



*March 2024*

FSDC Paper No.61

# Realising the Potential of Blockchain in Advancing Hong Kong's Financial Services Industry

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# **Executive Summary**

## Executive Summary

Hong Kong's financial services industry serves as a crucial pillar of the city's economy, solidifying its position as a prominent international financial centre. As the industry continues to evolve, it is imperative to explore innovative technologies that can drive its development and uphold the city's competitive edge. In line with this vision, Hong Kong is actively shaping up its competitiveness as an international innovation and technology hub, supported explicitly by the "Outline of the 14th Five-Year Plan for National Economic and Social Development of the People's Republic of China and the Long-Range Objectives Through the Year 2035" ("the 14<sup>th</sup> FYP").<sup>1</sup>

The 14<sup>th</sup> FYP places strong emphasis on the integration of Hong Kong's development with that of the broader national strategy, particularly the cities within the Greater Bay Area, and fostering collaboration between the Mainland and Hong Kong in the realm of innovation and technology. Aligned with the goals of the 14<sup>th</sup> FYP, it is crucial to explore innovative technologies that can drive the industry's development and maintain Hong Kong's competitive edge. One such technology with significant potential is blockchain, which has the capability to revolutionise various aspects across different industries.

Blockchain technology has a wide range of applications in both consumer-oriented services and business-to-business (B2B) interactions that extend beyond its association with cryptocurrencies. Progressive adoption of blockchain technology would therefore enable Hong Kong to develop a thriving and sustainable digital economy.

Riding on the transparency and security features of blockchain, the global market for blockchain in fintech is expected to grow from USD 1.4 billion in 2022 to an estimated USD 43.1 billion by 2030, with a CAGR of 53.6%.<sup>2</sup> This growth has spurred the emergence of various consumer and business applications. For instance, it enables supply-chain transparency, allowing consumers to track and verify the origin and authenticity of products. It also facilitates digital identity verification, providing individuals with a secure and decentralised solution to manage their personal data. Additionally, blockchain-powered loyalty programmes enhance reward systems across multiple merchants, while blockchain-based voting systems ensure secure and auditable digital voting, strengthening the democratic process. These applications demonstrate the potential of blockchain technology in various areas of business and society.

In addition to consumer applications, blockchain technology and related components such as smart contracts present promising opportunities in the B2B realm, facilitating data sharing, identity and credentials verification, etc. Noting Hong Kong's competitive advantages as an international financial centre with a robust B2B infrastructure, blockchain technology presents a plethora of innovative solutions that can potentially transform traditional financial systems by increasing efficiency and lowering transaction costs.

In the Chief Executive's 2023 Policy Address, the Hong Kong SAR Government unveiled its plan to launch over a hundred digital initiatives from 2024 to 2025 to promote the development of digital government and smart city development.<sup>3</sup> One notable example highlighted by the Government is adoption of blockchain technology for the electronic issuance and verification of certain licences and certificates. Noting the Government's efforts in adopting technology, the Financial Services Development Council (FSDC) has formed a dedicated Working Group comprising industry experts with a view to exploring the significant potential of blockchain technology in advancing Hong Kong's financial services industry, particularly in the context of B2B interactions.

<sup>1</sup> Xinhua (March 2021). *Outline of the 14th Five-Year Plan for National Economic and Social Development of the People's Republic of China and the Long-Range Objectives Through the Year 2035*. [https://www.xinhuanet.com/fortune/2021-03/13/c\\_1127205564.htm](https://www.xinhuanet.com/fortune/2021-03/13/c_1127205564.htm)

<sup>2</sup> Global Industry Analysts (February 2024). *FinTech Blockchain – Global Strategic Business Report*. <https://www.researchandmarkets.com/reports/5302634/fintech-blockchain-global-strategic-business>

<sup>3</sup> HKSAR (October 2023). *The Chief Executive's 2023 Policy Address*. [https://www.policyaddress.gov.hk/2023/public/pdf/policy/policy-full\\_en.pdf](https://www.policyaddress.gov.hk/2023/public/pdf/policy/policy-full_en.pdf)

While the report covers various use cases of blockchain technology in Hong Kong and the global financial services industry, the report's primary focus is to examine how the Government and regulatory measures facilitate the adoption of blockchain-enabled applications and promote the development of Web3 in the city. Active engagement and participation of both the Government and industry in the blockchain ecosystem would be essential to transforming and strengthening the financial services industry.

Based on the gathered market insights, the FSDC believes in promoting a collaborative approach to leverage the opportunities offered by blockchain technology and address the challenges associated with its adoption. The potential opportunities that merit consideration in Hong Kong and key recommendations are summarised as follows.

### **Potential opportunities for exploration in Hong Kong**

- i Promoting a government-participated blockchain as a utility service in Hong Kong
- ii Enabling the orderly issuance of stablecoins and tokenisation of real-world assets (RWAs) in Hong Kong
- iii Promoting Hong Kong as a blockchain-enabled carbon trading centre in Asia

### **Recommendations structured under three key dimensions for the Government's and relevant regulators' considerations –**

#### **Regulatory adaptation and oversight for technological readiness**

- i Conducting industry consultations on the development of a digitalisation strategy and roadmap
- ii Integrating development and regulatory oversight of blockchain applications under the established dedicated Task Force

#### **Cultivating a vibrant ecosystem for blockchain technology with active Government participation and strategic support**

- iii Fostering digitalisation adoption, including the use of blockchain technology in the delivery of government services and initiatives

#### **Capacity building: Raising public awareness and enhancing technical competency**

- iv Raising public awareness and the global profile of Hong Kong's blockchain ecosystem through targeted marketing and collaborative efforts
- v Establishing Hong Kong as a regional centre of excellence for training, thought leadership and technological literacy in blockchain and emerging technologies through conferences, targeted education, and integration of local and global expertise

# **Section 1**

An abstract 3D rendering featuring a large, glowing orange wireframe cube that frames the central text. Inside and around this cube are numerous smaller, glowing orange cubes of various sizes and orientations, some appearing to float or be stacked. The background is a dark, deep blue with a bokeh effect of soft, out-of-focus orange and white light spots, creating a sense of depth and digital space. The overall aesthetic is futuristic and high-tech.

# Transforming the financial services industry with blockchain technology



The financial services industry encompasses a range of sectors serving different market segments, traditionally including retail, commercial, and wholesale markets, on top of the emerging virtual asset ecosystem.<sup>4</sup> Virtual assets permeate all sectors, creating a cross-sectional influence across the entire financial landscape, from individual consumer payments to large-scale, institutional financial operations. Together, these sectors cater to specific customer segments and address unique financial demands (Figure 1).

## Benefits of using blockchain technology/ distributed ledger technology in the traditional financial services industry

Businesses associated with the retail, commercial, and wholesale segments are the bread and butter of the global financial services industry. The digital transformation presents an opportunity for the robust financial services industry to further enhance its effectiveness, efficiency, security, and customer experience. Among the roster of technologies enabling the transformation, blockchain technology or distributed ledger technology (DLT)<sup>5</sup> has been recommended as promising solutions to address the various challenges facing the traditional financial services industry and to elevate the industry's efficiency.

Key industry players and regulators are actively exploring the benefits blockchain technology or DLT could bring to the financial services industry. The Hong Kong Monetary Authority (HKMA) has dedicated research efforts to the technology, publishing two whitepapers in November 2016 and October 2017, respectively.<sup>6,7</sup> These whitepapers extensively explore the potential applications of DLT in financial services while also identifying potential implementation challenges related to governance, risk management, compliance and legal issues.

As part of these research studies, the HKMA identified three use cases in which DLT could prove beneficial for banking businesses. The proof-of-concept (PoC) work includes mortgage loan applications, trade finance, and digital identity management for know your customer (KYC) procedures. These use cases showcase the potential of DLT to streamline and enhance the overall efficiency of various banking operations. However, some challenges need to be addressed before implementing DLT in production, such as safeguarding data security and protection, adherence to industry standards, compliance with legal and regulatory requirements, and the establishment of a governance model (Figure 2).

Figure 1: Segments of the financial services industry

Segment	Target clients	Services
Retail	Individual customers	Offering various financial products and services tailored to personal financial needs. Personal banking services such as savings accounts, credit cards, loans, mortgages and insurance products
Commercial	Small to medium-sized enterprises (SMEs)	Catering to the financial requirements of the SMEs, and providing services that support their operational and business activities. These include business banking, trade finance, corporate lending, and treasury services
Wholesale	Institutions such as banks, investment firms, large or multinational corporations, Government	Handling large-scale financial transactions among institutional clients, such as institutional banking and investment banking services, capital market activities, asset management, and other high-value transactions
Virtual asset	Retail and professional investors including institutional investors	Offering services with the involvement of cryptocurrency exchanges, digital asset custodianship, tokenisation platforms, and DeFi protocols

5 World Bank Group (2017). *Distributed Ledger Technology and Blockchain*. <https://documents1.worldbank.org/curated/en/177911513714062215/pdf/122140-WP-PUBLIC-Distributed-Ledger-Technology-and-Blockchain-Fintech-Notes.pdf> (Extract from p.7 - Distributed Ledger Technology (DLT), is a modern approach to recording and sharing data across multiple data stores. It enables transactions and data to be recorded, shared, and synchronised among participants in a distributed network. Blockchains, a type of data structure used in some distributed ledgers, store and transmit data in connected blocks, employing cryptographic methods for secure and immutable data management.)

6 HKMA (November 2016). *Whitepaper on Distributed Ledger Technology*. [https://www.hkma.gov.hk/media/eng/doc/key-functions/financial-infrastructure/Whitepaper\\_On\\_Distributed\\_Ledger\\_Technology.pdf](https://www.hkma.gov.hk/media/eng/doc/key-functions/financial-infrastructure/Whitepaper_On_Distributed_Ledger_Technology.pdf)

7 HKMA (October 2017). *Whitepaper 2.0 on Distributed Ledger Technology*. <https://www.hkma.gov.hk/media/eng/doc/key-functions/financial-infrastructure/infrastructure/20171024e1.pdf>

Figure 2: Benefits and challenges identified from the HKMA's PoC work on banking businesses<sup>8</sup>

Benefits identified from the PoC work	Challenges/ considerations identified from the PoC work
<p><b>Transparency and fraud-resistance:</b> Increases transparency and lowers risk of fraud, fostering trust among transaction parties</p>	<p><b>Governance model:</b> Requires an effective governance mechanism to be established</p>
<p><b>Error-resistance:</b> Increases automation to reduce error-proneness</p>	<p><b>Data security:</b> Requires cyber resilience of the platform and network recovery measures to protect distributed data</p>
<p><b>Data access:</b> Facilitates faster access to the data stored across the network</p>	<p><b>Industry standards:</b> Industry standards in areas such as data structure not fully established, although these are necessary for cross-boundary/ border collaboration</p>
<p><b>Efficiency and cost-reduction:</b> Achieves higher efficiency and cost savings due to the standardisation and digitisation of documents, as well as the removal of intermediaries and a central authority</p>	<p><b>Interoperability:</b> Requires alignment and mechanism to enable communication and interoperability between different DLT systems, and between DLT systems and existing infrastructures</p>
<p><b>Regulatory oversight:</b> Offers real-time oversight and an immutable document trail</p>	

Source: HKMA

Following the launch of the HKMA's initial whitepaper in 2016, the Bank for International Settlements (BIS) published a report on DLT regarding payment clearing and settlement in February 2017, with the aim of facilitating central banks and regulatory bodies in analysing the use of blockchain technology/ DLT in terms of the potential implications of this technology on efficiency, safety, and the broader financial markets.<sup>9</sup> It identifies both the potential benefits and risks associated with blockchain technology/ DLT, which can provide the foundation for the next generation of payment systems.

Many notable publications followed, and these papers have, in one way or another, set the tone for the development of relevant technologies, as well as their implications for financial services in Hong Kong and beyond. For a detailed exploration of the blockchain protocol infrastructure and benefits of these technologies drawing on diverse case studies, please refer to Appendix 1 and 2, respectively.

<sup>8</sup> Ibid.

<sup>9</sup> Bank for International Settlements (February 2017). *Distributed ledger technology in payment, clearing and settlement - an analytical framework*. Committee on Payments and Market Infrastructures. <https://www.bis.org/cpmi/publ/d157.pdf>

## **Section 2**



# Global blockchain adoption landscape and its incorporation in the financial services industry

Fast forward to today, blockchain technology has yielded notable success with plenty of use cases in leading economies. These real-world examples demonstrate the significant advantages that come with blockchain technology/ DLT adoption in the financial services industry, with the benefits of streamlined processes, near-instant settlement, reduced settlement risk, enhanced transparency for consumers and regulators, and improved relationship management.<sup>10</sup>

There are myriad applications of blockchain technology/ DLT across the financial services industry. Referring to the up-and-coming potential the applications hold in the financial services industry, this paper focuses on exploring examples of tokenisation of real-world assets (RWAs), blockchain-enabled applications and associated infrastructures, among many others. A summary of successful use cases from Hong Kong and other regions is provided to serve as evidence of the transformative power of blockchain and DLT in the industry.

<sup>10</sup> KPMG. DLT: *The future is distributed*. <https://kpmg.com/xx/en/home/insights/2022/01/dlt-the-future-is-distributed.html>

## Tokenisation of real-world assets (RWAs)

The tokenisation of RWAs refers to the creation of blockchain-based tokens that represent or aim to represent ownership of a real-world asset.<sup>11</sup> This process, or tokenisation, is intended to enable fractional ownership, increased liquidity, and bring about more efficient trading of these assets. By leveraging blockchain technology, the ownership and transfer of traditionally illiquid assets can be facilitated and recorded in a secure and transparent manner.



### ***Tokenised green bond in Hong Kong***

For the industry, with the complexity of traditional green bond issuance and investment procedures involving multiple parties and various stages, it is not always easy to verify whether bond issuers have fulfilled their commitments, particularly in environmentally friendly projects. Such uncertainties have raised concerns among investors.

With a view to exploring a potential solution to this issue, the BIS Innovation Hub and the HKMA collaborated on Project Genesis, a two-phased comprehensive study. The first phase of the project explored the tokenisation of green bonds, with the objective of fostering sustainable investment practices and addressing transparency concerns.<sup>12</sup> The second phase of the project, Project Genesis 2.0, “explored the use of blockchain, smart contracts and other related technologies to demonstrate the technical feasibility of tracking, delivering and transferring of digitised carbon forwards attached to enhance the transparency, objectivity, and environmental integrity of the green bond market.”<sup>13</sup>

Building on Project Genesis, the Government issued an inaugural HKD 800 million tokenised<sup>14</sup> green bonds under the Government Green Bond Programme in February 2023.<sup>15</sup> These tokenised green bonds were settled using cash tokens on a delivery-versus-payment basis across a private blockchain network and were the first-ever issuance of tokenised green bonds by a government globally. The HKMA later published a report titled “Bond Tokenisation in Hong Kong” to share the experience of the inaugural issuance, with a view to providing a blueprint for market participants who are interested in conducting similar future issuances in Hong Kong.<sup>16</sup> In February 2024, the Government issued its second batch of digital green bonds, in four currency tranches totalling around HKD 6 billion.<sup>17</sup> This second issuance has incorporated multiple technological innovations and achieved new breakthroughs in terms of broadening investor participation and streamlining issuance process. It also represents the first multi-currency digital bond offering in the world. With such new development being a first of its kind, the issuances are considered an effective and viable means of promoting innovation and technology adoption in green finance.

<sup>11</sup> SFC (November 2023). *Circular on tokenisation of SFC-authorized investment products*.

<https://apps.sfc.hk/edistributionWeb/gateway/EN/circular/doc?refNo=23EC53> (According to the SFC’s Circular on tokenisation of SFC-authorized investment products dated 2 November 2023, the SFC stated that “tokenisation of investment products refers to the creation of blockchain-based tokens that represent or aim to represent ownership in an investment product.”)

<sup>12</sup> BIS and HKMA (November 2021). *Project Genesis – Report 1: A vision for technology-driven green finance*. [https://www.bis.org/publ/othp43\\_report1.pdf](https://www.bis.org/publ/othp43_report1.pdf)

<sup>13</sup> BIS (October 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](https://www.bis.org/about/bisih/topics/green_finance/genesis_2.htm)

<sup>14</sup> In the context of this issuance, the term “tokenised” means that the beneficial interests in the bond are recorded on settlement in the tokenised securities accounts on a private blockchain network.

<sup>15</sup> HKSAR Government (February 2023). *HKSAR Government’s Inaugural Tokenised Green Bond Offering*. <https://www.info.gov.hk/gia/general/202302/16/P2023021600466.htm>

<sup>16</sup> HKMA (August 2023). *Bond Tokenisation in Hong Kong*. <https://www.hkma.gov.hk/media/eng/doc/key-information/press-release/2023/20230824e3a1.pdf>

<sup>17</sup> HKSAR (February 2024). *HKSAR Government’s Digital Green Bonds Offering*. <https://www.info.gov.hk/gia/general/202402/07/P2024020700516.htm>

### **Tokenised notes issued by a Chinese financial institution in Hong Kong**

The banking industry in Hong Kong has stepped up its efforts to embrace the potential of blockchain technology and dedicated considerable effort to exploring the opportunities it presents. For example, Bank of China International achieved a milestone by issuing CNH 200 million fully digital structured notes – originated by UBS – on the Ethereum blockchain in June 2023, making it the first Chinese financial institution to offer tokenised security in the city.<sup>18</sup>

This transaction denotes a milestone in the Asia Pacific region as it stands as the pioneering example, established under both Hong Kong and Swiss law, of being tokenised onto the public Ethereum blockchain. This move serves as a public showcase, demonstrating that virtual assets and blockchain technology applications extend beyond cryptocurrencies alone. It represents a notable step forward for Hong Kong's digital economy and supports the digital transformation and innovative growth of its financial services industry.

### **Central bank digital currencies (CBDCs) and tokenised deposits**

Since 2017, the HKMA has launched various research projects<sup>19</sup> to study the potential of CBDC in the context of wholesale and cross-border payments and its potential advancement on the established retail payment infrastructure and services in Hong Kong. Leveraging their expertise in wholesale CBDC, the HKMA initiated Project e-HKD in June 2021<sup>20</sup> that focuses on exploring the viability and practicality of introducing e-HKD as a retail CBDC.

As a part of Project e-HKD, tokenised deposits is one of the potential domestic and retail use cases explored in Phase 1 of e-HKD Pilot Programme. The HKMA provides a general definition of “tokenised deposits” as referring to “digital representations of bank deposits where the money deposited with a bank is minted on that institution's own blockchain ledger with the backing of that financial institution's balance sheet.”<sup>21</sup>

In May 2023, Visa Inc., the Hongkong and Shanghai Banking Corporation Limited (HSBC) and Hang Seng Bank Limited commenced the pilot of tokenised deposit use cases under the e-HKD Pilot Programme to examine the atomicity and interoperability of on-us and cross-chain payments across interbank B2B payment flows using tokenised deposits.<sup>22</sup> This pilot project marks a global first in this area and showcases the potential of tokenised deposits. It also serves as a foundation for financial institutions to explore different use cases of tokenisation across regions.

In November 2023, HSBC and Ant Group successfully conducted a test in Hong Kong that utilised tokenised deposits for intra-group payment transactions.<sup>23</sup> The test, carried out under the HKMA's Fintech Supervisory Sandbox arrangement, explored the potential of deposit tokens in facilitating always-on, real-time treasury fund movement between accounts within the bank network. During the test, HSBC utilised Ant Group's blockchain platform, which was supported by Ant Group's banking partners. The platform improves the speed, cost-effectiveness, and visibility of treasury fund transfers.

18 UBS (June 2023). *BOCI issued first tokenized notes, originated by UBS and placed to its clients in Hong Kong.*

<https://www.ubs.com/global/en/media/display-page-ndp/en-20230609-tokenized-notes.html?caasID=CAAS-ActivityStream>

19 HKMA has launched various research projects on CBDCs, including Project LionRock, Project Inthanon-LionRock, Project mBridge, Project Aurum, Project e-HKD and Project Sela.

20 HKMA (September 2022). *e-HKD – Charting the Next Steps.* <https://www.hkma.gov.hk/media/eng/doc/key-information/press-release/2022/20220920e4a1.pdf>

21 HKMA (October 2023). *e-HKD Pilot Programme Phase 1 Report.* <https://www.hkma.gov.hk/media/eng/doc/key-information/press-release/2023/20231030e3a1.pdf>.

22 Visa (November 2023). *Visa showcases potential of tokenised deposits upon completion of hypothetical e-HKD pilot with two leading banks.*

[https://www.visa.com.hk/en\\_HK/about-visa/newsroom/press-releases/visa-showcases-potential-of-tokenised-deposits-upon-completion-of-hypothetical-e-hkd-pilot-with-two-leading-banks.html](https://www.visa.com.hk/en_HK/about-visa/newsroom/press-releases/visa-showcases-potential-of-tokenised-deposits-upon-completion-of-hypothetical-e-hkd-pilot-with-two-leading-banks.html)

23 HSBC (November 2023). *HSBC builds tokenised deposit-based treasury management capabilities.*

<https://www.about.hsbc.com.hk/-/media/hong-kong/en/news-and-media/231101-hsbc-builds-tokenised-deposit-based-treasury-management-capabilites-en.pdf>

## Settlement of Tokenised Assets

Phase 1 of e-HKD Pilot Programme extends its focus beyond CBDCs and includes the exploration of potential use cases that are specifically relevant to the Hong Kong market. Among these use cases is the application of e-HKD for transaction settlement involving tokenised assets. An e-HKD, capable of being “wrapped” or issued on a blockchain, holds the potential to directly settle transactions within the realm of Web3 and tokenised RWAs. By using e-HKD in this manner, the risk associated with conversion losses and the volatility typically associated with cryptocurrencies and stablecoins can be mitigated.<sup>24</sup>

To illustrate the practicality of e-HKD, a pilot project conducted by Fubon and Ripple focused on the application of e-HKD in facilitating transactions involving tokenised real estate assets, specifically in granting home equity lines of credit to real estate owners through a hypothetical e-HKD. This pilot demonstrates the potential capabilities of e-HKD in streamlining the loan approval process, enabling faster approvals, real-time availability of funds, and round-the-clock access. Moreover, the use of e-HKD allowed for the automatic disbursement of funds, adding an additional layer of convenience and efficiency to the transaction process.<sup>25</sup>

Additionally, in a separate pilot project conducted by BCG, HKT Payment Limited, and ZA Bank, it explored the settlement transactions using a hypothetical e-HKD for the tokenisation of pledging rights. This pilot demonstrates the benefits of tokenisation in the lending space, as it reveals that tokenisation allows borrowers to access a wider range of lending options, including smaller property-backed loans that traditional financial institutions may not typically consider. On the other hand, by leveraging an e-HKD framework, lenders will be able to offer more competitive interest rates for loans, considering the reduced exposure to associated risks.<sup>26</sup>

## Tokenised securities issued by a Chinese brokerage firm in Hong Kong

In November 2023, the Securities and Futures Commission (SFC) issued circulars on the tokenisation of SFC-authorized investment products and intermediaries engaging in tokenised securities-related activities.<sup>27,28</sup>

Building upon this development, a Chinese brokerage firm, GF Securities (Hong Kong) Brokerage Limited, a subsidiary of GF Securities Co. Ltd, listed in Hong Kong, issued tokenised securities in Hong Kong in January 2024.<sup>29</sup> This issuance marked GF Securities (Hong Kong) as the first Chinese brokerage firm to complete the mintage, issuance, and distribution of tokenised securities on the Ethereum blockchain, with the underlying assets originating from the firm itself. It represents the first non-custodial wallet institutional tokenisation use-case on a public blockchain in the global financial hub.

By leveraging the capabilities of the blockchain, investors are able to access and monitor trading records on a blockchain without time limitations. Furthermore, investors can manage diverse digital investment portfolios using the centralised features of the network.

24 HKMA (October 2023). *e-HKD Pilot Programme Phase 1 Report*, <https://www.hkma.gov.hk/media/eng/doc/key-information/press-release/2023/20231030e3a1.pdf>

25 Fubon Bank (October 2023). *Fubon Bank (Hong Kong) & Ripple to showcase a novel Home Equity Line of Credit Pilot Project*. [https://www.fubonbank.com.hk/resources/common/pdf/pr\\_231030\\_e.pdf](https://www.fubonbank.com.hk/resources/common/pdf/pr_231030_e.pdf)

26 HKT Payment Limited (May 2023). *Secured Lending Application Selected for HKMA's Inaugural e-HKD Pilot Programme for Retail Central Bank Digital Currency (CBDC) Assessment*. [https://www.pccw.com/assets/Common/files/press-release/2023/May/20230518\\_eHKD%20pilot\\_ENG.pdf](https://www.pccw.com/assets/Common/files/press-release/2023/May/20230518_eHKD%20pilot_ENG.pdf)

27 SFC (November 2023). *Circular on intermediaries engaging in tokenised securities-related activities*. <https://apps.sfc.hk/edistributionWeb/gateway/EN/circular/doc?refNo=23EC52>

28 SFC (November 2023). *Circular on tokenisation of SFC-authorized investment products*. <https://apps.sfc.hk/edistributionWeb/gateway/EN/circular/doc?refNo=23EC53>

29 GF Holdings (Hong Kong) (January 2024). *GF Securities (Hong Kong) Brings Securities Originated by Itself to Public Blockchain*. <https://www.gfgroup.com.hk/en/about/detail/dynamic?id=100192>

### **Tokenised commodity of the first gold-backed token**

In 2022, a wholly-owned subsidiary of the Chinese Gold & Silver Exchange, an exchange in Hong Kong specialising in physical gold and silver trading, issued the first gold-backed digital token, GoldZip (XGZ).<sup>30</sup> This digital token is built on a blockchain platform that facilitates the seamless development of decentralised applications through the use of smart contracts. As a significant milestone, the digital token explorer was launched towards the end of 2022, providing the public with access to extract information about the digital token stored on the blockchain.

One notable aspect of the GoldZip token is its cost efficiency. The transaction fee for XGZ is set at a mere 0.01%, while the Gas fee amounts to 0.3 VSYS tokens.<sup>31</sup> This results in a total cost of less than USD 10 per 1kg of gold transferred, making it an affordable and practical solution for conducting gold-backed transactions.

### **Blockchain-based collateral settlement transactions in the US**

J.P. Morgan introduced the Onyx Digital Assets platform as a means to bridge institutional investors with DeFi platforms within the cryptocurrency economy. The platform also facilitates intraday repurchase (repo) transactions, enabling short-term borrowing in fixed income by exchanging cash for tokenised collateral. As of July 2022, over USD 300 billion of repo transactions have been processed on the Onyx Digital Assets platform since its establishment.<sup>32</sup>

In October 2023, J.P. Morgan conducted its first live blockchain-based collateral settlement transaction with BlackRock and Barclays. J.P. Morgan leveraged its Tokenised Collateral Network (TCN), a blockchain-based platform, to facilitate the transaction.<sup>33</sup> BlackRock tokenised shares in one of its money market funds by using J.P. Morgan's Ethereum-based Onyx blockchain and TCN. The shares were then transferred to Barclays to be used as collateral in an over-the-counter derivatives trade. By implementing this blockchain-based solution, J.P. Morgan aims to significantly enhance the efficiency of transactions by releasing locked capital to serve as collateral in ongoing transactions. Based on this experience, it is expected that the application will expand to include other assets as collateral, such as equities and fixed-income securities, in the future.

### **Tokenised equities under the European Union's pilot regime for virtual assets**

In July 2023, US-based real-world asset tokenisation company, Securitize, issued its first tokenised securities in Europe. This accomplishment positions Securitize as the first digital asset platform with securities licenses in both the US and Europe.<sup>34</sup>

Securitize's entry into the European market follows its successful participation in the sandbox for digital asset securities, led by the Spanish General Secretariat of the Treasury and International Finance, in 2022. As a result, the company has now initiated the issuance of digital asset security tokens representing equity in Mancipi SA, a Spanish real estate investment trust (REIT) focusing on commercial real estate within the Spanish health sector.

<sup>30</sup> GoldZip (2024). *The future of gold investment*. <https://goldzip.info/#how-it-works>

<sup>31</sup> Ibid.

<sup>32</sup> JPMorgan (July 2022). *Blockchain brings collateral mobility to traditional assets*. <https://www.jpmorgan.com/insights/payments/wallets/blockchain-onyx-asset-tokenization>

<sup>33</sup> Bloomberg (October 2023). *JPMorgan Debuts Blockchain Collateral Settlement in BlackRock-Barclays Trade*.

<https://www.bloomberg.com/news/articles/2023-10-11/jpmorgan-jpm-launches-blockchain-settlement-in-blackrock-barclays-trade#xj4y7vzkg>

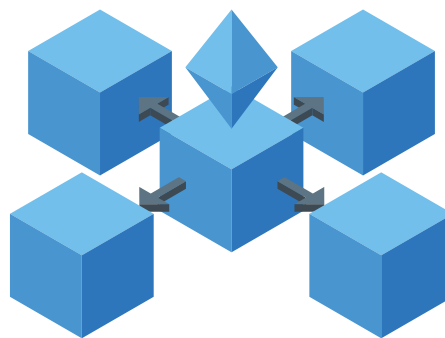
<sup>34</sup> Securitize (July 2023). *Securitize Expands Modernization of Capital Markets into Europe*.

<https://securitize.io/press-releases/securitize-expands-modernization-of-capital-markets-into-europe>



## Blockchain-enabled applications

In addition to tokenised RWAs, blockchain-enabled applications include other use cases that leverage the unique properties of blockchain technology. These applications can include DeFi platforms, supply chain management systems, voting systems, identity verification solutions and others. Blockchain-enabled applications leverage the decentralised, transparent, and immutable nature of blockchain to enhance security, efficiency, and trust in various industries and sectors.



### ***Cross-border payments and foreign exchange transactions between Hong Kong and other regions***

Among the range of initiatives that the HKMA has initiated on CBDC, Project mBridge experiments with a multi-CBDC common platform for wholesale cross-border payments focusing on the use case of international trade, which has the potential to connect central banks and commercial banks around the world as a public good.<sup>35,36</sup>

The project completed its pilot phase in 2022. Over the course of six weeks, 20 banks from four different jurisdictions successfully utilised the mBridge platform to conduct over 160 payment and foreign exchange transactions, with a total value of over HKD 171 million. Project mBridge was among the first multi-CBDC projects to settle real-value cross-border payment and foreign exchange transactions on behalf of corporates.<sup>37</sup>

### ***Universal network between CBDCs and regulated stablecoins***

The future of cross-border transactions and transfers between CBDCs or stablecoins hinges on the interconnectedness of different currencies, CBDC systems, and jurisdictions. Establishing a network that facilitates the seamless exchange of value and currencies across borders is of paramount importance. Such a network would significantly enhance the efficiency and effectiveness of financial transactions.

On that note, Red Date Technology, a Hong Kong-based technology company, collaborated with a global IT engineering and solutions provider, GFT, and a digital asset creation platform, Toko, and announced the launch of the Universal Digital Payments Network (UDPN) in January 2023.<sup>38</sup> The UDPN was established with the objective of serving a purpose similar to the Swift network, but providing interoperability between regulated stablecoins and CBDCs. Leveraging advances in blockchain infrastructure, the UDPN aims to enable global central banks and fiat-based digital currency systems to connect with a vast distribution network of regulated institutions and IT systems, making it easier for financial institutions to capitalise virtual assets more effectively.<sup>39</sup>

### ***Blockchain-based motor insurance platform in Hong Kong***

As of November 2023, the number of registered vehicles in Hong Kong surpassed 812,000 units.<sup>40</sup> With that number expected to grow, the demand for car insurance policy will grow in tandem, highlighting the importance of a robust and efficient car insurance registration process. In this context, blockchain technology emerges as an ideal solution to address this growing demand effectively.

35 HKMA (October 2023). *Experimenting with a multi-CBDC platform for cross-border payments*.

[https://www.hkma.gov.hk/media/eng/doc/key-functions/financial-infrastructure/mBridge\\_publication.pdf](https://www.hkma.gov.hk/media/eng/doc/key-functions/financial-infrastructure/mBridge_publication.pdf)

36 For more details on Project mBridge and other CBDC projects initiated by the HKMA, please refer to the HKMA's website:

<https://www.hkma.gov.hk/eng/key-functions/international-financial-centre/fintech/research-and-applications/central-bank-digital-currency/>

37 BIS (October 2022). *Project mBridge: Connecting economies through CBDC*.

<https://www.hkma.gov.hk/media/eng/doc/key-information/press-release/2022/20221026e3a1.pdf>

38 UDPN (January 2023). *Universal Digital Payments Network (UDPN) is launched to support seamless digital payments across multiple central bank digital currencies and regulated stablecoins*. <https://udpn.io/home>

39 [https://udpn.io/assets/pdf/UDPN-white%20paper-MM\\_170123.pdf](https://udpn.io/assets/pdf/UDPN-white%20paper-MM_170123.pdf)

40 CEIC (June 2023). *Hong Kong SAR, China Number of Registered Vehicles*. <https://www.ceicdata.com/en/indicator/hong-kong/number-of-registered-vehicles>

Remarkably, Hong Kong has already taken a step towards this direction. In December 2018, the Hong Kong Federation of Insurers (HKFI) and CryptoBLK, a Hong Kong-based blockchain company, collaborated and launched the Motor Insurance DLT-based Authentication System (MIDAS), the first blockchain-based motor insurance platform in Asia to confirm the validity of motor cover notes or policies.<sup>41</sup> The blockchain platform facilitates real-time authentication of motor insurance policies through privacy-preserving mechanisms that involve various stakeholders, including insurers, intermediaries, regulators, government agencies, and the public. This feature effectively detects and identifies fraudulent activities, enhancing overall security and integrity.

### **Blockchain infrastructure in Mainland China**

Mainland China's state blockchain infrastructure Xinghuo Blockchain Infrastructure and Facility (BIF) serves as a notable example of a worldwide trustworthy digital foundation. Xinghuo BIF leverages its technological expertise and public service capabilities to offer blockchain services that cater to the needs of cross-border commodity tracking, identity verification, and supply-chain finance.

As of the end of 2022, Xinghuo BIF operated seven supernodes in major cities in Mainland China, along with 29 backbone nodes providing services to a broader range of industries and cities.<sup>42</sup> Furthermore, Xinghuo BIF has expanded its reach internationally by launching the first International Supernode in Malaysia, aiming to contribute to the development of a trusted digital infrastructure for China-ASEAN economic and trade cooperation.<sup>43</sup>

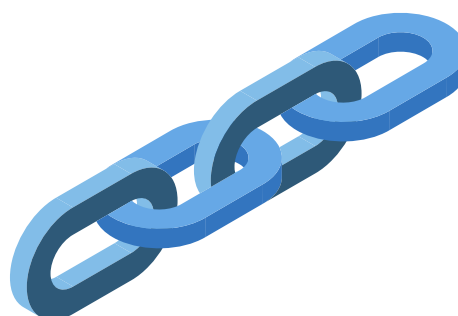
### **Tokenisation platform and digital gold system**

As part of the broader adoption of blockchain technology, HSBC Holdings Plc (HSBC) is leveraging its gold system in conjunction with its Orion platform, a blockchain platform launched in 2022 to issue and securely store digital assets such as bonds.<sup>44</sup>

Previously, gold trading used paper-based record keeping and over-the counter trading methods. In November 2023, HSBC introduced a new platform that leverages DLT to convert the ownership of physical gold kept in its London vault into digital tokens.<sup>45</sup> Each of these tokens corresponds to a specific gold bar, effectively digitising the asset and enabling it to be tracked, traded, and managed on the blockchain. These digital tokens can then be exchanged via the bank's single-dealer platform.

### **Lessons learnt from less successful use cases**

Recognising various use cases of blockchain technology, it is crucial to acknowledge that not all blockchain projects have been successful. Alongside the achievements of leading economies, there have been instances where blockchain initiatives faced challenges and ultimately failed to achieve their intended goals. Building on the successful cases, a pivotal factor in developing a technical architecture is ensuring its openness to innovation by design and its ability to facilitate active participation. This enables businesses to plug in the technology efficiently and unleash their innovative potential within the ecosystem.



41 HKFI (December 2018). *Launch of the first-ever blockchain application for motor insurance authentication*. <https://www.hkfi.org.hk/#!/media-release/454>

42 CAICT (November 2022). *Xinghuo BIF launched the first International Supernode in Malaysia to build trusted digital infrastructure for China-ASEAN economic and trade cooperation*. [http://www.caict.ac.cn/english/news/202211/t20221128\\_412127.html](http://www.caict.ac.cn/english/news/202211/t20221128_412127.html)

43 Ibid.

44 HSBC (January 2023). *Investor bulletin January 2023*.

<https://www.hsbc.com/-/files/hsbc/investors/investing-in-hsbc/pdf/230127-investor-bulletin-edition-january-2023.pdf?download=1>

45 Bloomberg (November 2023). *HSBC Takes Stab at Using Blockchain to Modernize London's Antiquated Gold Market*.

<https://www.bloomberg.com/news/articles/2023-11-01/hsbc-launches-blockchain-platform-to-tokenize-ownership-of-gold-in-london-vault>

A case in point is the Australia Securities Exchange's ambitious project to develop a blockchain-based clearing system. Despite a substantial investment of over AUD 245 million, the project did not proceed further. The decision was primarily driven by concerns surrounding the system's complexity, scalability, and lack of adequate specialist support.<sup>46</sup>

In addition, blockchain projects such as We.trade<sup>47</sup>, TradeLens<sup>48</sup> and Marco Polo Network<sup>49</sup>, which aimed to transform trade finance and supply chain management with blockchain technology, respectively, failed to reach the necessary commercial viability for sustained business operations.

An exploration of these cases, which we have outlined in Appendix 3, illustrates a broader set of challenges that the global financial industry grapples with when adopting or sustaining blockchain technologies. It highlights the importance for stakeholders to gain an in-depth understanding of blockchain's inherent limitations.

These limitations and challenges can be broadly classified into four main categories: technical challenges, capacity building and public awareness, operational issues, and regulatory constraints. A brief description of each challenge is listed below. Each of these areas presents unique obstacles that need to be addressed to unlock the full potential of blockchain.



**Technical challenges:** The task of balancing decentralisation, security, and scalability – often referred to as the blockchain trilemma – can indeed be complex. To unlock the full potential of blockchain, a crucial focus should be on interoperability, seamless exchange with different blockchain networks, and integration into existing legacy systems which can be challenging.



**A better understanding of blockchain technology and applications is needed:** The path to wider adoption of the technology is often hindered by misconceptions – primarily associating blockchain with the volatility of cryptocurrencies – and a shortage of skilled professionals.



**Operational challenges:** The adoption of blockchain technology in a centralised business model can present operational challenges that can undermine its potential benefits. Companies in the blockchain and crypto sectors struggle with accessing traditional banking services, hindering their growth. Furthermore, the absence of specific audit standards for blockchain and virtual assets complicates financial verification, highlighting the need for tailored audit methodologies to ensure transparency and stakeholder trust.



**Regulatory constraints:** From a regulatory perspective, jurisdictional complexities arise due to blockchain's decentralised nature, creating confusion about the applicability of laws across borders.

By proactively addressing these issues, stakeholders can navigate the complexities associated with blockchain, make informed decisions, and significantly increase the likelihood of success in future initiatives.

46 Australian Securities Exchange (November 2022). *ASX will reassess all aspects of the chess replacement project and derecognise capitalised software of \$245-255 million pre-tax in 1H23*. [https://www.asx.com.au/content/dam/asx/about/media-releases/2022/60-17-november-2022-CHESS-Replacement-ASX-reassessing-financial-derecognition\\_.pdf](https://www.asx.com.au/content/dam/asx/about/media-releases/2022/60-17-november-2022-CHESS-Replacement-ASX-reassessing-financial-derecognition_.pdf)

47 Trade Finance Global (June 2023). *We.trade enters the trough of disillusionment – what this means for the digitalisation of trade finance*. Deepesh Patel. <https://www.tradefinanceglobal.com/posts/we-trade-enters-the-trough-of-disillusionment-what-this-means-for-the-digitalisation-of-trade-finance/>

48 Maersk (November 2022). *A.P. Moller - Maersk and IBM to discontinue TradeLens, a blockchain-enabled global trade platform*. <https://www.maersk.com/news/articles/2022/11/29/maersk-and-ibm-to-discontinue-tradelens>

49 Trade Finance Global (February 2023). *Marco Polo Network runs insolvent with €5.2m debts*. Deepesh Patel. <https://www.tradefinanceglobal.com/posts/marco-polo-network-runs-insolvent/>

## **Section 3**



## Factors to consider when designing blockchain applications

As Hong Kong continues to integrate blockchain technology into its fintech ecosystem, it is reinforcing its status as a thriving centre for innovation, investment, and technological progress in the financial sector. The city boasts several key advantages that expedite the adoption of blockchain technology. These include a well-developed telecommunications and network infrastructure, relatively ample access to a pool of skilled financial and technological professionals, and a robust legal framework, all of which lay a strong foundation for blockchain innovation and sophisticated digital transactions.

Nevertheless, it is crucial for both the Government and the industry to consider certain factors when designing blockchain applications and address imminent challenges in the financial services sector before implementing such technology in their businesses. This entails thorough planning and strategising to ensure blockchain solutions align with specific business needs, comply with regulatory requirements, and effectively address security, scalability, and interoperability concerns.

## **Governance model**

Establishing a suitable governance model is crucial for effective blockchain implementation. It requires the development of a governance mechanism that outlines the roles, responsibilities, and decision-making processes within the blockchain ecosystem. In particular, certain activities can be governed with a light-handed approach, while others must undergo review and regulation by the respective government bodies or regulators. Therefore, a well-defined governance model ensures transparency, accountability, and efficient coordination among various stakeholders.

## **Laws and regulations**

Most of Hong Kong's current regulatory framework has been established to accommodate the long-standing practices observed in the traditional financial services sector. As blockchain applications interact and new ones are introduced in traditional financial services, traditional enforcement methods may not fully address the challenges posed by emerging technologies. Some industry practitioners suggest adopting a technology-driven approach is necessary to foster growth, encourage innovation, and maintain market stability and protection.

To effectively oversee emerging market activities, it is essential for the law and regulations to incorporate monitoring, reporting, and a new incentive system. This consideration can be approached from two aspects. The first aspect involves the adoption of blockchain technology within the virtual asset domain. On this note, the Government and regulators have continuously modified and developed the regulatory framework to accommodate market activities. For instance, the SFC revised its anti-money laundering and counter-financing of terrorism (AML/CFT) guidelines for licensed corporations and associated entities to incorporate provisions and guidance related to the Anti-Money Laundering and Counter-Terrorist Financing (Amendment) Ordinance 2022 (the Amendment Ordinance)<sup>50</sup>, as well as introduced Guidelines for Virtual Asset Trading Platform Operators.<sup>51</sup> The Financial Services and the Treasury Bureau (FSTB) and the HKMA have released a public consultation paper to invite feedback from the public and stakeholders on the legislative proposal for implementing a regulatory regime for stablecoin issuers in Hong Kong.<sup>52</sup>

The second aspect relates to the further adoption of blockchain technology and its integration with traditional financial products and services, such as tokenised assets. In this context, the issue of “digital native processes” becomes relevant, highlighting the limitations presented by current laws and regulations regarding the use of fully digital signatures. For instance, certain documents, such as the instruments that require stamping under the Stamp Duty Ordinance and negotiable instruments, are not covered by the recognition of electronic signatures under the Electronic Transactions Ordinance, meaning that these documents still require traditional wet-ink execution.<sup>53</sup> These documents are particularly relevant to tokenised bonds and shares involving Hong Kong-incorporated companies, hence resulting in distinct challenges.<sup>54</sup> In this regard, conducting regular reviews of the legal framework and providing updated guidance that reflects recent advancements in technology will foster the integration and utilisation of blockchain technology.

50 SFC (May 2023). *Circular to Licensed Corporations and Associated Entities - Anti-Money Laundering / Counter-Financing of Terrorism Amendments to Anti-Money Laundering and Counter-Financing of Terrorism Guidelines*. <https://apps.sfc.hk/edistributionWeb/gateway/EN/circular/intermediaries/supervision/doc?refNo=23EC21>

51 SFC (June 2023). *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?rev=f6152ff73d2b4e8a8ce9dc025030c3b8>

52 HKMA (Dec 2023). *Stablecoins – Regulating issuers to accord protection to users*. <https://www.hkma.gov.hk/eng/news-and-media/insight/2023/12/20231227/>

53 *Cap. 553 Electronic Transactions Ordinance*. [https://www.elegislation.gov.hk/hk/cap553?xpid=ID\\_1438403432447\\_004](https://www.elegislation.gov.hk/hk/cap553?xpid=ID_1438403432447_004)

54 ASIFMA (October 2023). *ASIFMA Submission on Regulatory DLT Blockers in Hong Kong*.

### ***Industry standards and interoperability***

Industry standards play a pivotal role in facilitating collaboration and interoperability. Although standards in areas such as data structure are not yet fully established, their development is crucial for seamless cross-border collaboration and data exchange. Embracing industry standards promotes interoperability and facilitates the integration of blockchain with existing systems and enables communication and interoperability between different DLT systems and between DLT systems and existing systems.

### ***Degree of decentralisation***

The degree of decentralisation and the extent of anonymity are factors that impact the design of blockchain systems. Depending on the use case and regulatory requirements, the appropriate level of decentralisation and anonymity needs to be determined. This may involve choosing between a permissioned blockchain, where access is restricted to authorised participants or a permissionless blockchain that allows for broader participation.

Moreover, the volume of transactions to be handled also influences the choice between permissioned and permissionless blockchains. High transaction volumes may necessitate a permissioned blockchain that offers greater scalability and faster transaction processing, while permissionless blockchains are more suitable for open and decentralised ecosystems.

### ***Proven and resilient blockchain technology***

As mentioned in the previous section, numerous blockchain projects failed to reach the necessary commercial viability for sustained business operations. In addition to addressing commercial viability, another crucial aspect to consider when adopting blockchain technology is the need of cyber resiliency. As blockchain networks are not immune to potential vulnerabilities and attacks, it becomes imperative to ensure the robustness and security of the technology to safeguard against potential threats.

### ***Talent gap***

The talent issue poses a challenge to fintech development in the blockchain sector. There is often a knowledge gap between individuals with technical backgrounds and those with expertise in financial services. The gap is created as IT personnel may not have a comprehensive understanding of the underlying financial products required for developing technology. At the same time, professionals from the financial services industry possess the necessary knowledge to effectively deploy such technology. To bridge the knowledge gap and promote a skilled workforce in the fintech sector, comprehensive training programmes can equip individuals with the necessary interdisciplinary skills and knowledge, covering both the technical and financial aspects of blockchain technology.

By taking into account these non-technical factors and investing in talent development, businesses can explore the integration of blockchain technology into their operations. This strategic approach ensures the implementation of effective governance structures, adherence to regulatory compliance requirements, robust data security measures, seamless interoperability with existing systems, and the cultivation of a skilled workforce capable of leveraging blockchain technology effectively.

Upon evaluating the considerations involved in the creation of blockchain applications, please refer to Appendix 4 for a brief review of Hong Kong's readiness for a B2B blockchain network.

## **Section 4**



# Expanding opportunities for Hong Kong - the way forward

With staunch support from the Government, a thriving ecosystem, and a balanced regulatory approach, the potential of blockchain technology presents Hong Kong and financial institutions based in the city with a reason to expedite their technology adoption journey. Looking ahead, the city has a unique opportunity to harness the power of blockchain on a much grander scale, ushering in transformative changes across multiple sectors. The following examples illustrate potential areas where blockchain technology can be expanded.

## Promoting a government-participated blockchain as a utility service in Hong Kong

As advocated by some industry practitioners, an opportunity lies in the Government sponsoring the establishment of a common blockchain utility service to enable industry adoption. A government-participated blockchain, serving as a common blockchain utility service, can provide a reliable and readily accessible infrastructure for regulated activities. This is consistent with the concept of “blockchain as a public good”, where the Government plays a pivotal role in providing vital services for the welfare of society. On this note, it is imperative for the Government to identify and establish viable business cases that leverage the adoption of blockchain technology to improve the operation and efficiency of public services.

As Hong Kong progresses towards a digital economy, it is important for the Government to support the establishment of the fundamental infrastructure necessary for companies to adopt blockchain technology. In this connection, the Government's participation would be a powerful endorsement, signalling blockchain's viability and robust support from the highest levels of governance. A government-supported blockchain platform would allow verification of specific information that will minimise associated risks and costs, offering a secure and credible framework that lowers the entry barriers for companies, and thereby facilitating adoption across various business sizes and sectors.

Moreover, the Government's proactive stance could extend to forging public-private partnerships, drawing on the expertise of industry leaders to enhance the platform's capabilities. The Government's strategic involvement would add an essential layer of legitimacy and trust to the blockchain platform, encouraging wider adoption among businesses and individuals.

In terms of the 'blockchain's architecture and functionality, it is suggested that the Government and its partners consider forking the existing blockchain, e.g. Ethereum, with the aim of making it openly accessible only to licensed parties for regulated activities.<sup>55</sup> The Government and its partners will need to assess the feasibility of “forking” an existing blockchain to cater to the specific needs and requirements of regulated activities in Hong Kong. For instance, the parties can consider incorporating onboarding procedures similar to a KYC process, with varying qualification levels required depending on their intended activities on the blockchain network.

This approach fosters a conducive environment where licensed parties can participate and conduct blockchain-based activities in compliance with local regulations, thereby safeguarding the interests of investors and users.<sup>56</sup> Looking ahead, a government-participated blockchain has the potential to expand and implement beyond the finance sector to more areas in Hong Kong, including supply chain management, healthcare, intellectual property rights, and many others.

<sup>55</sup> Poon, J. (2023). *A critical juncture for digital assets*.

<sup>56</sup> HKMA. (October 2017). *Whitepaper 2.0 on Distributed Ledger Technology*.

<https://www.hkma.gov.hk/media/eng/doc/key-functions/financial-infrastructure/infrastructure/20171025e1a1.pdf>

## Considerations

Establishing a robust law and regulatory framework to govern the government-participated blockchain is critically important. As blockchain services have the potential to cover various applications, the law and regulatory framework must be agile and adaptable to minimise friction in adoption, promote growth, and protect the public.

In addition to the regulation, the implementation of a government-participated blockchain also brings with it a set of limitations and challenges, such as the issues of scalability, cybersecurity, and privacy, that must be addressed to ensure its smooth operation and reliability.



**Scalability**



**Cybersecurity**



**Privacy**

## Scalability and transaction speed

A blockchain will have more users or transactions, given its public nature. As the number of participants and transactions increases, the blockchain may become congested, leading to slower transaction processing times.<sup>57</sup> This can hinder the efficiency and responsiveness of the blockchain utility service, especially in situations where real-time/ immediate transaction settlement is critical. For instance, delays in financial transactions or emergency healthcare services, delays can have significant economic implications or even threaten lives. Therefore, ensuring high transaction throughput and real-time processing is important for a government blockchain to serve its intended purpose.

## Cybersecurity

Cybersecurity becomes even more critical when the platform handles sensitive data and oversees regulated activities. Although some existing blockchains have established an admirable security framework, it is essential to implement additional measures to protect the Government-participated blockchain from potential cyber threats.<sup>58</sup>

## Possible solutions

To address these concerns, the Government and its partners should collaborate with cybersecurity experts and seasoned blockchain developers to design practicable solutions with backup strategies to ensure system resilience and recovery in the face of potential issues.

This can involve exploring scalability solutions, such as Layer 2 protocols or sharding, to increase transaction capacity and alleviate network congestion. When public blockchain platforms are used, Layer 2 protocols offer off-chain or cross-chain solutions that can handle transactions away from the main blockchain, reducing the load on the network.<sup>59</sup> Sharding, on the other hand, divides the blockchain into smaller parts, each capable of processing its transactions and smart contracts.<sup>60</sup>

<sup>57</sup> Cointelegraph. *Permissioned blockchain vs. permissionless blockchain: Key differences*. <https://cointelegraph.com/learn/permissioned-blockchain-vs-permissionless-blockchain-key-differences>

<sup>58</sup> Deloitte. *Blockchain and Cybersecurity*. <https://www2.deloitte.com/content/dam/Deloitte/tr/Documents/technology-media-telecommunications/Blockchain-and-Cyber.pdf>

<sup>59</sup> Gangwal A., Gangavalli H. R., and Thirupathi A. (July 2022). *A Survey of Layer-Two Blockchain Protocols*. <https://arxiv.org/pdf/2204.08032.pdf>

<sup>60</sup> Tao Y., Li B. Jiang J., Ng H. C., Wang C., Li B. (2020). *On Sharding Open Blockchains with Smart Contracts*. <https://iqua.ece.toronto.edu/papers/ytao-icde20.pdf>

However, the use of Layer 2 protocols may expose it to cybersecurity attacks and failures in cross-chain protocols. In this context, the parties will need to address risk arising from the use of Layer 2 protocols. Measures to be considered may include integrating advanced cryptographic techniques to provide cybersecurity, multi-factor authentication to prevent unauthorised access, and secure key management systems to protect against the loss or theft of cryptographic keys, enhancing the cybersecurity posture of a government-participated blockchain.

Furthermore, staying up to date with technological advancements and industry best practices is crucial. If such a public chain is established, the Government will need to invest in research and development, foster partnerships with academic institutions and industry leaders, and actively engage in the global blockchain community. This proactive approach will allow Hong Kong's government-participated blockchain utility service to stay at the forefront of technological advancements, ensuring its long-term viability and competitiveness in the evolving digital landscape.

### **Enabling the orderly issuance of stablecoins in Hong Kong**

In the Policy Statement on Development of Virtual Assets in Hong Kong issued by the Government in October 2022, stablecoins were identified as a key focus area within the virtual asset ecosystem. Recognising the potential use cases and risks of stablecoins<sup>61</sup>, the FSTB and the HKMA recently jointly issued a public consultation paper on the legislative proposal for implementing the regulatory regime for fiat-referenced stablecoin issuers in Hong Kong.<sup>62</sup>

Against this background, issuing stablecoins pegged to the Hong Kong dollar, as well as those pegged to other commonly used currencies, in an orderly manner becomes possible. Ideally, a Hong Kong dollar-backed stablecoin may bring a positive impact on the liquidity and market depth of the Hong Kong dollar, thereby enhancing the efficiency of the financial markets.

This stablecoin may provide a digital currency alternative with a stable value, making it widely accepted as a means of payment within the city. With the use of DLT, payment and settlement via stablecoins could become more efficient and transparent and with enhanced certainty due to the immutability of transactional data. When used in conjunction with smart contracts, i.e. programmes that are stored on blockchain, stablecoins could also function as “programmable money” and be used to execute complex transactions.<sup>63</sup>

### **Promoting Hong Kong as a blockchain-enabled carbon trading centre in Asia**

Recognising sustainable development as a pivotal factor in shaping a long-lasting future, reducing carbon emissions and embracing sustainable practices have emerged as predominant trends in the world's leading economies. One noteworthy commitment among nations is Mainland China's pledge to achieve a carbon emission peak by 2030 and attain carbon neutrality before 2060.<sup>64</sup>

Hong Kong, as a prominent financial hub in the nation, has also made significant efforts to combat climate change. The city aims to reduce carbon emissions by 50% before 2035 and achieve carbon neutrality by 2050.<sup>65</sup> These targets reflect Hong Kong's dedication to aligning its economic prowess with sustainable practices, reinforcing the city's role as a responsible global player in combating climate change.

61 HKMA (December 2023). *Stablecoins – Regulating issuers to accord protection to users*. <https://www.hkma.gov.hk/eng/news-and-media/insight/2023/12/20231227/>

62 FSTB and HKMA (December 2023). *Legislative Proposal to Implement the Regulatory Regime for Stablecoin Issuers in Hong Kong – Consultation Paper*. <https://www.hkma.gov.hk/media/eng/doc/key-information/press-release/2023/20231227e4a1.pdf>

63 HKMA (December 2023). *Stablecoins – Regulating issuers to accord protection to users*. <https://www.hkma.gov.hk/eng/news-and-media/insight/2023/12/20231227/>

64 National Development and Reform Commission (March 2021). *The Outline of the 14th Five-Year Plan for the National Economic and Social Development and the Long-Range Objectives*. <https://www.ndrc.gov.cn/xxgk/zcfb/ghwb/202103/P020210323538797779059.pdf>

65 Environment and Ecology Bureau (October 2021). *Hong Kong's Climate Action Plan 2050*. [https://cnsd.gov.hk/wp-content/uploads/pdf/CAP2050\\_booklet\\_en.pdf](https://cnsd.gov.hk/wp-content/uploads/pdf/CAP2050_booklet_en.pdf)

Building on the concerted efforts of public-sector stakeholders, the HKEX and the community, the FSDC launched a research report on Hong Kong's role in capturing the carbon market opportunities in 2023,<sup>66</sup> identifying the challenges facing the voluntary carbon markets (VCMs) and offering insights on creating a comprehensive ecosystem that fosters the growth of carbon trading, particularly VCMs, in Hong Kong. The paper explored the advantages of constructing a technology-driven carbon credit trading platform by harnessing the synergies of blockchain and IoT technology. Such an approach would streamline the verification process of carbon credits and promote data transparency, which tracking and tracing transaction prices, volume, and the retirement status of relevant carbon credits. This integration was identified as a viable technological solution with the potential to prevent the issue of double-counting carbon credits and facilitate the credibility of data, thereby bolstering the integrity, efficiency and effectiveness of VCMs.

### ***Climate actions in Mainland China and potential development in Hong Kong***

In June 2023, the China Academy of Information and Communications Technology (CAICT) introduced a new carbon data service network called Carbon data Reliable Circulation (CRC).<sup>67</sup> This CRC network utilises various technologies – including logo analysis, distributed digital identity, smart contracts, privacy computing, and industrial big data – to provide a one-stop solution for capturing and verifying the carbon footprint of products, aiming to digitally capture and authenticate the carbon footprint of products, providing a seamless and credible solution.<sup>68</sup>

If Hong Kong becomes one of the service nodes in the CRC network, the city will have access to a range of advanced technologies by participating in the network. These technologies will enable Hong Kong to offer a comprehensive and reliable solution for capturing and verifying the carbon footprint of products. Additionally, Hong Kong's involvement in the CRC network will facilitate collaboration and knowledge sharing with other participants. Capitalising on partnership opportunities and advanced blockchain technologies, Hong Kong can establish itself as a regional hub for carbon data services, further strengthening its position as a responsible global player in addressing climate change.

<sup>66</sup> FSDC (February 2023). *Road to Carbon Neutrality: Hong Kong's Role in Capturing the Rise of Carbon Market Opportunities*. <https://www.fsd.org.hk/media/4plathbr/20230202-fsdc-carbon-paper-en.pdf>

<sup>67</sup> Xinghuo (June 2023). *Carbon data Reliable Circulation*. [https://www.cnii.com.cn/rmydb/202306/t20230613\\_479077.html](https://www.cnii.com.cn/rmydb/202306/t20230613_479077.html)

<sup>68</sup> Ibid.

## **Section 5**

# Recommendations

As outlined in the previous sections, while the integration of blockchain technology/ DLT has gained momentum, there is still substantial scope for deeper, more widespread adoption in the financial services industry. Nurturing a vibrant and supportive ecosystem is a crucial driver of this process. Such an ecosystem thrives on the collaborative efforts of three key pillars: the Government, industry, and academia. With this in mind, the FSDC has identified strategic initiatives across three dimensions to boost blockchain adoption and propel its advancement in the city.

## **Regulatory adaptation and oversight for technological readiness**

- *Recommendation 1: Conducting industry consultations on the development of a digitalisation strategy and roadmap*
- *Recommendation 2: Integrating development and regulatory oversight of blockchain applications under the established dedicated Task Force*

## **Cultivating a vibrant ecosystem for blockchain technology with active Government participation and strategic support**

- *Recommendation 3: Fostering digitalisation adoption, including the use of blockchain technology in the delivery of government participated services and initiatives*

## **Capacity building: Raising public awareness and enhancing technical competency**

- *Recommendation 4: Raising public awareness and the global profile of Hong Kong's blockchain ecosystem through targeted marketing and collaborative efforts*
- *Recommendation 5: Establishing Hong Kong as a regional centre of excellence for training, thought leadership and technological literacy in blockchain and emerging technologies through conferences, targeted education and integration of local and global expertise*

## Regulatory adaptation and oversight for technological readiness

In their efforts to stay ahead of the ever-evolving landscape of emerging technologies and create an environment that promotes innovation in Hong Kong, the Government and regulators have been actively exploring potential amendments and enhancements to the regulatory framework and legislation. To further advance this goal, the Innovation, Technology and Industry Bureau promulgated the Hong Kong Innovation and Technology Development Blueprint (Blueprint) in December 2022.<sup>69</sup> The Blueprint outlines a path and strategic planning for Hong Kong's innovation and technology development over the next five to ten years.

Furthermore, in the 2023 Policy Address, the Chief Executive made an announcement regarding the establishment of the Digital Policy Office.<sup>70</sup> This office will be led by the Commissioner for Digital Policy and will have the crucial responsibility of formulating policies on digital government, data governance and information technology.

However, the rapid development of new technologies has outpaced current legislative provisions, necessitating updates to ensure regulatory clarity and consistency. To this end, the following two proposals are suggested for the Government's consideration as follows.

### **Recommendation 1: Conducting industry consultations on the development of a digitalisation strategy and roadmap**

Building on the Government's various initiatives to foster a thriving fintech ecosystem, the financial service industry has responded to the call for digitalisation and made significant strides in providing innovative services and solutions to their clients.<sup>71</sup> However, the industry highlights that Hong Kong faces a challenge in terms of having a clear roadmap, comprehensive turnkey solutions, and sufficient technical support for effectively transforming the digitalisation of business operations across various industries.<sup>72</sup>

While financial institutions in Hong Kong appreciate and acknowledge the value of the current regulatory approaches in place, market participants have put forth proposals calling for the implementation of more flexible and adaptable regulations and guidelines, specifically targeting innovative technologies such as blockchain, for the industry to navigate the evolving digital landscape effectively.<sup>73</sup> As highlighted in the previous section, the industry proposed expanding the recognition of electronic signatures under the Electronic Transactions Ordinance (ETO) and Stamp Duty Ordinance as a means to accelerate the process of digitalisation.<sup>74</sup> In particular, market participants suggest considering the removal of existing exceptions from using electronic records and digital signatures as outlined in Schedule 1 of the ETO.<sup>75</sup> This suggestion entails modernising the associated legal framework and establishing industry standards and best practices for electronic transactions and signatures.

69 Innovation, Technology and Industry Bureau (December 2022). *Hong Kong Innovation and Technology Development Blueprint*. [https://www.itib.gov.hk/en/publications/I&T%20Blueprint%20Book\\_EN\\_single\\_Digital.pdf](https://www.itib.gov.hk/en/publications/I&T%20Blueprint%20Book_EN_single_Digital.pdf)

70 HKSAR (October 2023). *The Chief Executive's 2023 Policy Address*. <https://www.policyaddress.gov.hk/2023/en/p39.html>

71 HKIMR and AoF (July 2023). *The Digitalisation of Financial Services in Hong Kong: Recent Experience, Regulatory Developments and Considerations for Sustainable Innovation and Growth*. <https://www.aof.org.hk/docs/default-source/hkimr/applied-research-report/drep.pdf>

72 HKPC and Microsoft Hong Kong (October 2023). *Hong Kong Enterprise Digitalisation Index Survey*. <https://campaigns.hkpc.org/hubfs/CDD/media%20team/HK-Enterprise-Digitalisation-Index.pdf>

73 HKIMR and AoF (July 2023). *The Digitalisation of Financial Services in Hong Kong: Recent Experience, Regulatory Developments and Considerations for Sustainable Innovation and Growth*. <https://www.aof.org.hk/docs/default-source/hkimr/applied-research-report/drep.pdf>

74 ASIFMA (October 2023). *ASIFMA Submission on Regulatory DLT Blockers in Hong Kong*.

75 Hong Kong e-Legislation (January 2024). *Cap. 553 Electronic Transactions Ordinance*. [https://www.elegislation.gov.hk/hk/cap553?xpid=ID\\_1438403432447\\_004](https://www.elegislation.gov.hk/hk/cap553?xpid=ID_1438403432447_004)



### Existing provisions in the ETO

As stipulated in Schedule 1 of the ETO (Cap. 553), the exemption from using electronic records and digital signatures includes the making, execution or making and execution of any instrument which is required to be stamped or endorsed under the Stamp Duty Ordinance (Cap. 117) other than a contract note to which an agreement under section 5A of that Ordinance relates; and any assignment, mortgage or legal charge within the meaning of the Conveyancing and Property Ordinance (Cap. 219) or any other contract relating to or effecting the disposition of immovable property or an interest in immovable property.

Transitioning from regulations to operations, market participants also emphasise the importance of establishing guidance workshops, training sessions, and regular dialogue between regulators and the industry to provide in-depth insights into the regulatory framework and address any industry-specific concerns or challenges.<sup>76</sup> On this note, it is imperative for the Government to develop a clear direction and framework for the potential opportunities. One effective way to attain a comprehensive understanding of digitalisation efforts and industry requirements is through organising a hackathon. This hackathon can serve as a platform for interested entities to identify obstacles associated with digitalisation and possible solutions and blockchain applications in their business operations. By engaging participants in brainstorming sessions and problem-solving activities, they can test and validate technological solutions to ensure their viability and potential for successful implementation during the Proof-of-Concept phase.

After developing a direction and framework for the potential opportunities and raising public awareness about digital transformation through the hackathon, the Government and relevant regulators should conduct regular industry consultations on the development of a comprehensive digitalisation strategy and roadmap for the city. These consultations should involve the active engagement of key stakeholders from diverse industries, including finance, technology, and other relevant sectors. Industry consultations will promote a sense of ownership and shared responsibility among stakeholders to cultivate a collective vision for the city's digital future.

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<sup>76</sup> ASIFMA (October 2023). *ASIFMA Submission on Regulatory DLT Blockers in Hong Kong*.

## Consultations on a Digitalisation Roadmap

The COVID-19 pandemic has served as one of the key factors to accelerate the shift towards digitalisation. In recent years, many governments have recognised the need to modernise regulations to effectively address the challenges and opportunities that come with digital transformation. The following examples and their key takeaways serve as valuable references for Hong Kong's digitalisation strategy and roadmap development:

### European Commission

- **Consultation on a New Digital Finance Strategy**

The European Commission has acknowledged the immense potential of the digital economy, especially within the financial sector. To this end, the European Commission initiated a public consultation in April 2020 to gather the views of Member States on policies that can facilitate the growth of digital finance and enhance the regulatory framework for the EU financial system to align with the digital landscape.<sup>77</sup>

The consultation received feedback from various stakeholders in the financial industry, and the majority of respondents expressed the view that the existing regulatory framework was not technology-neutral and did not adequately support innovation in the financial sector.<sup>78</sup> Respondents also stressed the importance of ensuring multi-disciplinary cooperation between authorities, as well as enhancing the digital capacity and skills of supervisors to effectively regulate and supervise digital financial services.<sup>79</sup>

In response to the feedback, the European Commission introduced and adopted a digital finance package in September 2020 to foster innovation in financial products, including crypto assets, and safeguard consumer interests.<sup>80</sup>

- **Digital Education Action Plan (2021-2027)**

Noting a growing need for enhancing the digital capacity of stakeholders, including policymakers, academia, researchers, and institutions, the European Commission initiated an open public consultation on the update of the Digital Education Action Plan in June 2020.<sup>81</sup>

Building on the feedback received during the consultation, the European Commission subsequently released a comprehensive Digital Education Action Plan for the period from 2021 to 2027. Its primary objective is to support Member States in adapting their education and training systems to equip stakeholders with the necessary knowledge, skills, and strategies, aiming to effectively navigate the rapidly changing digital landscape and capitalise on the potential benefits offered by digital technologies.<sup>82</sup>

To bolster cooperation and foster exchange in the field of digital education at the EU level, the European Commission has taken the initiative of setting up the European Digital Education Hub.<sup>83</sup> This education hub serves as a platform for strengthening collaboration, promoting knowledge sharing, and facilitating the exchange of best practices among digital education practitioners and stakeholders in the Member States.

77 European Commission (2020). *Consultation on a new digital finance strategy for Europe / FinTech action plan*. [https://finance.ec.europa.eu/regulation-and-supervision/consultations/2020-digital-finance-strategy\\_en](https://finance.ec.europa.eu/regulation-and-supervision/consultations/2020-digital-finance-strategy_en)

78 European Commission (September 2020). *Consultation on a new digital finance strategy - summary of responses*. [https://finance.ec.europa.eu/system/files/2020-09/2020-digital-finance-strategy-consultation-summary-of-responses\\_en.pdf](https://finance.ec.europa.eu/system/files/2020-09/2020-digital-finance-strategy-consultation-summary-of-responses_en.pdf)

79 Ibid.

80 European Commission (September 2020). *Digital finance package*. [https://finance.ec.europa.eu/publications/digital-finance-package\\_en](https://finance.ec.europa.eu/publications/digital-finance-package_en)

81 European Commission (June 2020). *Digital education action plan (update)*. [https://ec.europa.eu/info/law/better-regulation/have-your-say/initiatives/12453-Digital-education-action-plan-update\\_en](https://ec.europa.eu/info/law/better-regulation/have-your-say/initiatives/12453-Digital-education-action-plan-update_en)

82 European Commission (September 2020). *Digital Education Action Plan (2021-2027)*. <https://education.ec.europa.eu/focus-topics/digital-education/action-plan>

83 European Commission. *European Digital Education Hub*. <https://education.ec.europa.eu/focus-topics/digital-education/action-plan/european-digital-education-hub>

## The Government of Ontario

- **Digital and Data Strategy Consultations**

The Government of Ontario conducted three phases of public consultation in 2019 and 2020 to support the implementation of its digital initiatives outlined in the Ontario Onwards Action Plan.<sup>84</sup> The action plan is a comprehensive guide that outlines the Government of Ontario's pledge to modernise public sector services and enhance operational efficiency by encouraging the integration of digital and data-driven solutions.<sup>85</sup>

The consultations focused on various key areas, including promoting trust and confidence in the data economy, discussing the challenges and opportunities associated with digital transformation, and exploring ways to enhance a smarter government.<sup>86</sup> Based on the results of these consultations, the Government of Ontario launched its Digital and Data Strategy in April 2021 to position Ontario as a leading digital jurisdiction globally, equipped with skilled talent, robust privacy protection measures, strong data connectivity, and comprehensive government support for digital services.<sup>87</sup>

## Australian Government

- **Consultation on the Australian Government First Data and Digital Government Strategy**

Recognising the rising demand for secure and seamless digital government services in Australia, the Albanese Government initiated a public consultation in June 2023 to develop their first data and digital government strategy. This strategy will serve as a blueprint for the Government's adoption of digital technologies until the year 2030.

In December 2023, the Australian Government launched the Data and Digital Government Strategy<sup>88</sup> and the Implementation Plan<sup>89</sup>. In particular, the Implementation Plan provides a detailed timeline and action plan for executing specific initiatives to achieve the Australian Government's data and digital agenda by 2030. These documents outline the vision and roadmap for leveraging digital technologies and data-driven approaches within the Australian Public Service.

84 The Government of Ontario (March 2022). *Digital and Data Strategy consultations*. <https://www.ontario.ca/page/digital-and-data-strategy-consultations>

85 The Government of Ontario (September 2023). *Ontario Onwards: Action Plan*. <https://www.ontario.ca/page/ontario-onwards-action-plan>

86 The Government of Ontario (December 2023). *Archived - Consultation for Ontario's Digital and Data Strategy*. <https://www.ontario.ca/document/consultation-ontarios-digital-and-data-strategy>

87 The Government of Ontario (April 2021). *Building a Digital Ontario*. <https://www.ontario.ca/page/building-digital-ontario#section-0>

88 Australian Government (December 2023). *Data and Digital Government Strategy*. <https://www.dataanddigital.gov.au/sites/default/files/2023-12/Data%20and%20Digital%20Government%20Strategy%20v1.0.pdf>

89 Australian Government (December 2023). *Data and Digital Government Strategy Implementation Plan*. <https://www.dataanddigital.gov.au/sites/default/files/2023-12/Data%20and%20Digital%20Implementation%20Plan%20v1.0.pdf>

Drawing from the experiences of other jurisdictions, conducting public consultations can be a crucial initial step towards developing an efficient and adaptable blueprint for digital transformation. Such consultations can serve as invaluable opportunities to seek insights from the industry and carefully review the existing regulatory framework, enabling necessary adjustments to align with the rapidly evolving digital landscape.

As with other successful public consultation exercises carried out by the Government and regulators in the past, the FSDC believes valuable feedback from stakeholders of different backgrounds will be gathered.

***Recommendation 2: Integrating development and regulatory oversight of blockchain applications under the established dedicated Task Force***

To cultivate a fertile ecosystem for blockchain-based financial services, the need for a clear strategic direction, regulatory clarity, and consistency in the industry is critical. The development of a regulatory environment that is both conducive to growth and underpinned by governance is paramount for the industry's advancement.

The multifaceted and cross-sectoral nature of blockchain applications necessitates a coordinated oversight mechanism. Multiple regulators are involved in overseeing the diverse applications of blockchain, each governed by distinct sets of laws that influence the development and deployment of the technology. In light of this, a dedicated oversight body, with diverse insights from regulators, industry associations, and market experts, can offer comprehensive monitoring of blockchain technologies and related applications. The Task Force on Promoting Web3 Development (the Task Force),<sup>90</sup> under the guidance of the Financial Secretary and with the participation of members from relevant sectors, including key government officials and financial regulators, is well positioned to broaden its remit to undertake this role.

The Task Force plays a governance role in identifying and mitigating emerging risks and challenges in the fast-evolving blockchain landscape. Engaging in systematic reviews, aligning with international best practices, and staying attuned to market dynamics, the Task Force is empowered to craft strategic policy directives and refine regulatory approaches in a timely manner. Such coordinated oversight fosters an environment where innovation thrives in concert with consumer protection and the maintenance of financial system integrity.

In August 2023, the HKMA, in collaboration with the SFC and the IA, introduced the Hong Kong Fintech Promotion Roadmap, marking significant initiatives for the upcoming year to enhance further fintech adoption, including DLT within the financial sector.<sup>91</sup> Despite this initiative's merits, a more extended strategic vision is necessary to build sustained growth and instil confidence among stakeholders, both locally and internationally. The Task Force, with its wealth of expertise, is presented with a unique opportunity to shape the blockchain technology landscape and to drive higher adoption rates.

To create a thriving ecosystem, the Task Force should consider comprehensive planning by formulating a medium-term roadmap, such as a five-year plan, for advancing blockchain adoption. This framework not only addresses regulatory structures but also spans talent development, investment opportunities, and collaborative ventures, complete with in-depth use cases across various industries, delineating the attendant benefits. Such a strategic and granular plan would undoubtedly catalyse the long-term progression and broad-based adoption of blockchain technology, positioning Hong Kong at the forefront of this digital revolution.

The Task Force's mandate can be expanded further to include initiatives such as research and development and educational outreach. For example, the Task Force is suggested to have regular dialogue with key stakeholders from various industries, including financial institutions, technology companies, industry associations, and legal experts, to ensure a comprehensive understanding of the challenges and opportunities presented by blockchain technology across different industries.<sup>92</sup> This collective expertise can help strike a balance between facilitating innovation and safeguarding the interests of consumers and the overall financial system.

90 HKSAR (June 2023). *Task Force on Promoting Web3 Development established*. <https://www.info.gov.hk/gia/general/202306/30/P2023063000579.htm>

91 HKMA (August 2023). *Hong Kong Fintech Promotion Roadmap*.

<https://www.hkma.gov.hk/media/eng/doc/key-information/guidelines-and-circular/2023/20230825e1a1.pdf>

92 There are various associations in Hong Kong dedicated to fostering a vibrant and inclusive environment for Internet and virtual assets, such as the Fintech Association of Hong Kong and Web3 Harbour etc.

## Cultivating a vibrant ecosystem for blockchain technology with active Government participation and strategic support

In recent year, the Government has made commendable efforts to promote innovation and technology and fintech development in the city. With various funding commitments and support schemes, the Government has invested over HKD 200 billion in developing innovation and technology infrastructure, promoting research and development, nurturing the tech talent pool and many others.<sup>93</sup> (Refer to Appendix 5 for a list of the related government funding scheme and support, and strategic initiatives offered by non-departmental public bodies or corporations.) While financial incentives are a crucial piece of the puzzle in driving technological advancement, they represent only one facet of the Government's role in cultivating a dynamic ecosystem.

### **Recommendation 3: Fostering digitalisation adoption, including the use of blockchain technology, in the delivery of government services and initiatives**

The Government's active engagement in the digitalisation and blockchain ecosystem catalyses for the widespread adoption of these technologies. This direct involvement plays a pivotal role in strengthening Hong Kong's leadership in technology innovation and incentivising financial institutions to embrace and capitalise on these advancements.

In Hong Kong, the Government is dedicated to formulating strategies and implementing measures to promote the adoption of digitalisation across various industries.<sup>94</sup> However, there is a common misconception among many corporations that digitalisation simply refers to digitisation – merely converting documents into digital formats such as PDFs. Even in such a case, the total amount of paper consumed in 2022-23 in Hong Kong still increased by 4.47% compared to the previous year.<sup>95</sup>

To promote a more accurate understanding of digitalisation, the Government should raise awareness and provide guidance. This can be achieved through various means, including launching targeted campaigns, organising workshops and seminars where industry experts and digitalisation practitioners share their knowledge and experiences intending to raise corporations' awareness about the broader concept of digitalisation, and providing resources, such as guidelines, toolkits, and frameworks, to support corporations in understanding and implementing digitalisation initiatives.

It is essential for the Government to take the initiative and lead by example in digitally transforming its own operations. By embracing electronic processes and actively implementing digitalisation strategies, the Government will set a precedent, demonstrating the benefits and advantages of digital transformation to other sectors and encouraging them to follow suit.<sup>96</sup> In this regard, blockchain technology, in particular, stands out as a tool to accelerate digital transformation efforts.

An opportunity where the Government can exemplify digitalisation lies within the Land Registry's operations. Some industry practitioners have highlighted the potential of property tokenisation. Integral to this advancement is the need to digitalise the registration and transfer of land ownership. Currently, the Land Registry operates a computerised land register for each property, but the process is still heavily dependent on paper documentation. This includes the manual submission of deeds and other legal documents for property registration and record-keeping,<sup>97</sup> which not only increases the risk of human error but also drives up transaction costs due to brokerage, recording, and legal fees.<sup>98</sup> The integration of blockchain technology into the Land Registry could enhance efficiency and reduce costs. Blockchain provides a secure and transparent method for recording property transactions, ensuring the authenticity of documents and minimising the risk of fraud.<sup>99</sup> It would

93 HKSAR (November 2023). *AI firms keen to come to HK*. [https://www.news.gov.hk/eng/2023/11/20231108/20231108\\_154643\\_019.html](https://www.news.gov.hk/eng/2023/11/20231108/20231108_154643_019.html)

94 HKSAR (June 2022). *Government announces establishment of Digital Economy Development Committee*. <https://www.info.gov.hk/gia/general/202206/22/P2022062200375.htm?fontSize=1>

95 HKUST. *Paper*. <https://sust.hkust.edu.hk/performances/paper>

96 Mohammed Shuaib, Noor Hafizah Hassan, Sahnius Usman, Shadab Alam, Surbhi Bhatia, Deepika Koundal, Arwa Mashat, Assaye Belay (2022). *Identity Model for Blockchain-Based Land Registry System: A Comparison*. <https://www.hindawi.com/journals/wcmc/2022/5670714/>

97 The Land Registry. *Registration of Deeds*. [https://www.landreg.gov.hk/en/services/services\\_a\\_1.htm#1](https://www.landreg.gov.hk/en/services/services_a_1.htm#1)

98 Saull, A., Baum, A., & Braesemann, F (2020). *Can digital technologies speed up real estate transactions?* <https://doi.org/10.1108/JPIF-09-2019-0131>

99 Madhura, K., & Mahalakshmi, R. (2022). *Usage of blockchain in real estate business for transparency and improved security*. <https://doi.org/10.1109/ACCAI53970.2022.9752593>

enable a more streamlined registry process and verification system, granting land inspectors and users alike effortless access to and confirmation of records.<sup>100</sup>

Another opportunity lies in adopting blockchain technology for verifying cross-boundary data and digital identities. This opportunity aligns with the Government's focus on establishing a mechanism for facilitating data trading within the data ecosystem, as highlighted in the 2024-25 Budget.<sup>101</sup> Notably, Mainland China has emerged as a frontrunner in this area, placing significant emphasis on developing its digital economy. To deepen integration between Hong Kong and the Mainland, it is strategic for the Government to prioritise the use of blockchain for these purposes.

A notable initiative is the launch of a blockchain-based verification platform as part of the Greater Bay Area (GBA) initiative, designed to streamline cross-boundary data verification between Shenzhen and Hong Kong. It aims to strengthen data connectivity across the GBA.<sup>102</sup> The initial phase of the trial operation will target the cross-boundary financial field.<sup>103</sup>

Additionally, the Ministry of Public Security and the national-level Blockchain-based Service Network jointly introduced the Real-Name DID (RealDID) service in December 2023.<sup>104</sup> The RealDID is designed to leverage blockchain technology to provide a wide range of identity verification services to the entire population of Mainland China in a secure and reliable manner. These services include real name verification, data encryption for personal data protection, secure private logins, business identity checks, and personal identification certificate services. Together, these initiatives signify a concerted effort to integrate blockchain technology into Mainland China's digital infrastructure.

Acknowledging the growing demand for the effective flow of financial data within the GBA, the FSDC published a report on establishing Hong Kong's role as the financial data hub of the region in December 2022.<sup>105</sup> One of the policy recommendations suggests the Government explores the use of new technologies, including blockchain technology, to enable cross-boundary data transfers within the GBA. Insights can be drawn from other global blockchain-based data exchange networks that involve various governments. It is crucial for the Government to not only act as a promoter of the blockchain-based platform, but also actively integrate the platform to deliver utility services in Hong Kong.

Considering the inherent and delicate nature of verification services, it is important for the Government to establish a clear and transparent regulatory framework. Such a framework would ensure the secure and traceable handling of cross-boundary data, thereby safeguarding the sensitive information of corporations and individuals and upholding their privacy rights.

Furthermore, blockchain-based verification services should not be limited solely to the financial sector. They have far-reaching implications for the entire local ecosystem, extending to various sectors such as supply chain management, healthcare, real estate, and more. Therefore, in addition to implementing laws and regulations, the Government should also play a significant role in establishing standards and promoting interoperability in blockchain-based solutions across sectors and regions. This approach, often referred to as government-to-government collaboration, leverages the Government's influence in driving cooperation and coordination among different authorities and entities, with the goal of nurturing a thriving blockchain ecosystem that benefits both the public and private sectors.

100 Sharma, Richa and Galphat, Yugchhaya and Kithani, Ekta and Tanwani, Jaya and Mangnani, Bhavesh and Achhra, Nikita (May 2021). *Digital Land Registry System Using Blockchain*, <https://deliverypdf.ssrn.com/delivery.php?ID=884112031001096106090023118025009024001024032007049053005122123102085115088113080121124025056115114005124127019097100099102110023039056023040022114015098007005095118093008028091088008011096113122117016007117067117094019005013030005123101115080118064115&EXT=pdf&INDEX=TRUE>

101 HKSAR (February 2024). *The 2024-25 Budget*. <https://www.budget.gov.hk/2024/eng/budget14.html>

102 Shenzhen Government Online (November 2023). *深港跨境資料驗證平臺建設啟動*. [http://www.sz.gov.cn/cn/xxgk/zfxgj/zwdt/content/post\\_11014610.html](http://www.sz.gov.cn/cn/xxgk/zfxgj/zwdt/content/post_11014610.html)

103 According to the Shenzhen Municipal People's Government, the Bank of China and the Bank of East Asia will be among the first financial institutions to use the platform.

104 Ministry of Public Security of China (December 2023). *BSN實名DID服務正式啟動*. [http://bigdata.sic.gov.cn/sic/83/79/1213/20231213163418553826252\\_pc.html](http://bigdata.sic.gov.cn/sic/83/79/1213/20231213163418553826252_pc.html)

105 FSDC (December 2022). *Connecting Data: Establishing Hong Kong as a Cross-Boundary Financial Data Hub*. <https://www.fsdc.org.hk/media/rbje0yr/20221209-datahub-report-final-en.pdf>

## Capacity building: Raising public awareness and enhancing technical competency

The effective adoption and implementation of blockchain technology in Hong Kong partly relies on public awareness and understanding of its potential benefits. Recognising this crucial aspect, it is imperative to prioritise efforts to raise public awareness and knowledge of Hong Kong's blockchain landscape.

### **Recommendation 4: Raising public awareness and the global profile of Hong Kong's blockchain ecosystem through targeted marketing and collaborative efforts**

To catalyse the widespread adoption of blockchain technology in Hong Kong, it is essential to raise public awareness of the local blockchain ecosystem and its myriad benefits and potential. While the integration of blockchain into government services is advantageous, as noted earlier, the importance of strategic marketing efforts and strengthening Hong Kong's global presence should not be underestimated. Highlighting real-world applications within both the public and private sectors serves as a potent impetus for adoption. Such a dual strategy would ensure the sustainability of Hong Kong's blockchain environment.

Take, for instance, the Shared Blockchain Platform introduced by the Office of the Government Chief Information Officer (OGCIO) in June 2022. This platform enables government bureaux and departments to provide citizens with high-quality digital government services by leveraging blockchain applications in a convenient and swift manner.<sup>106</sup> Notwithstanding the efforts made towards this initiative, industry practitioners have expressed that public awareness and adoption have been suboptimal.

This indicates the need for the Government to develop a comprehensive marketing strategy in tandem with its investment and adoption of blockchain technology. Such a strategy should accentuate the initiative's unique advantages and demonstrate successful implementations, thereby fostering understanding, acceptance, and ultimately, widespread adoption of the platform.

In addition to domestic efforts, the Government's role in the blockchain sector should also be marked by active international collaboration, establishing its presence on the global stage. Engaging in global discussions with international blockchain communities, such as the European Commission,<sup>107</sup> the Technical Committees in the International Organisation for Standardisation,<sup>108</sup> the IEEE Standards Association<sup>109</sup> and others, Hong Kong can promote its status and stay informed about the latest advancements, regulatory developments, and practical use cases from around the world. In this context, the Government can adapt its strategies and policies to align with global best practices. This engagement also opens opportunities for cross-border collaborations and knowledge sharing, contributing to the growth and development of Hong Kong's blockchain ecosystem.

In pursuit of a long-term vision, Hong Kong should transform itself into a centre of blockchain excellence in training, thought leadership and community engagement. The allocation of HKD 50 million announced in the 2023-24 Budget to foster the Web3 ecosystem through hosting international seminars, in addition to the annual Fintech Week, contributes to the transformation. In particular, the establishment of "Web3 Hub@Cyberport", is designed to nurture local startups and entice international Web3 companies through a supportive and collaborative environment. By October 2023, this initiative successfully attracted over 210 Web3 companies to Hong Kong. Additionally, the city marked its influence by hosting its first major Ethereum event during the "Web3 Innovators Season". This is complemented by local universities enhancing their educational offerings, with Hong Kong Polytechnic University being recognised as a top institution for blockchain education.

By continuing to organise and host international blockchain events, Hong Kong can reinforce its role as a crucible of blockchain thought leadership. These gatherings are not just events but incubators for collaboration and community-building, essential elements for establishing Hong Kong as a beacon of blockchain excellence and engagement.

<sup>106</sup> ITIB (November 2022). *LCQ17: Development of metaverse*. [https://www.itib.gov.hk/en/legislative\\_council\\_business/questions/2022/pr\\_20221130.html](https://www.itib.gov.hk/en/legislative_council_business/questions/2022/pr_20221130.html)

<sup>107</sup> European Commission. *Blockchain standards*. <https://digital-strategy.ec.europa.eu/en/policies/blockchain-standards>

<sup>108</sup> ISO. *ISO/TC 307 Blockchain and distributed ledger technologies*. <https://www.iso.org/committee/6266604.html>

<sup>109</sup> IEEE Blockchain. *Standards*. <https://blockchain.ieee.org/standards>

This multifaceted approach, combining domestic initiative promotion and global engagement, is pivotal in advancing Hong Kong's blockchain ecosystem and enhancing its position as a frontrunner in this field.

***Recommendation 5: Establishing Hong Kong as a regional centre of excellence for training, thought leadership and technological literacy in blockchain and emerging technologies through conferences, targeted education, and integration of local and global expertise***

To truly excel in the blockchain domain, Hong Kong needs a structured approach to the cultivation of education and expertise. Recognising the critical role of a well-informed populace and a skilled workforce, the Government and regulatory bodies must channel resources into comprehensive initiatives aimed at elevating blockchain literacy at all levels – from policymakers, regulators, and industry practitioners to the general public.

**Nurturing local talent through education**

Comprehensive and accessible educational programmes and training workshops, covering a wide spectrum of blockchain technology or DLT knowledge, are essential. These initiatives should delve into the fundamental principles of blockchain technology or DLT, its potential applications across various sectors, and the regulatory considerations associated with its implementation. For instance, the implementation of the Enhanced Competency Framework on fintech exemplifies this approach by incorporating fundamental concepts of financial technologies, including blockchain, within fintech applications in the banking sector.<sup>110</sup> This framework ensures that professionals possess a solid understanding of blockchain's applications in the banking sector. For those seeking a more advanced understanding, other advanced educational programmes and training workshops available in the market could further deepen their knowledge.

Training workshops, integrated within these educational programmes, can significantly contribute to promoting blockchain awareness. They serve as interactive platforms where participants engage in hands-on learning experiences through practical demonstrations and simulations. Furthermore, workshops provide a venue for discussions on best practices, challenges, and emerging trends in the blockchain space.

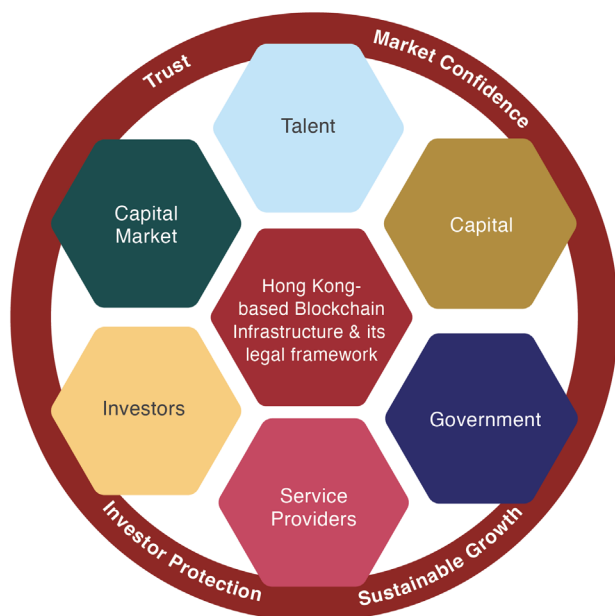
To maximise the impact of these educational initiatives, it is crucial to foster collaborative relationships with academic institutions and industry experts in order to develop curricula that focus on blockchain technology and its related research programmes. Integrating blockchain courses into established academic disciplines, including computer science, information engineering, business, and law, will enable Hong Kong to nurture a new generation of professionals who are well-versed in blockchain. Moreover, inviting industry experts in the design and execution of these educational programmes will provide students with practical knowledge and insights that bridge the gap between theoretical concepts and real-world applications. Such involvement also helps to ensure that the curriculum remains current and relevant, which is essential for keeping pace with the fast-evolving blockchain landscape.

<sup>110</sup> HKMA (December 2021). *Enhanced Competency Framework on Fintech*.  
<https://www.hkma.gov.hk/media/eng/doc/key-information/guidelines-and-circular/2021/20211203e1.pdf>



## Attracting global talent, companies, and capital

Figure 3: Hong Kong-based blockchain infrastructure and its legal framework<sup>111</sup>



A **blockchain infrastructure** would attract **talent** & **capital**, and the legal framework could anchor its presence in Hong Kong.

Active **government** participation would instill market confidence, establish trust & fairness among players, and accelerate market development.

**Service providers** (incumbents and new players) would engage with a common and decentralised platform, thus, amplifying the advantage of inter-exchangeable tokenised assets.

**Investors** would be protected and the advantage of inter-exchangeable tokenised assets facilitates wealth creation for both retail and institutional participants.

A vibrant ecosystem would attract additional **capital market** opportunities which help to fuel the flywheel.

New opportunities will attract more **talent** and **capital**.

Beyond the local efforts, attracting Mainland and other international blockchain expertise is equally important for driving innovation and advancing the ecosystem. Industry practitioners shared from their experience that the inflow of highly-skilled professionals with expertise in Web3 or blockchain technology into Hong Kong has remained limited, especially Western talent.

To strengthen the talent pool, the Government has notably expanded the Talent List Hong Kong to include experts in innovation and technology, covering those with a background in DLT, subject to the qualification requirements.<sup>112</sup> However, industry practitioners report challenges in sourcing qualified candidates for open positions due to specific requirements, such as requiring certain academic qualifications or proof of recognition of work outside the applicant's immediate occupation. In light of this, it is suggested that the Government should regularly review and modify these qualification requirements to better reflect the nature of the field, thereby ensuring that suitable talent is attracted to the city.

In addition, to elevate its standing as a centre of excellence for blockchain and Web3 on the international stage, the Government should actively organise international conferences and summits on blockchain technology and seek partnerships with international organisations and specialists by initiating collaborative research projects, joint initiatives, and exchange programmes. These partnerships would facilitate knowledge transfer and cross-border collaborations. By tapping into global best practices, Hong Kong can promote a more diverse and inclusive blockchain ecosystem, as well as uphold its reputation.

In conclusion, Hong Kong's focus on enhancing blockchain literacy, nurturing homegrown talent, and drawing in international expertise is fundamental to its ascendance in the worldwide blockchain arena. Through investment in educational initiatives, practical training workshops, and platforms dedicated to the exchange of knowledge, both the general populace and industry professionals can deepen their understanding of blockchain technologies. This concerted effort positions the city as a future regional blockchain hub, fostering innovation and driving economic growth.

<sup>111</sup> Poon, J. (January 2024). *Hong Kong-based Blockchain Infrastructure & its Legal Framework*.

<sup>112</sup> Talent List Hong Kong. [https://www.talentlist.gov.hk/en/iso7\\_4.html](https://www.talentlist.gov.hk/en/iso7_4.html)

## **Section 6**

## Section 6: Conclusion

As one of the world's leading international financial centres, Hong Kong has always adopted a forward-thinking approach to stay abreast of the latest technological advancements. For instance, the HKMA recently introduced the stablecoin issuer sandbox arrangement in March 2024, with an aim to convey regulatory guidelines to parties interested in issuing fiat-referenced stablecoins in Hong Kong. This initiative aligns with one of the suggested opportunities in our paper and facilitates the exploration of innovative possibilities within the industry.<sup>113</sup> Today, this means embracing the rapidly evolving blockchain technology, which presents significant opportunities to boost efficiency, enhance transparency, and bolster security in financial transactions and operations. By integrating blockchain solutions into its financial infrastructure, Hong Kong stands to streamline complex processes, reduce costs, and elevate customer experiences – all of which will strengthen its competitiveness on the global stage.

Realising this objective requires a thorough assessment of Hong Kong's current state and an understanding of the key factors necessary to encourage the widespread adoption of blockchain technology in the financial services industry. The onus is on Hong Kong's financial services industry to invest in the research, development, and implementation of blockchain solutions. With a robust framework of financial support and incentives, Hong Kong has the potential to attract both local and international organisations and professionals to invest in blockchain initiatives, thereby nurturing innovation and fuelling economic growth.

Moreover, the successful integration of blockchain technology hinges on a collaborative endeavour involving the Government, regulators, industry players, and academia. This partnership is essential for fostering an environment conducive to blockchain innovation and adoption in Hong Kong. Additionally, it plays a key role in elevating public awareness about the benefits and potential of blockchain technology, thus propelling the digital economy forward. In particular, initiatives aimed at promoting blockchain education and knowledge-sharing will ensure individuals and businesses understand the value of the technology and are more prepared to embrace this transformative technology.

It is believed that the recommendations outlined in this paper can solidify the Government's commitment to technological advancements and innovation, benefiting both the economy and society as a whole. Through collective efforts, blockchain technology can be harnessed to boost the growth of the financial services industry, paving the way for a more efficient, transparent, and inclusive future.

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<sup>113</sup> HKMA (March 2024). *HKMA launches the stablecoin issuer sandbox arrangement.*  
<https://www.hkma.gov.hk/eng/news-and-media/press-releases/2024/03/20240312-4/>

# **Appendix**

## Appendix 1: Blockchain protocol infrastructure

The blockchain protocol infrastructure provides the technology stack and architecture that enables a blockchain network to operate as a secure and decentralised system.<sup>114</sup> The layers of the blockchain protocol infrastructure work together to provide the necessary functionality for storing and transmitting data, validating transactions, and enabling the creation and execution of decentralised applications (DApps) and smart contracts.

### Layer 0

The foundational layer of blockchain technology, known as Layer 0, comprises essential components that facilitate the functioning of blockchain networks such as Bitcoin and Ethereum. These components include hardware, Internet, and connections that facilitate the seamless functioning of Layer 1 and serve as the basis for all subsequent layers.

### Layer 1

Layer 1 of the blockchain protocol consists of various blockchain networks, including Bitcoin, Ethereum, and Binance Smart Chain. This layer serves a critical function in upholding the integrity and security of the system, as it relies on its immutable nature. Its duties include overseeing consensus processes, programming languages, block time, dispute resolution mechanisms, and regulatory frameworks that govern the fundamental operations of the blockchain network.

### Layer 2

The security and immutability of Layer 1 blockchain networks are paramount features, yet they present certain challenges such as scalability, energy consumption, and transaction speed. To address these issues, scaling solutions on Layer 2 have been developed to optimise blockchain efficiency and throughput. These solutions, including Lightning Network for Bitcoin and Plasma for Ethereum, process transactions off-chain before submitting the final outcome to the main blockchain, thereby providing faster and more cost-effective transactions while reducing the overall load on the Layer 1 network. Layer 2 solutions also facilitate new use cases and applications, previously unfeasible on Layer 1, and promote greater interoperability and cross-chain functionality. Overall, Layer 2 scaling solutions represent an advancement in blockchain technology, addressing key challenges associated with Layer 1 networks and unlocking new avenues for innovation and growth.

### Layer 3

Layer 3 is widely recognised as the application layer in the blockchain protocol, constituting the topmost layer of the blockchain architecture. It serves as a user-friendly platform for creating and deploying DApps, which have the potential to revolutionise a broad range of use cases, including digital identity verification, supply chain management, gaming, and financial services. The primary function of Layer 3 is to provide a user interface that abstracts away the technical complexities of blockchain technology, making it accessible to users without requiring an in-depth understanding of the underlying technology. By providing a user-friendly interface, Layer 3 enables users to interact with the blockchain and its underlying smart contracts, facilitating a wide range of practical applications for blockchain technology.

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<sup>114</sup> Blockchain Council (May 2022). *A Beginner's Guide To Understanding The Layers Of Blockchain Technology*. <https://www.blockchain-council.org/blockchain/layers-of-blockchain-technology/>

## Appendix 2: Benefits of using blockchain technology in the traditional financial services industry

As mentioned in the preceding section, the traditional financial services industry has long been an integral part of global commerce. However, the industry is not without its challenges, including issues related to transparency, security, and accessibility. With the advent of blockchain technology, there is the potential to address some of these challenges and transform the traditional financial industry.



### **Efficient and fast financial transactions**

Traditional financial transactions often require intermediaries to process and verify the transaction, resulting in a time-consuming and costly process. The emergence of blockchain technology has brought about a new approach that eliminates the need for intermediaries, providing a peer-to-peer network where transactions can be conducted directly between parties. This new approach not only reduces costs but also increases efficiency, making it an attractive option for those seeking to streamline their financial transactions.

For instance, securing a mortgage or business loan from a traditional bank can be a complex and time-consuming process for individuals or small and medium-sized enterprises. This involves background checks, information verification, credit scoring, and loan processing to prove their financial capability and rationale for borrowing. The entire process may take several weeks to months to determine the success of the application.<sup>115</sup>

Nevertheless, blockchain technology has the potential to simplify banking and lending services by minimising counterparty risk and cutting down on issuance and settlement times, with its decentralisation, immutability and security features. When using blockchain, anti-money laundering (AML) and know-your-customer (KYC) data can be stored immutably and accessed by other banks that are members of the network.<sup>116</sup> By employing verified documentation and AML and KYC data stored on the blockchain network, operational risks can be reduced, and financial documents can be verified in real time, leading to a more efficient and secure lending process.



### **Reduction of transaction costs**

Blockchain technology can reduce costs associated with financial transactions by eliminating the need for intermediaries. Intermediaries in traditional finance services often charge fees for their services, increasing the overall cost of a financial transaction. With blockchain technology, the need for intermediaries is eliminated, reducing the cost of processing a transaction.

A recent study shows that the global leading investment banks can save 30% to 50% on compliance costs and up to 50% on both centralised and business operations through the adoption of blockchain technology. Furthermore, the research indicates that blockchain can potentially lead to cost savings of 70% on central finance reporting.<sup>117</sup> This is attributed to the enhanced data quality, transparency, and internal controls that blockchain technology offers. These findings suggest that blockchain adoption can provide a valuable opportunity for financial institutions to streamline their operations and increase cost efficiency.

<sup>115</sup> Consensys. *Blockchain in Financial Services*. <https://consensys.net/blockchain-use-cases/finance/>

<sup>116</sup> Pradnya Patil, M. Sangeetha (December 2022). *Blockchain-based Decentralised KYC Verification Framework for Banks*. <https://doi.org/10.1016/j.procs.2022.12.055>

<sup>117</sup> Accenture Consulting (2017). *Banking on Blockchain: A Value Analysis for Investment Banks*.

<https://www.studocu.com/in/document/sharda-university/financial-management/accenture-banking-on-blockchain/31442178>



## **Error and fraud prevention**

Another way blockchain technology can increase efficiency is by eliminating the need for manual processing. In traditional financial transactions, documents and records are often manually processed, increasing the risk of errors and delays. To address these issues, blockchain technology allows transactions to process automatically, thereby reducing the risk of errors and fraud.<sup>118</sup>

Moreover, blockchain technology can enhance the security of financial transactions by providing a decentralised and immutable ledger. The decentralised nature of blockchain ensures that there is no single point of failure, reducing the risk of cyber-attacks or different types of fraud, including financial fraud, identity fraud and supply fraud.<sup>119</sup> Additionally, the immutability of the blockchain ledger ensures that transaction records cannot be altered or deleted, providing an extra layer of security and transparency.

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118 Rennock M-JW, Cohn A., Butcher J.R (2018) *Blockchain technology and regulatory investigations*, *The Journal*. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7306205/>

119 Anuska Rakshit, Shriya Kumar, Ramanathan L (January 2022). *Fraud Detection: A Review on Blockchain*, *International Research Journal of Engineering and Technology*. [https://www.researchgate.net/publication/358090241\\_Fraud\\_Detection\\_A\\_Review\\_on\\_Blockchain](https://www.researchgate.net/publication/358090241_Fraud_Detection_A_Review_on_Blockchain)

## Appendix 3: General challenges facing the global financial services industry in adopting blockchain technology in the financial sector

Effective implementation of blockchain technology requires a comprehensive understanding of its challenges and limitations, as well as proactive measures to address them. This approach empowers stakeholders to make informed decisions, significantly enhancing the likelihood of success in future initiatives.

In the current global financial industry, the adoption of blockchain technology faces four principal hurdles: technical obstacles, limited knowledge of the technology, operational difficulties, and regulatory issues. Among these challenges, unsuccessful commercialisation, rather than technical challenges, is the primary reason for the majority of failed blockchain initiatives. Furthermore, the difficulty of competition to join the blockchain network run by the private sector has been a significant contributing factor to the failure of many such initiatives.

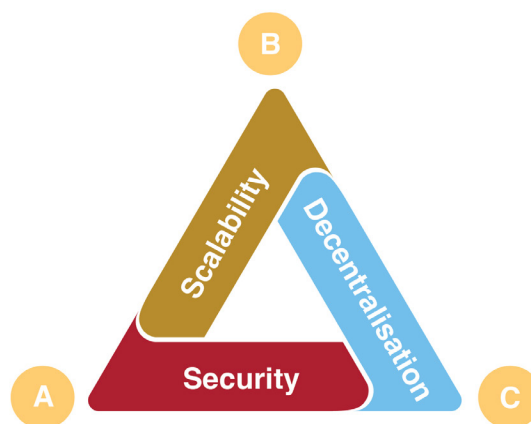
With this in mind, the FSDC has identified key factors for each challenge in the following section. By gaining a better understanding of these challenges and developing strategies to address them, stakeholders can navigate the complexities associated with blockchain implementation effectively. This will enable them to overcome the obstacles and make the most of the technology's potential for their business pursuits.

### **Technical obstacles**

#### **Scalability**

The issue of blockchain scalability poses a significant challenge for permissionless blockchains, particularly with respect to transactions involving cryptocurrencies.<sup>120</sup> The term “scalability” primarily denotes transaction speed, with many cryptocurrencies currently lagging behind other payment methods in terms of processing times. The issue of the blockchain scalability trilemma, which was first introduced by the founder of Ethereum, poses a significant challenge for the cryptocurrency industry. The trilemma posits that blockchains can only achieve two out of three key objectives at any one time: decentralisation, scalability, or security, resulting in unavoidable trade-offs.<sup>121</sup>

Figure 4: Blockchain Trilemma



	<b>Chosen</b>	<b>Give up</b>
A	Scalability, Security	Decentralisation
B	Scalability, Decentralisation	Security
C	Security, Decentralisation	Scalability

<sup>120</sup> K. Qin (May 2018). *An overview of blockchain scalability, interoperability and sustainability*. Hochschule Luzern Imperial College London Liquidity Network. [https://www.eublockchainforum.eu/sites/default/files/research-paper/an\\_overview\\_of\\_blockchain\\_scalability\\_interoperability\\_and\\_sustainability.pdf](https://www.eublockchainforum.eu/sites/default/files/research-paper/an_overview_of_blockchain_scalability_interoperability_and_sustainability.pdf)  
<sup>121</sup> Crypto.com (January 2020). *A Deep Dive Into Blockchain Scalability*. <https://crypto.com/university/blockchain-scalability>



While newer blockchains offer higher capacity, this often comes at the cost of greater centralisation and weaker security measures. Additionally, differences in design can preclude blockchain interoperability.<sup>122</sup> Therefore, it is crucial to carefully consider the trade-offs between increased capacity and security when selecting a blockchain solution. It is also important to evaluate the specific requirements of the project to determine the most suitable blockchain solution that meets the desired interoperability needs.

To address the scalability issues currently faced by the blockchain industry, there has been a notable increase in the utilisation of Layer 2 blockchain projects and solutions in response to this challenge as previously stated in the paper. This technology has garnered significant attention and is anticipated to be widely adopted in the future, bringing with it the potential for reduced transaction fees. The implementation of Layer 2 solutions is a promising initial effort by the industry to address scalability challenges.

In late 2022, Ethereum launched “The Merge” as its next step in overcoming these challenges. According to the Ethereum roadmap. The Merge reduced Ethereum’s energy consumption by approximately 99.95%.<sup>123</sup> It is important for the industry to exercise patience in reviewing the performance of this new technology and its impact on the blockchain landscape, as well as the future of Layer 2 scaling solutions. While Ethereum’s latest development represents a substantial step forward in addressing scalability challenges, it will take time to fully assess its effectiveness and potential implications. As such, a cautious and measured approach is necessary to evaluate the long-term viability and impact of this development.

### ***Lack of standardisation and limited interoperability among different blockchain networks***

Blockchain technology has emerged as a highly promising tool for transforming the financial services industry. By leveraging blockchain, financial transactions can become more transparent, cost-effective, and secure. However, despite the potential benefits, one of the most significant challenges hindering the adoption of blockchain in the global financial industry is the lack of standardisation and limited interoperability between diverse blockchain networks.<sup>124</sup> As the technology is still in its early stages of development, with numerous blockchain networks and platforms available, each blockchain network operates with its distinct protocols, standards, and features. This fragmentation poses significant challenges for businesses that aim to adopt blockchain, particularly in terms of interoperability and efficiency.

Without standardisation and interoperability, different blockchain networks cannot communicate or exchange data with each other, which can lead to reduced efficiency and increased complexity. This fragmentation also makes it difficult for businesses to build a comprehensive blockchain infrastructure that meets their specific needs. Interoperability standards need to be developed to enable communication between different blockchain networks, to ensure they work effectively together. This lack of standardisation needs to be addressed to enable blockchain to deliver its full potential benefits.

### ***Integration of blockchain technology-related infrastructure into legacy systems***

In addition, another significant challenge is the integration of new blockchain technology-related infrastructure into legacy systems. A recent survey has revealed that half of the leaders in the global financial services industry perceive legacy processes and systems as an impediment to the widespread adoption of virtual assets.<sup>125</sup> This insight highlights the need for modernisation in the financial sector to accommodate the emerging digital landscape. While the financial services industry has a complex legacy infrastructure that has been developed over decades and is difficult to replace, integrating new blockchain technology-related infrastructure into legacy systems can be a major challenge for businesses, which requires investment in both time and resources.

<sup>122</sup> BIS (June 2022). *Blockchain scalability and the fragmentation of crypto*. <https://www.bis.org/publ/bisbull56.pdf>

<sup>123</sup> Ethereum (July 2023). *The Merge*. <https://ethereum.org/en/roadmap/merge/>

<sup>124</sup> Salil Gunashekar et al. (October 2017). *The potential role of standards in supporting the growth of distributed ledger technologies/blockchain*, Rand Corp. <https://www.rand.org/randeurope/research/projects/blockchain-standards.html>

<sup>125</sup> Deloitte (2021). *2021 Global Blockchain Survey*. [https://www2.deloitte.com/content/dam/insights/articles/US144337\\_Blockchain-survey/DI\\_Blockchain-survey.pdf](https://www2.deloitte.com/content/dam/insights/articles/US144337_Blockchain-survey/DI_Blockchain-survey.pdf)

As legacy systems may not be compatible with blockchain technology, it may lead to data silos and inefficiencies. Additionally, the integration of blockchain technology into legacy systems can create security vulnerabilities when legacy systems may not be designed to handle the security requirements of blockchain technology. In this respect, this can be a significant barrier to the adoption of blockchain in the financial services industry.

To overcome these challenges, businesses must take a measured and strategic approach to the adoption of blockchain technology. This involves developing a comprehensive understanding of blockchain technology and its potential uses, as well as the challenges and risks associated with its adoption. This understanding should be supported by a clear strategy for integrating blockchain technology into existing legacy systems, with a focus on interoperability, security, and efficiency.



## **A better understanding of blockchain technology and its applications**

### ***Relationship between blockchain and cryptocurrencies***

The inception of blockchain technology lies in the creation of Bitcoin, which aims to provide a convenient alternative currency without being subject to the control of a centralised governing body.<sup>126</sup> A market survey revealed that a significant proportion of respondents, approximately 62% and 48%, respectively, believe that blockchain is the same as cryptocurrency or Bitcoin.<sup>127</sup> In addition, a recent survey indicated that 75% of respondents who have heard of cryptocurrencies lack confidence in their safety and reliability due to their association with illegal activities, high-profile hacks, and scams.<sup>128</sup> This has caused many businesses and traditional financial institutions to become apprehensive and lose interest in cryptocurrencies. Moreover, the recent collapse of crypto exchanges and associated media hype have exacerbated perceptions of blockchain technology as risky and complex. The misconception that blockchain is solely associated with the high volatility and uncertainty of cryptocurrencies has led many traditional businesses and financial institutions to view blockchain technology with scepticism and reluctance. This has implications for the development and adoption of blockchain technology among businesses and financial institutions despite its potential to bring about transformative changes.

### ***Inadequate knowledge about the prospect and implementation of blockchain projects***

The reluctance to embrace blockchain technology can also be attributed to the inherent uncertainties and ambiguities that accompany emerging technologies. Blockchain technology is currently in its nascent stages of development. As a result, many businesses may find it challenging to grasp its full potential and the ways in which it can be seamlessly incorporated into their respective operations. The inherent uncertainty and ambiguity that often accompany emerging technologies can understandably trigger unease among executives and decision-makers, leading to hesitancy in investing in blockchain-based projects.

One of the primary obstacles faced by organisations and financial institutions in implementing blockchain technology is the scarcity of skilled professionals within the global blockchain industry, according to 2022 Global Blockchain Industry Talent Insights.<sup>129</sup> This shortage can present challenges in terms of identifying and recruiting suitable candidates who possess the requisite knowledge and expertise to effectively leverage blockchain technology in a business setting. According to a recent study, there is a persistent shortage of qualified professionals in the global blockchain industry, resulting in a high turnover rate. The current shortage of qualified personnel in the global blockchain industry presents an ongoing challenge for organisations striving to establish and retain a capable workforce in developing blockchain technology in their businesses and achieving desired business outcomes.

<sup>126</sup> Publications Office of the European Union (2015). *Crypto-currencies: Cyber-Security analysis of current architectures*.

<sup>127</sup> Vorhaus Advisors and Forte (December 2020). *Untapped Opportunities: Games, Virtual Goods, and Blockchain*.

<https://coingeek.com/only-1-in-4-us-adults-have-idea-what-blockchain-is-survey/>

<sup>128</sup> Pew Research Center (April 2023). *Majority of Americans aren't confident in the safety and reliability of cryptocurrency*.

<https://www.pewresearch.org/short-reads/2023/04/10/majority-of-americans-arent-confident-in-the-safety-and-reliability-of-cryptocurrency/>

<sup>129</sup> OKX & LinkedIn (August 2022). *2022 Global Blockchain Industry Talent Insights*. <https://lnkd.in/d8kq2eic>



## Operational challenges

### ***Centralised business model***

The decentralised architecture of a blockchain network is one of its key benefits, as it eliminates the need for intermediaries and enables secure and transparent transactions. However, the adoption of blockchain technology in a centralised business model can present operational challenges that undermine its potential benefits. One example is the failure of TradeLens, a blockchain-based platform for global trade developed by IBM and Maersk.<sup>130</sup> In November 2022, the TradeLens team made the decision to withdraw the offerings and discontinue the use of the platform by the first quarter of 2023. Maersk has communicated that the attainment of full global industry collaboration remains a key requirement that has yet to be met. Consequently, TradeLens has yet to attain the level of commercial viability imperative to sustain operations and deliver on financial expectations as an independent enterprise.

In contrast to permissionless blockchain ledgers such as Bitcoin or Ethereum, which permit participation by anyone, permissioned or private blockchains utilise centrally controlled distributed ledger technology that exclusively admits vetted members. While this approach enables participants to view business transactions in real time and benefit from the speed and efficiency of digitisation, it sacrifices some anonymity and decentralisation. As a result, the lack of full global industry collaboration and the failure to achieve the necessary level of commercial viability required to sustain operations and meet financial expectations led to the demise of TradeLens.

### ***Access to traditional financial services***

Another significant operational obstacle arises from the interdependence of blockchain technology and cryptocurrencies, as previously stated. The increasing prevalence of emerging technologies and virtual assets has prompted many companies to operate within the crypto or virtual assets space. Nonetheless, within the realm of blockchain and cryptocurrency, numerous enterprises face obstacles when it comes to obtaining conventional banking amenities, such as initiating bank accounts, owing to the perceived risks linked with these burgeoning technologies. This reluctance is often attributed to concerns regarding the potential for money laundering and other illicit activities.

The inability to access traditional banking services can pose obstacles for businesses operating in the blockchain and cryptocurrency industry. This can adversely impact their ability to manage finances, pay suppliers, or receive payments from customers, thus limiting their scope for growth and expansion.

Moreover, the lack of access to banking services creates a barrier to entry for new players in the market. Startups seeking to venture into the blockchain and cryptocurrency space may find it challenging to establish the necessary financial infrastructure to support their business activities. This can impede innovation and competition within the industry, hampering the potential benefits of blockchain technology for the broader financial system.

### ***Absence of applicable principles and criteria for the assessment of controls over blockchain technology and virtual assets***

Traditionally, auditors have depended on the services of banks and other third-party entities to verify a substantial portion of the information pertaining to their client's assets. However, with the advent of blockchain technology, these intermediary parties are rendered unnecessary. As a result, blockchain imposes fresh challenges for auditors that must be addressed with a nuanced and comprehensive approach.

The primary challenge associated with auditing a blockchain lies in the absence of a single source of truth or central database that consolidates all transactions. Unlike traditional centralised systems, blockchains operate in a decentralised manner. Each transaction recorded on the blockchain must be independently verified on

<sup>130</sup> Maersk (November 2022). A.P. Moller - Maersk and IBM to discontinue TradeLens, a blockchain-enabled global trade platform. <https://www.maersk.com/news/articles/2022/11/29/maersk-and-ibm-to-discontinue-tradelens>

every participating node, making the auditing process time-consuming and resource-intensive. As a result, conducting audits on blockchains becomes inherently complex.

However, the existing accounting standards, ISAE 3000 and HKSAE 3000, merely provide a “framework” for performing an assessment and delivering an “attestation report”. Consequently, the implementation of accounting standards and compliance regulations that address emerging technologies and asset classes often lags behind the rapid pace of technological development.

In addition, companies operating in the crypto or Web3 space encounter difficulties when seeking reliable audit opinions for their financial statements. This challenge arises from the lack of a specific audit standard designed to verify the ownership of virtual assets. As a result, traditional audit procedures and methodologies may not be fully applicable or effective in evaluating and confirming the legitimacy and ownership of these virtual assets. This absence of a standardised framework creates uncertainties and complexities in the audit process, making it challenging for companies to provide a clear and transparent picture of their financial positions to stakeholders and investors. Consequently, there is a need for the development of specialised audit standards tailored to the unique characteristics and challenges presented by virtual assets, enabling auditors to provide accurate and trustworthy opinions on the financial statements of crypto and Web3 companies. Such standards would enhance transparency, instil confidence in the financial reporting of virtual assets, and facilitate the growth and maturation of this emerging sector.



## **Regulatory constraints**

Blockchain technology has been identified as a disruptive innovation that has the potential to transform the financial services industry. Its decentralised architecture enables secure, transparent, and efficient transactions, with the potential to reduce costs and increase speed in financial transactions. However, with this potential comes regulatory challenges. In this context, the adoption of blockchain technology in the financial services industry requires a regulatory framework to create an environment that is conducive to innovation and competition, while protecting consumers and ensuring the integrity of the financial system. Additionally, effective regulation is of utmost importance in providing a clear framework for the legal and compliance aspects of blockchain technology usage. This can reduce uncertainty, foster investment in the technology and help promote trust in the technology by ensuring its responsible and transparent use. However, the adoption of blockchain technology in the financial services industry poses regulatory challenges. These challenges are primarily related to jurisdictional issues, trust issues, and potential privacy risks associated with the operation and management of blockchain infrastructure.

### ***Jurisdictional issues***

One of the most pressing challenges faced by regulators in the realm of blockchain technology is the issue of jurisdictional boundaries. The decentralised nature of blockchain transactions can result in confusion and uncertainty regarding the application of specific laws and regulations across multiple jurisdictions. This, in turn, can pose difficulties for regulatory authorities in enforcing existing laws and regulations, particularly in cases where there are conflicting regulatory frameworks across different jurisdictions.

The issue of jurisdictional boundaries is of particular relevance in the context of cryptocurrencies, which are frequently traded on decentralised exchanges that operate across multiple jurisdictions. The lack of a central authority and the decentralised nature of blockchain networks can complicate efforts to monitor and enforce compliance with AML and KYC regulations. As such, stakeholders across the regulatory landscape must remain vigilant and proactive in developing effective strategies for addressing these unique challenges.

To address these challenges, there have been attempts to establish international standards and guidelines for the regulation of blockchain and cryptocurrency transactions. For example, the Financial Action Task Force (FATF) has updated its FATF Standards to provide guidance on how they apply to virtual asset activities and

virtual asset service providers (VASPs), with the aim to assist jurisdictions in mitigating the risks of money laundering and terrorist financing associated with virtual asset activities while ensuring the stability of the global financial system.<sup>131</sup> Recently, the Markets in Crypto-assets Regulation (MiCA) introduced by the European Securities and Markets Authority (ESMA), an independent EU authority, entered into force in June 2023. The regulation is designed to address the lack of oversight for crypto-assets that fall outside the parameters of existing financial services legislation. Its primary objective is to promote greater transparency and consumer awareness of the inherent risks associated with such assets.<sup>132</sup>

### ***Trust issues associated with the operation and management of blockchain infrastructure***

Another significant regulatory challenge is trust issues associated with the operation and management of blockchain infrastructure. Blockchain networks are often operated and managed by entities located in different jurisdictions, which can create trust issues for users and regulators. Users may be concerned about the security and reliability of blockchain infrastructure developed by entities located in other jurisdictions, which can lead to reduced confidence in the technology.

To address these challenges, regulators may need to establish standards for the operation and management of blockchain infrastructure, as well as guidelines for the use of blockchain technology in financial services. According to a joint report by the European Commission and the European Investment Bank, it is recommended that an EU-wide risk-based framework be established by the European Union in order to evaluate and certify AI and blockchain technologies that meet ethical, regulatory, and “trustworthiness” criteria.<sup>133</sup> One potential approach for evaluating individual projects involving AI and blockchain technologies is to leverage the expertise of EU digital innovation hubs. These hubs could provide coordinated assessment services and confer a “green stamp” on projects that meet European standards and comply with relevant regulations. Such recognition would signal to stakeholders across the EU that these systems have undergone rigorous scrutiny and adhere to established guidelines, promoting trust and confidence in their use.

### ***Potential privacy risk***

Blockchain technology has been widely hailed as a transformative innovation that can revolutionise the way information is stored and shared. The transparency and immutability of blockchain technology mean that once information is recorded on the blockchain, it cannot be modified or deleted. This feature can be an advantage for maintaining data integrity and preventing fraud, but it can also create a challenge to align the “on-chain” data and any “off-chain” contents.

The use of blockchain technology to store sensitive information poses privacy risks for individuals and confidentiality implications for organisations. A recent survey highlighted the concerns of global financial services industry leaders regarding cybersecurity and privacy in the context of virtual assets. The survey found that 71% of respondents identified cybersecurity as a leading obstacle to the acceptance and use of virtual assets, while 59% cited privacy concerns as a challenge.<sup>134</sup> These findings suggest that privacy risks associated with blockchain technology are a concern for the financial services industry and need to be addressed to ensure the safe and secure adoption of blockchain technology in financial services.

<sup>131</sup> FATF (2019). *Guidance for a Risk-Based Approach to Virtual Assets and Virtual Asset Service Providers*, FATF, Paris. [www.fatf-gafi.org/publications/fatfrecommendations/documents/Guidance-RBA-virtual-assets.html](http://www.fatf-gafi.org/publications/fatfrecommendations/documents/Guidance-RBA-virtual-assets.html)

<sup>132</sup> MiCA (May 2023). *Regulation (EU) 2023/1114 of the European Parliament and of the Council of 31 May 2023 on markets in crypto-assets, and amending Regulations (EU) No 1093/2010 and (EU) No 1095/2010 and Directives 2013/36/EU and (EU) 2019/1937*. <http://data.europa.eu/eli/reg/2023/1114/oj>

<sup>133</sup> European Commission and European Investment Bank (June 2021). *Artificial intelligence, blockchain and the future of Europe: How disruptive technologies create opportunities for a green and digital economy*. [https://www.eib.org/attachments/thematic/artificial\\_intelligence\\_blockchain\\_and\\_the\\_future\\_of\\_europe\\_report\\_en.pdf](https://www.eib.org/attachments/thematic/artificial_intelligence_blockchain_and_the_future_of_europe_report_en.pdf)

<sup>134</sup> Deloitte (2021). *2021 Global Blockchain Survey*. [https://www2.deloitte.com/content/dam/insights/articles/US144337\\_Blockchain-survey/DI\\_Blockchain-survey.pdf](https://www2.deloitte.com/content/dam/insights/articles/US144337_Blockchain-survey/DI_Blockchain-survey.pdf)

In response to the challenges presented by data privacy and security concerns, a number of privacy-preserving techniques have been developed and successfully implemented in conjunction with blockchain technology. These techniques are designed to ensure the safe and secure transmission of sensitive data, while also preserving the privacy and confidentiality of the information being shared. One of the most notable cryptographic methods used to address the privacy risks associated with the use of blockchain technology is the zero-knowledge proof technique.<sup>135</sup> This zero-knowledge proof technique allows for secure authentication without revealing any sensitive information that could potentially be compromised. With zero-knowledge proofs, individuals and organisations can maintain the confidentiality of their data while still being able to verify their identity and authenticate transactions on the blockchain. This approach holds great promise for preserving the privacy of sensitive data in a range of applications.

### ***Lack of regulatory clarity and defined industry best practices***

The slow development and adoption of blockchain technology in the financial services industry can, to some extent, be attributed to the lack of clarity regarding the regulatory oversight of blockchain-based financial services and the absence of well-defined industry best practices. This uncertainty poses a significant barrier for market participants, as they struggle to determine the appropriate regulatory authority and standards to follow when operating within this domain.

For instance, one area within blockchain applications experiencing remarkable growth is the global tokenisation market, which is projected to increase from USD 2.3 billion in 2021 to USD 5.6 billion by 2025. Asset tokenisation involves the creation of digital tokens representing real-world assets and issuing them on the blockchain. It goes beyond mere data tracking on distributed ledger technologies, as transactions conducted on these platforms can have legal implications, such as the transfer of ownership of a shipment.

Asset tokenisation carries broad implications that span across financial market practices, participants, market infrastructure, and regulators, encompassing various financial instruments and asset classes. Industries make a tremendous effort to ensure the accurate representation of tokenised assets and their alignment with real-world assets. In this context, the presence of dedicated regulatory bodies equipped with clear regulations and guidelines is paramount for codifying the process of representing asset ownership and transfer, thereby facilitating the development and adoption of blockchain technology.

These dedicated regulatory bodies play a crucial role in codifying the process of representing asset ownership and transfer, providing much-needed clarity and legal certainty. By establishing comprehensive regulations, these bodies not only ensure the reliability and security of transactions but also enhance trust and confidence in the technology. Additionally, market participants can have a clear understanding of their rights and obligations when engaging in blockchain-based asset tokenisation. This regulatory framework helps mitigate risks, protects the interests of stakeholders, and fosters a conducive environment for innovation and investment.

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<sup>135</sup> Aleksander Berentsen, Jeremias Lenzi, and Remo Nyffenegger (May 2023). *An Introduction to Zero-Knowledge Proofs in Blockchains and Economics*, Federal Reserve Bank of St. Louis Review. <https://files.stlouisfed.org/files/htdocs/publications/review/2023/05/12/an-introduction-to-zero-knowledge-proofs-in-blockchains-and-economics.pdf>

## Appendix 4: Hong Kong's ecosystem readiness for B2B blockchain network

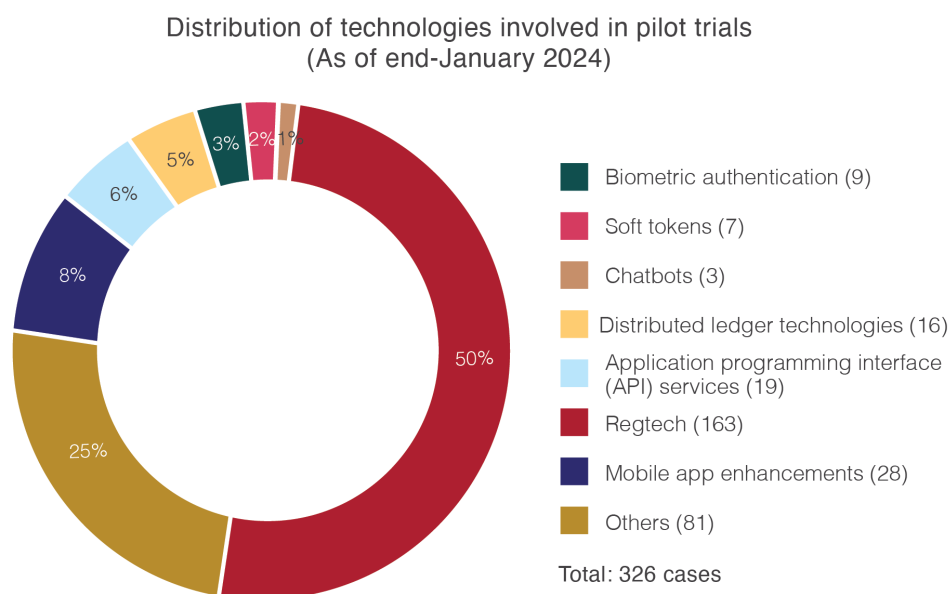
The financial centres of the world recognise the importance of staying at the forefront of technological advancements to drive economic growth. Hong Kong, known for its robust financial sector, has emerged as a leading hub for fintech innovation. The Hong Kong Government and regulators have been actively involved in establishing “Hong Kong Inc.” and collaborating with the private sector to foster a dynamic fintech ecosystem. By fostering collaboration between the public and private sectors, Hong Kong aims to cultivate a vibrant ecosystem that nurtures the development of startups, attracts investment, and promotes technological innovation.

### Sandboxes for Pilot Trials of Cross-sector Fintech Products

Spearheaded by the HKMA and the SFC and the Insurance Authority (IA), the city has fostered a supportive ecosystem for fintech startups and established players alike. In particular, the HKMA, SFC, and IA have established dedicated sandboxes, providing a streamlined platform for conducting pilot trials of cross-sector fintech products.

Recognising the transformative power of fintech, the HKMA has taken proactive measures to facilitate its development while ensuring regulatory compliance. In an effort to streamline the launch of new technology products and reduce development costs, the HKMA established the Fintech Supervisory Sandbox (FSS) in 2016 which facilitates pilot trials of fintech initiatives by banks and their partnering technology firms.<sup>136</sup> The FSS allows for a limited number of participating customers to test new initiatives without the need to achieve full compliance with the HKMA's supervisory requirements. By providing an environment for data gathering and user feedback, banks and tech firms can refine their new initiatives, ultimately expediting the launch of new technology products. As of the end of January 2024, the FSS had allowed pilot trials of 326 fintech initiatives, out of which sixteen were related to distributed ledger technologies including tokenised deposits.<sup>137</sup>

Figure 5: Use of the FSS (as of end-January 2024)<sup>138</sup>



<sup>136</sup> HKMA. *Fintech Supervisory Sandbox (FSS)*. <https://www.hkma.gov.hk/eng/key-functions/international-financial-centre/fintech/fintech-supervisory-sandbox-fss/>

<sup>137</sup> Ibid.

<sup>138</sup> Ibid.

In parallel, the SFC and the IA also launched the SFC Regulatory Sandbox and InsurTech Sandbox in 2017, respectively.<sup>139,140</sup>

All of these sandboxes serve as a consolidated entry point, enabling efficient testing and validation of innovative solutions within the Fintech landscape.<sup>141</sup>

### **Development of Virtual Assets**

In recent years, intense global cryptocurrency trading led to the rapid development of the virtual market, prompting governments worldwide to formulate policies to regulate related activities. The Government and regulatory bodies in Hong Kong have demonstrated their active support for the development of digital innovation, acknowledging the potential benefits that digital technology can bring to the economy. This support extended to one of the most well-known and widely used applications of blockchain technology – virtual assets, including cryptocurrencies – which have become a key focus of industry growth and innovation.

In particular, the SFC has been particularly proactive in overseeing and regulating the virtual asset market since 2017. Given the fast-evolving nature of this market, the SFC has introduced a comprehensive regulatory regime that covers a wide range of virtual asset-related activities, promoting innovation while also ensuring that investor and market participant protection remains a top priority. In November 2018, the SFC issued a statement on the regulatory framework for virtual asset portfolios managers, fund distributors and trading platform operators<sup>142</sup> to, amongst others, set out a conceptual framework for the potential regulation of virtual asset trading platforms.<sup>143</sup>

Notably, Mainland China, previously the world's second-largest economy in mining for cryptocurrencies, banned all domestic crypto mining in June 2019. Subsequently, in September of the same year, they further prohibited all crypto-related transactions, considering their illicit financial activities.<sup>144</sup> As a consequence of these actions, coupled with other countries offering incentives to attract crypto-related businesses, it led to the migration of certain crypto companies and exchanges, such as FTX, to relocate their primary operations away from Hong Kong.

Despite Mainland China's measures against cryptocurrency trading, the Government and public sectors in Hong Kong have made great efforts to develop the city as a virtual asset hub. These endeavours are conducted under the framework of the "one country, two systems" policy, which allows Hong Kong to maintain its distinct legal and regulatory framework while being part of Mainland China. Recognising the risks associated with trading virtual assets, the SFC introduced the "Voluntary Opt-in Licensing Regime" for platforms offering trading of securities-type virtual assets in November 2019. This regime provided investors with a clear distinction between regulated platforms and those that continue to operate without regulation.<sup>145</sup> In the subsequent year, the FSTB conducted a public consultation to propose the regulation of VASPs to provide for anti-money laundering and counter-terrorist financing measures as well as investor protection, among other regulatory requirements.<sup>146,147</sup> The proposal stipulated that licensed VASPs could only offer services to professional investors and must adhere to rigorous criteria for the inclusion of virtual assets on their platform.

139 SFC (September 2017). *Circular to announce the SFC Regulatory Sandbox*. <https://apps.sfc.hk/edistributionWeb/gateway/EN/circular/doc?refNo=17EC63>

140 IA. *Insurtech Sandbox*. [https://www.ia.org.hk/en/aboutus/insurtech\\_corner.html](https://www.ia.org.hk/en/aboutus/insurtech_corner.html)

141 While the industry acknowledges and appreciates the regulators for creating a conducive environment for innovation and technology, some feedback gathered suggested that there was still room for improvement in sandbox operations. For example, suggestions have been made to enhance entry and operational requirements.

142 SFC (November 2018). *Statement on regulatory framework for virtual asset portfolios managers, fund distributors and trading platform operators*.

<https://www.sfc.hk/en/News-and-announcements/Policy-statements-and-announcements/Statement-on-regulatory-framework-for-virtual-asset-portfolios-managers>

143 SFC (November 2018). *SFC sets out new regulatory approach for virtual assets*.

<https://apps.sfc.hk/edistributionWeb/gateway/EN/news-and-announcements/news/doc?refNo=18PR126>

144 The State Council The People's Republic of China (September 2021). *關於進一步防範和處置虛擬貨幣交易炒作風險的通知*.

[https://www.gov.cn/zhengce/zhengceku/2021-10/08/content\\_5641404.htm](https://www.gov.cn/zhengce/zhengceku/2021-10/08/content_5641404.htm)

145 SFC (November 2019). *Position paper: Regulation of virtual asset trading platforms*.

<https://www.sfc.hk/-/media/EN/files/ER/PDF/20191106-Position-Paper-and-Appendix-1-to-Position-Paper-Eng.pdf?rev=5f591ab333a740b888a225c7496f3092>

146 FSTB (November 2020). *Public Consultation on Legislative Proposals to Enhance Anti-Money Laundering and Counter-Terrorist Financing Regulation in Hong Kong*. [https://www.fstb.gov.hk/fsb/en/publication/consult/doc/consult\\_amlo\\_e.pdf](https://www.fstb.gov.hk/fsb/en/publication/consult/doc/consult_amlo_e.pdf)

147 FSTB (May 2021). *Consultation Conclusions: Public Consultation on Legislative Proposals to Enhance Anti-Money Laundering and Counter-Terrorist Financing Regulation in Hong Kong*. [https://www.fstb.gov.hk/fsb/en/publication/consult/doc/consult\\_conclu\\_amlo\\_e.pdf](https://www.fstb.gov.hk/fsb/en/publication/consult/doc/consult_conclu_amlo_e.pdf)



In October 2022, a milestone was reached in the development of virtual assets within the region of Hong Kong. The Government took a decisive step by issuing a policy statement that outlined its policy stance and approach towards developing a vibrant sector and ecosystem for virtual assets in Hong Kong.<sup>148</sup> This statement demonstrated the Government's commitment to embracing the potential of virtual assets and its recognition of the transformative impact they can have on the economy. By providing clarity on its policy stance, the Government sent a strong signal to industry players, investors, and stakeholders that Hong Kong is determined to create a supportive environment for virtual asset development. Consequently, numerous virtual asset-related companies from Mainland China and foreign countries expressed interest in establishing their presence in Hong Kong, further solidifying its position as a digital innovation and financial technology hub.<sup>149</sup>

Looking to the present, the licensing regime for VASPs took effect on 1 June 2023.<sup>150,151,152</sup> The policy decision to allow retail investors to access licensed virtual asset trading platforms, marked an important step in enhancing investor protection and regulatory oversight in the virtual asset space.<sup>153</sup>

In addition, the recent establishment of the Institute of Web 3.0 Hong Kong and the Task Force on Promoting Web3 Development has marked a momentous step towards creating a supportive ecosystem for Web3 and virtual asset development in Hong Kong.<sup>154</sup> These institutions and task forces play a pivotal role in driving technological progress within the city. Taking a step back and considering the path towards achieving this technological advancement, it is crucial to retain talented individuals and attract organisations and institutions to establish a presence in Hong Kong. This, in turn, requires the availability of viable business prospects within the city. By embracing Web3 as part of efforts to spur the economy and nurturing a vibrant ecosystem for technology development, Hong Kong can position itself as a leading destination for Web3 innovation, ensuring long-term growth and success in this rapidly evolving field.

Furthermore, recognising the growing interest of financial institutions in tokenising traditional financial instruments and observing an increased number of intermediaries exploring tokenised securities, to provide regulatory certainty and manage associated risks, the SFC issued two circulars on tokenisation of SFC-authorized investment products<sup>155</sup> and intermediaries engaging in tokenised securities-related activities<sup>156</sup> in November 2023. The circulars aim to foster a healthy and responsible tokenisation marketplace while ensuring investor protection and sustainable innovation. Intermediaries regulated by the SFC should refer to the circular on intermediaries engaging in tokenised securities-related activities in conjunction with the SFC's circular on tokenisation of SFC-authorized investment products to understand the regulatory framework governing these activities. The SFC's objective is to support continued innovation while safeguarding investors and maintaining market integrity.

148 FSTB (October 2022). *Policy Statement on Development of Virtual Assets in Hong Kong*.

[https://gia.info.gov.hk/general/202210/31/P2022103000454\\_404805\\_1\\_1667173469522.pdf](https://gia.info.gov.hk/general/202210/31/P2022103000454_404805_1_1667173469522.pdf)

149 HKSAR (March 2023). *SFST's speech at Aspen Digital Web 3 Investment Summit*. <https://www.info.gov.hk/gia/general/202303/20/P2023032000278.htm>

150 SFC (June 2023). *Licensing Handbook for Virtual Asset Trading Platform Operators*. <https://www.sfc.hk/-/media/EN/assets/components/Guidelines/File-current/Licensing-Handbook-for-VATPs-31-05-2023.pdf?rev=a94fa7324a964e328dd2415815611d76>

151 SFC (June 2023). *Guidelines for Virtual Asset Trading Platform Operators*. <https://www.sfc.hk/-/media/EN/assets/components/files-current/web/guidelines/Guidelines-for-Virtual-Asset-Trading-Platform-Operators/Guidelines-for-Virtual-Asset-Trading-Platform-Operators.pdf?rev=f6152ff73d2b4e8a8ce9dc025030c3b8>

152 SFC (June 2023). *Guideline on Anti-Money Laundering and Counter Financing of Terrorism (For Licensed Corporations and SFC-licensed Virtual Asset Service Providers)*. [https://www.sfc.hk/-/media/EN/assets/components/files-current/web/guidelines/guideline-on-anti-money-laundering-and-counter-financing-of-terrorism-for-licensed-corporations/AML-Guideline-for-LCs-and-SFC-licensed-VASPs\\_Eng\\_1-Jun-2023.pdf?rev=d250206851484229ab949a4698761cb7](https://www.sfc.hk/-/media/EN/assets/components/files-current/web/guidelines/guideline-on-anti-money-laundering-and-counter-financing-of-terrorism-for-licensed-corporations/AML-Guideline-for-LCs-and-SFC-licensed-VASPs_Eng_1-Jun-2023.pdf?rev=d250206851484229ab949a4698761cb7)

153 SFC (May 2023). *Consultation Conclusions on the Proposed Regulatory Requirements for Virtual Asset Trading Platform Operators Licensed by the Securities and Futures Commission*. <https://apps.sfc.hk/edistributionWeb/api/consultation/conclusion?lang=EN&refNo=23CP1>

154 HKSAR Government (June 2023). *Task Force on Promoting Web3 Development established*. <https://www.info.gov.hk/gia/general/202306/30/P2023063000579.htm>

155 SFC (November 2023). *Circular on tokenisation of SFC-authorized investment products*. <https://apps.sfc.hk/edistributionWeb/gateway/EN/circular/doc?refNo=23EC53>

156 SFC (November 2023). *Circular on intermediaries engaging in tokenised securities-related activities*. <https://apps.sfc.hk/edistributionWeb/gateway/EN/circular/doc?refNo=23EC52>

## Appendix 5: Summary list of fintech-related government funding scheme, strategic initiatives offered by non-departmental public bodies or public corporations

### ***Government Funding Scheme & Support***

The Government has been diligently promoting the development of innovation and technology (I&T) through substantial funding commitment and support schemes worth over HKD 200 billion.<sup>157</sup>

#### *Supporting Research & Development*

- Enhanced Tax Deduction for R&D Expenditures
- Enterprise Support Scheme (ESS)
- Guangdong-Hong Kong Technology Cooperation Funding Scheme (TCFS)
- Innovation and Technology Support Programme (ITSP)
- Mainland-Hong Kong Joint Funding Scheme (MHKJFS)
- Midstream Research Programme for Universities (MRP)
- Partnership Research Programme (PRP)
- Research and Development Cash Rebate Scheme (CRS)
- Technology Start-up Support Scheme for Universities (TSSSU)

#### *Nurturing Tech Talent Pool*

- Development Fund for the Travel Industry
- Maritime and Aviation Training Fund
- New Industrialisation and Technology Training Programme (NITTP)
- Research Talent Hub for Incubatees and I&T Tenants of the HKSTPC and the Cyberport (RTH-SPC)
- Research Talent Hub for ITF projects (RTH-ITF)
- Research Talent Hub for Technology Companies Conducting R&D Activities in Hong Kong (RTH-TC)
- STEM Internship Scheme
- Talent List Hong Kong
- Technology Talent Admission Scheme (TechTAS)

#### *Government Co-Investment with Private VCs*

- Innovation and Technology Venture Fund (ITVF)

#### *Facilitating Technology Adoption/Patent Application*

- Applying For a Standard Patent
- Free IP Consultation Service
- IP Manager Scheme PLUS
- Public Sector Trial Scheme for Technology Companies Conducting Research and Development (R&D) Activities in Hong Kong (PSTS-TC)
- Public Sector Trial Scheme for Incubatees & Graduate Tenants of Hong Kong Science & Technology Parks Corporation and Hong Kong Cyberport Management Company Limited (PSTS-SPC)
- Public Sector Trial Scheme – ITF Projects (PSTS-ITF)
- New Industrialisation Funding Scheme (NIFS) (formerly known as Re-industrialisation Funding Scheme (RFS))

<sup>157</sup> InvestHK (2024). *Government Funding Scheme & Support*. <https://www.startmeup.hk/startup-resources/government-funding-scheme-and-support/>

***Marketing Development/Business Upgrading***

- Trade and Industrial Organisation Support Fund (TSF)
- General Support Programme (GSP)
- SME Export Marketing Fund

***GBA-focused Schemes***

- Funding Scheme for Experiential Programmes at Innovation and Entrepreneurial Bases in the GBA
- Funding Scheme for Youth Entrepreneurship in the Guangdong-Hong Kong-Macao Greater Bay Area
- Greater Bay Area Youth Employment Scheme
- Youth Development Fund

***SME Loan Guarantee/Export Credit Insurance***

- Export Credit Insurance
- SME Financing Guarantee Scheme

***Industry Focus Funding Schemes***

- Construction Innovation & Technology Fund (CITF)
- CreateSmart Initiative
- Design Incubation Programme
- Green Tech Fund
- Incentive Scheme for Recurrent Exhibitions
- New Energy Transport Fund (previously named Pilot Green Transport Fund)
- Pilot Information Technology Development Matching Fund Scheme for Travel Agents (Pilot Scheme)
- Social Innovation and Entrepreneurship Development Fund (SIE Fund)
- The Innovation and Technology Fund for Better Living (FBL)

***Strategic Initiatives Offered by Non-Departmental Public Bodies or Public Corporations******Hong Kong Science & Technology Parks Corporation (HKSTP)***

- Elevator Pitch Competition (EPiC)
- HKSTP Acceleration Programme
- HKSTP Incubation
- HKSTP Venture Fund
- IDEATION
- Incu-Bio Incubation Programme
- TechnoPreneur Partnership Programme (TPP)

***Hong Kong Cyberport Management Company Limited (Cyberport)***

- Cyberport Accelerator Support Programme
- Cyberport Creative Micro Fund (CCMF)
- Cyberport Esports
- Cyberport Incubation Programme
- Cyberport Macro Fund (CMF)
- Cyberport Placement and Internship Programme
- Cyberport University Partnership Programme (CUPP)
- Overseas/Mainland Market Development Support Scheme (MDSS)

***Hong Kong Productivity Council (HKPC)***

- Biz Expands Easy (BEE)
- Chinese Medicine Development Fund (CMDf)
- Cleaner Production Partnership Programme (CPPP)
- Dedicated Fund on Branding, Upgrading and Domestic Sales (BUD Fund)
- Patent Application Grant (PAG)
- Pilot Subsidy Scheme for Third-party Logistics Service Providers (TPLSP)
- Recycling Fund (RF)
- Smart Traffic Fund (STF)
- Technology Voucher Programme (TVP)

***Government Support Bodies******Government Departments and Statutory Bodies Offering Support to Startups and SMEs***

- “Four-in-One” SME Centres
- CreateHK
- Cyberport
- Hong Kong Design Centre
- Hong Kong Productivity Council (HKPC)
- Hong Kong R&D Centres
- Hong Kong Science & Technology Parks Corporation (HKSTP)
- Hong Kong Trade Development Council (HKTDC)
- InvestHK/ Fintech HK
- Trade and Industry Department (TID) of the HKSAR Government
- Fintech Proof-of-Concept Subsidy Scheme

***Fintech Sandboxes***

- Fintech Supervisory Sandbox (FSS)
- Insurance Authority Insurtech Sandbox
- SFC Regulatory Sandbox

***Innovation Solutions for Public Services Needs***

- EMSD E&M InnoPortal
- Smart Government Innovation LAB

## Acknowledgements

**The FSDC would like to thank the following working group members for their valuable input:**

Mr Evan Auyang  
Mr Tim Bailey  
Mr Emil Chan  
Mr Leiming Chen  
Mr William Gee  
Mr David Hollard  
Ms Angelina Kwan  
Mr Alvin Kwock  
Mr Ernest Leung  
Mr Robert Lui  
Mr Rocky Mui  
Professor Jack Poon  
Dr Duncan Wong  
Dr Xiao Feng  
Mr Peter Yan

The FSDC would also like to thank Mr Peter Brewin for his contribution to the Paper.

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### **About the FSDC**

The FSDC was established in 2013 by the Hong Kong Special Administrative Region Government as a high-level, cross-sectoral advisory body to engage the industry in formulating proposals to promote the further development of the financial services industry of Hong Kong and to map out the strategic direction for the development.

The FSDC has been incorporated as a company limited by guarantee with effect from September 2018 to allow it to better discharge its functions through research, market promotion and human capital development with more flexibility.

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