Group, 2025b).

However, the Hong Kong Institute of Certified Public Accountants (HKICPA) has pointed out that both existing accounting approaches – treating virtual assets as inventory or intangible assets – have notable limitations (Li & Wang, 2021). These methods do not fully reflect the real market value or the risks associated with virtual assets. Therefore, we recommend that regulators accelerate the development of a tailored auditing framework designed specifically for CeFi institutions. Such a framework would enable auditors to evaluate asset values and related risks more accurately, ultimately strengthening the stability of the Web 3.0 financial market.

b) Local Web 3.0 Talent Certification System

The shortage of Web 3.0 talent has been a major challenge for businesses in Hong Kong. In his speech at the Hong Kong Web3 Festival, legislator Johnny Ng Kit-Chong noted that while the Web 3.0 industry possesses abundant resources and creative ideas, it faces a severe shortage of skilled professionals (Lian, 2025). For many companies, this talent gap has become a major obstacle to growth. A report titled "Hong Kong Web3 Blueprint: Building a Web3 International Finance Hub" by Web3 Harbour and PwC reinforces this view, stating plainly that "the lack of talent availability is the current state of Hong Kong Web 3.0 Industry" (Web3 Harbour & PwC., 2025).

Although major universities and training institutions in Hong Kong offer Web 3.0-related courses, these programs face two major problems. First, there is a lack of standardization in course design, leading to substantial discrepancies in teaching content across different institutions. Second, due to the rapid iteration of blockchain technology, course curricula often fail to keep up with the latest industrial requirements. These two issues collectively result in capability fragmentation among job seekers: some candidates may demonstrate expertise in specific Web
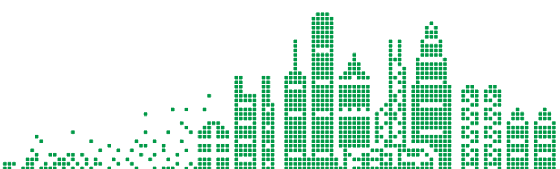
3.0 technical domains but lack proficiency in other critical skills demanded by the industry. This imbalance makes it challenging for enterprises to quickly evaluate whether candidates meet practical job requirements through traditional recruitment processes. Consequently, enterprises are compelled to invest significant resources in post-hiring internal training, which substantially increases their labor costs.

To address the above challenges, we suggest that the authorities establish a standardized local Web 3.0 talent certificate framework. Specifically, the government should take the lead in introducing an officially recognized "Web 3.0 Practitioner Certification" system with clearly formulated and quantifiable skill assessment criteria. This system would help companies quickly verify candidates' qualifications and reduce recruitment costs, and it would ensure that talent development aligns with industry needs, improving the efficiency of Hong Kong's Web 3.0 talent pool.

c)   **Introducing Global Leading CeFi Institutions**

As of November 2025, leading local cryptocurrency exchanges in Hong Kong have already been providing trading services for major cryptocurrencies such as Bitcoin, Ethereum, and CRP. For example, HashKey has claimed support for 19 cryptocurrencies in Hong Kong (HashKey, 2025). However, this level of coverage is still relatively small compared with international leaders like Coinbase, and it is not enough for local cryptocurrency exchanges to take advantage in global market competition. According to disclosures from Coinbase, it now supports trading for more than 275 different virtual assets and 340 trading pairs (Coinbase, 2025).

Yet, internationally leading CeFi institutions such as Binance and Coinbase have not yet established compliant business branches in Hong Kong, so they do not directly compete with local exchanges. In this context, compared with their counterparts in other global markets, Hong Kong's local centralized financial institutions face lower competitive pressure, offer a narrower range of virtual-asset services, and have relatively limited potential for international competitiveness.

To address this, we recommend that Hong Kong authorities actively attract internationally recognized CeFi institutions to enter the local market. Introducing these global leaders would create a "catfish effect," encouraging local firms to improve their competitiveness and strengthen their core capabilities. In the long run, this approach would help Hong Kong-based CeFi institutions build a solid foundation to compete successfully on the global stage.

4.2 Suggestions for TradFi-CeFi Development

a)   Upgrading Audit Frameworks for Traditional Enterprises

Hong Kong authorities should not only establish auditing rules tailored for CeFi institutions but also update the existing audit standards for traditional enterprises, as many of them are beginning to hold virtual assets. As virtual asset trading expands in Hong Kong, more institutional clients are participating. Licensed platforms like OSL now offer staking services, allowing institutional clients to earn returns by holding digital currencies and verifying blockchain transactions (OSL Group, 2025c). Moreover, the Hong Kong government is actively developing various Web 3.0 financial products, including stablecoins and Tokenized securities. As more of these products become available to institutional clients, it is foreseeable that Web 3.0 assets will make up a much larger part of Hong Kong companies' total assets in the future.

Since Web 3.0 assets are significantly different from traditional financial products in valuation and risk management, authorities and accounting institutions could work together to improve Hong Kong's audit system. Such refinement would enable the audit system to more systematically identify the value and potential risks of enterprises' Web 3.0-related assets, thereby strengthening the transparency and resilience of Hong Kong's financial ecosystem and safeguarding long-term financial stability.

b)   Upskilling TradFi Professionals for Web 3.0 Development

For the development of TradFi-CeFi, enterprises and the government do not need to create an entirely new talent pool. Instead, they could build on Hong Kong's existing TradFi education infrastructure. By equipping finance professionals with Web 3.0 knowledge, these individuals can transition smoothly into the Web 3.0 domain.

For example, fund managers who oversee virtual asset ETFs can be trained by experienced traditional ETF managers. These professionals already understand ETF operations, trading strategies, and risk management. Once they learn the features of Web 3.0 assets and blockchain transaction mechanisms, they will be well-prepared to manage virtual asset ETFs effectively.

Regulatory authorities who encourage TradFi practitioners to actively engage in Web 3.0 education and training programs are recommended. Notably, the Hong Kong government has already begun the process to promote such initiatives. The HKMA, in collaboration with the FSTB, has launched the Training Subsidy for Fintech Practitioners through the Hong Kong Institute of Bankers (HKIB), providing financial support for banking professionals to study blockchain, distributed ledger, and Web 3.0–related subjects (Hong Kong Monetary Authority, 2024).

This initiative not only enhances the technical capabilities of TradFi professionals, helping them remain competitive in a rapidly evolving financial ecosystem, but also builds a high-caliber talent pool for the future development of the TradFi–CeFi sector. Therefore, we suggest that the government further expand such programs beyond the banking industry to include professionals in investment banking, asset management, and other financial sectors, thereby fostering a more comprehensive Web 3.0 talent ecosystem.

4.3   Suggestions for DeFi

In the previous analysis, we highlighted the regulatory challenges and substantial risks inherent in DeFi systems. DeFi platforms lack a physical presence in traditional financial structures – there is no centralized management, physical offices, or dedicated servers. These characteristics make it extremely difficult for regulators to enforce effective oversight.

The decentralized structure of DeFi also means that many platforms do not have dedicated technical maintenance teams. This absence can leave smart contracts and underlying protocols vulnerable to security flaws, making DeFi platforms particularly attractive targets for hackers (Federal Bureau of Investigation, 2022). These attacks not only harm individual investors but also undermine the stability of the broader financial market. Additionally, the anonymous and decentralized nature of DeFi is frequently abused by criminals for illegal activities such as money laundering and illicit fund transfers, exacerbating the risk of financial crime (U.S. Department of the Treasury, 2023). For these reasons, we advise the Hong Kong government against introducing DeFi-related entities and products into the local market to safeguard local financial stability.

However, monitoring the development of DeFi platforms is necessary. Particular attention should be paid to business model innovations and advancements in the DeFi systems. When major breakthroughs or new financial models emerge in DeFi systems, comprehensive evaluations should be conducted to determine whether these innovations can be adapted and integrated into CeFi or TradFi-CeFi ecosystems, creating new growth opportunities for Hong Kong's Web 3.0 sector.

References

1. Aghion, P., & Howitt, P. (1992). A Model of Growth Through Creative Destruction. *Econometrica*, 60(2), 323–351. https://doi.org/10.2307/2951599

2. Chainalysis. (2024). *Eastern Asia: Institutions Drive Adoption in South Korea and Hong Kong*. The 2024 Geography of Cryptocurrency Report. https://www.chainalysis.com/blog/eastern-asia-crypto-adoption-2024

3. Chainalysis. (2025). The 2025 Crypto Crime Report. https://www.chainalysis.com/wp-content/uploads/2025/03/the-2025-crypto-crime-report-release.pdf

4. Coinbase.com. (2025). Supported cryptocurrencies and trading pairs | Coinbase Help. https://help.coinbase.com/en/prime/trading-and-funding/supported-cryptocurrencies-and-trading-pairs

5. Crypto.com. (2024). *Crypto Market Sizing Report 2024*. https://crypto.com/en/research/2024-crypto-market-sizing-report

6. Federal Bureau of Investigation (2022). *Cyber Criminals Increasingly Exploit Vulnerabilities in Decentralized Finance Platforms to Obtain Cryptocurrency, Causing Investors to Lose Money*. Internet Crime Complaint Center (IC3). https://www.ic3.gov/PSA/2022/PSA220829

7. Financial Stability Board. (2023). *The Financial Stability Risks of Decentralized Finance*. https://www.fsb.org/uploads/P160223.pdf

8. Financial Times. (2019). *Safety in numbers: how crypto helps to bank the unbanked*. Financial Times. https://www.ft.com/partnercontent/binance/safety-in-numbers-how-crypto-helps-to-bank-the-unbanked.html

9. Forbes (2025). *Cryptocurrency Prices Today By Market Cap*. https://www.forbes.com/digital-assets/crypto-prices/?sh=7025f0d92478

10. HashKey Group (2025). Crypto-Market Place. Available at: https://www.hashkey.com/en-US/spot/BTC_USD

11. Hong Kong Institute for Monetary and Financial Research (2024). *Decentralized Finance, Current Landscape and Regulatory Developments* (No.1/2024). https://www.aof.org.hk/docs/default-source/hkimr/applied-research-report/defirep.pdf

12. Hong Kong Monetary Authority. (2024). *Pilot Scheme on Training Subsidy for Fintech Practitioners*. Hong Kong Monetary Authority. https://www.hkma.gov.hk/eng/key-functions/international-financial-centre/s oft-infrastructure/pilot-fintech/

13. Hong Kong Monetary Authority. (2025). *Regulatory Regime for Stablecoin Issuers*. Hong Kong Monetary Authority. https://www.hkma.gov.hk/eng/key-functions/international-financial-centre/stablecoin-issuers/

14. Howcroft, E., Wee, R., & Conlin, M. (2025). *Trump's new meme coin soars on his first day in office, lifts other tokens*. Reuters. https://www.reuters.com/technology/trumps-new-crypto-token-jumps-ahead-his-inauguration-2025-01-20/

15. Huang, Q. (2025). 港交所：港ETF市場流動性居全球第三　盈富基金交投續稱王 [Hong Kong Stock Exchange: Hong Kong's ETF market liquidity ranks third globally; Tracker Fund of Hong Kong continues to lead in trading volume]. Xianggang 01. https://www.hk01.com/%E8%B2%A1%E7%B6%93%E5%BF%AB%E8%A8%8A/60286383/%E6%B8%AF%E4%BA%A4%E6%89%80-%E6%B8%AFetf%E5%B8%82%E5%A0%B4%E6%B5%81%E5%8B%95%E6%80%A7%E5%B1%85%E5%85%A8%E7%90%83%E7%AC%AC%E4%B8%89-%E7%9B%88%E5%AF%8C%E5%9F%BA%E9%87%91%E4%BA%A4%E6%8A%95%E7%BA%8C%E7%A8%B1%E7%8E%8B

16. Kerner, S.M. (2023). *Decentralized finance vs. centralized finance: What's the difference?*. TechTarget. https://www.techtarget.com/whatis/feature/Decentralised-finance-vs-centralised-finance-Whats-the-difference

17. Kharpal, A. (2022). *What is "Web3"? Here's the vision for the future of the Internet from the man who coined the phrase*. CNBC. https://www.cnbc.com/2022/04/20/what-is-web3-gavin-wood-who-invented-the-word-gives-his-vision.html

18. The Research Centre for Blockchain Technology. (2022). PolyU ranks No.1 in CoinDesk's Best Universities for Blockchain 2022. Department of Computing | Hong Kong Polytechnic University. https://blockchain.comp.polyu.edu.hk/polyu-shines-in-the-coindesks-global-ranking-of-the-best-university-for-blockchain-in-2022/

19. Lee, K.C (2025) *The Chief Executive's 2025 Policy Address.*. Policyaddress.gov.hk. https://www.policyaddress.gov.hk/2025/en/p103.html

20. Li, K., & Wang, J. (2021). *Blockchain and accounting*. Driving Business Success, 17(9), 41-43. https://aplus.hkicpa.org.hk/blockchain-and-accounting/

21. Lian, Z. (Ed.) (2025). *2025香港Web3嘉年華在港舉辦 匯聚400多位全球頂尖專家學者* [The 2025 Hong Kong Web3 Carnival will be held in Hong Kong, bringing together more than 400 top global experts and scholars]. Bauhinia Magazine. https://bau.com.hk/web/article/1359274777540759552/web/content_1359274777540759552.html

22. Multipolitan. (2025). Crypto Friendly Cities Index 2025. https://www.multipolitan.com/resource/crypto-friendly-cities-index-2025

23. *OFFICIAL TRUMP*. (2023). CoinMarketCap. https://coinmarketcap.com/currencies/official-trump/

24. OSL Group (2025a, January 24). CeFi vs DeFi: A Centralized and Decentralized Finance Comparison. https://www.osl.com/hk-en/academy/article/cefi-vs-defi-a-centralised-and-decentralised-finance-comparison

25. OSL Group (2025b). 2024 Annual Report. https://media-bcgroup.todayir.com/20250428170802774011645591_en.pdf

26. OSL Group (2025c) Group Staking Service | Compliant Exchanges and Custody Guarantee Fund Security.https://www.osl.com/hk/staking?channel=Meetsocial_google_web_hk_ua_SEM_reg_brandedkw_2025mar

27. Financial Services and the Treasury Bureau (2022) *Second policy statement on development of digital assets issued to scale Hong Kong to new heights of global digital asset leadership*. Info.gov.hk. https://gia.info.gov.hk/general/202506/26/P2025062600269_500089_1_1750909574183.pdf

28. Securities and Futures Commission. (2023a). *Other virtual asset related activities*. https://www.sfc.hk/en/Welcome-to-the-Fintech-Contact-Point/Virtual-assets/Other-virtual-asset-related-activities

29. Securities and Futures Commission. (2023b). *Guidelines for Virtual Asset Trading Platform Operators*. https://www.sfc.hk/-/media/EN/assets/components/codes/files-current/web/guidelines/Guidelines-for-Virtual-Asset-Trading-Platform-Operators/Guidelines-for-Virtual-Asset-Trading-Platform-Operators.pdf?

30. Securities and Futures Commission. (2025). *Virtual asset trading platform operators*. https://www.sfc.hk/en/Welcome-to-the-Fintech-Contact-Point/Virtual-assets/Virtual-asset-trading-platforms-operators

31. Statista. (2025). *DeFi - Worldwide*. https://www.statista.com/outlook/fmo/digital-assets/defi/worldwide

32. Talent List Hong Kong. (2025). *Talent List Hong Kong*. The Government of Hong Kong Special Administrative Region. https://www.talentlist.gov.hk/en/iso5_6.html

33. U.S. Department of the Treasury. (2023). *Illicit Finance Risk Assessment of Decentralized Finance*. home.treasury.gov. https://home.treasury.gov/system/files/136/DeFi-Risk-Full-Review.pdf

34. Uniswap Docs. (2025). *Dynamic Fees*. Uniswap. https://docs.uniswap.org/contracts/v4/concepts/dynamic-fees

35. United Nations. (2021). *Payment through cryptocurrencies*. https://syntheticdrugs.unodc.org/syntheticdrugs/en/cybercrime/onlinetrafficking/payment/index.html

36. Wardle, M., & Mainelli, M. (2025). *The Global Financial Centres Index 38*. Long Finance; Financial Centre Futures. https://www.longfinance.net/publications/long-finance-reports/the-global-financial-centres-index-38/

37. Web3 Harbour, & PwC. (2025). *Hong Kong Web3 Blueprint: Building a Web3 International Finance Hub*. Web3 Harbour. https://storage.googleapis.com/web3_harbour_bucket/Hong%20Kong%20Web3%20Blueprint.pdf

38. Wharton Initiative on Financial Policy and Regulation. (2024). WEB3. BDAP. https://bdap.wharton.upenn.edu/web3/

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