The Digitalisation of Financial Services in Hong Kong

Recent experience, regulatory developments and considerations for sustainable innovation and growth

July 2023

HKIMR

HONG KONG ACADEMY OF FINANCE 金融學院

Hong Kong Institute for Monetary and Financial Research
HKIMR Applied Research Report No.2/2023

Contents

Foreword

Digitalisation is one of the key strategic initiatives aimed at promoting the further development of Hong Kong as a premier global financial centre. Upgrading the digital and data infrastructure, reforming regulatory requirements, developing an ecosystem that promotes innovation and FinTech, and nurturing as well as attracting talents are some of the areas where various major initiatives have been introduced.

Hong Kong is one of the cities in the world with an excellent digital infrastructure, as shown by indicators such as 5G and mobile penetration rates. The willingness to try out new, digital ways of doing things is generally keen, both amongst businesses and consumers, and this is an important environment for digital finance developments. Being a regional hub and a global business and financial centre, coupled with a free and competitive market environment, Hong Kong provides a highly desirable location for financial institutions and startups from different parts of the world to invest in and explore new digital initiatives.

This report first reviews some of the market and policy factors that have accelerated the pace of digitalisation in Hong Kong's financial services industry, and the wide range of new digital services and initiatives introduced in recent years. It then looks deeper into some of the implications of rising digitalisation in the financial services industry.

The digitalisation of financial services can bring different benefits and new opportunities, such as promoting green finance and environmental sustainability, and the outreach to customers and new markets. Yet, with higher speed and increased accessibility of services, and easier access to data, the digitalisation of financial services can also bring new challenges. For example, some recent international banking problem cases have highlighted the financial stability risk of increased scale and speed in bank-runs enabled by instantaneous transfer of funds. Hence, this report looks into some of these new challenges, particularly the implications of financial digitalisation on inclusion and consumer protection, and highlights the mitigating measures adopted by the public and private sectors, both in Hong Kong and internationally, to address the potential risks in the digital finance era.

Technologies and new applications can progress fast and as new regulations and standards on data security and privacy evolve, they could differ across jurisdictions, leading to the risk of fragmentation in global standards and fair competition problems in the trading of digital services. The need for dialogue and cooperation amongst different jurisdictions is therefore important. Hong Kong participates actively in such discussions through multilateral organisations, particularly in subjects such as the fair treatment of consumers and this report highlights global developments in some of these areas and the role Hong Kong plays in the process.

Digital finance is a rich and rapidly-evolving subject. This is why it is an important theme for the HKIMR in its research pursuits. This report is the most recent one in this subject area, following others that have been published in the past few years, and more will be published in the near future. We hope our efforts will provide financial institutions and regulators with a broad overview of digital finance developments and valuable insights which could help to promote a healthy and sustainable digitalisation journey for the financial services industry in Hong Kong.

Mr Kwok-Chuen Kwok

Executive Director
Hong Kong Institute for Monetary and Financial Research

Chief Executive Officer
Hong Kong Academy of Finance

Acknowledgements

We thank the Insurance Authority, the Mandatory Provident Fund Schemes Authority, the Securities and Futures Commission as well as the Banking Conduct Department, the Banking Supervision Department, the Fintech Facilitation Office, the Market Development Division, and the Soft Infrastructure and Deposit Protection Division of the Hong Kong Monetary Authority for their valuable comments and suggestions. We are also grateful for our collaboration with Mr Chris Harvey in conducting interviews with market participants in Hong Kong from October 2022 to January 2023. We would like to thank the Hong Kong Institute for Monetary and Financial Research Council of Advisers for Applied Research for their continuing support and guidance related to the Institute's research activities.

Executive Summary

Hong Kong, as one of the world's premier financial centres, is rapidly embracing digitalisation in financial services, striving to position itself at the forefront of the industry's evolution. This progress has reshaped the way an extensive array of financial services is provided. Policy makers and market participants have taken note of the emergence of digital innovations in financial services, acknowledging their potential impact on the industry's future trajectory.

This report first reviews the market and policy factors that have accelerated the digitalisation of Hong Kong's financial services industry. It then discusses the implications of financial digitalisation for inclusion and environmental sustainability, as well as the associated risks for consumers, featuring insights from local financial institutions based on interviews commissioned by the Hong Kong Institute for Monetary and Financial Research. The report also outlines measures implemented both within Hong Kong and internationally to mitigate potential risks and enhance consumer protection in the digital era. It concludes with considerations for a mature digitalisation journey in Hong Kong.

The trend of financial digitalisation in Hong Kong is driven by several market factors, such as the high information technology (IT) penetration rate as well as the advancement of FinTech ecosystem and the underlying technologies. Hong Kong is home to a vibrant group of Fintech companies spanning across various sectors such as WealthTech, InsurTech, and RegTech. In addition, **a series of policy initiatives have also been rolled out in Hong Kong to foster a conductive environment for digital transformation.** These policy initiatives have emphasised promoting FinTech adoption, nurturing the FinTech ecosystem, enhancing data infrastructure, and cultivating talent with FinTech expertise. **The pace of financial digitalisation was further accelerated by the COVID-19 pandemic.**

Financial inclusion refers to the universal and easy access to, and use of, a wide range of reasonably priced financial services that meet the needs of individuals and businesses. **The digital transformation of financial services industry in Hong Kong has expanded financial inclusion** by augmenting consumers' convenience in accessing financial services, providing efficient ways to enrich consumers' knowledge of financial services, enhancing financial institutions' ability to gather consumer-consented data, and elevating operational efficiency and service quality. **This progress is facilitated by digital channels and innovations that streamline the presentation and delivery of financial services, advanced data collection instruments, and cutting-edge data analytics technologies.** However, the digitalisation of financial services may not include certain groups, such as low-income individuals with limited access to internet connectivity and digital devices and the elderly lacking financial literacy, despite concerted efforts to promote financial education and literacy. It is important to be mindful of these potentially adverse issues in the process of digitalisation.

The digitalisation of financial services offers an opportunity to foster environmental sustainability. Progressive advancements in cloud-based solutions have facilitated greener operation of the financial services industry by reducing the necessity for travel and paper-based transactions. **Many financial institutions have leveraged digital channels to provide eco-friendly products,** such as green bonds, low-carbon portfolios, and sustainable energy funds. Moreover, **the integration of digital technologies holds the potential to fractionalise digital assets, enhance transparency, and boost economic efficiency in the green finance sector.** Market participants have underscored the potential of blockchain technology in facilitating the fractionalisation of digital green bonds, enabling investments in smaller denominations, and potentially attracting a broader investor base. The Internet of Things has also been highlighted as a potential solution for monitoring green projects.

Despite the benefits of digitalisation for financial inclusion and environmental sustainability, **financial digitalisation may also introduce new risks or magnify existing risks for consumers, with primary concerns covering data security, data privacy, and fair treatment of consumers.** Some typical risks, among others, include online frauds and scams, consumer data breaches, inadequate consumer understanding of data usage, deviation of data usage from its stated purpose, third-party compromise of consumer data, exclusion of specific consumer groups from accessing financial products or services, and the increased risk of selling unsuitable products to consumers due to risen usage of digital distribution channels and Artificial Intelligence (AI).

To mitigate these risks, a variety of measures have been implemented both in Hong Kong and internationally to strengthen consumer protection through the collective efforts of public and private sectors. Policy makers and regulators have introduced a series of initiatives, including but not limited to alignment with international standards, regulation and supervision and data protection. **It is worth noting that differences exist across jurisdictions in policies and regulations on consumer protection and data governance, which highlight the importance of discussions and collaborations amongst the relevant authorities. There has been some progress in this respect and Hong Kong has been actively involved in these discussions.**

Financial institutions have also taken various actions to ensure the effectiveness of these measures and promote consumer protection. Commonly adopted measures by financial institutions both in Hong Kong and internationally to enhance consumer protection cover the areas of data governance, consent management, and third-party risk management. In addition, financial institutions have been engaged in fostering equitable and fair treatment of consumers, promoting financial education and literacy, and enhancing complaint handling and redress mechanisms.

As technological innovations progress and mature, they will continue to reshape the financial services landscape. **To effectively harness the transformative potential of digital advancements, market participants have acknowledged the importance of investing in key areas, such as enhancing user experience and trust, securely adopting advanced technologies, and cultivating talent in relevant domains.** Innovative solutions and collaborative efforts are essential to tackle the potential challenges in these respective areas and fully realise the potential of advanced technologies in financial services. This necessitates fostering a culture of innovation and a dedication to ongoing learning and development to remain at the forefront of the evolving technological landscape.

Regulators in Hong Kong have adopted a range of regulatory approaches to strike a balance between enabling innovative financial technologies and safeguarding the financial system. These include setting up innovation hubs, using regulatory accelerators, deploying regulatory sandboxes, and issuing regulatory guidance on financial consumer protection. **Market participants acknowledge the value of these existing regulatory approaches and have offered recommendations for updating guidelines and enhancing communication between regulators and the industry.**

Chapter 1
Financial Digitalisation in Hong Kong

Current landscape, market incentives, and policy initiatives

HIGHLIGHTS:

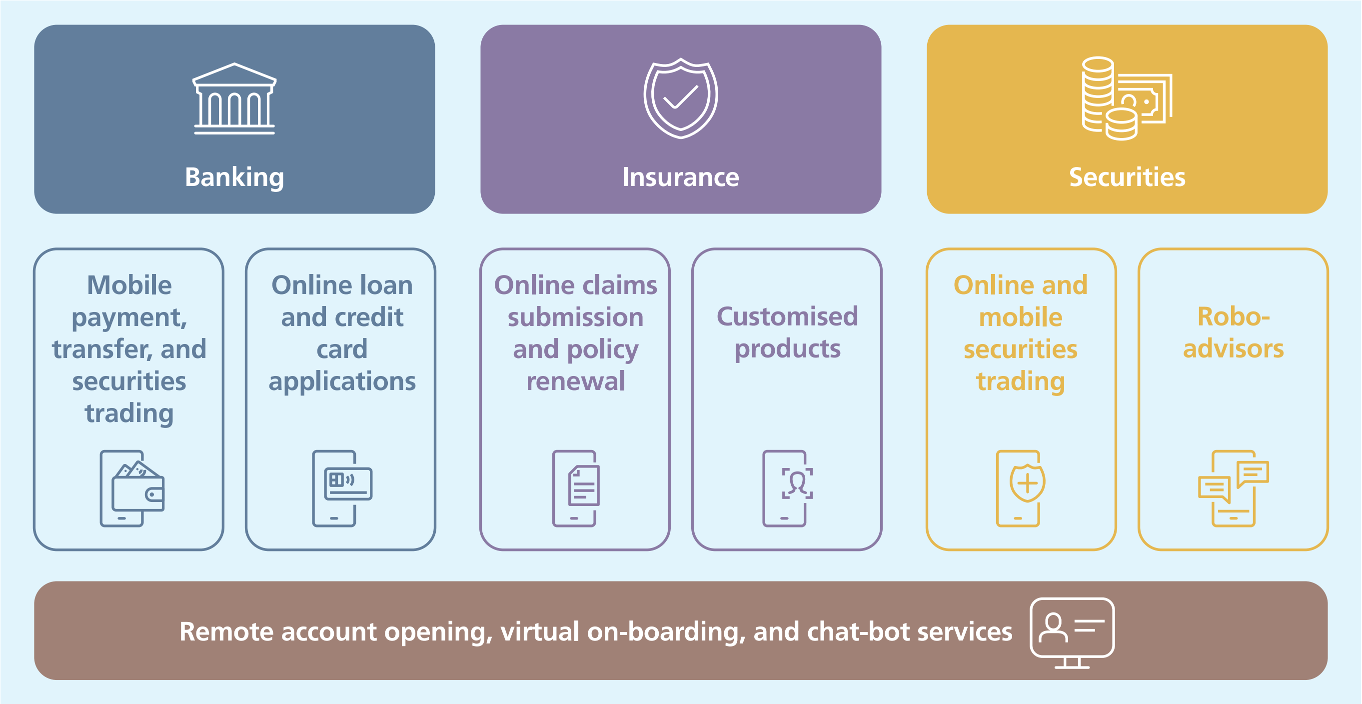
- Financial institutions in Hong Kong, including banks, insurers, and securities firms, are rapidly embracing digitalisation in providing and delivering financial services.
- A number of market factors have contributed to the accelerated pace of financial digitalisation in Hong Kong, such as a high IT penetration rate, the COVID-19 pandemic, the FinTech ecosystem, competition from new entrants and peers, and business transformation opportunity.
- The government and regulators in Hong Kong have deployed several policy initiatives to support the digitalisation of financial services. These initiatives include promoting FinTech adoption, nurturing the FinTech ecosystem, enhancing data infrastructure, and developing talent with FinTech expertise.

Digital technologies, such as smartphones, high-speed Internet and artificial intelligence (AI), are electronic tools that generate, exchange, store or process data. Digital technologies have radically changed almost every aspect of human life and the financial services industry is not immune from this trend. Financial institutions around the world have been undergoing digital transformation, which refers to the use of digital technologies to transform business models and generate value-creation opportunities.[1]

1.1. FINANCIAL SERVICES' DIGITALISATION JOURNEY IN HONG KONG

Financial institutions in Hong Kong, including banks, insurers, and securities firms, are actively embracing digitalisation in providing and delivering financial services. The pace of digital transformation can be seen easily from a customer perspective (Chart 1.1).[2] For example, traditional transactional services provided by banks, such as payment and transfer, have been digitalised into online/mobile payments and digital wallets. Digital banking has also enabled customers to apply for credit cards or personal loans that can be approved instantly, and to withdraw cash without physical cards. Insurers have digitalised policy application, claims submission and policy renewal processes. Drawing from advances in AI and big data analytics, some insurers have also introduced customised products to fit individual customer's needs. Securities firms have introduced online and mobile securities trading to allow customers to trade at their convenience, and some have also introduced robo-advisors. In addition, remote account opening, virtual onboarding and chatbot services have also become a norm across the financial services industry in Hong Kong.[3]

Chart 1.1: Examples of digitalisation of financial services



Source: HKIMR staff compilation.

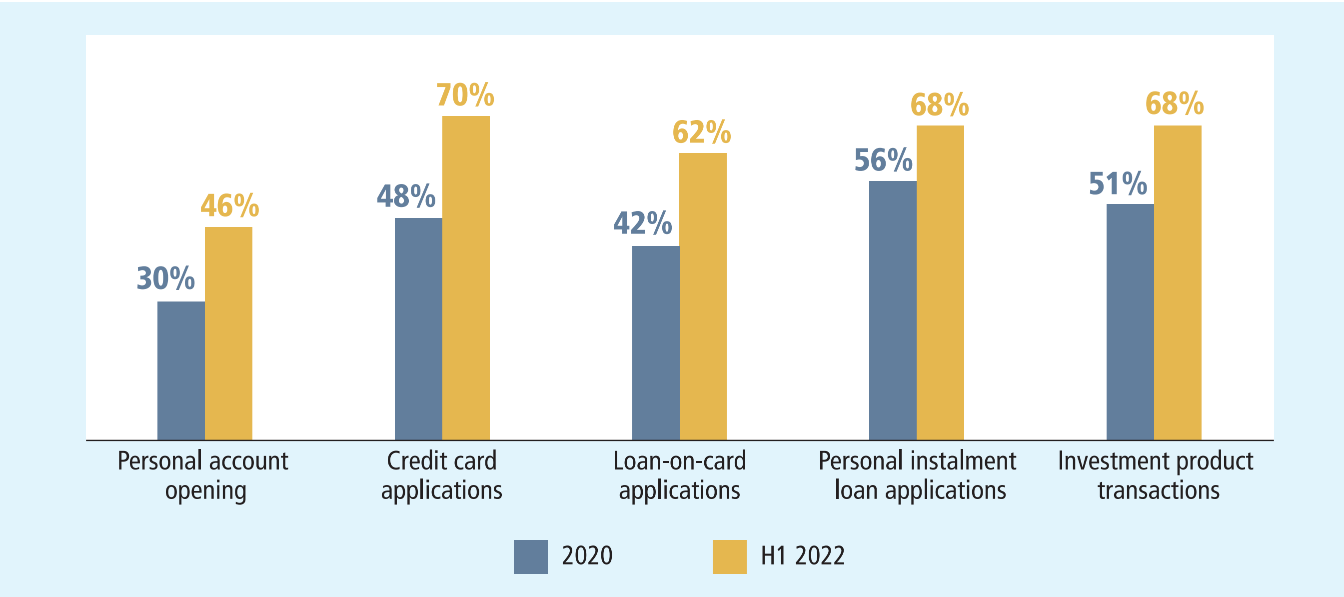
---

1 *Gartner Information Technology (IT) Glossary.*

2 *The use cases displayed are for explanatory purposes only, as the use cases of one sector can cut across other sectors of the financial services industry as well.*

3 *HKIMR (2022).*

Chart 1.2: Proportion of usage of digital channels in retail banking in Hong Kong



Source: HKMA (2023a).

Several market factors have contributed to the accelerated pace of digitalisation of financial services in Hong Kong, including a high information technology (IT) penetration rate, the COVID-19 pandemic, the FinTech ecosystem, competition from new entrants and peers, and business transformation opportunities.

High IT penetration rate

Hong Kong is a highly digitalised city with a mobile subscriber penetration rate of 298.1% and a household broadband penetration rate of 99.5% as of December 2022,[4] and internet usage rate for businesses at 95.7% as of 2021. The government and private sector have provided over 86,000 wireless hotspots across Hong Kong that are free of charge as of February 2023.[5] Hong Kong's high IT usage and penetration rate have laid the foundation for financial institutions to digitalise their businesses effectively.

As financial services become more digital in Hong Kong, customers are increasingly willing to use these services. In 2019, Hong Kong was ranked in the top five among the world's developed markets for consumer FinTech adoption.[6] According to a 2021 survey by the Hong Kong Monetary Authority (HKMA), there is a high penetration rate of digital payment services, with 98% of local payment instructions processed by retail banks and 80% of cross-boundary remittances made via digital channels.[7] In addition, the use of digital channels for account opening, loan applications, and investment product transactions by retail customers has substantially increased from 2020 to H1 2022 (Chart 1.2).[8] A Visa study on Hong Kong consumers in 2020 also found that mobile banking is used the most for

4 *https://www.ofca.gov.hk/en/news_info/data_statistics/key_stat/index.html*

5 *https://www.ogcio.gov.hk/en/about_us/facts/it_usage_penetration_survey.html*

6 *EY (2019).*

7 *https://www.hkma.gov.hk/eng/news-and-media/insight/2022/04/20220419/*

8 *https://www.hkma.gov.hk/media/eng/publication-and-research/annual-report/2022/AR2022_E.pdf*

the majority of banking tasks and that Hong Kong consumers are using more digital payments than cash for the first time in 2020.[9]

The COVID-19 pandemic

Although the COVID-19 pandemic and the associated social-distancing measures implemented in Hong Kong have brought disruption to the financial services industry, they have also further accelerated the pace of the digitalisation of financial services. The shortened business hours and infeasibility of face-to-face meeting during the pandemic resulted in a shift towards digital channels. A study by the HKIMR on financial institutions in Hong Kong found that businesses conducted via digital channels increased from 31% to 47% during the pandemic in 2020-2021. In addition, the study revealed that over 40% of financial institutions had accelerated their adoption of financial innovations because of the pandemic. These financial innovations were adopted along the full value chain and allowed financial institutions to increase their competitiveness, maintain customer relationships and enhance their own IT ecosystem.[10]

The FinTech ecosystem

Hong Kong has nurtured a thriving FinTech ecosystem by leveraging the city's low and simple tax regime, rich pool of diversified financial institutions, and access to Mainland China and international markets. By November 2021, the city's FinTech investments had leapt to US$795 million, which was more than twice the amount recorded in 2020.[11] In addition to these funding opportunities, the Hong Kong Science Park and the Cyberport also provide full-range entrepreneurial support and value-added services for FinTech companies to accelerate their product development and commercialisation.[12] For instance, both of them provide networking opportunities with industry experts, mentors, and investors via events and workshops and offer affordable office spaces. The Cyberport Incubation Programme offers access to funding and business development assistance.

Hong Kong is home to more than 800 FinTech companies, spanning various sectors such as WealthTech, InsurTech, and RegTech, and some of them have achieved unicorn status with valuations exceeding US$1 billion. These FinTech companies have facilitated the digitalisation of financial services in Hong Kong.[13]

Hong Kong has nurtured a thriving FinTech ecosystem by leveraging on its low and simple tax regime, rich pool of diversified financial institutions, and access to Mainland China and international markets.

Competition from new entrants and peers

Virtual banks and insurers are FinTech companies that have been licensed to deliver retail banking and insurance services in Hong Kong, primarily or solely through digital distribution channels. By replacing physical branches with digital channels, virtual banks and insurers offer a new kind of customer experience at a fraction of the overhead costs of physical incumbents. Since 2019, the HKMA and the Insurance Authority (IA) have authorised eight virtual

[9] *Visa (2020).*

[10] *HKIMR (2022).*

[11] *https://www.theasset.com/article/46107/attracting-funding-to-hong-kong-fintech-sector*

[12] *https://www.hongkong-fintech.hk/en/insights/news/news-2022/fact-sheet-hong-kong-fintech-landscape/*

[13] *https://www.hongkong-fintech.hk/en/insights/news/news-2022/fact-sheet-hong-kong-fintech-landscape/*

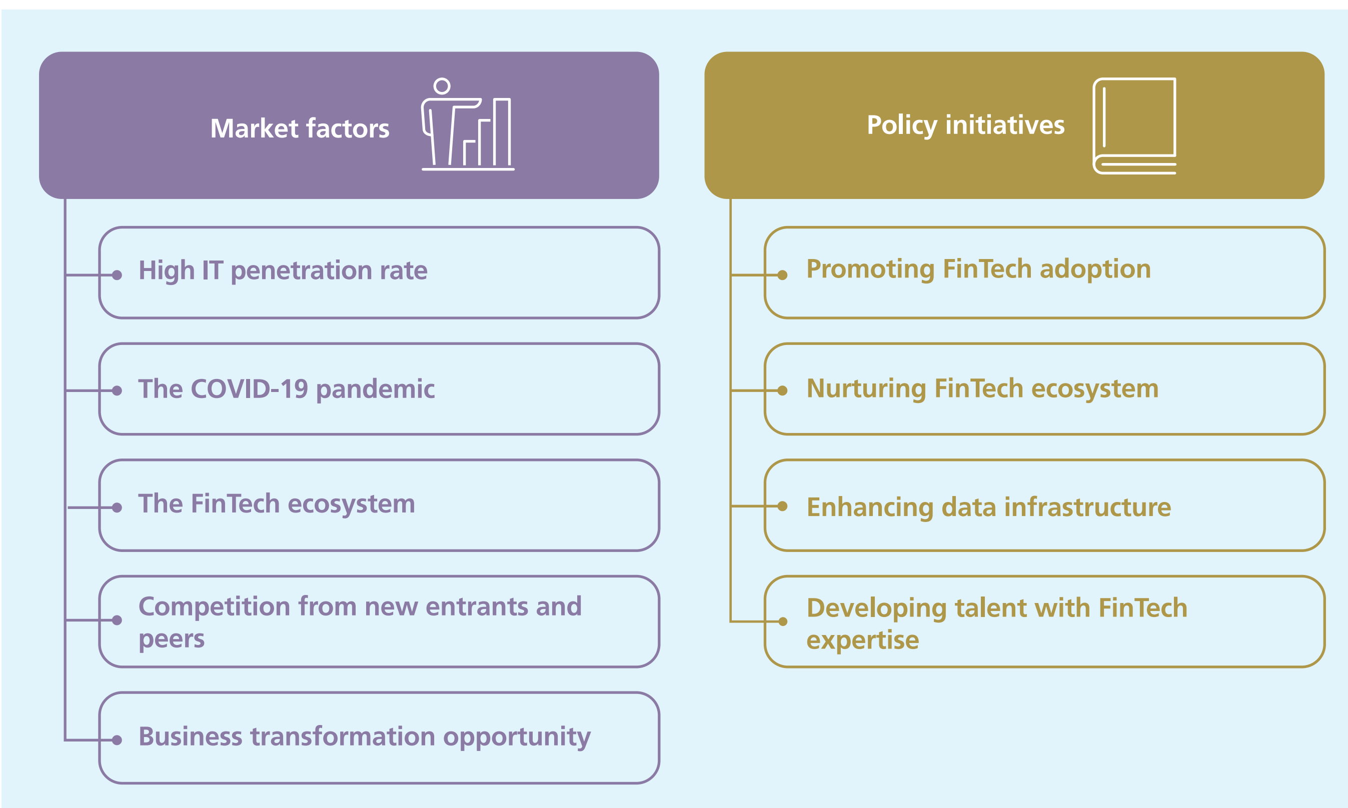
banks and four virtual insurers.[14] More than 1.2 million virtual bank accounts were opened in the first two years.[15] These new entrants to the financial market have prompted incumbents to accelerate the rollout of digital services to retain customers.

Physical incumbent financial institutions in Hong Kong also compete amongst themselves and are heavily investing in digitalisation of their services. Research by the HKIMR found that financial institutions increased the use of digital channels by more than 50% during the COVID-19 pandemic.[16] An HKMA survey further showed that banks expected a 40% growth in their FinTech investments from 2022 to 2025 when compared with the 2019-2022 period.[17]

Business transformation opportunity

In addition to keeping up with consumer expectation and competition, financial institutions also see digitalisation as an opportunity to transform their businesses. Digital distribution channels enable financial institutions to engage a large number of potential customers that they may not reach otherwise. Data analytics allow financial institutions to better access their customers and design their products to suit customer needs. The internal digitalisation of business operations allows financial institutions to improve their cost efficiency and operational sustainability.

Chart 1.3: Factors contributing to the digitalisation of the financial services industry



Source: HKIMR staff compilation.

---

14 *As of February 2023.*

15 *https://www.hkma.gov.hk/eng/news-and-media/insight/2022/04/20220419/*

16 *HKIMR (2022).*

17 *HKMA (2022a).*

The left-hand side of Chart 1.3 summarises the market factors that contribute to the digitalisation of the financial services industry in Hong Kong. Policy initiatives illustrated on the right-hand side of Chart 1.3 also play an important role in facilitating the digitalisation of Hong Kong's financial services industry.

1.2. POLICY INITIATIVES ON DIGITALISATION

To maintain Hong Kong's status as an international financial centre and an international FinTech hub, regulators in Hong Kong have deployed several policy initiatives to support the digitalisation of financial services, including promoting FinTech adoption, nurturing the FinTech ecosystem, enhancing data infrastructure and developing talent with FinTech expertise (Chart 1.3).

Promoting FinTech adoption

The Hong Kong government and regulators have been actively promoting FinTech adoption by taking the lead to adopt digital technologies. In December 2020, the "iAM Smart" mobile app was launched as a digital platform to provide various functions, including authentication, form filling, personalised notifications, and digital signing.[18] The launch of the iAM Smart app is part of the citywide digital transformation initiative to promote the widespread adoption of digital technologies in Hong Kong. As of December 2022, over 200 services across several industries and sectors have made themselves accessible through the iAM Smart app. For instance, the Mandatory Provident Fund Schemes Authority (MPFA) adopted the app as an authentication option for its eService platform in December 2021. The eService allows Mandatory Provident Fund (MPF) intermediaries to view their registration details, pay annual fees, submit notification of information changes and annual returns electronically. Around 99% of MPF intermediaries have submitted their annual returns through the eService. In addition to the adoption of the iAM Smart app in its eService platform, the MPFA also developed the ePortal, which is an electronic submission portal for MPF trustees to electronically submit their annual returns (including financial statements) of MPF schemes to the MPFA.[19] All MPF trustees have submitted their annual returns through the MPFA ePortal with the take-up rate of 100%.

The HKMA also recognises the potential of RegTech. For example, the effective implementation of RegTech can help banks to enhance risk management and regulatory compliance. More widespread RegTech adoption would also help to strengthen Hong Kong's position as an international financial centre and maintain the banking sector's competitiveness. In November 2020, the HKMA published a white paper on RegTech that outlined a roadmap to further promote RegTech adoption. As part of the two-year RegTech promotion roadmap to encourage greater sharing of RegTech adoption experiences, the HKMA has launched various RegTech initiatives including a Global RegTech Challenge, a flagship RegTech global conference, a RegTech Knowledge Hub and the publication of a series of RegTech Adoption Practice Guides.

"iAM Smart" mobile app provides the one-stop personalised digital services platform, enabling users to log in and use online services by their personal mobile phone in a smart and convenient way.

[18] https://www.info.gov.hk/gia/general/202012/29/P2020122900647.htm

[19] https://www.mpfa.org.hk/en/info-centre/press-releases/20211229_eservice

In 2020, the Securities and Futures Commission (SFC) launched WINGS, which is a digitalised platform for licensees to submit their information to the regulator. Digitalised licensing functions were added to WINGS in 2021.[20] This new capability provides greater convenience for the financial services industry and allows the SFC to harness data analytics to sharpen its assessments of applicants and licensees.[21]

The IA has developed a digital platform for the submission of licensing applications, that is, the Insurance Intermediaries Connect (IIC) platform. The IIC platform allows intermediaries to apply for licences and access registration records at any time and enhances communication efficiency between applicants and the IA.[22]

The IA also introduced temporary facilitative measures at the beginning of the COVID-19 pandemic to reduce the need for physical interactions between insurance intermediaries and their clients. The measures waived the financial needs analysis requirement for designated insurance products, provided that compensating measures were in place, which allowed insurers to digitalise their sales processes during the pandemic.[23]

In 2017, the HKMA announced a number of initiatives to prepare Hong Kong to move into a new era of smart banking, including the introduction of virtual banks to Hong Kong. By leveraging its 2017 smart banking era strategy, the HKMA unveiled in 2021 the "FinTech 2025" strategy to drive FinTech development in Hong Kong. Under the "FinTech 2025", the HKMA is committed to digitalising its bank supervision and helping Hong Kong banks to fully digitalise their operations by 2025. According to the HKMA's Tech Baseline Assessment, most participating banks have seen good progress in their adoption objectives under the FinTech 2025 Strategy.[24] In 2018, the HKMA also introduced a faster payment system (FPS), which is an open payment platform that interconnects banks and stored-value facility operators and allows individuals and businesses to make real-time transfers using multiple currencies and top up e-wallets.[25]

The SFC and the HKMA have worked together to provide tailored guidance for the financial services industry on the design and operation of online platforms for investment products, including specific guidance on the provision of automated or robo-advice in 2018.[26, 27] In 2021, the HKMA issued guidance on the distribution of investment and insurance products through non-face-to-face channels (e.g. online platforms and video conferences) to facilitate the growth of non-face-to-face channels and give customers greater choice of products and investment advice while according consumer protection.[28] Technology adoption in wealth management is expected to be supported by the increased demand for investment and wealth management services presented by the Guangdong–Hong Kong–Macau Greater Bay Area (GBA). For example, the Cross-boundary Wealth Management Connect Scheme was rolled out in 2021.[29]

---

20 *https://apps.sfc.hk/edistributionWeb/gateway/EN/circular/intermediaries/licensing/doc?refNo=21EC66*

21 *https://apps.sfc.hk/edistributionWeb/gateway/EN/news-and-announcements/news/doc?refNo=20PR131*

22 *IA (2023).*

23 *https://www.ia.org.hk/en/infocenter/press_releases/20200327.html*

24 *HKMA (2022a).*

25 *https://fps.hkicl.com.hk/eng/fps/index.php*

26 *https://apps.sfc.hk/edistributionWeb/gateway/EN/news-and-announcements/news/doc?refNo=18PR34*

27 *HKMA (2018a).*

28 *HKMA (2021a).*

29 *HKMA (2022a).*

Nurturing the FinTech ecosystem

Regulators have also deployed measures to nurture the FinTech ecosystem, such as participating in a Coordination Group on Implementation of Fintech Initiatives, chaired by the Secretary for Financial Services and the Treasury, to holistically review and supervise the development of FinTech in Hong Kong.[30]

In 2021, the Financial Services and the Treasury Bureau (FSTB) launched the FinTech Proof-of-Concept Subsidy Scheme to provide early-stage funding support for collaborations between traditional financial institutions and FinTech firms. A total of 93 projects were approved, involving a total grant of HK$10 million.[31] In the light of the positive response, the FSTB allocated another HK$10 million to launch a new round of the scheme in 2022, with a total of 56 projects approved. In August 2022, the Hong Kong government also launched a HK$5 billion tech fund to support and attract startups striving to achieve unicorn status.

Financial regulators have also established sandboxes that allow financial institutions and tech firms to conduct pilot trials of their FinTech initiatives involving a limited number of customers. The sandboxes allow financial institutions and tech firms to gather real-life data and user feedback on their new FinTech products and make refinements to them before the full product launch.

Enhancing data infrastructure

Several initiatives have been launched to enhance Hong Kong's data infrastructure. As one of the major initiatives under the "FinTech 2025" Strategy, the HKMA has built Commercial Data Interchange (CDI), a consent-based data infrastructure to make the data sharing between banks and data providers more secure, efficient and scalable. These data are only shared after the data owners have explicitly given their consent to banks and data providers. The CDI allows banks to obtain commercial data (such as e-trade declarations, e-commerce, supply chain, payment and credit) of the concerned enterprises from third-party platforms for conducting more objective and accurate credit analyses. Thereby, the CDI reduces the need for enterprises to provide collateral and effectively enhances the access of small and medium-sized enterprises (SMEs) to financing.[32]

In 2018, the HKMA launched an open application programming interface (API) framework.[33] In a four-phase approach, the API initiative allows banks to open up their internal IT systems and data for programmatic and secured access by third-party service providers or their counterparts in an open and documented manner. The IA also sees the importance of open APIs and is exploring the development of an open API framework for the insurance sector.[34]

The MPFA has undertaken to set up and operate the eMPF Platform, a common and integrated electronic platform aiming to standardise, streamline and automate the existing scheme administration processes. The eMPF Platform will improve user experience, enhance operational efficiency and reduce administration costs of the MPF System. In respect of functionalities, the eMPF Platform will serve as a one-stop electronic platform for handling MPF matters. Scheme members will be able to manage their MPF accounts across different MPF schemes through online and mobile applications anytime anywhere. Employers and self-employed

---

30 *https://www.info.gov.hk/gia/general/202112/28/P2021122800574.htm*

31 *FSTB (2021).*

32 *https://www.hkma.gov.hk/eng/key-functions/international-financial-centre/fintech/research-and-applications/commercial-data-interchange/*

33 *HKMA (2021b).*

34 *IA (2021).*

persons can also handle their MPF contributions through the platform, which will reduce paper work and inadvertent errors. Subject to the orderly onboarding of MPF schemes in sequence upon completion of platform development, the eMPF Platform is expected to come into full operation in 2025 at the earliest.

Developing talent with FinTech expertise

Developing talent is another major initiative launched by the Hong Kong government and regulators. In 2016, the HKMA launched the FinTech Career Accelerator Scheme (FCAS) to expand Hong Kong's FinTech talent pool by providing internship, training and job opportunities to undergraduate students. In 2023, the FCAS has also extended its scope to include the insurance sector through the joint collaboration of the HKMA and the IA by offering job opportunities in InsurTech-related positions. In 2022, the HKMA also launched the Industry Project Masters Network Scheme, which aims to groom FinTech talent by providing opportunities to postgraduate students to work on banks' FinTech or industry projects and gain hands-on experience and skills.[35] In addition to these schemes for young talent, in 2022, the HKMA also launched a FinTech module under the Enhanced Competency Framework to provide professional training and qualifications for banking practitioners and individuals who aspire to a FinTech career in the Hong Kong banking sector.

In 2020 and 2022, the FSTB launched two rounds of the Financial Practitioners FinTech Training Programme, which targets financial practitioners from all sectors to enhance their practical knowledge of FinTech applications, attracting participation of 7200 financial practitioners.[36] Moreover, in 2022, the FSTB commissioned the HKMA to implement the Pilot Scheme on Training Subsidy for FinTech Practitioners to encourage practitioners in the banking sector to acquire professional qualifications in FinTech.[37, 38] The Hong Kong government also launched the Technology Talent Admission Scheme and Quality Migrant Admission Scheme, which both aim to attract global technology talent to settle in Hong Kong.[39, 40]

Overall, the financial services industry in Hong Kong has been proactively embracing digitalisation, driven by various market factors and policy initiatives. Financial institutions endeavour to leverage this trend to create new or modify existing business processes, cultures and customer experiences to meet the changing business and market requirements.

As the financial services industry in Hong Kong continues to digitalise, it is important to understand the benefits and risks that digitalisation brings to consumers and society at large. The next chapter discusses the role of digitalisation in enhancing financial inclusion and environmental sustainability, as well as the associated risks.

---

35 *https://www.hkma.gov.hk/eng/key-functions/international-financial-centre/fintech/talent-development/*

36 *https://www.info.gov.hk/gia/general/202007/01/P2020063000762.htm*

37 *https://www.budget.gov.hk/2022/eng/budget54.html*

38 *https://www.info.gov.hk/gia/general/202209/26/P2022092600400.htm*

39 *https://www.immd.gov.hk/eng/services/visas/quality_migrant_admission_scheme.html*

40 *https://www.immd.gov.hk/eng/services/visas/TECHTAS.html*

Chapter 2
Implications of Digitalisation for Financial Services

Financial inclusion, environmental sustainability, and potential risks

HIGHLIGHTS:

- Digitalisation has expanded financial inclusion in Hong Kong through the increasing usage of digital channels and innovations, open banking, advancement in data collection and data analytics.
- The digital transformation in the financial services industry offers the promise of a more sustainable future through facilitating greener operation of the financial services industry and promoting more efficient and effective green finance.
- Digitalisation may also create new risks or amplify existing ones for consumers, which are mainly related to data security, data privacy, and fair treatment of consumers.

In the era of digitalisation, the way a broad range of financial services are provided, such as payments, savings, borrowing, investment, insurance services, and pension, has been transformed. Financial institutions are leveraging digital technologies to optimise their operations and gain a competitive edge in attracting consumers. The competition structure of the market has undergone a change, primarily due to differences in the pace of digitalisation and the entry of virtual banks and insurers. Against this backdrop, it is important to understand the role of digital transformation in advancing financial inclusion and sustainability, as well as the potential risks associated with digitalisation, which are critical issues for consumer welfare.

To gain insight into the experiences and perspectives of market participants on the digitalisation of financial services in Hong Kong, the HKIMR commissioned a small group of interviews with financial institutions and other relevant entities.[41] This chapter describes these interviews by focusing on how digitalisation expands financial inclusion and enhances environmental sustainability, as well as the associated risks.

2.1. THE ROLE OF DIGITALISATION IN EXPANDING FINANCIAL INCLUSION

Financial inclusion can be understood as universal and easy access to, and use of, a wide range of reasonably priced financial services that meet the needs of individuals and businesses. Globally, the underutilisation of financial services is often attributed to several factors, such as inconvenience in accessing financial services, limited availability of client information for financial institutions, inadequate knowledge of financial products among potential customers, and the high costs of financial services. For instance, physical distance and complex procedures may deter consumers from using financial services or products, while the lack of client information can obstruct financial institutions from extending loans. Digital technologies offer a powerful solution for expanding access to financial services in Hong Kong.

Chart 2.1 provides a visual summary of how digitalisation has expanded financial inclusion. A wide array of digital channels has improved the convenience

Chart 2.1: Solutions for inclusion enabled by financial digitalisation

Source: HKIMR staff compilation based on the interviews.

[41] *The interviews were held from October 2022 to January 2023 with a small panel of interviewees from banks, insurers, asset managers, consulting firms, and industrial organisations.*

of accessing financial services, such as the mobile apps provided by financial institutions, digital payments, and digital cash withdrawals. The digital delivery of information, such as online chat services, seminars, automated emails and text messages, and product information available on mobile apps and websites, has enriched consumer knowledge and reduced their information-searching costs. To ensure that the information and services offered are valuable to consumers, financial institutions have utilised advanced data collection and analytics tools to collect and analyse consumer data, resulting in improved KYC processes and tailored offerings of products and services that meet consumer needs. In addition, data analytics has enhanced the operational efficiency and service quality of financial institutions. For example, manual verifications of Hong Kong ID cards and insurance claims have been replaced with automated verifications, and machine learning has been used to improve asset management performance. These improvements have led to lower costs and higher-value-added products and services, which can attract price- and quality-sensitive consumers who opted out previously.

Market participants have observed how digitalisation has expanded financial inclusion in Hong Kong and are anticipating that the ongoing digital transformation and innovations will further facilitate the access to and use of financial services by both individuals and businesses.

It should be noted that financial inclusion in this context pertains to the collective level of the general public. However, it should not be disregarded that certain groups may not be included. For instance, low-income individuals may face challenges in accessing digital devices or stable internet connections, while the elderly may lack digital literacy and individuals with disabilities may encounter difficulties in operating digital devices. It is important to take these factors into account in the process of digitalisation.

Digital platforms

Financial institutions have enhanced consumer experience and service quality by improving their product offerings on digital platforms. Digital channels, such as mobile apps and websites, provide a convenient way to support consumer learning and financial product delivery. With improved mobile apps and secured identity authentication, such as facial recognition and two-factor authentication, users can easily use financial services without accessing a computer. Due to the ability of digital channels to reduce the cost and price of services and increase consumers' convenience of access to information and products, there has been a noticeable shift in consumer behaviour towards digital platforms.

Some banks in Hong Kong have improved customer experience through greater use of technology by launching remote account opening services. Of all the personal bank accounts opened in the first half of 2022, around 46% were opened via digital channel, vis-à-vis less than 20% for the whole year of 2019. For those customers with visual impairment to access banking services, banks in Hong Kong, at the encouragement of the HKMA, have installed voice navigation ATMs and the number of these ATMs have increased significantly from around 50 machines in 2018 to over 1,600 machines by end-2022.

The use of digital channels to sell insurance policies has recently garnered consumers' attention. For instance, an interviewee noted that a survey found that Hong Kong's virtual insurers experienced premium growth by a factor of 8x (from HK$43 million to HK$345 million) from 2020 to 2021.[42] Some interviewees suggested that this growth could be attributable to the capacity of digital channels to reduce intermediary costs and enhance product accessibility.

[42] *Quinlan & Associates (2022).*

Some financial institutions have improved digital platforms to make financial planning and wealth management more accessible to ordinary people. By leveraging digital platforms, these institutions have implemented digital innovations to enhance individuals' financial planning and wealth management. For instance, they provide personal finance management tools on their digital platforms, including annual and monthly spend analysis and peer comparison tools. In addition, one interviewee noted that some banks (including both conventional and virtual banks) were developing digital wealth management solutions, such as robo-advisors, to target the mass market. These digital innovations enable ordinary people to access financial planning and wealth management advice that were once exclusive for the wealthy in the pre-digital age.

To facilitate the accessibility of virtual assets, the SFC has licensed digital asset brokerages and trading platforms for professional investors since 2020.[43] To balance meeting retail investors' demand for alternative assets while safeguarding them against potential risks over the years, the SFC has released a number of virtual asset policies that have gradually allowed retail investors to gain limited exposure to virtual assets.[44]

Digital payments, cash withdrawals, and cheque deposits

Digital payments have surged in popularity in Hong Kong during the COVID-19 pandemic. Almost all interviewees believed that this trend would likely continue in the post-pandemic era because these digital payment innovations have made fund transfers much more convenient. For instance, the FPS enables users to perform free instant interbank fund transfers using a mobile number, email address or FPS identifier. The FPS has seen a substantial increase in annual payments processed from HK$817.7 billion in 2019 to HK$2,901.4 billion in 2022. The interviewees emphasised the high value that consumers place on these advances in payment infrastructure.

In addition to the FPS, e-wallets have also contributed to the convenience of payments and fund transfers. Several financial institutions and service providers have offered e-wallets to users. The increasing number of merchants that allow payments via e-wallets in Hong Kong has spurred the use of e-wallets. For instance, since the MTR Corporation launched a quick response (QR) code payment service in January 2021, consumers can now use a variety of digital wallets for QR code payments at MTR entry/exit gates on the MTR heavy rail network. Furthermore, some taxis, restaurants and many retailers have enabled e-wallet payments. The mutual effort towards digitalisation made by financial service providers and merchants has improved consumer experience.

An e-wallet is a software-based system that allows individuals to make electronic transactions using the money added from a linked bank account or transferred from others.

As a smart banking innovation, many Hong Kong banks have introduced a mobile cash withdrawal function to enable consumers to withdraw cash from ATMs without using a physical ATM card. While cash usage has decreased in Hong Kong as a result of the increased use of digital payments, some consumers still prefer to carry cash. With this innovative function, users can instantly withdraw cash from any supported ATMs within the member banks network by scanning the QR codes displayed on the ATMs using their bank's mobile app, mitigating concerns of card skimming or password exposure.

---

[43] *https://www.sfc.hk/en/Welcome-to-the-Fintech-Contact-Point/List-of-licensed-virtual-asset-trading-platforms*

[44] *For example, the SFC and HKMA issued a joint circular in January 2022 allowing a limited suite of virtual asset-related derivative products to be distributed to retail investors (see: https://apps.sfc.hk/edistributionWeb/gateway/EN/circular/doc?refNo=22EC9) and has authorised three authorized virtual asset futures exchange traded funds since December 2022 for retail offering (see https://apps.sfc.hk/edistributionWeb/gateway/EN/circular/products/product-authorization/doc?refNo=22EC60).*

Despite the prevalence of digital transfers, some consumers still require the use of regular cheques. To enhance the convenience of cheque deposits, many banks in Hong Kong have developed a mobile cheque deposit function. Using the bank's mobile app, consumers can easily deposit a cheque at any time by selecting their preferred deposit account, entering the cheque details and taking a photo of the cheque. This streamlined process saves consumers' time by enabling them to deposit a cheque without having to visit an ATM or a branch.

Open banking

The open APIs provided by financial institutions can allow third-party service providers to retrieve financial product information and owner-consented account information from financial institutions. Open APIs can also enable third parties to redirect platform users to access the financial institutions' product application and transaction functions. These practices can also increase the convenience in accessing financial services, and are collectively referred to as Open Banking. Financial institutions have recognised the value of open APIs and have developed them to facilitate convenient customer access to financial services.

APIs serve as interfaces between software applications, facilitating communication between them by allowing one application to pass data to another or access the functionality of another application.

Open APIs are APIs that allow third-party access to an organisation's systems.

To date, over 1,000 open APIs have been developed in Hong Kong to help users access financial services in various ways.[45] For instance, some retail companies have subscribed to banks' APIs to enable their customers to pay for purchases from their websites using the reward points accumulated on selected banks' credit cards.[46] In addition, some service providers specialising in providing information comparing different financial products (such as insurance products, account opening requirements and credit card benefits) have subscribed to APIs to retrieve product information from the related financial institution's website and redirect consumers to the financial product application webpage.

Open APIs can also enable services that would not be possible otherwise. For instance, by allowing third-party financial planning platforms to access account information of a customer who owns accounts at multiple financial institutions, Open APIs can facilitate the provision of consolidated overviews of the customer's transactions across all banks, expenses analyses, cost savings advice, and other services based on the records pulled from multiple banks.

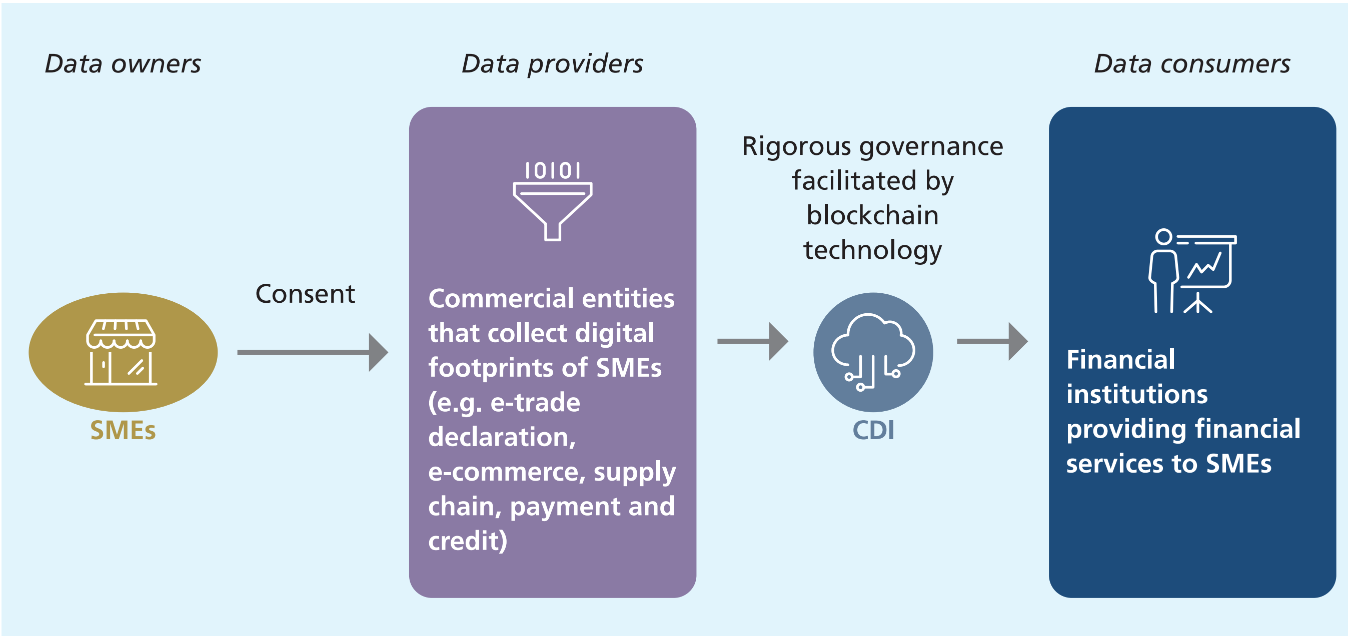
Efforts to enhance digital literacy

To bolster the accessibility of financial services, financial institutions have also simultaneously endeavoured to strengthen users' digital literacy to promote further advancements in accessibility across the financial services industry. Although user experience has improved in recent years, accessing and using financial services still requires a degree of digital literacy, even at the most basic level, such as account management and payments. To expand financial inclusion for the less digitally literate individuals, financial institutions have made efforts to help them become familiar with digital innovations. For instance, several interviewees have introduced digital assistants into their physical

[45] *https://openapi.hkstp.org/banking/en-us/api-catalogue/*

[46] *Examples of open APIs (with names of banks and service providers) can be found at https://openapi.hkstp.org/banking/en-us/, which provides a single point of reference for all the open APIs offered by banks to facilitate access by third-party service providers.*

Chart 2.2: How does CDI facilitate SMEs' loan applications



Source: HKMA website and HKIMR staff compilation.

banking branches to help those less digitally literate consumers in using the bank's mobile app and website. The interviewees also mentioned efforts have been made to simplify the mobile apps and websites to appeal to these less digitally literate users. The interviewees noted that these efforts will continue in the near future.

Data collection

Significant efforts have been made across the financial services industry to integrate improved data collection from multiple external and internal sources with advanced analytics capabilities. For example, asset management firms are utilising advanced tools to gather a vast amount of alternative data as input for investment analysis to improve performance. However, some SMEs and new business starters may be unable to produce sufficient evidence in making applications to open bank accounts and access credit. Without adequate information on these prospective clients, financial institutions may be more cautious in providing them with credit. Box 2.1 provides the relevant insights from the interviewees.

Box 2.1 Insights from market participants

Data availability is an important issue for financial inclusion, such as for those with very thin or no credit history and for startups that have not established their past financial performance data. Modelling data for these groups would differ significantly from the traditional approach banks use for underwriting loans.

Advancements in data collection and sharing have encouraged financial inclusion. The HKMA's rollout of CDI and promotion of open APIs is a positive sign.

CDI, launched by the HKMA in October 2022, has helped to address this pain point. CDI is a data infrastructure that aims to enable the secure and efficient transmission of owner-consented data from data providers to financial institutions that offer services to the SMEs. Although SMEs may have a limited credit history and insufficient financial data, their use of various platforms can provide alternative data that reflects their financial condition and prospects, such as e-commerce, government service, and supply chain platforms. CDI provides a channel for financial institutions to obtain alternative data for data-driven decisions, such as account opening and credit scoring. Chart 2.2 illustrates the basic functioning of CDI. As of the end of June 2023, CDI had facilitated the approval of more than 3,100 loan cases by the participating banks, amounting to over HK$2.8 billion.[47]

SME owners value CDI for its ability to expand their access to financial services at a lower cost. For instance, SMEs with limited financial data may be able to obtain a loan through CDI without the need to provide collateral. The amount financed and interest rates offered by CDI can be competitive in the market.[48] In light of these experiences, the interviewed market participants expressed that the CDI initiative could do much to help address the pain point of data availability.

Data analytics

With broader access to data, financial institutions are better equipped to leverage data analytics to offer more competitive prices and higher quality products that meet consumer needs. Asset management firms are engaging with AI and machine learning (ML) techniques to explore big data and maximise the value of investments for their stakeholders. Chart 2.3 illustrates how data analytics tools can be used in investment processes. AI and ML can analyse real-time data and market trends, providing automated investment suggestions based on analysis results, which can aid investment management.

Some interviewees mentioned that they are using data analytics tools to identify underserved clients and develop programmes and products that meet their specific needs. The insurance sector has also leveraged data analytics to enhance operational efficiency. The interviewed insurers highlighted that data analytics tools have enabled them to automate claims processes across a majority of business units. This automation has improved claim performance, expedited claim processing and reduced operating costs.

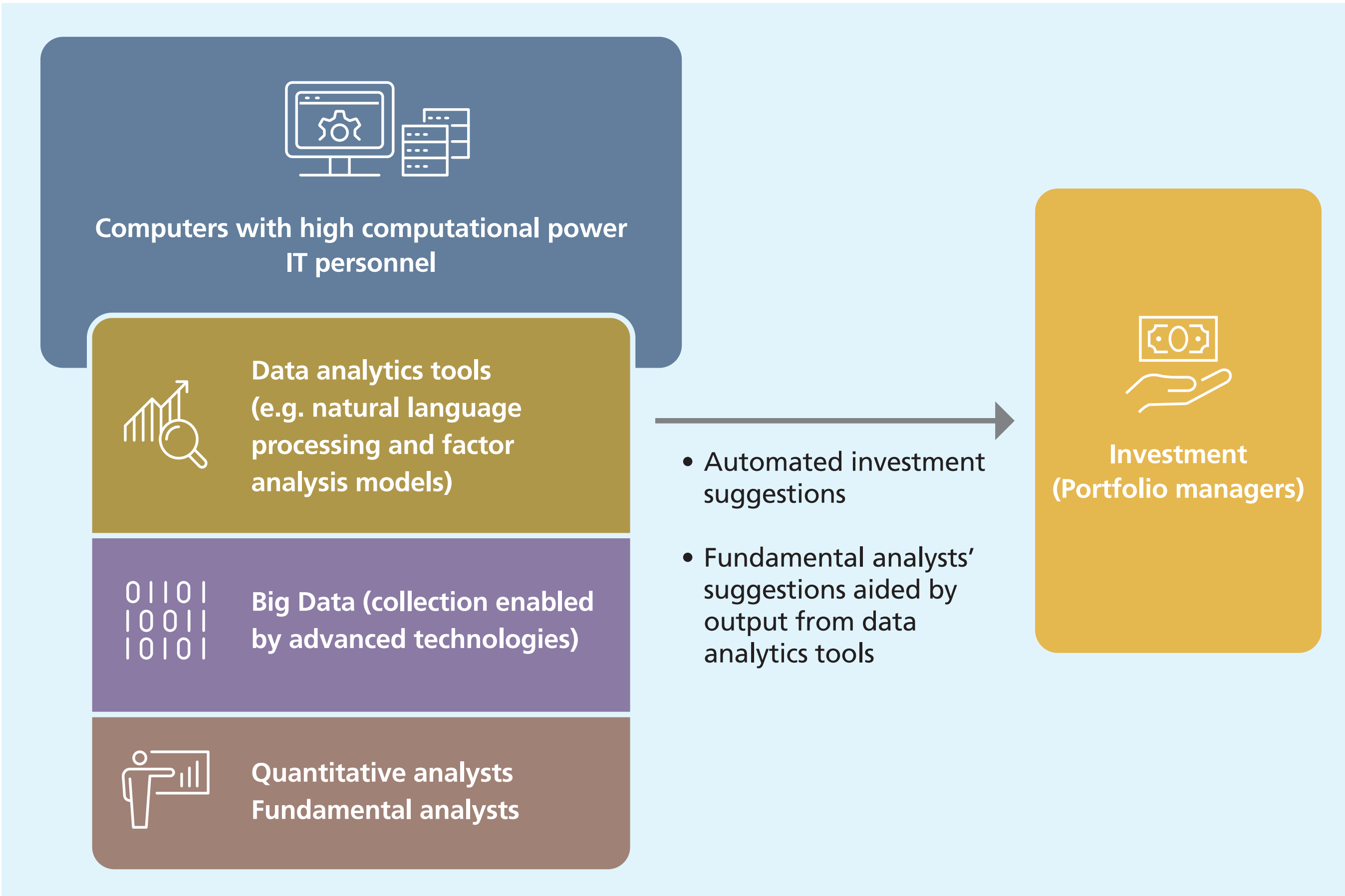
In addition, data analytics has enabled financial institutions to better identify consumer preferences and needs, increasing the value added in services and products. Several interviewees mentioned that they are leveraging data analytics tools such as ML to analyse their clients' wealth management behaviour and send personalised messages to help them manage their wealth more effectively. Some interviewees also indicated that AI teams have been created to analyse big data, assess clients' risk preferences and determine the suitability of financial products for their clients. These tailored services enable consumers to better identify the products that fit their needs.

Recognising the value of AI, financial institutions have also acknowledged that digital analytical tools may be more effective when used in conjunction with traditional approaches for some services. The insights from the interviewees demonstrated in Box 2.2 support this statement. This hybrid approach is consistent with an agile use of digital analytical tools in enhancing consumer experience.

[47] *https://cdi.hkma.gov.hk/*

[48] *Related use cases are available on the CDI webpage (see https://cdi.hkma.gov.hk/)./*

Chart 2.3: Asset management empowered by digitalisation



Source: HKIMR staff compilation.

Box 2.2 Insights from market participants

Wealth management firms cannot rely solely on digital technologies, such as robo-advisors, to serve wealthy clients. While AI can perform routine tasks, human interaction is still necessary to build relationship and help clients understand complex financial products. A hybrid-service model is more suitable for meeting these needs.

2.2. DIGITALISATION AND ENVIRONMENTAL SUSTAINABILITY

The digital transformation of the financial services industry offers the promise of a more sustainable future. To the extent that digitalisation bolsters financial inclusion, it contributes to the resilience of the economy and social sustainability. While digitalisation was primarily initiated to enhance operational efficiencies and promote data management, it also has the potential to reduce the need for physical space, paper and energy consumption. Financial institutions have also recognised the value of digital tools for preventing greenwashing[49] and suggested that digital technologies could help investors redirect their financing towards more environmentally efficient users of capital by offering access to green assets. In recognition of this value, regulators, FinTech companies and financial institutions have collaborated to highlight the technological possibility of making green assets accessible to a broader investor base and optimise the climate market with improved efficiency, transparency and reliability.

Greener operation of the financial services industry

Progressive advancements in cloud-based solutions have facilitated greener operation of the financial services industry by reducing the need for travel and paper-based transactions. For instance, many financial institutions now offer online loan applications, replacing the in-person submission of paper documents with online channels. This reduces the need for consumers to physically visit a branch and print the documents, providing them with a more convenient and efficient banking experience. Digital account opening, available through both virtual and traditional financial institutions has also helped to reduce the number of trips to physical locations and paper processes.[50] In addition, some financial institutions have offered their employees full or partial work-from-home arrangements. This can help reduce greenhouse gases from transportation.

The digital distribution of product information and regular reports to consumers has also reduced paper and ink consumption. For example, many banks in Hong Kong encourage consumers to receive credit card bills through digital channels, considering the large amount of paper and ink consumption associated with monthly bills. This shift towards digital channels is a meaningful step towards environmental sustainability.

More efficient and effective green finance

Digital channels have enhanced green finance in two ways. First, they have made the distribution of green financial products more efficient and effective. Second, the sustainability-related information provided by digital platforms has allowed consumers to make more informed decisions about sustainable investments. For instance, many financial institutions have leveraged digital channels to offer green products, such as green bonds, low-carbon portfolios and sustainable energy funds. Digital offerings have made these products conveniently accessible to consumers. In addition, some service providers have collected sustainability-related data on companies and used data analytics tools to create company-specific environmental, social and governance (ESG) scores. Many digital investment platforms have subscribed to this information and continuously update these scores for platform users. Some of these platforms have also used data analytics tools to create sustainability-related scores for stakeholders' overall investment portfolios. Chart 2.4 provides an example of the sustainability-related information displayed on digital investment platforms. In this example, three environmental scores (i.e. resource use, emissions and environmental innovation) for the stakeholder's investment portfolio are displayed, along with the percentage of companies in the account that have ESG ratings.

Green bonds are used to fund projects that have positive environmental benefits. Digital technologies have enabled the fractionalisation of green bonds, permitting investment in small denominations.

---

[49] *Greenwashing is the process of conveying a false impression or providing misleading information about how an entity's products or activities are environmentally sound.*

[50] *Thethe iAM Smart website provides a list of financial institutions (see https://www.iamsmart.gov.hk/en/e-service-non_gov.html).*

Chart 2.4: An example of portfolio sustainability information at digital platforms

Source: HKIMR staff compilation.

Green bonds have provided a financing source for entities with a demand for environmentally friendly (i.e. green) projects. However, traditional bond investments require a significant financial commitment from the investor. For instance, in Hong Kong, the retail government bonds were sold at multiples of HK$10,000. In addition, monitoring and auditing the green impact of funded projects can be difficult, and the issuer may fail to deliver, which raises concerns about 'greenwashing' behaviour. Digital technologies have been identified as having the potential to enable the monitoring of environmental impacts and fractionalisation of digital debt, which allows for investment in small denominations. Several interviewees expressed positive attitudes towards the role of digital technology in sustainability, particularly green asset tokenisation, which uses digital tokens to represent fractional ownership to the underlying assets and thereby allows for investment in smaller denominations.

Box 2.3 Insights from market participants

"Greenwashing" is an important issue we pay attention to. It is promising to use blockchain technology, smart contracts, and Internet of Things (IoT) to address these issues.

To contribute to the development of green assets markets and the monitoring of the proceeds from green assets issuance, regulators, FinTech companies and financial institutions have collaborated to progressively concept-test and try out green bond tokenisation. They have successfully developed four prototypes in Project Genesis 1.0 and 2.0. In November 2021, the Bank for International Settlements (BIS) Innovation Hub and the HKMA announced the successful conclusion of Project

Genesis 1.0 in collaboration with private sector companies. The project showcased the technological possibilities for retail investors to buy and sell tokenised green bonds and track the environmental impact of the financed projects.[51] In October 2022, Project Genesis 2.0 was announced, highlighting the potential of adding tokenised greenhouse gas reduction commitments to green bonds.[52] If the bond issuer fails to meet the carbon reduction commitment, it can purchase more carbon credit on the market to achieve its goal, reducing the risk of greenwashing.

These projects highlight the potential of blockchain and smart contracts to fractionalise digital debt and enable investments in small denominations. In addition, the IoT is highlighted as a potential solution for monitoring green projects by using real-time sensors to track how much clean energy is being generated and the subsequent reduction in CO_2 emissions linked to individual investments.

In February 2023, the HKMA took a further step towards real-life implementation and helped the Hong Kong government to issue the world's first tokenised government green bond. Blockchain technology was successfully applied to institutional bond issuance and settlement, laying a solid foundation for introducing blockchain-enabled impact tracking and reporting in the future.

While the integration of digital technologies in green finance is still at a nascent stage, it has the potential to revolutionise the green finance sector through fractionalising digital assets, enhancing transparency, and promoting economic efficiency.

Collecting, recording, and using climate-relevant data is critical but challenging for green finance. Although the adoption of digital technologies in green finance is still in its infancy, its potential to fractionalise digital assets, improve transparency, and advance economic efficiency has the power to transform the green finance sector.

2.3. POTENTIAL RISKS ASSOCIATED WITH DIGITALISATION

Recognising the value of digitalisation for financial inclusion and environment sustainability, regulators and international organisations have also identified some potential risks to consumers associated with this transformation. These risks mainly relate to data security, data privacy, and fair treatment of consumers. As critical components of cybersecurity, data privacy and security refer to the protection of sensitive and confidential information from unauthorised access, use, disclosure, modification, or destruction. While data privacy focuses on the protection of personal information, data security involves the protection of all types of sensitive data, including personal, financial and business information. The fair treatment of consumers refers to the ethical and equitable treatment of consumers by businesses and organisations. Table 2.1 reviews some typical risks to consumers in the digital era, among others, and their key features.

51 *https://www.bis.org/press/p211104.htm*

52 *https://www.bis.org/about/bisih/topics/green_finance/genesis_2.htm*

Table 2.1: Potential risks to consumers in the digital age

Potential risks	Key features
Online frauds and scams	Fraudsters may use online channels to steal consumer data that could be used to impersonate victims
Data breaches	Leaked consumer data may be used to impersonate victims for illicit activities
Uninformed consent	Consumers may not fully understand how their data will be used and the collected data may not be used for the stated purpose
Third-party risk	Third parties may directly or indirectly compromise consumer data
Inequitable treatment of consumers	Digitalisation may exclude certain consumer groups from accessing financial products or services
Mis-selling financial products	Increased usage of digital distribution channels and AI may increase the risk of selling unsuitable products to customers

Source: HKIMR Staff compilation.

Online frauds and scams

In recent years, online frauds and scams, which refers to fraudulent activities conducted digitally, have surged with the accelerated digital transformation of the financial industry. Financial institutions, due to the nature of their business, need to collect and store large amounts of customer data. While this enables a surging number of online transactions every day, it also makes the data a prime target for fraudsters. Fraudsters often use online channels, such as emails, websites, or communication messengers, to steal bank logins, credit card data, or personal information to impersonate victims. A 2021 digital fraud study shows that the percentage of suspected online fraud attempts within the financial services industry increased by 149% globally when comparing the last four months of 2020 with the first four months of 2021.[53]

Data breaches

A data breach occurs when data are accessed, processed, erased, lost, or used without permission. Fraudsters may commit data breaches for illicit purposes, such as illegally transferring victims' money, committing fraud with victims' identities or selling these stolen identities on the black market. A study on Hong Kong consumers reveals that the majority of them (82%) believe there are more risks than benefits when it comes to their digital data and almost half (46%) believe that governments and companies could do more to protect their data and privacy.[54] According to the Office of the Privacy Commissioner for Personal Data, there were 142 data breach notifications in Hong Kong from 2021 to 2022.[55]

Uninformed consent

As financial institutions collect increasing amounts of personal data amidst the digitalisation trend, there is a growing concern regarding the use of these collected data. A 2020 BIS report reveals that up to nine out of ten end users do not read the data usage terms and conditions before accepting them, implying that consumers do not fully understand how their

---

[53] *https://thefintechtimes.com/transunion-find-digital-fraud-attempts-have-shot-up-by-149-globally-since-september-2020/*

[54] *Visa (2020).*

[55] *PCPD (2022).*

personal data will be used.[56] Moreover, even for consumers who are informed, there are still risks as to whether the collected data are used solely for the reason that they were collected for. For example, data collected with consumer consent for identification purposes may be used for marketing purposes.

Third-party risk

As the digital transformation evolves, financial institutions have increasingly relied on third parties to provide technological services, such as telecommunications, cloud, website hosting, and cybersecurity services. Outsourcing to third parties allows financial institutions to provide services more efficiently and at lower costs. However, there are still risks that these third parties (or their malicious staff) may intentionally steal consumer data for malicious use themselves or sell to other parties. Likewise, hackers may target these third parties and use them as intermediaries in launching cyber-attacks and trying to infiltrate the networks of financial institutions to access consumer data.[57] Some market participants cited concerns over data security as the main reason for their slow adoption of cloud services.

Inequitable treatment of consumers

The increasing amount of data collection has allowed financial institutions to conduct more in-depth analysis of consumers than ever. Advanced analytics tools can enhance financial institutions' understanding of their customers, but their usage also raises concerns regarding the inequitable treatment of consumers. Whether by design or not, data analytics tools may exclude certain customer groups from certain products or price the same products differently across customers. In addition, as digitalisation makes the offering, delivery, and receiving of financial services more reliant on digital tools, certain groups may find it difficult to access these services due to the limited digital literacy or lack of access to electronic devices or internet connections. In some cases, these population groups may find the migration from traditional channels to digital channels not only inconvenient but also inaccessible.

Mis-selling financial products

The increased usage of digital distribution channels and AI analytics tools may also increase the risk of selling unsuitable or inappropriate products and services to customers. The digital offering of products or services may result in consumers purchasing them without being sufficiently informed, which can be exacerbated by the use of aggressive advertisements and marketing tactics. For example, a study on the EU consumer credit market found that only 28% of consumers can make an informed choice when purchasing a loan online.[58] In addition, when the wrong or insufficient data are used by AI analytics tools, the tool may provide recommendations that do not match the consumer's risk profile, thereby not leading to good customer outcomes. The same study finds that in the online credit market, credit assessments commonly do not use the right dataset to assess a borrower's ability to afford a loan, lack sufficient information, and are based on unverified declarations made by the consumer, leading to increased risk of mis-selling consumer credit products.[59]

Considering the potential risks associated with digitalisation, policy makers, regulators and financial institutions are all key actors in improving consumer protection and developing a responsible digital finance ecosystem. The next chapter highlights the measures adopted by these key actors both internationally and in Hong Kong to mitigate these potential risks and safeguard consumers' interests.

56 *BIS (2020).*

57 *So far there are not many instances as financial institutions generally have their own cybersecurity measures.*

58 *https://www.finance-watch.org/publication/consumer-protection-digitalisation-of-retail-financial-services-during-the-covid-19-pandemic/*

59 *https://www.finance-watch.org/publication/consumer-credit-market-malpractices-uncovered/*

Chapter 3
Financial Consumer Protection and Risk Mitigating Measures

The local and international experience

HIGHLIGHTS:

- Policy makers, regulators, and financial institutions have a critical role to play in promoting consumer protection and fostering a responsible digital finance ecosystem.
- Policy makers and regulators in Hong Kong and globally have put in place measures to enhance consumer protection in the digital era, including alignment with international standards, regulations and supervision, data protection, collaboration among various stakeholders, and consumer education.
- Financial institutions worldwide have made efforts to foster consumer protection, covering areas of data governance, consent management, and third-party risk management. In addition, they have been devoted to promoting equitable and fair treatment of consumers, reinforcing financial education and literacy, and strengthening complaints handling and redress mechanism.

The digitalisation of financial services has offered an opportunity for enhancing financial inclusion and promoting environmental sustainability. However, it also has the potential to introduce new risks or amplify existing risks to consumers. In light of this issue, policy makers, regulators, and financial institutions have a critical role to play in promoting consumer protection and fostering a responsible digital finance ecosystem (Chart 3.1). This section provides a holistic review of the prevailing measures implemented both internationally and in Hong Kong aimed at mitigating potential risks in the digital environment, from the perspectives of policy makers, regulators, and financial institutions, respectively.[60]

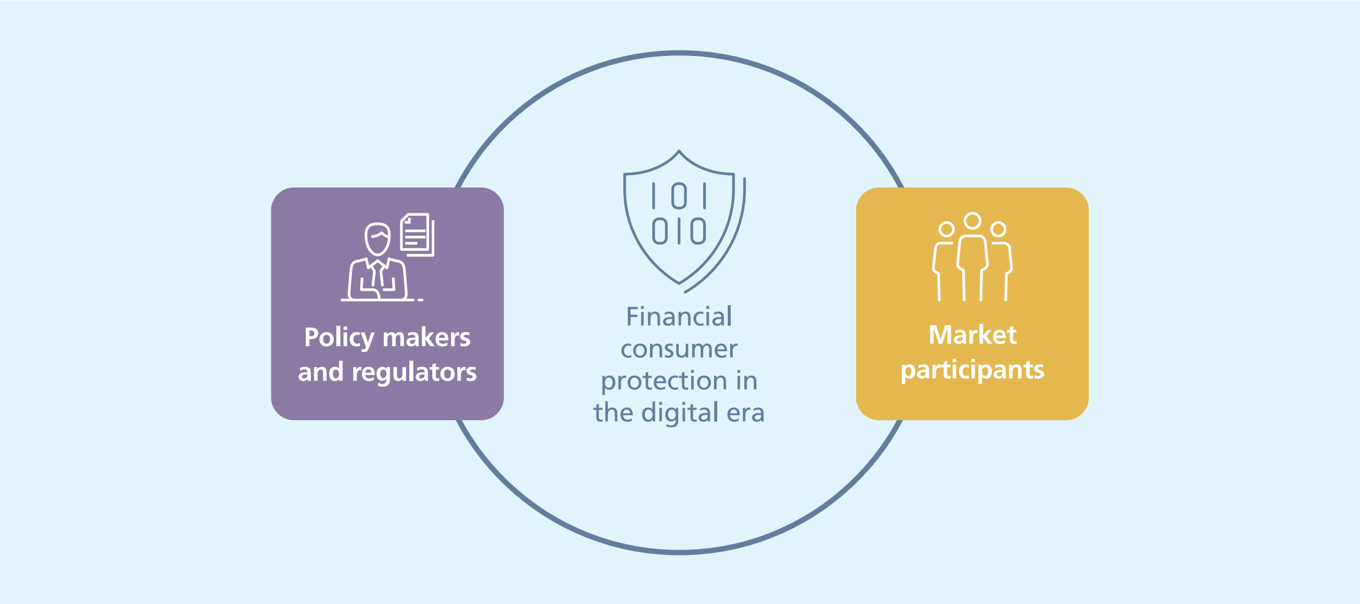
3.1. MEASURES IMPLEMENTED BY POLICY MAKERS AND REGULATORS

Policy makers and regulators are essential in financial consumer protection. They are responsible for establishing and enforcing laws, regulations, and guidelines that promote fair and transparent practices in the digital finance markets. In addition, they have the important role of supporting financial education to help consumers make informed decisions and protect themselves from potential cyber threats. International organisations, though not necessarily classified as policy makers or regulators, play a key role in establishing international standards and promoting cooperation across jurisdictions on financial consumer protection.

Global standards in respect of financial consumer protection

International organisations work to develop guidelines, principles, and best practices that promote transparency, fairness, and accountability in financial markets, and ensure that consumers are protected from harm. By providing a platform for sharing information and co-ordinating efforts, international organisations help promote consistency and coherence in consumer protection policies and practices, which can benefit consumers, businesses, policy makers, and regulators alike.

Chart 3.1: Key actors in a responsible digital finance ecosystem



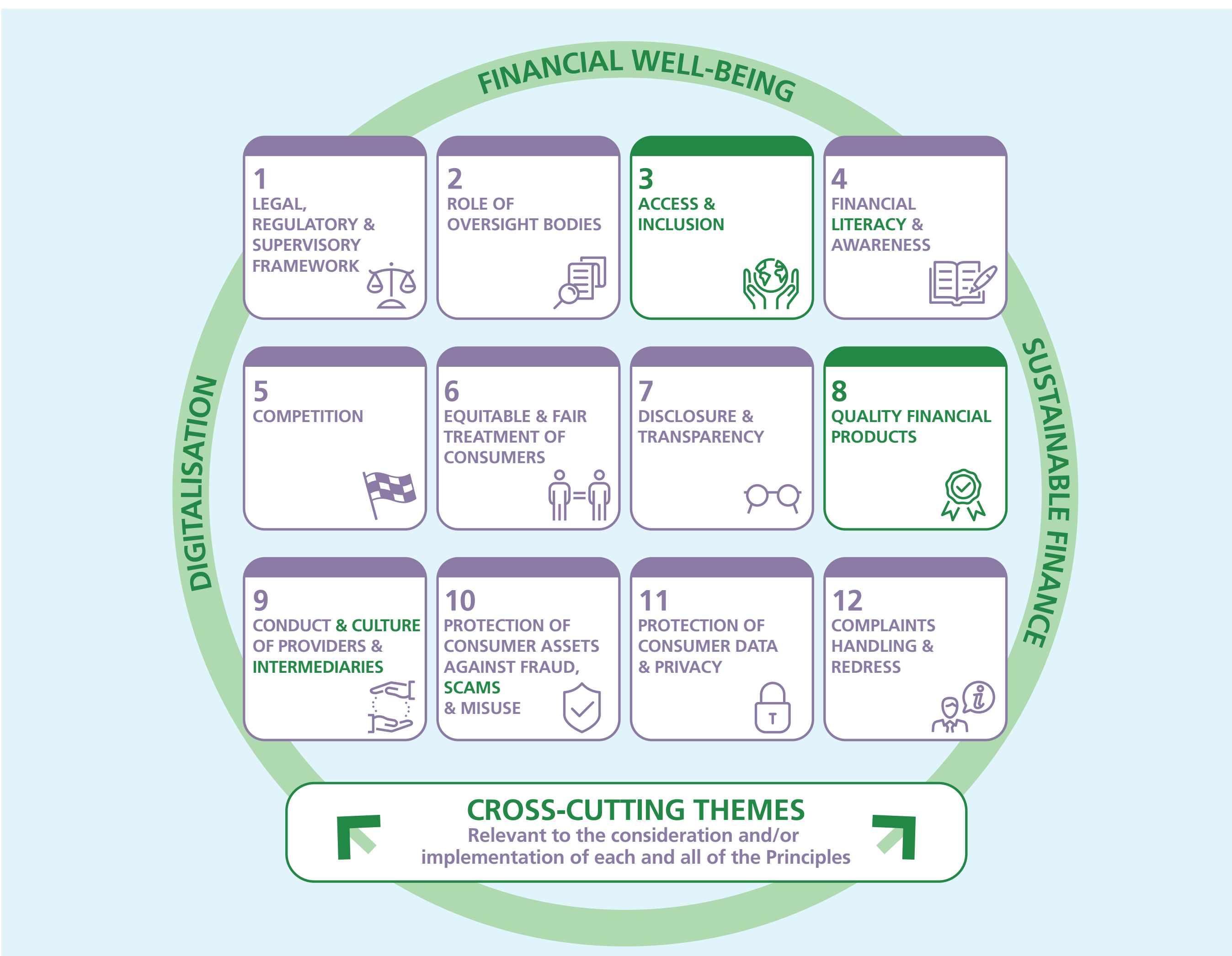
Source: HKIMR staff compilation.

[60] *The discussion of the measures adopted by financial institutions takes into accounts the insights from the interviewed market participants.*

The Organisation for Economic Co-operation and Development (OECD) has been working to promote international co-operation and consistency in consumer protection policies and practices. It has developed policy guidelines and best practices for consumer protection and conducted research and analysis on emerging consumer protection challenges, such as the challenges related to digital financial services and e-commerce.

In particular, the OECD plays a key role in setting global standards in respect of financial consumer protection. The G20/OECD High-Level Principles on Financial Consumer Protection (the Principles), which were first adopted by the OECD Council in 2012 and revised and updated in 2021 and 2022, are the leading international high-level standard for effective and comprehensive financial consumer protection frameworks. Many jurisdictions have adopted the Principles in establishing or enhancing their financial consumer protection frameworks. Among other important aspects, the updated Principles recognise the trends and developments impacting consumers, such as financial innovation and digitalisation (Chart 3.2). In particular, in the recent update, digitalisation was included as a "cross-cutting theme" that is relevant to the consideration and/or implementation of the Principles. The objective is to support policy

Chart 3.2: The G20/OECD High-Level Principles on Financial Consumer Protection



Note: The green text illustrates the updates to the Principles.

Source: OECD (2022).

makers and regulators in ensuring that consumers can capitalise on these emerging opportunities while simultaneously managing an appropriate degree of financial consumer protection.[61]

To support the development and implementation of the Principles, the OECD has formed the G20/OECD Task Force on Financial Consumer Protection (the Task Force), bringing together members from different jurisdictions to discuss the latest financial consumer protection issues and carry out initiatives in support of the implementation of the Principles.

With the Principles setting out the foundations, the Task Force has further developed Effective Approaches for Financial Consumer Protection in the Digital Age,[62] which serve as relevant, practical and evidence-based guidance and examples about how the Principles can be implemented in an increasingly digital environment.

In response to the development of digitalisation, international organisations have initiated a diverse array of measures aimed at promoting robust and effective regulatory standards and practices in financial markets to safeguard consumers against the potential risks. One noteworthy example is the International Financial Consumer Protection Organisation (FinCoNet), which fosters interaction, sharing and collaboration among regulators responsible for financial consumer protection.[63]

The FinCoNet facilitates research, exchange of information, and best practices related to consumer protection issues, with a focus on consumer credit and banking processes. With digitalisation being a priority, FinCoNet actively studies and provides recommendations to regulators in respect of digitalised financial products and services. Table 3.1 presents the highlights of FinCoNet's work on digitalisation.

Various other prominent international organisations that contribute to financial consumer protection include, but are not limited to, the Basel Committee on Banking Supervision, Financial Stability Board, International Organization of Securities Commissions, International Association of Insurance Supervisors, and International Organisation of Pension Supervisors. These entities are instrumental in promoting a fair and responsible digital finance landscape and in formulating benchmarks that inform policy makers and financial regulators as they develop policy frameworks for financial consumer protection taking digitalisation into account.

Table 3.1: Highlights of FinCoNet's work on digitalisation

Subject	Related work
Digital transactions	Explore the impact of digitalisation and the increase in digital transactions (especially payments), such as the impact on market conduct supervision in particular.
Credit products	Provide guidance to regulators on promoting responsible lending amidst the digitalisation of credit products and services, particularly short-term, high-cost consumer credit.
Supervisory tools	Support the adaptation and implementation of supervisory tools (including SupTech) and practices amid digitalisation; Share relevant effective approaches that were adopted by different jurisdictions.

Source: FinCoNet[64] and HKIMR staff compilation.

[61] *OECD (2022).*

[62] *G20/OECD Task Force on Financial Consumer Protection (2019).*

[63] *Established in 2013, FinCoNet's membership comprises more than 30 regulators around the world (including the HKMA).*

[64] *https://www.finconet.org/resources/*

Hong Kong's experience

As a preeminent international financial hub, Hong Kong has emerged as a crucial centre for digital financial services. Over the years, Hong Kong's policy makers and regulators have developed robust policy frameworks, guidelines, and regulations to promote the security and protection of consumers in the digital environment.

- *Alignment with international standards*

Hong Kong policy makers and regulators place significant emphasis on aligning with international standards in financial consumer protection. Recognising the importance of cross-border collaboration and co-ordination on financial consumer protection-related issues, especially in the era of digital finance, Hong Kong financial regulators have been actively participating in international discussions. Alongside drawing on the best practices and experiences of other jurisdictions, which can inform the development of effective financial consumer protection frameworks tailored to Hong Kong's specific circumstances, financial regulators have also been proactively sharing the experiences of Hong Kong.

For example, the HKMA is a member of the G20/OECD Task Force and actively participates in its work related to the implementation of the G20/OECD Principles as well as the Effective Approaches. The HKMA has referred to the Principles in devising its consumer protection measures in response to digitalisation, such as introducing consumer protection measures in respect of the use of Big Data Analytics and Artificial Intelligence (BDAI) by banks (covering governance and accountability, fairness, transparency and disclosure, and data privacy and protection),[65] and enhancing disclosure measures in respect of digital platforms for the application of unsecured loan and credit card products (in the form of "double reminder" to customers).[66, 67]

In 2018, the HKMA published the Open API Framework for the Hong Kong banking sector, which recommends prevailing international technical and security standards to ensure swift and secure adoption, while also safeguarding consumer privacy and security.[68] In addition, the HKMA set out consumer protection measures in respect of Open API, covering proper onboarding checks, monitoring and publication of a list of partnering third-party service providers, enhancing customer education, establishing clear liability and settlement arrangement, and putting a proper complaint handling and redress mechanism in place.[69]

- *Regulations and supervision*

In addition to keeping abreast of international developments, Hong Kong financial regulators also closely monitor the development of digitalisation of financial services to ensure regulatory responses are provided in a timely and proper manner. For example, the HKMA introduced consumer protection measures in response to innovative financial products or services driven by digitalisation, including "Buy Now, Pay Later" products.[70]

As cyber risks pose a significant threat to consumers' interests, policy makers and financial regulators in Hong Kong have recognised the need for effective cybersecurity management and put in place relevant guidelines. For instance, the HKMA introduced the Cyber Resilience Assessment Framework (C-RAF) 1.0 and 2.0 in 2016 and 2020, respectively, requiring banks in Hong Kong to assess their own cyber-risk profiles and benchmark the level of defence and resilience that would be required to accord

---

65 *HKMA (2019a).*

66 *HKMA (2020a).*

67 *The HKMA's guidance on BDAI has been cited in the Effective Approaches by the Task Force.*

68 *HKMA (2018b).*

69 *HKMA (2019b).*

70 *HKMA (2022b).*

appropriate protection against cyber-attacks. The IA issued the Guideline on the Use of the Internet for Insurance Activities[71] and Guideline on Cybersecurity[72] in 2017 and 2019, respectively, requiring authorised insurers to comply when conducting insurance business over the internet, with the aim of protecting existing and potential policyholders. Similarly, the SFC issued the Guidelines for Reducing and Mitigating Hacking Risks Associated with Internet Trading in 2017,[73] mandating all licensed or registered persons engaged in internet trading to devote efforts to protecting clients' internet trading accounts, infrastructure security management, and cybersecurity management and supervision. In the MPF space, the MPFA provided MPF trustees with guidance in different areas including cybersecurity governance and risk management, cybersecurity controls and IT vendor management.[74]

In 2018, the SFC and the HKMA worked together to provide tailored guidance to the industry on the design and operation of online platforms for investment products, including specific guidance on the provision of automated or robo-advice.[75, 76] In 2021, the HKMA also issued guidance on the distribution of investment and insurance products through non-face-to-face channels (such as online platforms and videoconferences) to facilitate the growth of non-face-to-face channels and give customers a greater choice of products and investment advice while according protection to these customers.[77]

On opening of investment accounts, the SFC amended the relevant guidance in 2019 to facilitate new approaches, such as the remote onboarding of overseas individual clients. The changes were made to cater for the need for intermediaries to adapt their practices as business activities are increasingly conducted online.[78] In connection, the HKMA issued guidance to clarify that if a bank has established the true and full identity of a client when opening a bank account irrespective of using face-to-face or non-face-to-face approaches, the bank is not required to verify the client's identity again when opening an investment account for the client. This would further streamlines the account opening process.[79]

To facilitate intermediaries' digital communication with customers in respect of distribution of investment products, the HKMA also worked with the SFC to provide guidance to the industry in 2020 on intermediaries' provision of trade documents (e.g. monthly account statements) and product documents (e.g. offering documents) to customers by electronic means.[80] In addition, the HKMA worked with the SFC in 2018 to provide guidance on the key controls and procedures that intermediaries are expected to put in place when using instant messaging applications to receive client investment orders.[81] The HKMA also developed guidance on the use of instant messaging for general banking services.[82]

Given the surge in consumers' use of digital channels, regulators are paying close attention to the potentially higher risks associated with inadequate information disclosure, which can undermine consumer protection despite the ease and convenience of digital services. In 2019, the SFC

---

71 *IA (2017).*

72 *IA (2019).*

73 *SFC (2017)*

74 *MPFA (2019).*

75 *https://apps.sfc.hk/edistributionWeb/gateway/EN/news-and-announcements/news/doc?refNo=18PR34*

76 *HKMA (2018a).*

77 *HKMA (2021a).*

78 *https://apps.sfc.hk/edistributionWeb/gateway/EN/circular/intermediaries/supervision/doc?refNo=19EC45*

79 *HKMA (2019c).*

80 *HKMA (2020b), SFC (2020a) and SFC (2020b).*

81 *https://apps.sfc.hk/edistributionWeb/gateway/EN/circular/intermediaries/supervision/doc?refNo=18EC30*

82 *HKMA (2019d).*

issued the Guidelines on Online Distribution and Advisory Platforms to provide tailored guidance to the industry on the design and operation of online platforms and to clarify how the Suitability Requirement would operate in an online environment.[83] In 2022, the SFC also issued a report on the review of licensed corporations providing online brokerage, distribution and advisory services to share the observations and findings of the review with the financial industry so that firms may benchmark themselves against their peers and be mindful of the deficiencies that the review identified. Firms were also reminded of the expected regulatory standards when providing these services online.

Further to the Enhanced Disclosure Measures in respect of Digital Platforms for the Application of Unsecured Loan and Credit Card Products[84] introduced in 2020, in late 2022, the HKMA released the Feedback from Recent Review on Consumer Protection in respect of Digital Platforms for the Application of Credit Products, in which it shared key observations on areas for improvement and sound practices to enhance disclosure on digital platforms with the financial services industry to ensure the fair treatment of consumers and enable them to make informed decisions.[85] In view of the technological advancements in recent years, the HKMA strengthened the surveillance of banks' online platforms for investment products and insurance products through comprehensive surveys and onsite examinations.

Policy makers and regulators are committed to striking a balance between promoting financial innovation and fostering consumer protection. The regulatory sandbox launched by various financial regulators in Hong Kong is a prime example. It provides a supervisory arrangement with greater flexibility to enable qualified institutions to gather real-life data and user feedback on innovative initiatives and make the corresponding refinements, with one of the key objectives being the protection of consumers' interests.

Policy makers and regulators are dedicated to achieving a balance between encouraging financial innovation and promoting consumer protection.

- *Data protection*

The collection and usage of personal data may infringe on individuals' privacy and give rise to consumer protection issues in the digital economy, highlighting the importance of comprehensive data protection laws. In Hong Kong, the Personal Data (Privacy) Ordinance (PDPO) governs the collection, holding, processing, disclosure and usage of personal data, and is applicable to both the public and private sectors. As the regulatory body responsible for enforcing the PDPO in Hong Kong, the Office of the Privacy Commissioner for Personal Data has issued an array of guidelines aimed at ensuring effective compliance with the PDPO, with many of them specifically focusing on personal data protection in the digital realm.[86] Box 3.1 provides more details about the PDPO.

---

[83] *This refers to the requirement (as set out in paragraph 5.2 of the Code of Conduct for Persons Licensed by or Registered with the Securities and Futures Commission (Code of Conduct)) that licensed or registered persons should, when making a recommendation or solicitation, ensure that the suitability of the recommendation or solicitation for the client is reasonable in all the circumstances, having regard to information about the client of which the licensed or registered person is or should be aware through the exercise of due diligence.*

[84] *HKMA (2020a).*

[85] *HKMA (2022c).*

[86] *For example, it issued the "Guidance on the Ethical Development and Use of Artificial Intelligence" in 2021. For more information about the data privacy and security guidelines, please refer to the PCPD website (see https://www.pcpd.org.hk/english/resources_centre/publications/guidance/guidance.html).*

Chapter 3

Box 3.1: The PDPO and its six Data Protection Principles

The PDPO took effect in 1996 and experienced significant amendments in 2012 and 2021, respectively. It regulates the collection, holding, processing, disclosure, and usage of personal data through six Data Protection Principles (DPP).[87]

DPP 1: Purpose and Manner of Collection

- Data collected should be necessary, adequate and lawful and means of collection should be lawful and fair
- Data subjects should be informed of the purpose, usage, access and correction of their data

DPP 2: Accuracy and Duration of Retention

- Data users and any third parties appointed to handle data should ensure data is accurate and not kept longer than necessary

DPP 3: Use of Data

- Data must not be used for any other purpose other than the original purpose, unless given consent by the data subject
- Data subjects must be informed of and consent to the transfer of data to a third-party

DPP 4: Data Security

- Data users and any third parties appointed to handle data should protect the personal data against unauthorised or accidental access, processing, erasure, loss or use

DPP 5: Openness and Transparency

- Data users should ensure openness of their policies and practices, the kind of data held and main purposes for holding it

DPP 6: Access and Correction

- Data subjects must have a right to access and correct their data

Source: HKIMR staff compilation.

- *Collaboration among various stakeholders*

Amid the rapid development of technologies and the digital economy, various stakeholders in Hong Kong have strengthened their co-operation in the area of consumer protection, including different government departments, financial regulators, the industry, and academia. For instance, the Hong Kong Association of Banks (HKAB) and the DTC Association,[88] with the endorsement of the HKMA, jointly issued the revised Code of Banking Practice in 2021, which enables banks to better protect consumers' interests in the digital environment and cater to their diverse customers' evolving needs.[89]

In view of a growing number of unauthorised payment card transactions involving frauds and scams, the HKMA invited the HKAB to set up a dedicated taskforce in early 2023 to consider a package of major enhancement measures on

[87] *https://www.pcpd.org.hk/english/data_privacy_law/ordinance_at_a_Glance/ordinance.html*

[88] *The DTC Association refers to the Hong Kong Association of Restricted Licence Banks and Deposit-taking Companies.*

[89] *HKAB and DTC Association (2021).*

protection of payment card customers, with a focus on empowering customers to have more autonomy in managing their card spending and borrowings, and offering better protection against unauthorised transactions. After discussion with the dedicated taskforce, the HKMA issued new guidance on 25 April 2023[90] setting out principles for handling of unauthorised payment card transactions, and requesting banks to review their approach on the provision of over-the-limit facilities to cardholders, with a view to obtaining the explicit agreement (with proper disclosure of the relevant consequences) of all cardholders. The HKMA also requested banks to strengthen security controls over the binding of payment cards to new mobile payment services through additional authentication to confirm that the cardholders have indeed given the instructions to bind their cards with new payment services. The HKMA has also announced that it will continue working closely with the industry taskforce to implement the comprehensive package of measures being developed, which will also include functions to facilitate customers' management of credit limits including that for card-not-present (CNP) transactions; instant suspension of cards; and specialised handling team for unauthorised transactions.

An independent statutory body, the Consumer Council in Hong Kong, is committed to enhancing consumer welfare and empowering consumers to protect themselves.[91] The Consumer Council has put forward its views and suggestions regarding policy considerations from the aspects of consumer protection for the various consultation papers issued by Hong Kong's financial regulators, such as on crypto-assets and stablecoins, as well as the hacking risks associated with internet trading.[92] Moreover, the Consumer Council has actively strengthened its collaborations with Greater Bay Area neighbours and other counterparts outside Hong Kong to jointly protect consumer rights in recent years.

- *Consumer education to improve financial literacy*

Consistent with the trend across the globe, awareness of the importance of financial education is gaining momentum among policy makers and regulators in Hong Kong. Recognising the potential risks to consumers in the new era of technological innovations, the Consumer Council offers tailored education for different spectrums of the community, from young students to the elderly, with the aim of raising their awareness and enabling them to acquire the knowledge needed to make informed decisions.[93]

The Investor and Financial Education Council (IFEC), a public organisation and subsidiary of the SFC, is dedicated to equipping the public with the knowledge, attitudes, and skills necessary for making informed investment and financial decisions and managing money wisely.[94] The IFEC is backed by the four financial regulators and the Education Bureau in Hong Kong. In 2016, the IFEC launched The Chin Family, a platform to provide free financial education resources to the Hong Kong public to raise their awareness and financial literacy, such as through mass media campaigns.

The HKMA has a "Smart Consumers" webpage, which provides information, smart tips, and education videos for financial consumers to use banking services in a smart and responsible way.[95] The HKMA has recently stepped up its public education effort through a series of posts on various social media platforms (such as Facebook, Instagram, and WeChat) to alert the public to some common scam tactics.

---

[90] *HKMA (2023b) and HKMA (2023c).*

[91] *The Consumer Council was established in April 1977 under the Consumer Council Ordinance (Cap. 216).*

[92] *https://www.consumer.org.hk/en/advocacy/consultation-papers*

[93] *https://www.consumer.org.hk/en/consumer-education*

[94] *https://www.ifec.org.hk/web/en/about-ifec/index.page*

[95] *https://www.hkma.gov.hk/eng/smart-consumers/*

Relevant experiences of other jurisdictions

Policy makers and regulators in many jurisdictions have implemented initiatives to enhance consumer protection in the digital age. In 2020, for instance, the Central Bank of Portugal released the best practices that financial institutions should observe to ensure compliance with the rules governing the duties of transparency and assistance applicable to the marketing of retail banking products and services through digital channels.[96] Meanwhile, the Financial Conduct Authority in the UK has been operating their regulatory sandbox in recent years to enable firms to test innovative propositions in the market with real consumers, while ensuring that appropriate consumer safeguards are in place.[97] In October 2022, the Central Bank of Ireland published a Discussion Paper on the Consumer Protection Code Review due to the rapidly changing financial services landscape, which includes the digital transformation trend.[98]

International collaboration and co-ordination on consumer protection within the digital realm has grown stronger in recent years. For instance, the Consumer Protection Cooperation (CPC), a network of authorities responsible for enforcing EU consumer protection laws to safeguard consumers' interests in the countries of the EU and the European Economic Area, introduced the new CPC Regulation in 2020, which establishes stronger co-ordinated mechanisms to investigate and tackle widespread infringements and enables co-operation on infringements of short duration, such as misleading short-term advertising campaigns.[99]

Technological advancements have had a profound impact on the financial services industry, with improved data collection and usage as key digital transformation characteristics. Data play a pivotal role in building a modern financial ecosystem that supports innovative development patterns. Governments across jurisdictions have established laws and policies regulating the collection, storage and processing of data across jurisdictions. For example, the EU's General Data Protection Regulation (GDPR), which was adopted in April 2016 and became enforceable in 2018, is the toughest privacy and security law in the world.[100] Some laws, such as the UK's Data Protection Act[101] and Brazil's General Data Protection Law,[102] are similar to or have expanded the coverage of the GDPR. By establishing clear rules on data protection and privacy, the GDPR and other relevant laws or policies promote trust in digital financial services and protect the rights and interests of consumers.

However, significant differences in data-related laws and policies can be observed across jurisdictions due to specific security concerns and varying development statuses.[103] International communication and co-ordination efforts have been underway to mitigate undue fragmentation in this realm, which can help strike a balance between growth and competition. One notable example is the World Trade Organization (WTO)'s Joint Statement Initiative on E-commerce (JSI) in a partnership that aims to establish a binding agreement among its members. The JSI covers both traditional trade topics, such as trade facilitation, and several digital policy issues, such as cross-border data flows and data localisation, online consumer protection and privacy and network neutrality. 87 WTO members currently participate in the JSI, representing slightly over half of all WTO members and 90% of global trade.[104]

---

96 *https://clientebancario.bportugal.pt/en/noticias/banco-de-portugal-establishes-best-practice-enhance-information-transparency-digital*

97 *https://www.fca.org.uk/firms/innovation/regulatory-sandbox*

98 *https://www.centralbank.ie/regulation/consumer-protection/consumer-protection-codes-regulations/consumer-protection-code-review*

99 *European Commission (2019).*

100 *https://gdpr.eu/what-is-gdpr/*

101 *https://www.gov.uk/data-protection*

102 *https://fadv.com.hk/blog/brazilian-general-data-protection-law-lgpd/*

103 *UNCTAD (2021).*

104 *https://dig.watch/processes/wto-ecommerce*

Moreover, local policy makers and regulators have made collective efforts to achieve synergy and exchange insights on data and consumer protection. For example, the Information Commissioner's Office and the Competition and Markets Authority in the UK have collaborated to develop strategies to tackle the complex relationship between competition and data protection issues.[105] Through such partnerships and collaborations, regulatory bodies can both enhance consumer protection and promote innovation amidst the rapidly developing digital economy.

International communication and co-ordination efforts have been underway to mitigate undue fragmentation in data-related laws and policies, which can help strike a balance between growth and competition.

3.2. MEASURES ADOPTED BY FINANCIAL INSTITUTIONS

Financial institutions worldwide have implemented a range of measures to mitigate the potential risks arising from digital transformation and promote consumer protection, such as improving data privacy and security, implementing robust cybersecurity protocols and promoting transparency and fairness. While the specific measures adopted by financial institutions may differ slightly across jurisdictions, there are many common practices facilitated by the increased international co-operation and dialogue. Chart 3.3 presents the various measures that financial institutions have widely adopted to safeguard consumers' interests and how these measures correspond to the potential risks discussed in the previous chapter. These measures take into account the insights of the participants we have interviewed and practices obtained through desktop research.

Maintaining robust data governance

With the rapid advancement of digital channels and emerging technologies, financial institutions face emerging challenges in managing and protecting the vast amount of customer data. In addressing these challenges, financial institutions widely adopt robust data governance practices to ensure that the data are effectively managed, protected, and used in compliance with relevant laws and regulations, and consumer interests are well safeguarded.

A robust data governance framework can comprise a range of elements, such as establishing data protection objective and policies, enforcing data risk management, implementing effective data privacy and security measures, and applying data warehousing.[106] Some interviewees highlighted that they have established a data council to ensure that all new initiatives comply with the existing legal and regulatory requirements, and have established a security operations centre to manage the risks associated with data security. Other interviewees noted that they had designed a centralised database to store and retrieve data efficiently and to maintain a complete and accurate record of metadata. In addition, digital tools, such as AI and distributed ledger technologies (DLT), are widely used as promising solutions for financial institutions to detect and prevent data leakage, identity theft, and phishing attacks.

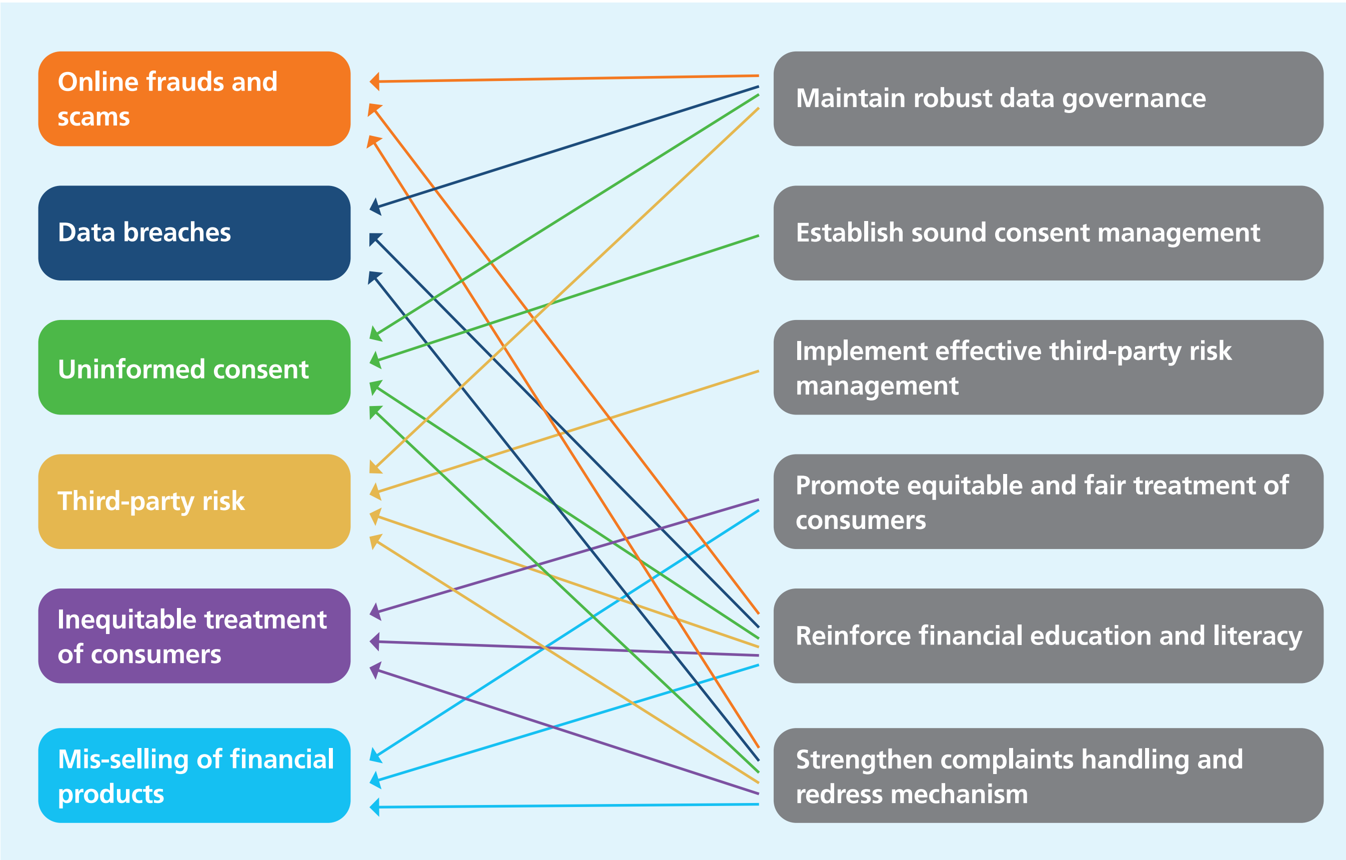
Financial institutions widely implement robust data governance practices to ensure effective management, protection, and use of data, thereby safeguarding consumers' interests.

---

[105] *https://www.twobirds.com/en/insights/2021/uk/when-competition-law-and-data-protection-overlap*

[106] *SAS Institute (2018) and HKIMR (2020).*

Chart 3.3: Potential risks to financial institutions and their corresponding mitigating measures



Source: HKIMR staff compilation.

Establishing sound consent management

With the rising concerns surrounding data privacy and security, consent management has been on top of the priority list for financial institutions worldwide. A sound consent management protocol ensures that consumers can decide what kind of their personal data financial institutions are entitled to collect and use. Financial institutions worldwide are accountable for collecting and managing customer consent and complying with personal data processing standards.

Financial institutions have implemented certain best practices for effective consent management. First, they always obtain explicit consent from their customers before collecting and using their personal data. Second, they provide adequate and transparent information about how they use and protect customer data, such as disclosing their sharing of data with third parties and implementing appropriate security measures. In addition, some financial institutions have established a legal and compliance team to help ensure their compliance with relevant laws, industry guidelines and internal policies.

Implementing effective third-party risk management

Financial institutions have established policies and procedures governing their engagement with third-party service providers to ensure that the transferred information is treated as confidential and adequately safeguarded by the service providers. Some best practices for effective third-party risk management include obtaining certifications or assurance reports from independent third-party providers, periodic assessments of third-party business continuity plans, and utilisation of various third-party risk management software to monitor third-party resilience and trends in real-time.[107] Financial institutions have made great efforts to develop a more holistic and integrated approach to manage their relations with third-parties in an efficient and cost-effective manner.

Financial institutions always conduct thorough due diligence to select new vendors with high security standards and service quality. They also implement ongoing reviews of existing vendors to ensure consistent delivery of good services over time. Some interviewed financial institutions stated that they had put in place a robust contract management process to ensure that their contracts with third-party service providers incorporate clear clauses regarding security and data privacy, as well as mechanisms for monitoring and enforcing compliance. In addition, some interviewees highlighted that they notify their third-party vendors of any identified industry-wide vulnerabilities to ensure that the transferred data are well protected from threats.

Promoting equitable and fair treatment of consumers

Financial institutions have implemented a wide range of measures to promote equitable and fair treatment of consumers and contribute to the development of a fair and inclusive financial system (Chart 3.4). They have been making efforts to ensure that they do not deliberately restrict or exclude certain groups of customers from their products and services. For instance, many financial institutions offer assistance in the physical branch for the less digitally literate population to better utilise digital services.

Furthermore, financial institutions have established appropriate frameworks and policies to mitigate the increased risk of mis-selling products to consumers, as the suitability principle is pivotal in the provision of products and services to consumers. One interviewee underlined that they have a well-established customer suitability checking mechanism in place and they make good use of data and AI to better understand customers' needs and thereby recommend the most suitable products accordingly.

Chart 3.4: Measures to promote equitable and fair treatment of consumers

Source: HKIMR staff compilation.

[107] *Deloitte (2022).*

In addition, financial institutions have been devoted to providing clear and transparent information about their products and services, such as criteria, potential risks, and terms and conditions. One interviewed asset manager highlighted that they always inform customers of the investment outcome and compare the outcome with a reference model portfolio, while the final decisions are made by the customers.

Reinforcing financial education and literacy

Financial literacy and education can enable consumers to better comprehend financial products, make informed decisions and safeguard themselves against potential risks. Financial institutions have provided their customers with educational resources, such as online tutorials, seminars and financial planning tools, and have offered tailored support to more vulnerable groups when necessary. Some interviewees suggested that they regularly send anti-fraud and anti-phishing educational emails to customers and provide this information on their website.

Financial institutions have also widely promoted consumer education through the increasing adoption of emerging technologies, such as AI and ML. These advanced technologies have been leveraged to provide personalised education to consumers and conduct individualised penetration testing at the customer level.

Financial literacy and education can empower consumers to better understand financial products, make informed decisions, and protect themselves from potential risks.

Strengthening complaints handling and redress mechanisms

Financial institutions have implemented a range of measures to establish robust complaints handling and redress mechanisms, enabling consumers to voice their concerns and seek timely and equitable resolution.

They have been committed to developing clear and transparent complaints handling and redress policy frameworks. This involves, among others, detailing the required procedures for submitting complaints, the central contact point, and the escalation channels if needed. It is worth noting that financial institutions have provided multiple easily accessible channels for consumers to make complaints, such as phone or email contact options. In addition, financial institutions have provided training to their staff to ensure that they are equipped with the necessary knowledge and skills to handle complaints in a professional and timely manner. As agreed upon among the interviewees, establishing a sound complaints handling and redress mechanism is essential for the sustainable development of financial institutions, which benefits consumers and businesses alike.

Overall, policy makers, regulators, and financial institutions have been proactively taking steps to enhance consumer protection in the digital era. As the use of digital financial services continues to evolve, it is crucial for these measures to be regularly reviewed and updated to ensure their continued effectiveness in safeguarding consumers.

Chapter 4
Looking to a Mature Digitalisation Journey in Hong Kong

Considerations for achieving sustainable innovation and growth

HIGHLIGHTS:

- The progressive maturation and advancement of technologies will continuously reshape the financial services landscape.
- Fostering a positive user experience and trust in digital tools is instrumental in amplifying their adoption and utilisation.
- Securely embracing advanced technologies allows financial institutions to further exploit their potential, offering reliable and increasingly efficient digital financial services.
- By allocating resources to talent acquisition and professional development, financial institutions can harness digitalisation to enhance consumer experience, stimulate innovation, and effectively mitigate risks.

The previous chapters have highlighted the benefits and potential risks associated with digitalisation in financial services, along with measures to mitigate those risks. As technologies further advance and mature, they will continue to transform the financial services landscape. This chapter focuses on the views of market participants regarding the further advancement of digitalisation. The market participants collectively believe that enhancing digitalisation in financial services requires investment in various areas, such as improving user experience and trust, implementing advanced technologies, acquiring and nurturing talent, and updating regulatory guidelines (Chart 4.1). They highlighted that investment in these areas could offer new opportunities for innovation and growth.

4.1. ENHANCING USER EXPERIENCE AND TRUST IN DIGITAL TOOLS

As acknowledged by market participants, a positive user experience and trust in digital tools can increase their use of financial services and the amount of consumer-consented data collected. Empowered by a greater amount of data and advanced data analytics strategies, financial institutions can better understand their consumers' risk profiles and develop products that meet their needs and preferences. This creates value for both the institutions and their consumers. Chart 4.2 summarises the strategies highlighted by market participants to enhance user experience and trust in digital tools.

Improve the user interface

During the interviews with financial institutions, it was noted that user interface design is a crucial element in the creation of engaging and user-friendly digital tools. A high-quality user interface design is characterised by various features, such as ease of use, visual appeal, and ability to meet the needs of users. The implementation of a simplified user interface that meets users' needs has the potential to increase adoption rates while simultaneously reducing support costs by reducing the number of user inquiries and support requests. Given that user interface design is a specialised field that requires specific skills and expertise, the interviewees emphasised the importance of attracting and nurturing high-quality talent in this area to enhance user interface design.

Chart 4.1: Strategies for advancing digitalisation

Source: HKIMR staff compilation.

Chart 4.2: Strategies to enhance user experience and trust in digital tools

Source: HKIMR staff compilation.

> **An engaging and user-friendly user interface design is crucial in the creation of digital tools, which highlights the importance to attract and nurture high-quality talent in this area.**

Personalise the experience

Personalisation has been recognised as a strategy for enhancing user satisfaction by delivering a tailored experience that aligns with users' specific needs and preferences. When digital tools are designed to meet individual users' specific requirements, they are more likely to use these tools. Therefore, many financial institutions have taken steps towards personalising user experiences, such as providing tailored product and service offerings and sending personalised notifications.

To further improve personalisation, financial institutions can enhance the quality of consumer data by improving data governance and cleaning techniques, such as data validation, outlier detection, and handling missing values. In addition, the implementation of more advanced data analytics strategies can help financial institutions obtain a deeper understanding of consumer needs and preferences. These efforts can enable financial institutions to deliver even better personalised experiences.

Provide consumer support

To provide consumers with effective support, digital platforms can utilise AI-powered chatbots, virtual assistants, or human interventions. Chat services can offer immediate assistance, addressing concerns in real-time, and can be used to obtain information or assistance such as resolving technical issues. High-quality chatbots and virtual assistants should provide accurate responses and understand user inputs accurately. To further improve the quality of these digital assistants, it is important to improve the underlying AI technologies and the quality and quantity of data used to train the chatbots and virtual assistants. In addition, to enhance consumer satisfaction, some digital platforms offer human interventions. For example, users can flag incorrect responses and request live chat or phone support to improve the chatbots and enhance the quality of responses to consumer inquiries.

Ensure security

To encourage consumers to use the digital platforms for transactions and provide their data, it is crucial that they feel confident about the security of the entire process. Ensuring security necessitates minimising operational risk, which refers to the potential for losses stemming from inadequate or failed internal processes, personnel, systems, or external events. Chapter 3 discusses the efforts made by financial institutions to safeguard consumers against data risk, a risk category that falls under the broader umbrella of operational risk. Following the adoption of advanced technologies like blockchain and IoT in financial services, however, the financial institutions have recognised that new risks may emerge. For example, the immutability of blockchain transactions means that errors or mistakes cannot be rectified easily, and well-defined procedures and policies are required to correct these transactions. In addition, the significant computing power and energy consumption required to operate blockchain technology can pose operational risks to financial institutions. To address this issue and ensure security, financial institutions may need to explore innovative solutions for securing these resources.

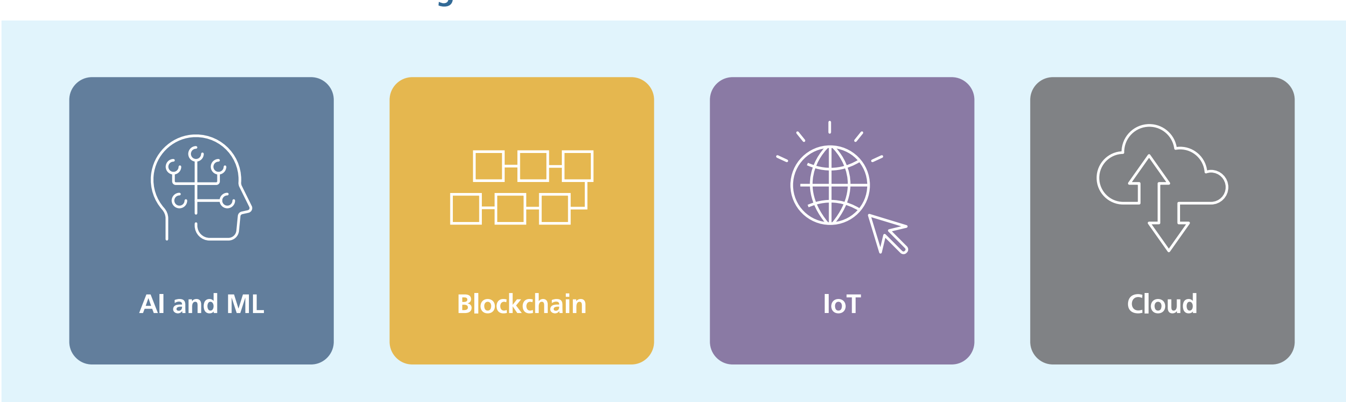
Enhance transparency

To earn more trust from their users, some financial institutions indicated that they will further prioritise transparency in their practices related to the collection, use, storage, and protection of user data. This involves providing clearer and more easily understandable privacy policies and terms of services. In addition, some interviewee suggested that they may offer users more control over the data that they had previously agreed to share to demonstrate their commitment to safeguarding user data and instilling confidence in their users.

4.2. ADOPTING ADVANCED TECHNOLOGIES IN A SECURED WAY

Several advanced technologies, such as AI and ML, blockchain, IoT, and cloud, have been progressively adopted in the digitalisation of financial services. The continued development and evolution of these technologies are propelled by advancements in various fields, such as mathematics, statistics, computer science, and electrical engineering. The secure and effective implementation of these technologies requires talent acquisition in the respective fields and partnering with trustworthy and reliable service providers. By doing so, financial institutions can better leverage the potential of these technologies to provide more efficient and secure digital services.

Chart 4.3: Advanced technologies in financial services



Source: HKIMR staff compilation.

Artificial intelligence and machine learning

Financial institutions have leveraged AI and ML in various areas, such as fraud detection, credit and market risk assessment, consumer preference identification, investment management, and process automation (such as verifying ID cards and insurance claims). To fully leverage the potential of AI and ML, it is important to continuously experiment and iterate with these solutions, testing new approaches, and refining existing approaches to improve their effectiveness. This process of improvement requires a culture of innovation and a commitment to ongoing learning and development to stay ahead of the evolving technological landscape. In addition, it is important to establish robust data governance mechanisms for collecting, cleaning, and managing high-quality data to ensure that AI and ML models have access to the data they need to generate accurate insights and predictions.

Meanwhile, interpretability can be a limitation of AI and ML in financial services. For example, ML models can be overly complex and difficult to interpret, which can make it challenging for financial institutions to understand how the models are making decisions. The lack of interpretability can also make it difficult to identify and correct errors or biases in the models. To address these concerns, financial institutions can conduct regular audits of AI and ML models to ensure that they are behaving as expected. The institutions can also apply explainable AI, an emerging field that involves developing algorithms and models that can provide explanations for their decisions and actions.

To harness the full potential of AI and ML, financial institutions need to foster a culture of innovation and embrace ongoing learning and development to stay ahead of the evolving technological landscape.

Blockchain technology

Blockchain technology has been utilised by some financial institutions in their operations and product offerings. Although blockchain technology is known for its security features, it is not completely immune to cyber-attacks. Thus, it is important to have strong security measures in place to protect against potential attacks. Moreover, developing and maintaining blockchain networks can be expensive, particularly for smaller financial institutions. Further innovative solutions and collaborative efforts are needed to address these issues and fully realise the potential of blockchain technology in financial services.

Internet of Things

The IoT technology has been utilised in various ways in financial services, such as the usage of smartwatches and fitness trackers for countless payments and insurers' reliance on IoT sensors to monitor the condition of properties and diving behaviours. Market participants have also recognised that the IoT technology has the potential to monitor energy consumption and carbon emission, and thus can enhance green finance. As IoT technology becomes more advanced, affordable, and secure, there can be a wider adoption of IoT devices and sensors in financial services to collect more consumer-consented data. With improved quantity and quality of data, data analytics can provide better insights for product development and personalised recommendations. In addition, IoT technology can be integrated with blockchain technology to create more secure financial services. For instance, IoT sensors can be used to track the movement of assets on a blockchain network, ensuring transparency and accountability.

Cloud technology

Cloud technology provides an effective way to harness the power of the increasingly large volume of data generated in financial services. Financial institutions in Hong Kong are progressively adopting cloud-based solutions for business operations, improving the agility and scalability of IT infrastructure and reducing costs. However, integrating cloud-based solutions with existing systems can be challenging, leading to issues with data synchronisation, workflow management, and other operational challenges. To address these issues, financial institutions can develop a comprehensive integration strategy that outlines how they will incorporate cloud-based solutions into their existing systems and processes. During the integration process, the institutions can leverage middleware technologies as a bridge between different systems to ensure secure data synchronisation across both cloud-based and on-premises systems while also facilitating the management of different systems' workflows. Moreover, it is important to ensure that the data are secure and protected when using third-party service providers. This can be achieved through the implementation of robust security measures, regular security audits, and thorough risk assessments.

4.3. SUPPORTING TALENT TRAINING AND UPSKILLING

Talent gaps and the importance of talent acquisition

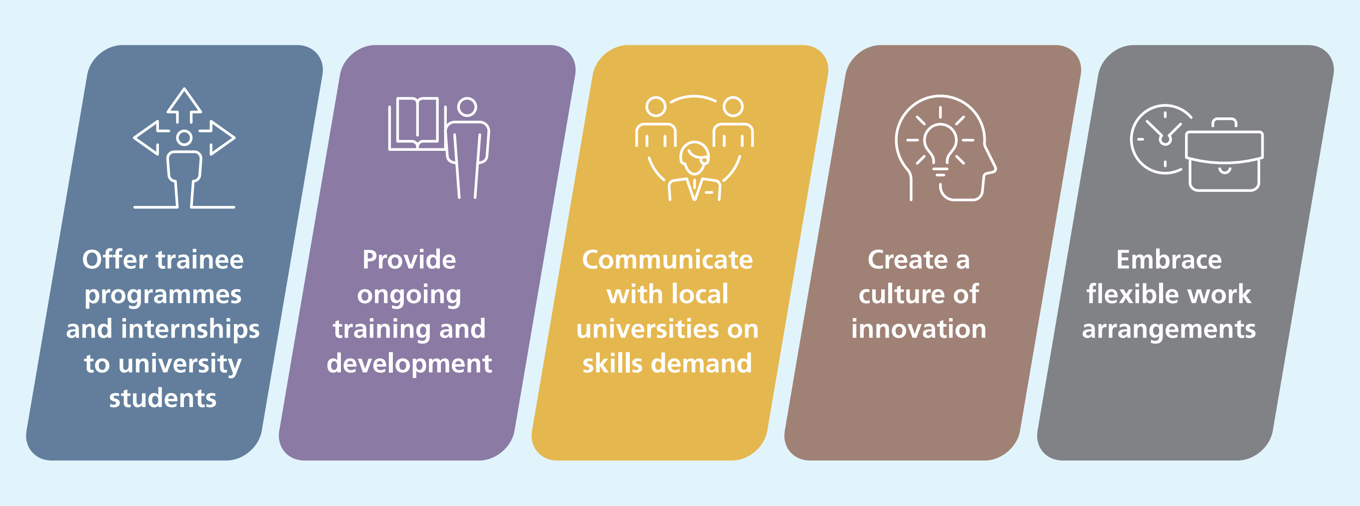
As digitalisation further advances, having the right talent is essential to tackle the challenges associated with consumer experience, adoption of advanced technology, and consumer protection. A more advanced and mature digitalisation requires acquiring high-quality talent to upgrade and replace outdated IT systems, optimise data analytics solutions, and ensure risk management in the digital era. Market participants have identified a skills gap in several key areas, including user experience and interface designers, data scientists, cloud engineers, cybersecurity specialists, and digitalisation project managers. Investing in talent acquisition and professional development in these areas can help bridge the skills gap and enable financial institutions to leverage digitalisation to enhance consumer experience, drive innovation, and manage risks.

Strategies identified by market participants

Recognising the importance of talent acquisition, financial institutions have proposed and adopted various strategies to nurture and attract talent (Chart 4.4). For instance, some institutions have established graduate associate programmes, also known as manager trainee programmes, in their technology departments to nurture prospective employees in the digitalisation field. To upskill existing talent, some financial institutions have provided employees with ongoing training and development, including rotating jobs between innovative technical departments and traditional departments, leadership training, and

Chapter 4

Chart 4.4: Market participants' strategies for talent acquisition



Source: HKIMR staff compilation.

technology-specific mentorship and coaching programmes. In addition, some interviewees have communicated with local universities, suggesting them to increase the supply of talent with the relevant skillsets, such as in the areas of cloud computing, user experience and interface design and data analytics, and to provide more cross-disciplinary training by adding technology-related knowledge to the curriculum, such as digital marketing.

Several interviewees highlighted the importance of creating a culture of innovation for advancing digitalisation. An innovative culture encourages employees to think outside of the box and produce new ideas for problem solving and improving customer experience. A culture of innovation also supports continuous learning, providing employees with resources and opportunities to develop the skills and knowledge necessary for the digital era. To attract talent, some financial institutions have embraced flexible work arrangements to improve work–life balance. Overall, the financial institutions believe that it is important to use talent-friendly strategies to attract and retain talent and provide an environment that allows them to explore their innovative capabilities and learn new knowledge to enhance their work.

4.4. UPDATING GUIDELINES AND ENHANCING COMMUNICATION

Existing regulatory approaches for FinTech innovations

Hong Kong regulators have adopted various regulatory approaches to achieve a balance between enabling innovative financial technology and safeguarding the financial system. This includes setting up innovation hubs (or offices), using regulatory accelerators, launching regulatory sandboxes and issuing regulatory guidance on financial consumer protection requirements when offering digital financial services.

Financial institutions place great importance on implementing talent-friendly strategies to attract and retain employees while fostering an environment that encourages innovation and continuous learning to enhance their work.

Established by the HKMA in March 2016, the FinTech Facilitation Office acts as a platform for exchanging ideas on innovative FinTech initiatives among key stakeholders and conducting outreach activities and as an interface between market participants and regulators within the HKMA to help improve the financial industry's understanding of the parts of the regulatory landscape that are relevant to them.[108] In the same year, the SFC established the FinTech Contact Point, and the IA set up the InsurTech Facilitation Team to exchange ideas with innovators and to facilitate the FinTech community's understanding of the current regulatory regime.[109] These contact points offer a first step for FinTech firms to obtain regulatory information. Regulatory accelerators enable partnership arrangements between innovators and regulatory authorities to develop use cases that can be applied in the future, such as identifying solutions to improve the efficiency of regulatory reporting, accelerate a greener digital future, and support better detection of money laundering. As mentioned in Chapter 1, the regulatory sandbox provides an experimentation environment for novel financial products or business models with controlled risk and cost.

---

108 *https://www.hkma.gov.hk/eng/key-functions/international-financial-centre/fintech/*

109 *https://www.sfc.hk/en/Welcome-to-the-Fintech-Contact-Point and https://www.ia.org.hk/en/aboutus/insurtech_corner.html#3*

Financial institutions recognise the importance of maintaining regular and timely communication with regulators, especially during the product development and launch stages of digital financial services.

In the area of financial consumer protection, the HKMA has been actively participating in international efforts, focusing on innovative products and the surge in scams and frauds on the back of the increasing use of digital banking channels. The HKMA also works closely with the business community and relevant stakeholders to further promote financial inclusion in Hong Kong using the innovative technologies available in the digital age. Regulatory guidance on financial consumer protection requirements when offering digital financial services has been periodically issued and updated taking the latest market developments into account.

Suggestions gathered from market participants

The market participants not only recognised the importance of existing regulatory approaches, but also put forward their recommendations for promoting FinTech innovations in the digitalisation of financial services. Their suggestions can be categorised into three main aspects. First, they proposed the need for more guidelines for innovative technologies, such as the use of blockchain technology. They suggested that these guidelines could be flexible and adaptable to the rapidly changing digital landscape. Second, they suggested that regulators organise guidance workshops and training sessions, and engage in regular dialogue with stakeholders. Finally, some interviewees emphasised the significance of more frequent and timely communication with regulators, particularly during the product development and introduction process, and believe that an open dialogue with regulators during the development of new digital financial services can enhance the development process to promote better customer outcomes.

Conclusion

As a premier international financial centre, Hong Kong has been swiftly adopting digitalisation in financial services, striving to establish itself as a major player in the industry's evolution. The developments of financial digitalisation in Hong Kong have been facilitated by both market factors, such as the advancement of the FinTech ecosystem, and a series of policy initiatives that aim at fostering a conductive environment for digital transformation.

Digitalisation of financial services in Hong Kong has brought about significant benefits and opportunities for financial inclusion and environmental substantiality through providing easier access to financial services and improving operational efficiency and user experience. **Policy makers, regulators, and financial institutions have focused on key areas of developments to enable digital transformation, such as digital platforms, technological innovations, data collection, and data analytics.** It is important to note that certain groups, such as low-income individuals with limited access to internet connectivity or the elderly lacking digital literacy, may not be included. These potentially adverse consequences should not be overlooked in the process of implementing financial digitalisation.

A crucial aspect of financial digitalisation involves harnessing the benefits of technological advancement while ensuring consumer protection. Policy makers and regulators both in Hong Kong and globally have established a series of measures to safeguard consumers' interests, such as regulatory and policy guidelines, data protection legislation, and consumer education. To better implement these measures, financial institutions have made efforts to implement robust data governance procedures and emphasised consumer education and financial literacy, empowering individuals to make informed decisions and navigate the digital financial landscape safely. **The differences that exist across jurisdictions in policies and regulations on consumer protection and data governance highlight the critical role of international discussions and collaborations. Progress has been made in this respect, in which Hong Kong has been actively engaged.**

Looking into the future, **fostering a culture of innovation and collaboration between financial institutions and FinTech firms is important for developing and implementing cutting-edge solutions that meet evolving consumer demands.** The implementation of these solutions requires a continuous effort to invest in human capital, equipping professionals with the necessary skills and knowledge to drive the industry forward. **The presence of a thriving community of FinTech companies in Hong Kong is poised to accelerate the digital transformation of financial services in the city.**

Regulators in Hong Kong have an important role to play in striking a balance between encouraging innovation and maintaining a stable, secure financial ecosystem. **This includes updating regulatory guidelines for the secure implementation of technological advancements and facilitating timely communication with market participants.** By doing so, regulators can help the industry maintain high standards of consumer protection while remaining agile and adaptive to the continuously changing landscape.

The ongoing digitalisation of Hong Kong's financial services industry presents an important opportunity to enhance consumer welfare and drive economic growth. Through collaborative efforts of financial institutions, regulators, and related third parties, and a strong focus on consumer protection, the financial services industry can navigate the challenges of this transformation and Hong Kong can continue to thrive as a global financial hub in the digital era.

Appendix A: Glossary of Technical Terms

Term	Meaning
Application Programming Interface (API)	A set of programming tools that allow the exchange of information and execution of instructions across different computer systems.
Artificial Intelligence (AI)	A set of technologies that mimic the cognitive functions of humans, such as decision-making behaviour.
Big Data (BD)	Large data collections in digital formats that are associated with high levels of seven ontological characteristics: volume, velocity, variety, veracity, validity, volatility and value.
Blockchain Technology	A distributed ledger system that allows records to be stored in a traceable, unalterable, and accessible manner.
Chatbot	A computer program that uses AI and natural language processing (NLP) to understand users' questions and stimulate chat conversation through text or voice interactions.
Cloud Computing	On-demand access to computing resources via the Internet, including data storage, servers, databases, networking and software.
Commercial Data Interchange (CDI)	Data infrastructure that allows the transmission of owner-consented data from data providers to financial institutions that offer services to SMEs.
Distributed Ledger Technology (DLT)	A technology that supports database networks that enable participants to create, disseminate and store information in a secure and efficient manner.
e-MPF Platform	A digital platform that allows MPF scheme members to manage their MPF accounts across different MPF schemes seamlessly through online and mobile apps.
e-Wallets	A non-physical stored-value facility that allows the storage of monetary value and can be used as a means of payment for goods and services and/or to another party (i.e. a P2P model).
Faster Payment System (FPS)	An open payment platform that allows customers to make cross-bank/e-wallet payments instantly in Hong Kong dollars or renminbi by entering the recipient's mobile phone number or email address.
Green Bond Tokenisation	Green bonds issued using DLT that allow beneficial interests to be recorded in a bond on a DLT ledger.

Term	Meaning
iAM Smart	A digital services platform that allows users to access online services, including authentication, form filling, personalised notification and digital signing functions.
Insurance Intermediaries Connect (IIC)	A digital platform for licensees to submit their licensing applications to the Insurance Authority.
Internet of Things (IoT)	A system of devices that are connected to the Internet for collecting and sharing data.
Machine Learning (ML)	A subset of AI techniques that can train and improve algorithms based on large datasets without human intervention.
Multi-purpose Stored-Value Facility (SVF)	A means of payment for goods and services provided by participating merchants, akin to an electronic surrogate for coins and banknotes.
Natural Language Processing (NLP)	A set of tools that transforms unstructured data, such as text and voice recordings, into structured data so that human languages can be understood by a computer.
Peer-to-peer (P2P) Model	An arrangement in which an individual payer sends a payment to an individual payee without the involvement of financial intermediaries.
Robo-advisors	A digital platform that employs mathematical algorithms to provide automated financial planning and investment services with minimal human intervention.
Smart Contracts	Self-drafted agreements that are developed in computer code enabling DLT to execute them automatically and in precise conformity with the contract terms.
WINGS Platform	A digitalised platform for licensees to submit licensing applications and information to the Securities and Futures Commission.

Appendix B: References

Bank for International Settlement/BIS (2020). 'Payment aspects of financial inclusion in the fintech era.' April.

Deloitte (2022). 'Global third-party risk management survey 2022.' September.

Ernst & Young/EY (2019). 'Global fintech adoption index 2019' September.

European Commission (2019). 'Single market scoreboard.'

Financial Services and the Treasury Bureau/FSTB (2021). '93 projects approved for fintech Proof-of-Concept subsidy scheme; Subsidies of $10 million cover various financial institutions.' August.

G20/OECD Task Force on Financial Consumer Protection (2019). 'Compendium of effective approaches for financial consumer protection in the digital age.' November.

Hong Kong Institute for Monetary and Financial Research/HKIMR (2020). 'Artificial Intelligence in banking: The changing landscape in compliance and supervision.' August.

Hong Kong Monetary Authority/HKMA (2018a). 'Online distribution and advisory platforms for non-SFO-regulated structured investment products.' August.

Hong Kong Monetary Authority/HKMA (2018b). 'Open API framework for the Hong Kong banking sector.' July.

Hong Kong Monetary Authority/HKMA (2019a). 'Consumer protection in respect of use of big data analytics and artificial intelligence by authorized institutions.' November.

Hong Kong Monetary Authority/HKMA (2019b). 'Consumer protection measures of authorized institutions in respect of open application programming interface framework.' October.

Hong Kong Monetary Authority/HKMA (2019c). 'Update on requirements for opening of accounts following amendments to paragraph 5.1 of the code of conduct.' August.

Hong Kong Monetary Authority/HKMA (2019d). 'Supervisory Policy Manual: Risk management of E-banking.' October.

Hong Kong Monetary Authority/HKMA (2020a). 'Enhanced disclosure measures in respect of digital platforms for the application of unsecured loan and credit card products.' September.

Hong Kong Monetary Authority/HKMA (2020b). 'Circular issued by the securities and futures commission ("sfc") on provision of trade documents to clients by access through intermediaries' websites.' September.

Hong Kong Monetary Authority/HKMA (2021a). 'Distribution of investment and insurance products through Non-face-to-face channels.' September.

Hong Kong Monetary Authority/HKMA (2021b). 'The next phase of the banking open API journey.' May.

Hong Kong Monetary Authority/HKMA (2022a). 'Tech baseline assessment key observations and way forward.' June.

Hong Kong Monetary Authority/HKMA (2022b). 'Enhancing consumer protection in respect of "Buy Now, Pay Later" products.' September.

Hong Kong Monetary Authority/HKMA (2022c). 'Feedback from recent review on consumer protection in respect of digital platforms for the application of credit products.' December.

Hong Kong Monetary Authority/HKMA (2023a). '2022 year-end review and priorities for 2023.' February.

Hong Kong Monetary Authority/HKMA (2023b). 'Principles for handling of unauthorised payment card transactions.' April.

Hong Kong Monetary Authority/HKMA (2023c). 'Binding payment cards for contactless mobile payments.' April.

Insurance Authority/IA (2017). 'Guideline on the use of internet for insurance activities.' June.

Insurance Authority/IA (2019). 'Guideline on cybersecurity.' June.

Insurance Authority/IA (2021). 'ASHK 19th Appointed Actuaries Symposium: Actuaries navigating a changing world – Keynote speech by Mr Tony Chan' November.

Insurance Authority/IA (2022). 'Annual Report 2020-21: Embracing the new normal.' February.

Insurance Authority/IA (2023). 'Annual Report 2021-22: Spearheading balanced development and sustainable growth.' January.

Mandatory Provident Fund Schemes Authority/MPFA (2019). 'On-site inspections on data risk management, cybersecurity risk management, digital readiness & operational efficiency.' November.

Office of the Privacy Commissioner for Personal Data /PCPD (2022). 'A new era in the regulatory regime for the protection of personal data: 2021-2022 annual report.' November.

Quinlan & Associates (2022). 'From push to pull: Examining the case for direct-to-consumer digital distribution in Hong Kong's insurance industry.' December.

SAS Institute (2018). 'The SAS data governance framework: a blueprint for success.'

Securities and Futures Commission/SFC (2017). 'Guidelines for reducing and mitigating hacking risks associated with internet trading.' October.

Securities and Futures Commission/SFC (2020a). 'Circular to intermediaries: Provision of trade documents to clients by access through intermediaries' websites.' September.

Securities and Futures Commission/SFC (2020b). 'Circular on the electronic dissemination of investment product documents.' September.

The Hong Kong Association of Banks and The DTC Association/ HKAB and DTC Association (2021). 'Code of banking practice.' December.

The Organisation for Economic Co-operation and Development/OECD (2018a). 'Toolkit for protecting digital consumers: A resource for G20 policy makers.' May.

The Organisation for Economic Co-operation and Development/OECD (2018b). 'Financial consumer protection approaches in the digital age.' July.

The Organisation for Economic Co-operation and Development/OECD (2022). 'G20/OECD high-level principles on financial consumer protection.' December.

United Nations Conference on Trade and Development/UNCTAD (2021). 'Digital economy report 2021- Cross-border data flows and development: For whom the data flow.' September.

Visa (2020). 'Consumer payment attitudes study 2.0 – The pandemic and cashless paradox.' December.

ABOUT THE HONG KONG ACADEMY OF FINANCE (AOF)

The AoF is set up with full collaboration amongst the Hong Kong Monetary Authority, the Securities and Futures Commission, the Insurance Authority and the Mandatory Provident Fund Schemes Authority. By bringing together the strengths of the industry, the regulatory community, professional bodies and the academia, it aims to serve as (i) a centre of excellence for developing financial leadership; and (ii) a repository of knowledge in monetary and financial research, including applied research.

ABOUT THE HONG KONG INSTITUTE FOR MONETARY AND FINANCIAL RESEARCH (HKIMR)

The HKIMR is the research arm of the AoF. Its main remit is to conduct research in the fields of monetary policy, banking and finance that are of strategic importance to Hong Kong and the Asia region. The Applied Research studies undertaken by the HKIMR are on topics that are highly relevant to the financial industry and regulators in Hong Kong, and they aim to provide insights on the long-term development strategy and direction of Hong Kong's financial industry.

CONTACT US

Email: hkimr@hkma.gov.hk

Tel: +852 2878 1706

Website: https://www.aof.org.hk/research/HKIMR

This is printed on environmentally friendly paper

FSC www.fsc.org MIX Paper from responsible sources FSC™ C084296

PRINTED WITH SOY INK™