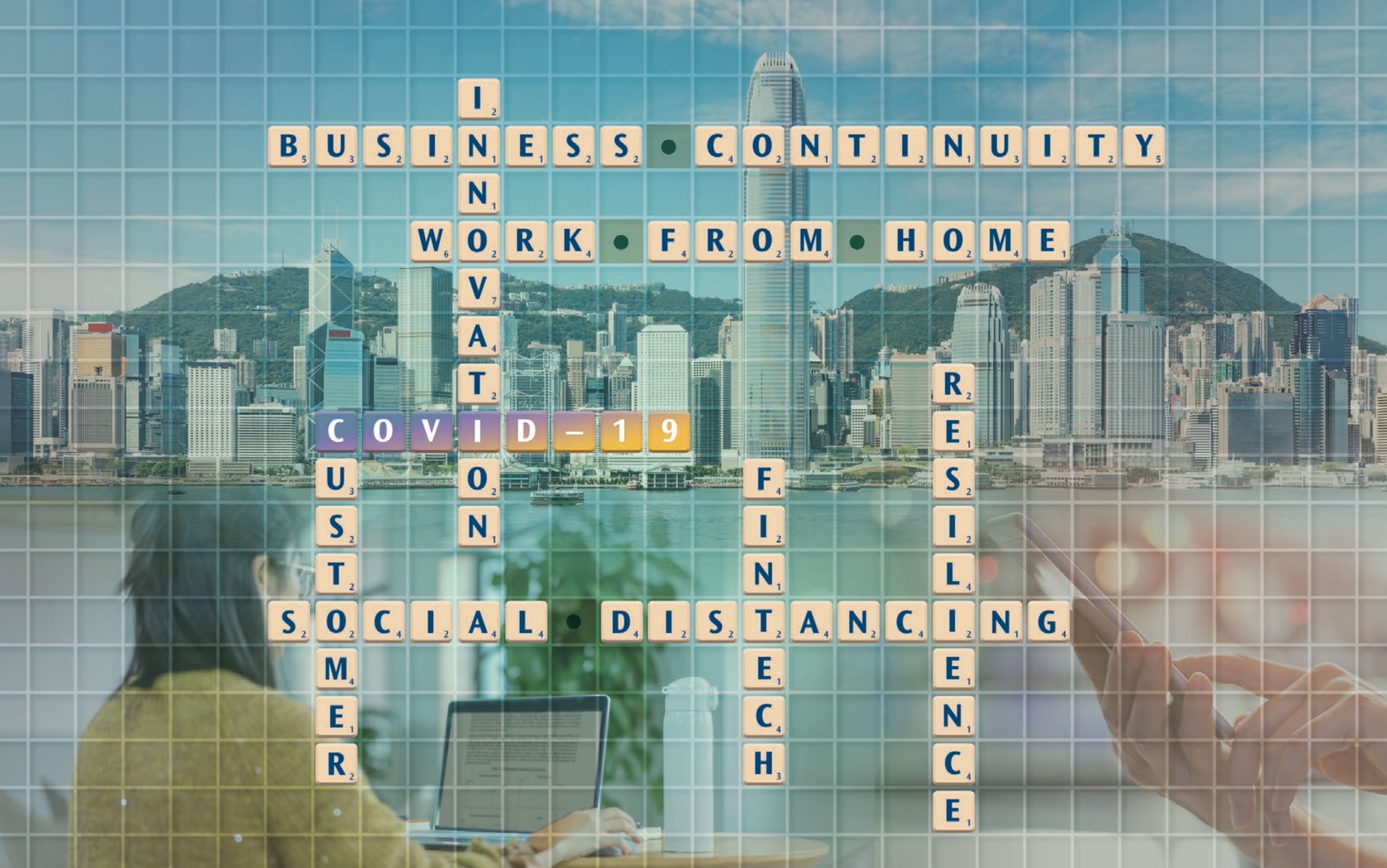

COVID-19 and the Operational Resilience of Hong Kong's Financial Services Industry

Preliminary considerations from the 2020-2021 experience

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Foreword

Since 2020, the COVID-19 pandemic has had an unprecedented impact on businesses and individuals globally. Despite the disruptions caused by the pandemic, the financial services industry across the globe has strived to achieve operational resilience. In Hong Kong, looking at the experience over the years 2020-2021, financial institutions have demonstrated a high level of operational resilience, thanks to business continuity preparations and the adoption of financial innovations. Although the emergency is not behind us, it is important to explore what aspects have been important to guarantee the smooth operations of financial institutions and highlight some considerations from the COVID-19 experience which may be useful should similar disruptive events occur in the future.

After reviewing the response of the international financial services industries to the pandemic in 2020-2021, which highlights the role and importance of operational resilience for financial institutions, this report discusses a framework proposing ways to enhance operational resilience during disruptive events. The report then explores the measures implemented by financial institutions in Hong Kong to mitigate the pandemic's impact, based on the results of a survey commissioned by the Hong Kong Institute for Monetary and Financial Research in July 2021. This survey also gathered views from financial institutions to understand how policy support, financial and data infrastructure and the adoption of financial innovations have contributed to operational resilience of financial institutions. The report is then concluded with some preliminary considerations regarding the impact of the measures taken during the first two years of the pandemic.

By illustrating the roles of business continuity plans, remote working arrangements and external factors in achieving operational resilience, we hope that this study can provide some useful preliminary insights for financial institutions to enhance their operational resilience in the post-COVID-19 future.

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Executive Summary

The COVID-19 pandemic is a disruptive event that has substantially affected financial institutions worldwide since 2020. With operational resilience a key and pressing priority to achieve, financial institutions across the globe have strived to overcome managerial and technological challenges, while regulators introduced a range of policy measures and provided supervisory guidance supporting financial institutions during the pandemic in 2020-2021.

This report, after reviewing how financial institutions in international markets maintained operational resilience during the pandemic in 2020-2021, discusses a framework proposing ways to enhance operational resilience during disruptive events. It also explores the views of financial institutions in Hong Kong based on a survey and interviews commissioned by the Hong Kong Institute for Monetary and Financial Research (HKIMR) in July 2021, highlighting the measures implemented across sectors of the financial services industry to mitigate the impact of the pandemic. The report then investigates how policy support, a robust financial and data infrastructure and the accelerated adoption of financial innovations have contributed to the operational resilience of financial institutions.

Business continuity planning can be an effective tool assisting financial institutions to achieve operational resilience during disruptive events. Key elements to consider include the identification of plausible scenarios and critical operations, the definition of response and recovery plans and business continuity exercises. **Financial institutions can also proactively manage the risks associated with increasing usage of information and communication technology and implement strong governance to sustain and enhance operational resilience.**

Financial institutions in Hong Kong were aware of the potential disruptions that could result from disruptive events, such as public health crises, and had put in place business continuity plans before the COVID-19 pandemic. In our survey, **85% of the respondents stated that they had incorporated pandemic scenarios in their business continuity plans before the pandemic.** They viewed the effective implementation of business continuity plans, together with investment in IT infrastructure and digital channels and policy support, as important factors contributing to their operational resilience.

Various staff deployment strategies, such as hybrid work models, have also been implemented to reduce the risk of infection spread. **In mid-2020, more than 50% of the staff of the surveyed financial institutions were working from home.** Although the survey respondents recognised the benefits of hybrid work models, such as enhancing the work-life balance of staff, they also highlighted several technological and managerial challenges. **Complementing the adoption of hybrid work models, financial institutions in Hong Kong have increased their investment in cybersecurity controls and IT systems, revised internal controls and operating procedures, and made efforts to maintain staff cohesion and corporate culture.**

Policy support, financial and data infrastructure and the accelerated adoption of financial innovations are important external enhancers of financial institutions' operational resilience. Financial regulators in Hong Kong have implemented measures and provided guidance to support financial institutions to deal with the impact of the pandemic. The smooth functioning of Hong Kong's financial and data infrastructure during the pandemic has helped financial institutions successfully deploy their operational strategies. At the same time, financial institutions have found ways to meet new customer expectations on the digitalisation of financial services by developing and adopting financial innovations along their value chains, such as card-less cash withdrawal, tailored insurance products and robo-advisors, supported by enhanced IT ecosystem.

In light of the experience during the pandemic in 2020-2021, some emerging trends can be observed in Hong Kong's financial services industry. The results of our survey suggested that **approximately 25% of staff in the financial services industry were expected to be working from home over the next five years,** significantly higher than the pre-pandemic level. In addition, the survey respondents predicted that customer receptiveness to using new technology would increase, **while digital channels were expected to take on an increasingly important role in conducting business over the same period.**

Our survey also revealed that **financial institutions in Hong Kong would continue to develop and adopt financial innovations to further digitalise their services. Most of them also support industrywide data sharing initiatives,** including the establishment of industrywide data infrastructure and promotion of Open Application Programming Interface. They also believed that supervisory guidelines, public-private partnerships, and knowledge sharing were important for establishing industrywide data infrastructure for financial institutions to further digitalise financial services.

In fostering the development of the financial services industry, regulators can play a role in ensuring the resilience of financial institutions. Survey respondents indicated that **in the near future cyberattacks, data breaches, business continuity planning, and hybrid work models were areas that could benefit from regulatory guidance.**

With the COVID-19 pandemic still ongoing, the future circumstances that financial institutions will face are unclear. However, the experience gained in 2020-2021 clearly suggests that operational resilience must be a compass for financial institutions that, with the help and guidance of financial regulators, will lead to smooth operations and ensure further growth and developments even during disruptive events.

Chapter 1
The COVID-19 Pandemic and the Financial Services Industry’s Operational Resilience: The International Experience

Public health measures, changing customer behaviour and the operations of financial institutions

HIGHLIGHTS:

- The COVID-19 pandemic has substantially affected financial institutions worldwide, with public health measures inevitably lowering staff productivity through physical interruptions and psychological distress.
- New customer behaviours aimed at reducing physical contacts, due to worries of infection, have undermined traditional ways of performing transactions and interacting with customers.
- Through human resource management strategies and additional ways of offering customers digital service channels, financial institutions have strived to overcome emerging managerial and technological challenges.
- With operational resilience a key and pressing priority to achieve, financial regulators across the globe have introduced policy measures and provided supervisory guidance supporting financial institutions in overcoming the operational challenges faced during the pandemic in 2020-2021.

1.1. THE COVID-19 PANDEMIC AND ITS IMPACT ON FINANCIAL SERVICES INDUSTRY

The COVID-19 pandemic, which began around the start of 2020, is a disruptive event that has had an unprecedented impact on the financial services industry across the globe.[1] In view of the immense pressure exerted on public health conditions and medical systems by the pandemic, most jurisdictions implemented public health measures such as travel restrictions, social distancing, lockdowns and quarantine to limit the transmission of the virus. While these measures have been largely effective in reducing the rate of infection, they have also significantly affected the business operations of financial institutions through various channels, primarily the impact on staff productivity and customer behaviours.

The pandemic has substantially affected financial institutions worldwide, with public health measures inevitably lowering staff productivity through physical interruptions and psychological distress.

Physical interruptions Employees infected with the virus or quarantined as a safety precaution were unable to perform their normal duties. In addition, shortened business hours and temporary closure of offices and branches to comply with public health measures prevented staff from working at full capacity. A recent research study estimates that employees across the globe lost an average of 4% of their working hours in 2020 due to the physical disruptions caused by the pandemic.[2]

Psychological distress Employees were also distracted from focusing fully on their work tasks and responsibilities over concern for their personal and family health. A global research study found that the prevalence of anxiety and depression had increased since the start of the pandemic.[3] The study also documented higher levels of mental distress during periods of intensifying COVID-19 -related deaths and imposition of strict confinement measures.

To restore staff productivity to normal levels, financial institutions introduced human resource management strategies and flexible working arrangements to prevent cross infection among staff and enable employees to work safely during the pandemic. From time to time, split teams have been deployed for critical functions, while supporting staff were assigned to work from home and remote locations to ensure duties were performed effectively.

Change in customer behaviour Customers worried about contracting COVID-19 became increasingly reluctant to use physical cash and visit physical branches as the pandemic took hold. According to a survey that studied the payment practices of consumers in the Euro area during March and May 2020, more than a third of the respondents stated that they had refrained from using banknotes and coins due to the fear of contracting the virus.[4] Customers also were reluctant to physically visit offices and branches of financial institutions. A survey of bank customers in the United States between February and March 2021 reports that over half of the respondents indicated that since the pandemic began they have visited bank branches much less frequently than they did before the pandemic.[5]

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1 *A health emergency, such as a pandemic, is a systemically disruptive event that has the potential to affect, to different extents, all individuals and institutions across all jurisdictions in the world. Individual disruptive events are instead events that have the potential to effect only one subset of individuals or institutions and do not necessarily exert effects across all jurisdictions. For the ease of readability, throughout this report, we do not distinguish between the two terminologies and refer to them as disruptive events.*

2 *International Labour Organization (2021).*

3 *Organisation for Economic Co-operation and Development (2021).*

4 *European Central Bank (2020).*

5 *S&P Global (2021).*

New customer behaviours aimed at reducing physical contacts, due to worries of infection, have undermined traditional ways of performing transactions and interacting with customers.

Because of the change in customer attitudes brought about by the pandemic, financial institutions responded by launching digital service channels that could perform transactions and interact with customers. Contactless digital payments enabled by tap-to-pay technologies and e-wallets have steadily gained popularity since the pandemic outbreak. Financial institutions have also increasingly utilised online platforms and mobile applications to serve their customers.

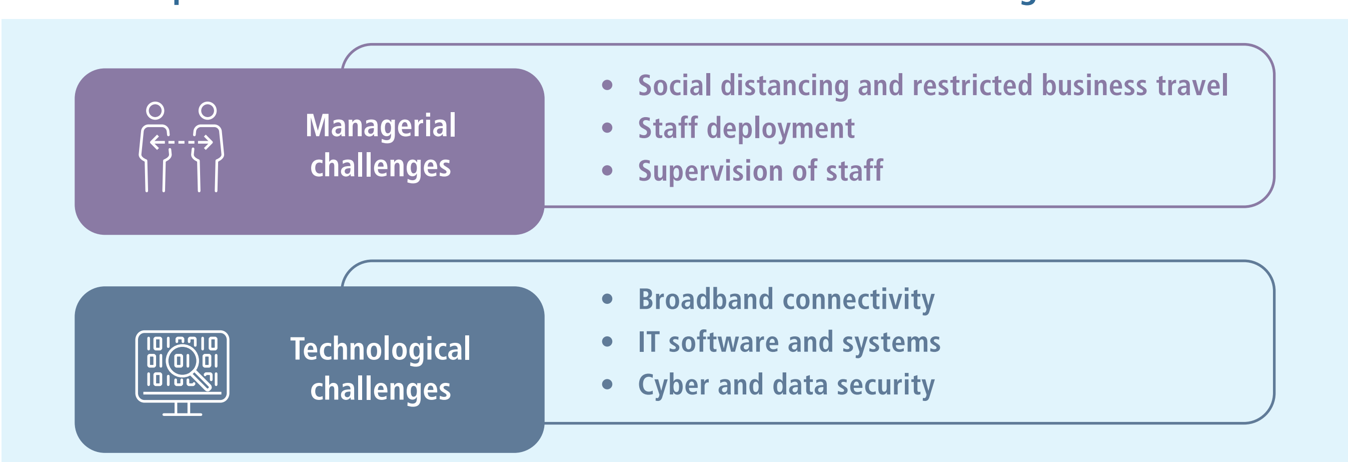
The pandemic has resulted in significant disruptions to financial institutions' traditional mode of business. To ensure their businesses to remain operational and sustainable during the stress and uncertainty, it was important for financial institutions to swiftly adapt to the rapidly changing situation and strive to maintain operational resilience. Operational resilience refers to the ability of a company to deliver critical operations through disruption. This ability enables a company to identify and protect itself from threats and potential failures, respond and adapt to, as well as recover and learn from disruptive events in order to minimise their impact on the delivery of critical operations through disruption.[6]

1.2. CHALLENGES IN MAINTAINING OPERATIONAL RESILIENCE DURING THE PANDEMIC

In achieving operational resilience during the pandemic, financial institutions have strived to overcome a range of managerial and technological challenges. A global survey conducted in 2020 investigated the emerging challenges financial institutions faced in maintaining operational resilience under the new business environment (Chart 1.1).[7]

Social distancing and restricted business travel
Due to social distancing, quarantine requirements and cross-border travel restrictions, financial institutions have had to replace physical meetings and business travels with cloud meetings and online video conferencing while continuing to engage with new

Chart 1.1: Operational hurdles financial institutions have been resolving



Sources: Norton Rose Fulbright (2020) and HKIMR staff compilation.

[6] *Basel Committee on Banking Supervision (2021a).*

[7] *Norton Rose Fulbright (2020).*

businesses and maintain relationships with customers locally and globally.

Staff deployment Financial institutions have made great efforts in human resource management to deploy staff to work effectively in flexible ways. Staff have also spent time adapting to the new work arrangements. As there have been several waves of COVID-19 infection, financial institutions have also needed to promptly update their staff deployment strategies to ensure staff can work safely and efficiently.

Supervision of staff Flexible working arrangements have required new practices for financial institutions to properly monitor, conduct and manage performance of employees working remotely and from home.

Broadband internet connectivity Substantial remote work and increasing application of digital service channels have been supported by extensive use of online and cloud resources. Financial institutions have to constantly secure their high-speed internet connection in order to keep their business running.

IT software and systems Operating in new ways, financial institutions have increased investments on IT infrastructure and upgraded relevant software and systems. Staff have had to be upskilled to keep up with IT changes and customers have to be familiarised with new digital platforms and applications.

Cyber and data security Personal devices and potentially unsecure networks may be used by staff working remotely and by customers accessing online services digitally. In addition, the surge in the usage of online video conferencing tools has increased the risks of intrusive eavesdropping and hijacking of confidential conversations.[8] Financial institutions have to step up protective measures to safeguard their businesses and customers against cyberattacks and data breaches.

Through human resource management strategies and additional ways of offering customers digital service channels, financial institutions have strived to overcome emerging managerial and technological challenges.

1.3. INTERNATIONAL EXPERIENCE ON REGULATORY INITIATIVES SUPPORTING OPERATIONAL RESILIENCE

Financial regulators across the globe have prioritised operational resilience as key policy parameter to be achieved and have provided ample support to financial institutions to assist them to overcome operational challenges presented by the pandemic.[9] To temporarily relieve the compliance pressure on financial institutions, the majority of supervisors have streamlined the implementation of regulatory changes and granted extension periods for compliance reporting, allowing financial institutions to allocate more resources for their businesses to respond to the pandemic.

Financial regulators have also issued supervisory guidance to help financial institutions address their operational challenges. Since the outbreak of the pandemic, regulators and financial institutions have been working closely together to ensure operational safety and better prepare for business continuity. With flexible working arrangements and increasing adoption of additional digital service channels, supervisors have also provided guidance on strengthening IT and cyber resilience and improving internal and external communications (Chart 1.2).[10]

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8 *KPMG (2020).*

9 *Financial Stability Board (2020).*

10 *Financial Stability Institute (2020).*

To ensure existing business continuity plans (BCPs henceforth) are suitable for the COVID-19 pandemic, supervisors have recommended financial institutions to review their BCPs regularly and timely so as to effectively respond to the rapid development of the pandemic.

Financial regulators have suggested reducing face-to-face meetings among employees and with customers to mitigate the risks of cross-infection. Financial institutions have also been encouraged to reduce the foot traffic at physical branches, with more customers utilising digital channels to access financial services.

Given remote working arrangements and the additional digital service channels adopted during the pandemic, supervisors have recommended financial institutions to monitor the capabilities of their IT infrastructure in handling the high volume of data transfer needed to support increased online traffic. To enhance cyber resilience, financial institutions have also been advised to enhance the protection of their IT systems against potentially more frequent and severe cyberattacks.

Financial regulators have highlighted the importance of effective communication between financial institutions and their stakeholders when business practices are updated. For example, employees can better perform their duties during the pandemic when they clearly understand the flexible work arrangements adopted and their job responsibilities. Customers can better schedule their transactions when they are informed about closing of branches and shortening of business hours and may switch to alternative means such as using internet and mobile applications to obtain services.

Chart 1.2: International experience on regulatory guidance in addressing operational challenges during the pandemic

Sources: Bank for International Settlements and HKIMR compilation.

With operational resilience a key and pressing priority to achieve, financial regulators across the globe have introduced policy measures and provided supervisory guidance supporting financial institutions in overcoming the operational challenges faced during the pandemic in 2020-2021.

With the introduction of supportive policy measures and provision of supervisory guidance by financial regulators, the implementation of flexible working arrangements and the launch of additional digital service channels have largely enabled financial institutions to mitigate the pandemic's disruptions to their business operations and maintain operational resilience internationally.[11] Meanwhile, with the COVID-19 pandemic still ongoing, the future circumstances that financial institutions will face are unclear and operational resilience will remain a key goal for financial regulators and institutions.

Given the prominent role that operational resilience plays in guaranteeing smooth business operations during disruptive events, the next chapter discusses key aspects that should be considered for a framework aimed at enhancing operational resilience.

[11] *Deloitte (2020).*

Chapter 2
Operational Risk and Crisis Management

How to enhance operational resilience in the midst of disruptive events

HIGHLIGHTS:

- Business continuity planning can be an effective tool for financial institutions to maintain operational resilience during disruptive events. Key elements of BCPs include the identification of plausible scenarios and critical operations, the definition of response and recovery plans, and business continuity exercises.
- Financial institutions can also proactively manage the operational risks associated with information and communication technology (ICT) and implement strong governance to sustain and enhance operational resilience.
- In Hong Kong, financial regulators have provided financial institutions with guidance related to BCPs and ICT risk management over the years to support financial institutions to achieve operational resilience.

Operational risk is the risk of loss resulting from inadequate or failed internal processes, people or systems, or external events.[12] It could lead to a drop in revenue and increase in costs, and thus a lower level of profitability. Therefore, it is crucial for financial institutions to maintain operational resilience during disruptive events.

2.1. ACHIEVING OPERATIONAL RESILIENCE THROUGH BUSINESS CONTINUITY PLANNING

To maintain operational resilience amid disruptive events, financial institutions can prepare and put in place BCPs, which involve establishing a system of prevention and recovery from potential threats to the institution. There are several key elements financial institutions may consider when developing a solid BCP:

Identifying a list of plausible scenarios that could significantly impact their business or daily operations. Such scenarios could be based on disruptive events that happened in the past or that might occur in the future. A global survey conducted in 2019 identified the major disruptive events experienced by over 1,000 organisations across a large sample of industries and jurisdictions.[13] These events can be categorised into seven major groups: operational, technological, humanitarian, financial, legal, human capital and reputational crises. Respondents reported operational and technological disruptions as the most frequently occurring disruptive events in the past five years. Operational disruptions, including operational breakdowns, competitive disruptions, and failures in supply chain and products, were experienced by over half of the respondents whereas one-third of the respondents encountered technological disruptions, which were triggered by technology failures or cyberattacks (Chart 2.1).

Identifying critical operations in BCPs to facilitate the assessment of the risks associated with various disruption scenarios and their potential impacts on critical operations. Financial institutions can also identify the people, technology, processes, information and facilities required to deliver critical operations during disruption, so that the key internal and external dependencies can be identified and managed in BCPs.

Response and recovery plans are expected to be developed so that critical business functions can operate smoothly during disruptive events. One example is how to effectively implement the strategy of staff deployment that both facilitates critical operations and safeguards employees in the changed conditions. Lessons learned from similar and related events are also worthy of reference when defining response and recovery plans.

Chart 2.1: Disruptive events that occurred before the pandemic

Source: PricewaterhouseCoopers and HKIMR compilation.

[12] *Basel Committee on Banking Supervision (2021b).*

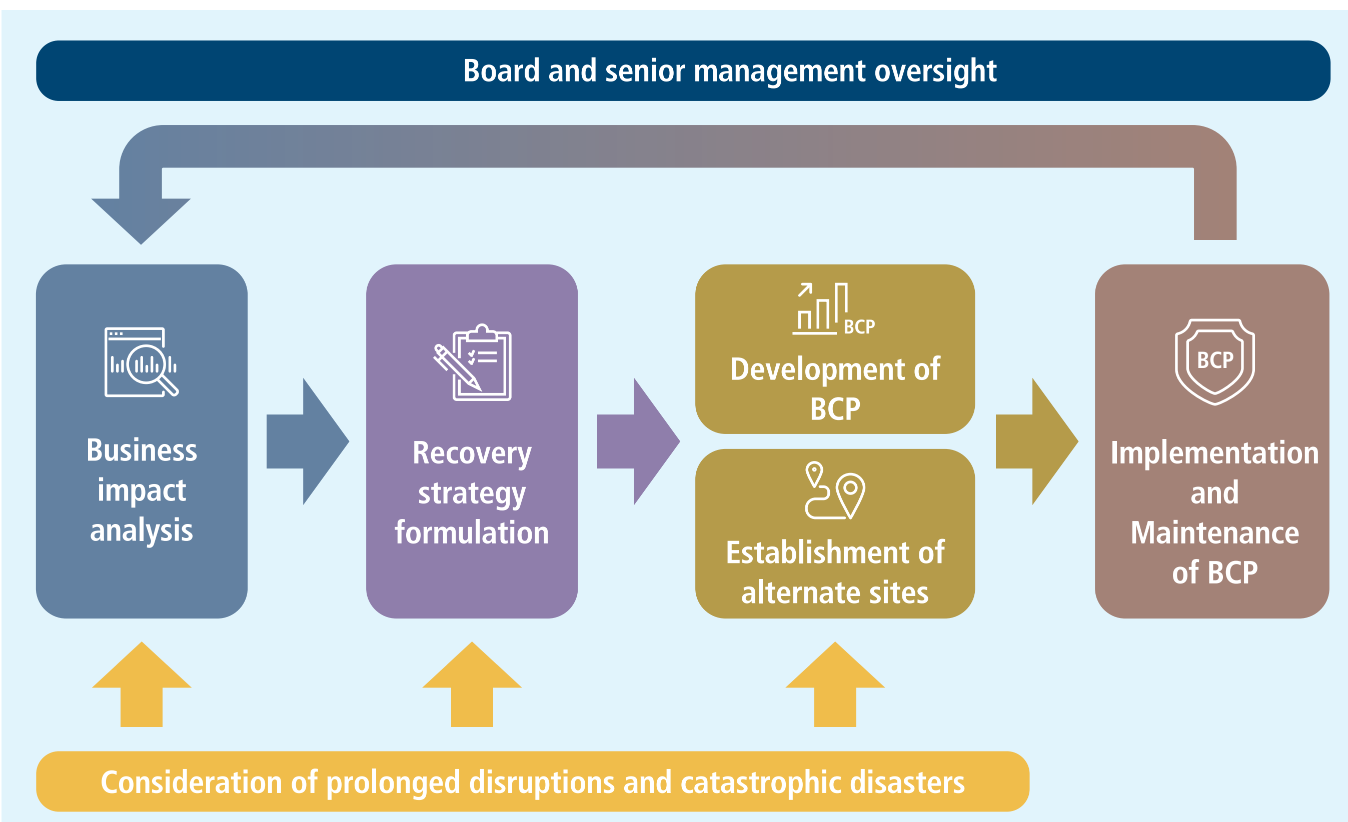
[13] *PricewaterhouseCoopers (2019).*

Business continuity exercises should also be conducted regularly to test the plan and strategies, with the participation of all staff who are likely to be involved in responding to disruptive events.[14] Business continuity exercises allow financial institutions to assess their ability to deliver critical operations during disruptions and improve their BCPs accordingly. In addition, business continuity exercises are also helpful in promoting awareness, familiarity and understanding among key personnel of their roles and responsibilities during disruptive events.

Business continuity planning can serve as an effective tool for financial institutions to maintain operational resilience during disruptive events.

In Hong Kong, financial regulators have provided financial institutions with guidance for BCPs over the years. For example, the Hong Kong Monetary Authority (HKMA) has issued detailed guidelines for BCPs, and the suggested process is presented in Chart 2.2.[15] Banks are expected to have workable and well-thought-through BCPs to protect the

Chart 2.2: HKMA's suggested process of business continuity planning



Source: HKMA.

[14] *In addition to firm-wide business continuity exercises, financial institutions are also encouraged to participate in market-wide and industry-wide business continuity exercises, which assess the level of resilience across markets and the compatibility of the recovery strategies of individual institutions.*

[15] *Hong Kong Monetary Authority (2002).*

critical areas of their business and to cope with prolonged disruptions.[16]

Similar guidance has been provided by other regulators in Hong Kong. The Securities and Futures Commission (SFC) expects all licensed corporations to have effective BCPs in place to respond to, adapt to and recover from disruptive events and review the plan at least annually to assess whether revisions are necessary in light of any material changes to the licensed corporation's operations, structure or business.[17] Licensed corporations are expected to conduct a business impact study, identify likely disruptive events, and document and regularly test their recovery plans. They should also adopt an effective incident management process to identify, assess, rectify and learn from disruptive incidents as well as to prevent their recurrence or mitigate their severity.

The Insurance Authority (IA) has also issued guidance for insurers in relation to BCPs.[18] Insurers are expected to maintain business continuity policy and BCPs for both going concern and gone concern basis. The business continuity policy involves the governance structure, identification of disruptive events, impacts to the insurer and the approach to continue and restore the business activities, while BCPs cover more detailed actions and procedures. When the BCP is executed, insurers are required to provide information of the disruptions, actions taken, potential impacts and the recovery target timeline to the IA promptly.

Furthermore, the Mandatory Provident Fund Schemes Authority (MPFA) has provided guiding principles to Mandatory Provident Fund (MPF) trustees to enhance their BCPs. MPF trustees are expected to identify, assess and manage potential business continuity risk to ensure that they are able to meet their obligations and protect the interests of MPF scheme members. They should also satisfy themselves that any outsourced service provider has adequate procedures over its BCP and BCP drill results. MPF trustees should also ensure adequate communication to stakeholders, staff and senior management, and promptly notify the MPFA of any significant business disruptions.

2.2. ACHIEVING OPERATIONAL RESILIENCE THROUGH INFORMATION AND COMMUNICATION TECHNOLOGY RISK MANAGEMENT

With technological advancements, financial institutions have been increasingly relying on information and communication technology (ICT) for their operations. Therefore, financial institutions may not sustain operational resilience without proactively managing the risks of conducting critical business operations with ICT. Two steps are essential which involve prioritising efforts to improve the capacity and security of the ICT system.

Enhancing the capacity of ICT infrastructure is pivotal to maintaining the smooth and effective functioning of critical operations. For example, financial institutions should secure their high-speed internet connection and prepare back-up strategies to mitigate the risks arising from third party collapse; upgrade the processing and transferring capabilities of information infrastructure to allow a large number of employees to remotely access cloud resources; and encourage and facilitate their staff who are responsible for technology risk management to acquire relevant professional qualifications.

[16] *In December 2021, the HKMA issued a letter to seek the views of the banking sector regarding the proposed revisions to the guidelines on business continuity planning and a new guideline on operational resilience. The two guidelines are under consultation at the time of writing.*

[17] *Securities and Futures Commission (2003, 2014, 2021a).*

[18] *Insurance Authority (2017).*

Ensuring the security of ICT system related to cybersecurity, data security and data privacy is crucial to sustaining operational resilience. For example, financial institutions should have established strategies and measures to safeguard their systems and business against cyberattacks and data breaches; control the access to data and systems using appropriate approaches of identification and authentication of users together with proper authorisation; encrypt sensitive data to protect against hostile collection by third parties and develop suitable internal communication tools to maintain data and information privacy.

Financial institutions can also proactively manage the operational risks associated with ICT and implement strong governance to sustain operational resilience.

Regulators in Hong Kong have provided guidance for financial institutions on managing the risks of utilising ICT. For example, the HKMA has provided general principles for ICT risk management covering the following areas: IT governance, security management, system development and change management, information processing, communications networks, and management of technology service providers.[19] The SFC has also provided licensed corporations with some suggested control techniques and procedures related to ICT risk management, including information security policy, access control, encryption, change management, user activities monitoring, and data backup and continuity planning.[20] Moreover, the IA has issued the Guideline on Cybersecurity, which sets the minimum standard for cybersecurity that authorized insurers are expected to have in place and the general guiding principles which the IA uses in assessing the effectiveness of an insurer's cybersecurity framework.[21] The MPFA has also provided guidance in different areas including cybersecurity governance and risk management, cybersecurity controls and IT vendor management. MPF trustees were expected to have sufficient oversight of cybersecurity risk management to properly manage cybersecurity risk.[22]

BCPs and ICT risk management are crucial to maintain operational resilience. Financial institutions can leverage their operational risk management functions to identify external and internal threats and potential failures in people, processes and systems, assess the potential disruptions to their critical operations, and set up feasible measures to maintain smooth and orderly functioning of their critical business during disruptive events.

Both BCPs and ICT risk management require the involvement of the management team, and thus strong governance is essential for achieving operational resilience. The board of directors of financial institutions should oversee the approach to achieve operational resilience, while their senior management should be responsible for implementing the approach appropriately. However, financial institutions occasionally have to cope with unexpected disruptions that are beyond the coverage of BCPs and ICT risk management framework. Under these circumstances, crisis management would be helpful for the management team to navigate unexpected disruptions (See Box 2.1 for further details).

19 *Hong Kong Monetary Authority (2003).*

20 *Securities and Futures Commission (2010).*

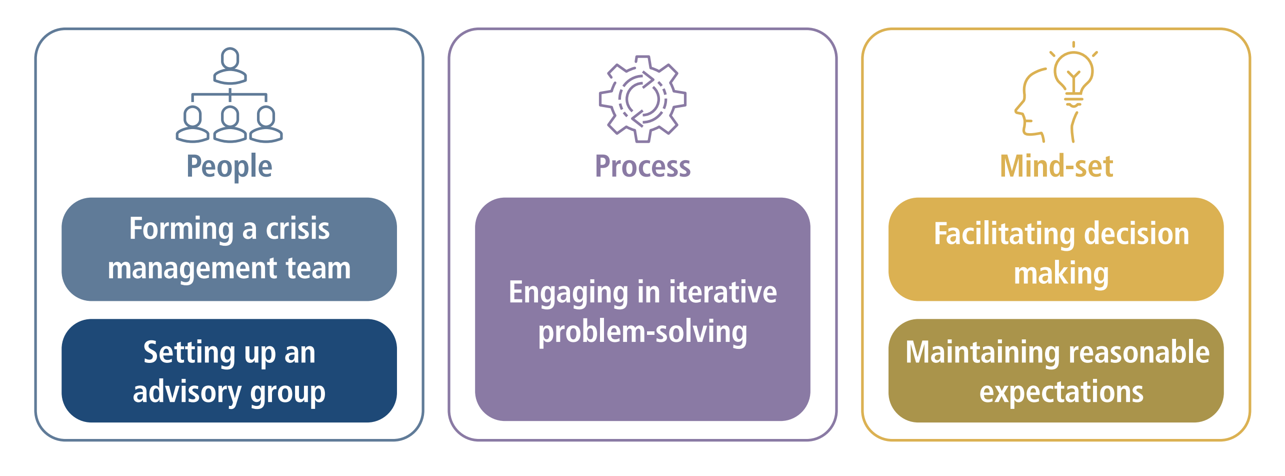
21 *Insurance Authority (2019).*

22 *Mandatory Provident Fund Schemes Authority (2019).*

Box 2.1: Crisis management – a way to navigate unexpected disruptions

In conducting business continuity planning, financial institutions are required to have a good understanding of the disruptive events identified. However, this may not always be the case. When there are no readily available tools to cope with the crisis, financial institutions can rely on their decision-making process to generate an appropriate response. This highlights the importance of possessing suitable people, processes and mindset for managing a crisis (Chart 2.3).[23]

Chart 2.3: Key elements of effective crisis management



Source: HKIMR compilation.

Financial institutions can form a crisis management team, consisting of members with different backgrounds, skills and experiences. A diverse group of people allows the team to develop a broader range of options to cope with the disruption. They can also set up an advisory group with experts who are not directly involved in the crisis but may assess the responses of other institutions and suggest workable solutions to the crisis management team.

Moreover, as a crisis can evolve over time, it is unlikely that the first decision made by the crisis management team will be the best response. Therefore, it is expected that the problem-solving process will be repeated several times, so that the team can learn from experience and develop a better response.

To facilitate the development of crisis response, financial institutions can also assign a facilitator to the crisis management team and encourage a constructive discussion environment. They should also have reasonable expectations of the response proposed by the crisis management team, allowing the team to learn from the implementation experience and update its proposed response.

The following chapters of this report, based on the results of a survey commissioned by the HKIMR, will focus on the experience of financial institutions in Hong Kong in managing the impact of the pandemic on their business operations over the years 2020-2021.

[23] *Leonard, Howitt, and Giles (2020).*

Chapter 3
Business Continuity Planning at Hong Kong's Financial Institutions

Arrangements, benefits and challenges of business continuity plans

HIGHLIGHTS:

- 85% of survey respondents stated that they had incorporated pandemic scenarios in their BCPs before the inception of the COVID-19 pandemic.
- Financial institutions viewed effective implementation of BCPs, investment in IT infrastructure and digital channels and policy support as important factors contributing to operational resilience.
- Surveyed financial institutions have developed hybrid work models and deployed more than 50% of their staff to work from home in mid-2020.
- Complementing the adoption of hybrid work models, financial institutions have increased their investment in cybersecurity controls and IT systems, revised internal controls and operating procedures, and made efforts to maintain staff cohesion and corporate culture.

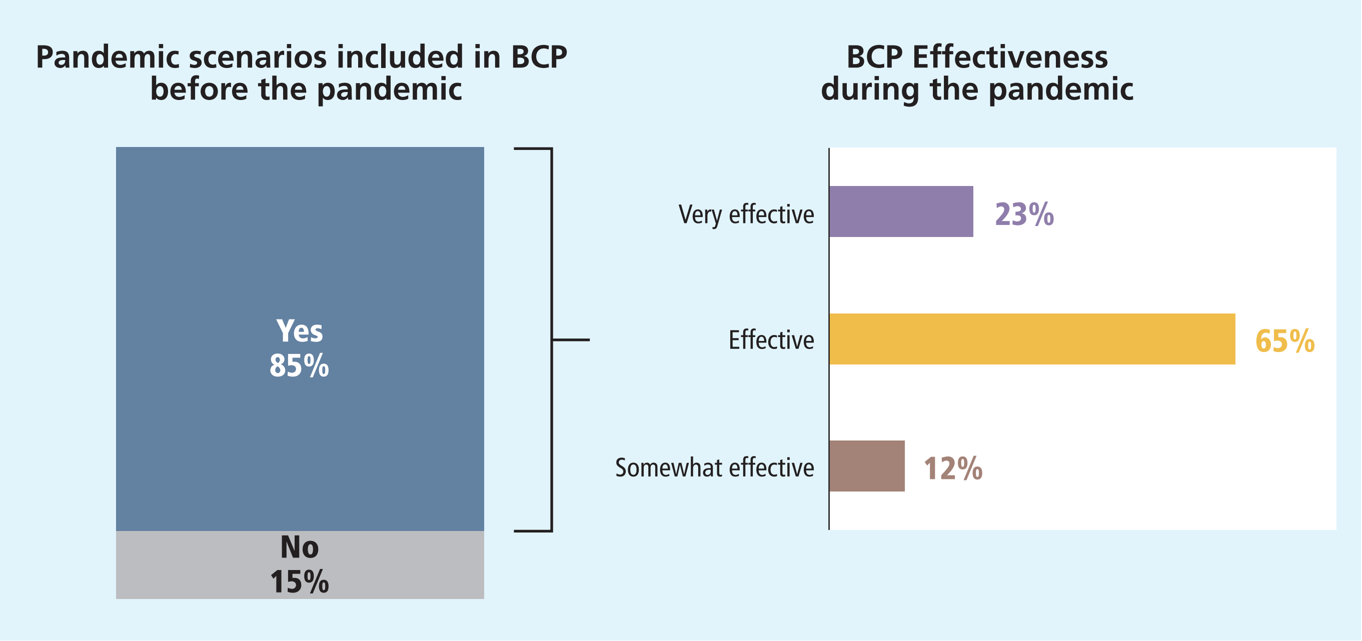
To understand the measures adopted by financial institutions in Hong Kong during the pandemic and the roles of financial infrastructure and innovations in ensuring the orderly and smooth functioning of the operations across different sectors of the financial services industry, the HKIMR commissioned a survey entitled *The Impact of COVID-19 on the Financial Services Industry in Hong Kong and the Roles of Financial Infrastructure and Innovations* (COVID-19 Survey) in July 2021. Survey questionnaires were sent to banks, insurers and securities firms. In addition, interviews were conducted with a wider range of market participants, including financial institutions, industry associations and solutions providers, to obtain their insights and experiences.

3.1. THE IMPORTANCE OF BUSINESS CONTINUITY PLANNING

Chapter 2 highlighted the fact that business continuity planning is essential for managing disruptive events. Because of the experience of the SARS outbreak in 2003, firms in Hong Kong were aware of the potential disruptions resulting from public health crises and therefore were well positioned in their BCPs to incorporate pandemic scenarios. When polled about their preparatory arrangements, around 85% of the survey respondents stated that they had incorporated pandemic scenarios in their BCPs before the COVID-19 pandemic. Furthermore, 88% of financial institutions surveyed implemented their BCPs effectively or very effectively during the pandemic (Chart 3.1).

85% of survey respondents stated that they had incorporated pandemic scenarios in their BCPs before the COVID-19 pandemic.

Chart 3.1: BCP preparedness and implementation in Hong Kong's financial services industry



Source: HKIMR staff compilation based on the COVID-19 Survey.

Survey respondents were also asked to rank the top three factors contributing to their operational resilience during the pandemic. The effective implementation of BCPs was considered one of the most important factors suggested by 87% of the survey participants (Chart 3.2). In addition, as financial institutions rely on their IT infrastructure and digital channels to mitigate the pandemic's impact, some 73% and 43% of surveyed financial institutions considered investments in IT infrastructure and digital channels as important respectively. Furthermore, 46% of them said support from policymakers could also help financial institutions maintain operational resilience.

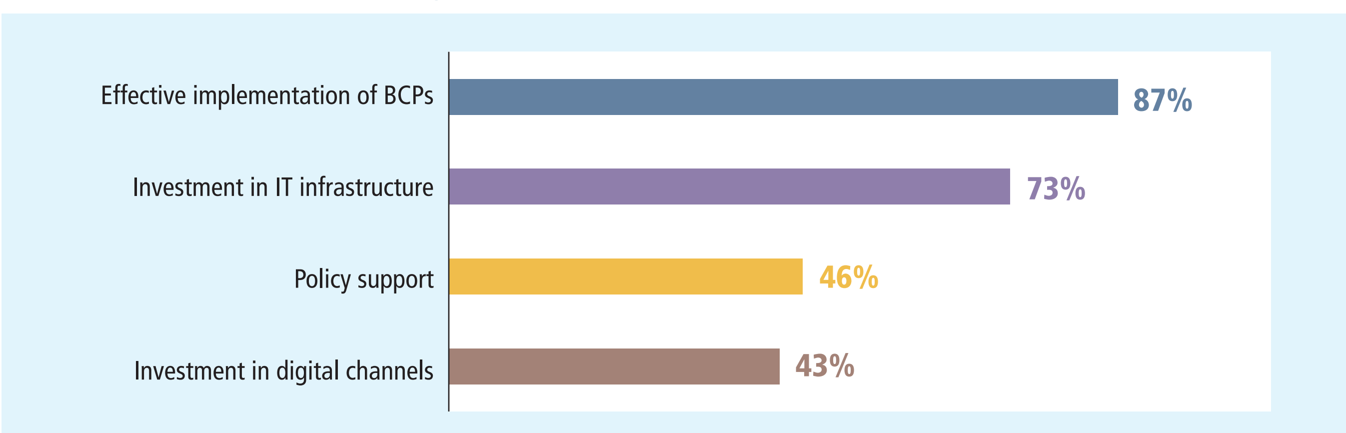
Financial institutions viewed effective implementation of BCPs, investment in IT infrastructure and digital channels and policy support as important factors contributing to operational resilience.

3.2. HYBRID WORK MODELS FOR STAFF DEPLOYMENT: BENEFITS, CHALLENGES AND MITIGATING MEASURES

In business continuity planning, financial institutions develop a strategy for staff deployment during disruptive events. During the pandemic, financial institutions in Hong Kong have implemented various staff deployment strategies to minimise the risk of infection, such as full work-from-home (WFH) arrangements, split team arrangements[24] and hybrid work models.[25]

Financial institutions in Hong Kong were not new to WFH arrangements. Before 2020, on average 7% of staff across the three financial sectors were already working from home (Chart 3.3). This survey finding was supplemented with insights obtained from the interviews. Some interviewees said that previous experiences, such as during Super Typhoon Mangkhut in 2018, increased their awareness of the difficulties of working in the office during disruptive events. In light of these experiences and to ensure the smooth and

Chart 3.2: Factors contributing to operational resilience



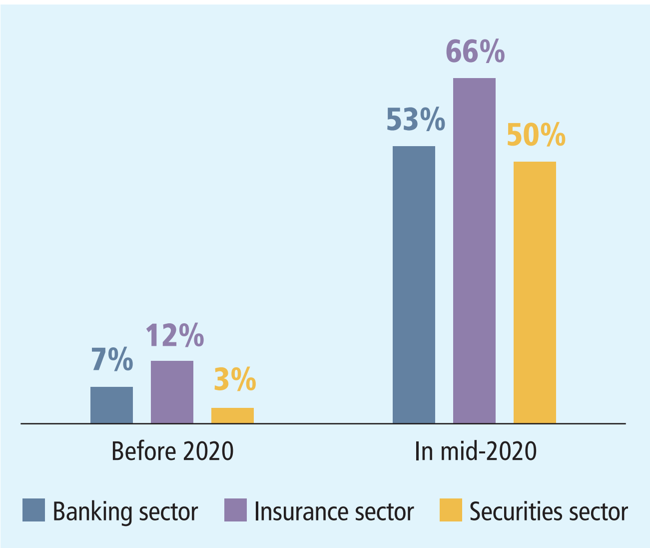
Source: HKIMR staff compilation based on the COVID-19 Survey.

[24] *In a split team arrangement, staff are divided into two or more teams. On a particular working day, only one team is scheduled to work in the office, and other teams work from home. When there is a confirmed case of infection in the team, that person would not have any close contact with staff in other teams, reducing the risk of outbreak in the workplace.*

[25] *In a hybrid work model, each staff member is assigned to work from home on some days and to work in the office for the remainder. Depending on the functions performed by the staff, different staff could have different numbers of days working in the office.*

orderly functioning of business operations, financial institutions have implemented measures to substantially enhance their WFH capacity, such as purchasing laptops and increasing communication network capacity.

Chart 3.3: Percentage of staff working from home before 2020 and in mid-2020



Source: HKIMR staff compilation based on the COVID-19 Survey.

In mid-2020, over 50% of the staff of the surveyed financial institutions worked from home.[26] However, several interviewees highlighted that a number of critical functions had to be performed onsite and limited physical branches remained accessible. For staff responsible for such functions, split team arrangements were used to ensure that back-up teams were always available.

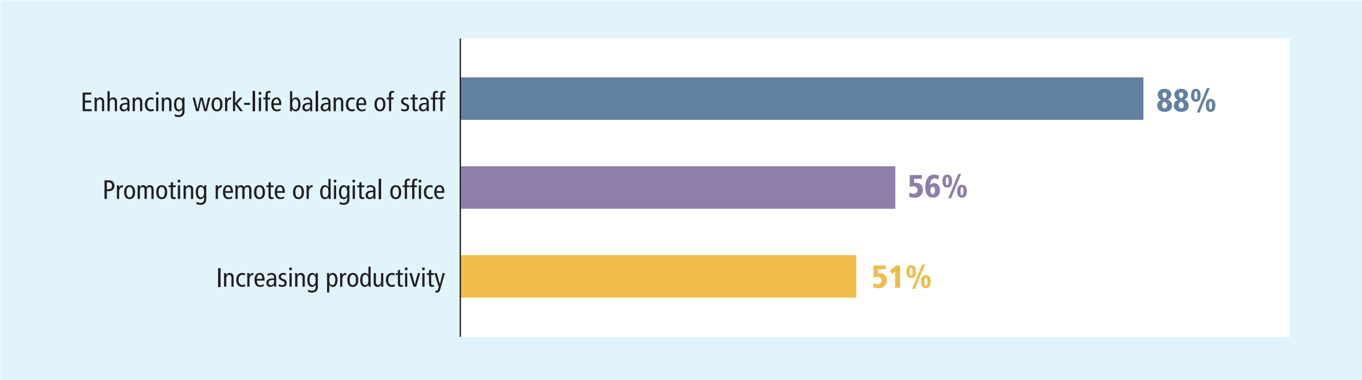
Surveyed financial institutions had developed hybrid work models and deployed more than 50% of their staff to work from home in mid-2020.

Financial institutions recognised the benefits of shifting to a hybrid work model. Most of the survey respondents felt that WFH arrangements could enhance the well-being of staff through a better work-life balance. In addition, over half of the respondents suggested that the decentralised work environment under hybrid work models helped promote the shift to a remote or digital office and increase staff productivity (Chart 3.4).

Financial institutions have faced several technological and managerial challenges when allowing staff to work from home during the pandemic. Staff who work from home have to access the firm's system and data remotely. Because of concerns about the security and privacy of data, around 60% of the respondents from the surveyed financial institutions considered cybersecurity a key challenge of hybrid work models. Some also expressed concerns about the capacity of their IT systems to accommodate such a large proportion of employees working remotely.

Chapter 3

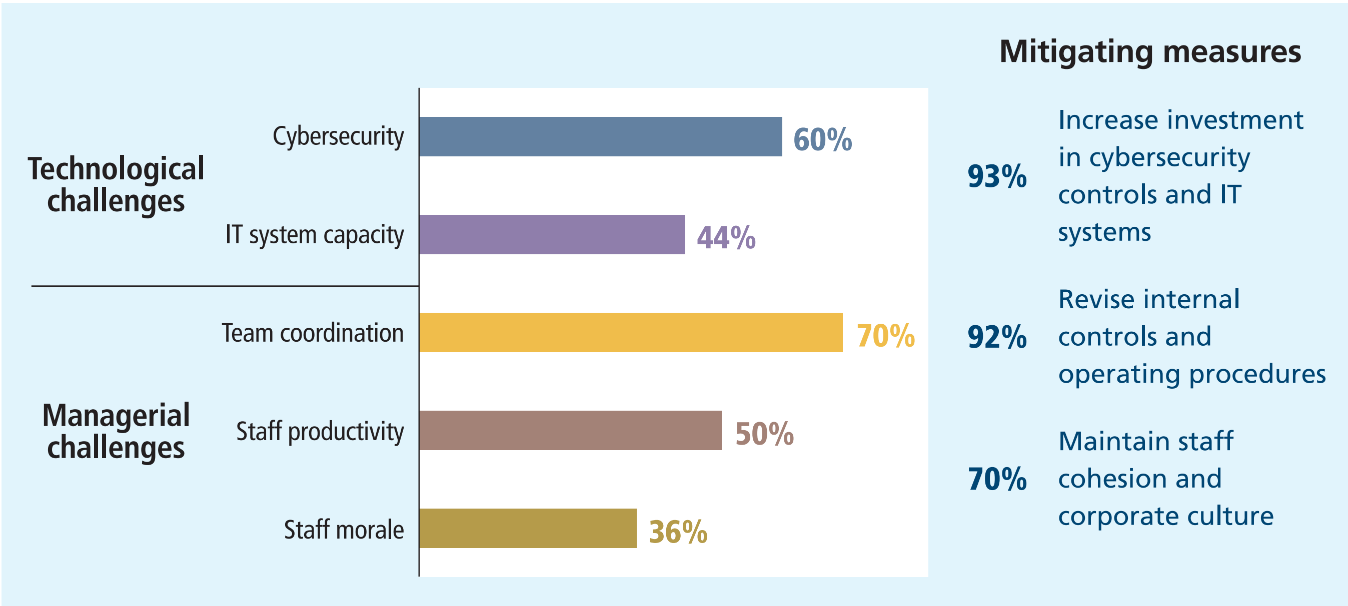
Chart 3.4: Benefits of hybrid work models



Source: HKIMR staff compilation based on the COVID-19 Survey.

26 *The findings are consistent with the survey results of the CFA Institute in 2021. Please refer to CFA Institute (2021) for details.*

Chart 3.5: Challenges associated with hybrid work models and mitigating measures



Source: HKIMR staff compilation based on the COVID-19 Survey.

Surveyed financial institutions have also highlighted that during the pandemic they had to face several managerial challenges (Chart 3.5). About 70% of the survey respondents viewed team coordination a challenge with hybrid work models, as it was not feasible to arrange face-to-face meetings. At the same time, half of the respondents stated that maintaining staff productivity was problematic, as it was difficult for supervisors to monitor the performance of their subordinates remotely. Respondents also indicated that maintaining staff morale was challenging due to the lack of team building activities.

Hybrid work models provide benefits, such as enhancing the work-life balance of staff, but they also pose technological and managerial challenges.

Financial institutions have implemented several measures to mitigate the impact of challenges related to WFH arrangements. To tackle the technical issues of cybersecurity and IT system capacity, 93% of the surveyed financial institutions stated they had increased their investment in cybersecurity controls and IT systems. Some financial institutions also upgraded their virtual private network (VPN) infrastructure by increasing bandwidth and enhancing connection capacity to allow more staff to connect to the system concurrently. One interviewee from the securities sector added that the company had also invested in technology to enhance data confidentiality during internal communication. A vast majority of financial institutions (92%) also indicated they had revised internal controls and operating procedures. For example, some financial institutions have strengthened their daily monitoring of VPN usage, email and shared drives to identify suspicious activities.

In addition, 70% of the survey participants have enhanced their internal communication tools to maintain team coordination and staff cohesion. Video conferencing tools, such as Zoom, Webex and Microsoft Teams, have also been introduced and consistently used to conduct team and town hall meetings. Some interviewees also stated that they had developed dedicated mobile applications for internal communication. Others have also highlighted the importance of staff engagement. To maintain the well-being of staff, some interviewees provided tips for staff working from home, such as taking short breaks during office hours. Social activities, such as yoga classes, have also been organised virtually.

Complementing the adoption of hybrid work models, financial institutions have increased their investment in cybersecurity controls and IT systems, revised internal controls and operating procedures, and made efforts to maintain staff cohesion and corporate culture.

With the goal of maintaining and enhancing operational resilience, financial institutions in Hong Kong have mitigated the impact of the COVID-19 pandemic by successfully implementing BCPs and revising their staff deployment strategies during times of intense uncertainty. The next chapter explores the role played by external enhancers of operational resilience and discusses how policy support, financial and data infrastructure and the adoption of financial innovations have helped financial institutions during the pandemic.

Chapter 4
External Enhancers of Operational Resilience

Policy support, financial and data infrastructure and the accelerated adoption of financial innovations

HIGHLIGHTS:

- Financial regulators in Hong Kong have implemented measures and provided guidance to support financial institutions to deal with the impact of the pandemic.
- The smooth functioning of Hong Kong's financial and data infrastructure during the pandemic has helped financial institutions to successfully deploy their operational strategies.
- To meet new customer expectations on the digitalisation of financial services, financial institutions have developed and adopted financial innovations along their value chains, supported by enhanced IT ecosystem.

In addition to the implementation of various measures such as BCPs and staff deployment strategies by financial institutions, external enhancers have also helped financial institutions maintain operational resilience during the pandemic. Three external enhancers, namely policy support, financial and data infrastructure and the adoption of financial innovations, are discussed in this chapter.

4.1. THE FIRST ENHANCER: POLICY SUPPORT

Regulators play an important role in ensuring the operational resilience of the financial services industry. Since the inception of the pandemic, financial regulators have deployed several policy measures to support corporations and individuals in Hong Kong. To alleviate the liquidity pressure faced by small and medium-sized enterprises (SMEs) and provide funding support for business owners and individuals, the HKMA has launched initiatives to release HK$1 trillion of lending capacity, facilitating banks to support their customers. Measures have also been implemented by regulators to support financial institutions during the pandemic, such as easing the regulatory and Continuing Professional Development requirements of industry practitioners.

Regulators have also issued guidelines and circulars to help financial institutions deal with the impact of the pandemic. The HKMA has lowered the regulatory reserve requirement for local banks to give them additional lending capacity to support their customers. To alleviate the burden on banks, the HKMA has implemented measures to support banks in managing liquidity and postponed the 2020 supervisor-driven stress test.[27] In addition, the HKMA has issued several circulars on anti-money laundering measures, which describe the key issues and practices observed in remote onboarding, and new guidelines on issues related to remote working arrangements, such as protection of customer data and the risks of video conferences.[28]

The IA has introduced Temporary Facilitative Measures (TFMs)[29] for the non-face-to-face distribution of designated insurance products during the pandemic. To clarify the coverage and requirements, several circulars have been issued to explain the details of implementation. In addition, some insurers have developed virtual onboarding platforms, which must be approved by the IA before being launched. To help insurers understand the regulator's expectations, the IA has issued a circular on the information needed for such applications and the requirements for the use of video conferencing tools to distribute long term insurance products.[30]

The SFC rolled out a dedicated webpage that provides information published by the SFC in relation to the pandemic, including statements, press releases and guidance.[31] To support licensed corporations in managing operational risk during the pandemic, the SFC has issued circulars on cybersecurity risk management under remote working arrangements and business continuity planning.[32] With travel restrictions and social distancing measures in place, licensed corporations may encounter difficulties in fulfilling their obligations in licensing matters. To clarify the regulatory flexibility provided to licensed

[27] *The HKMA has conducted supervisor-driven stress test since 2012 to better understand the resilience of locally incorporated retail banks to extreme adverse economic conditions and encourage them to develop plans to address potential problems in times of stress.*

[28] *Visit https://www.hkma.gov.hk/eng/key-functions/banking/banking-regulatory-and-supervisory-regime/riding-out-the-covid-19-challenge/ for the list of circulars issued by the HKMA on pandemic-related supportive measures.*

[29] *TFMs were first introduced in February 2020 and have been extended to September 2022 at the time of writing. Under TFMs, designated insurance products, including Qualifying Deferred Annuity Policy and Voluntary Health Insurance Scheme products, can be distributed via various non-face-to-face means, such as digital, telemarketing, postal or video conferencing. Additional measures have been put in place to protect the interests of policyholders, including an upfront disclosure at the point-of-sale and an extended cooling-off period of no less than 30 calendar days.*

[30] *See, for example, https://ia.org.hk/en/legislative_framework/circulars/reg_matters/files/Circular_21022020.pdf for the implementation of TFMs. See also https://ia.org.hk/en/legislative_framework/circulars/reg_matters/files/Circular_05082020.pdf for the use of video conferencing tools.*

[31] *Securities and Futures Commission (2021b).*

[32] *See https://apps.sfc.hk/edistributionWeb/gateway/EN/circular/intermediaries/supervision/doc?refNo=20EC37 and https://apps.sfc.hk/edistributionWeb/gateway/EN/circular/intermediaries/supervision/doc?refNo=21EC21 for further details.*

corporations while maintaining market integrity and investor protection principles, the SFC has also issued a list of FAQs on licensing-related matters.[33] For example, the SFC has allowed an extended period of three months for licensed individuals, who are due to pass licensing examinations or to complete additional professional trainings, to fulfil the examination and training requirements. Guidance has also been provided to licensed corporations anticipating delays in preparing audited accounts regarding application for an extension of the submission period. The SFC also recently published a report to provide additional guidance for operational resilience standards and required implementation measures, and to explain the expected regulatory standards for managing the risks of remote working. The report also provides suggested techniques and procedures to assist securities firms' compliance with these standards.[34] In light of the pandemic, the SFC waived its annual licensing fees in 2020 and 2021, which totally saved its licensees and registrants for around HK$470 million.

Concerning the operational resilience of MPF trustees, the MPFA has been regularly communicating with them during the pandemic to ensure that their BCPs are effective in maintaining continuous MPF operations without disruption. Furthermore, employers might experience difficulties in making MPF contributions and sending remittance statements to MPF trustees. Therefore, the MPFA has advised MPF trustees to provide additional digital channels to employers for submission of contributions and remittance statements. Moreover, to facilitate sales and marketing activities under social distancing measures, the MPFA has issued circular to MPF intermediaries on the sales and marketing activities via non-face-to-face means, such as telephone or video conference.[35]

Financial regulators in Hong Kong have implemented measures and provided guidance to support financial institutions to deal with the impact of the pandemic.

4.2. THE SECOND ENHANCER: A ROBUST FINANCIAL AND DATA INFRASTRUCTURE

The financial and data infrastructure affects the way financial institutions deliver services in a financial centre. To this aim, a robust financial and data infrastructure[36] can be intended as an important enhancer of operational resilience for financial institutions. In Hong Kong, the payment and securities trading infrastructure has been pivotal in ensuring financial institutions operate "as usual" during the pandemic; the technology-driven data infrastructure also played a vital role in supporting financial institutions to conduct business in a cost-effective way.

Payment and securities trading infrastructure

The Real Time Gross Settlement (RTGS) system for interbank payments was launched by the HKMA in 1996. The RTGS system can now handle payment and settlement in four currencies: Hong Kong dollar, Renminbi, US dollar and Euro. Underpinned by continuous upgrades in system capabilities and secure

[33] *Visit https://www.sfc.hk/en/faqs/intermediaries/licensing/Licensing-related-matters-in-light-of-the-COVID-19-pandemic for further information.*

[34] *Securities and Futures Commission (2021a).*

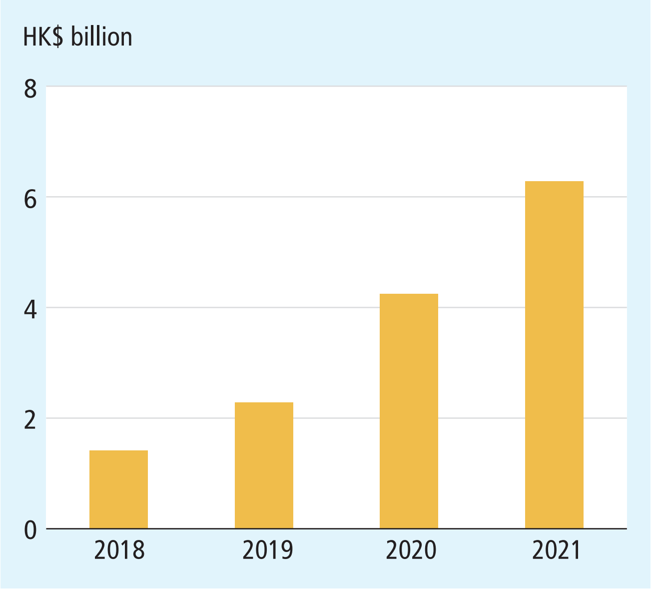
[35] *Visit https://www.mpfa.org.hk/pdf/eng/legislation_regulations/legulations_ordinance/circulars/mpf/2016_2020/files/CIR-20201014.pdf for further information.*

[36] *According to the HKMA, financial infrastructures in Hong Kong fall into three broad types: payment systems, debt securities settlement system, and domestic and external system linkages. Data infrastructure here refers to the infrastructure that is based on advanced data analytics used to facilitate financial institutions' business activities.*

linkages to different payment and settlement systems, the RTGS system operated smoothly with record turnover during the pandemic.

A milestone in the retail payment system in Hong Kong was the launch of the Faster Payment System (FPS) in 2018, which allows registered users to transfer money across different banks in Hong Kong dollar or Renminbi on a real-time, round-the-clock basis and free of charge. During the pandemic, money transfer through the FPS became more common among individuals due to concerns of cross infection and social distancing measures. As compared with 2019, the value of payments and transfers handled by FPS doubled in 2020, and recorded further growth in 2021 (Chart 4.1).

Chart 4.1: Value of payments and transfers handled by Faster Payment System



Note: Data of 2018 is based on Q4.
Source: HKMA.

The Hong Kong Exchanges and Clearing Limited (HKEX) operates the securities trading system in Hong Kong. To cope with growing turnover in the equity market, the HKEX upgraded its trading system in 2018 by replacing the third generation of the Automatic Order Matching and Execution System with the Orion Trading Platform – Securities Market. In 2021, the HKEX launched the Orion Central Gateway to enhance the performance and connectivity of its trading platform.

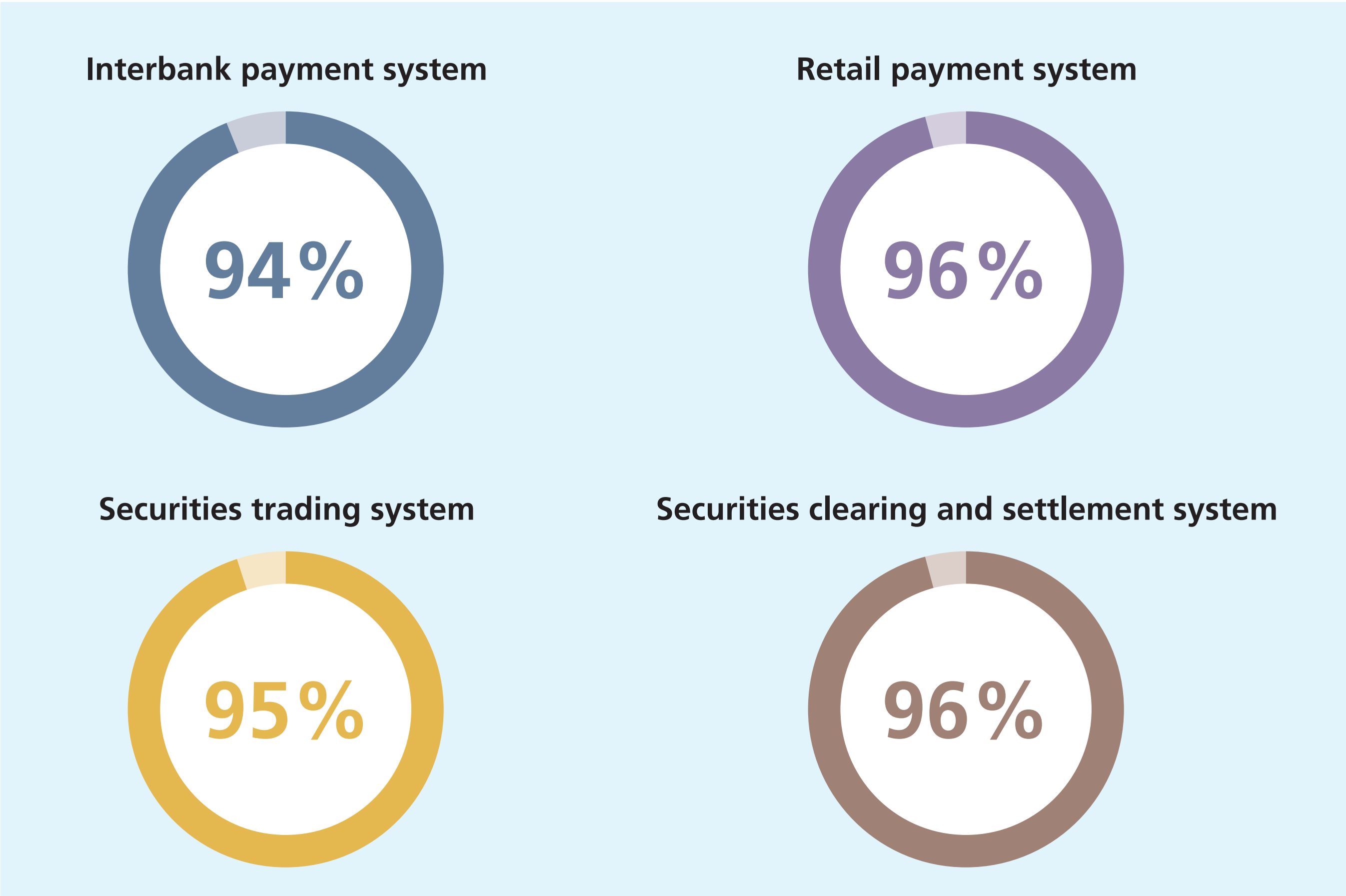
Equity and debt securities are cleared and settled by different systems. In the equity market, the Central Clearing and Settlement System (CCASS) operated by the HKEX is the central counterparty securities settlement system. Over the years, the CCASS has been upgraded to enhance its user interface, facilitate direct linkages with participants, and expand its functionalities, including the launch of a new securities management system and a common collateral management system.

The clearing and settlement of debt securities in Hong Kong is handled by the Central Moneymarkets Unit (CMU), operated by the HKMA. Following the launch of the Bond Connect Scheme and the Renminbi Sovereign Bonds and People's Bank of China Bill Issuance programmes, the services offered by CMU have been expanded to cover issuance, trading, depository, settlement and clearing of debt securities in different currencies, including Hong Kong dollar, Renminbi, US dollar and Euro.

During the pandemic, because of the high volume of transactions and the increased pressure on communication networks, financial institutions faced the risk of experiencing interruptions of payment and securities trading services with severe repercussions on their business operations.

However, this risk has not materialised as the robustness of the financial infrastructure in Hong Kong has helped financial institutions successfully deploy their operational strategies. According to the COVID-19 Survey, around 95% of the surveyed financial institutions have not experienced any interruptions in payment and securities trading services (Chart 4.2). The very few interruptions were mainly explained by network disruptions, slow response or outage of the financial institution's own IT systems, and some minor issues with the payment system. Most interruptions were resolved promptly, and thus the impact on business operations was minimal.

Chart 4.2: Percentage of financial institutions that experienced no interruption



Source: HKIMR staff compilation based on the COVID-19 Survey.

Data infrastructure

In addition to the financial infrastructure for payment and securities trading, the infrastructure based on advanced data analytics used to facilitate financial institutions' business activities can also be considered as a major enhancer of operational resilience.[37] In Hong Kong, the data infrastructure designed to prevent fraudulent claims and fake insurance documents, launched by the Hong Kong Federation of Insurers (HKFI) in collaboration with industry members, are good examples.

To prevent fraudulent claims, customers were usually required to provide original documents to insurers for claim processing. In 2018, the HKFI launched the Insurance Fraud Prevention Claims Database (IFPCD), which helps insurers in detecting and preventing fraudulent claims. With this data infrastructure in place, insurers have greater flexibility to allow their customers to submit claims online without providing the original documents. The IFPCD was designed to alert insurers of potentially fraudulent claims by using AI and big data analytics. It was also designed with a human oversight element, allowing claim handlers to provide feedback on an alert, facilitating the IFPCD in enhancing its algorithms and continuously improving its performance. The IFPCD put multiple measures in place to safeguard the privacy of the data collected.

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[37] *For example, eTradeConnect is a data infrastructure adopting distributed ledger technology. It allows customers and their trading partners to conduct trades and trade financing by sharing information in a cost-efficient way.*

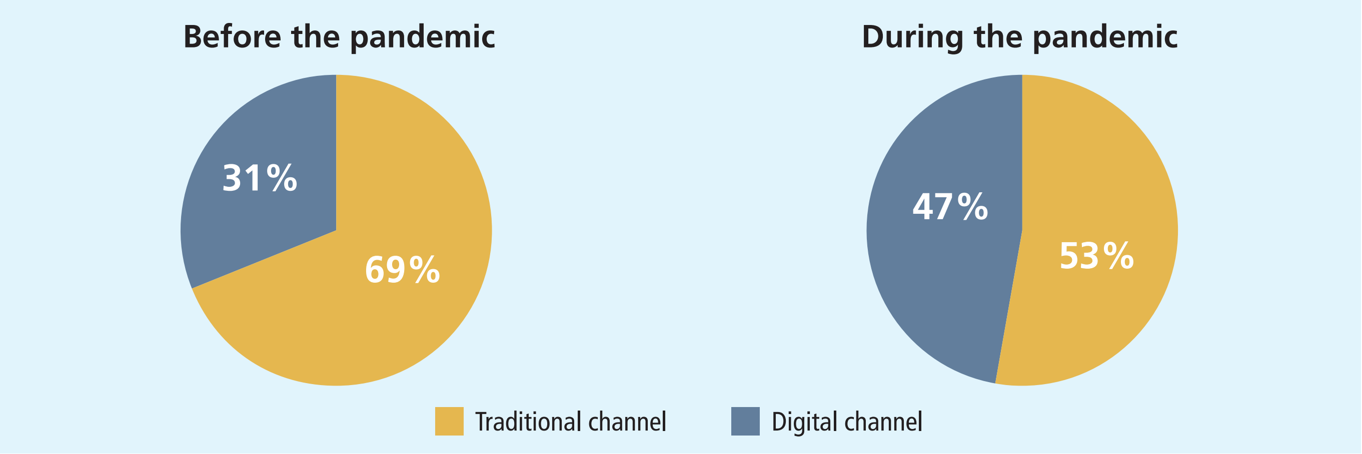
At the same time, more insurance policies were issued online without any physical contact during the pandemic, which could encourage fraudsters to create fake insurance documents. The HKFI launched the Motor Insurance DLT-Based Authentication System (MIDAS) in 2018 to address this issue. The MIDAS is a public-private partnership solution involving car owners, insurers, sub agents, the Hong Kong Police Force and the Transport Department, which utilises blockchain[38] technology to allow multi-stakeholder verification and real-time authentication of motor insurance cover notes and policies. To ensure data privacy, the MIDAS does not store any identifiable personal information on the blockchain.

The smooth functioning of Hong Kong's financial and data infrastructure during the pandemic in 2020-2021 has helped financial institutions successfully deploy their operational strategies.

4.3. THE THIRD ENHANCER: THE ADOPTION OF FINANCIAL INNOVATIONS

Although the pandemic has brought disruption to the financial services industry, it has also provided opportunities to restructure business models and introduce new products and services. According to the COVID-19 Survey, while before the pandemic it was more common for financial institutions to rely on their traditional channels, this changed with the pandemic resulting in an almost equal split between traditional and digital channels (Chart 4.3).[39] In fact, during the pandemic, prolonged social distancing measures and changes in customer behaviour have influenced the ways in which financial institutions had to serve their customers. Shortened opening hours and the infeasibility of face-to-face meetings have prompted financial institutions to increase the proportion of business conducted through digital channels. Under these new circumstances the use of financial innovations to provide better customer experience has represented an important enhancer of financial institutions' operational resilience.

Chart 4.3: Business channels before and during the pandemic



Source: HKIMR staff compilation based on the COVID-19 Survey.

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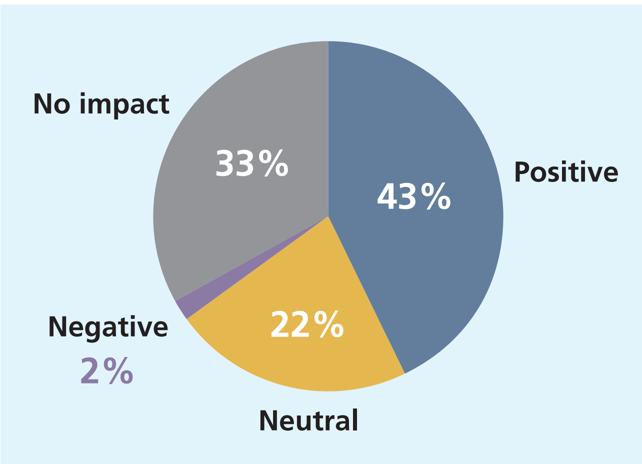
[38] *Blockchain is a digital ledger that consists of blocks, which are used to record transactions. Each block contains information of its previous block, and therefore these blocks can be linked together to form a chain. With this feature, one can only modify the data of a block by altering all the subsequent blocks in the chain, making the blockchain resistant to malicious modification of data.*

[39] *For example, with the increasing use of digital channels for employers to make MPF contributions and send remittance statements to MPF trustees, the digital take-up rates for e-submission of remittance statements and digital payment for contributions were 48% and 59% respectively in December 2021, significantly higher than the corresponding proportions in December 2019.*

Survey respondents also suggested that over 40% of financial institutions accelerated their adoption of financial innovations due to the pandemic (Chart 4.4).[40]

Chart 4.4: Impact of the COVID-19 pandemic on the adoption of financial innovations



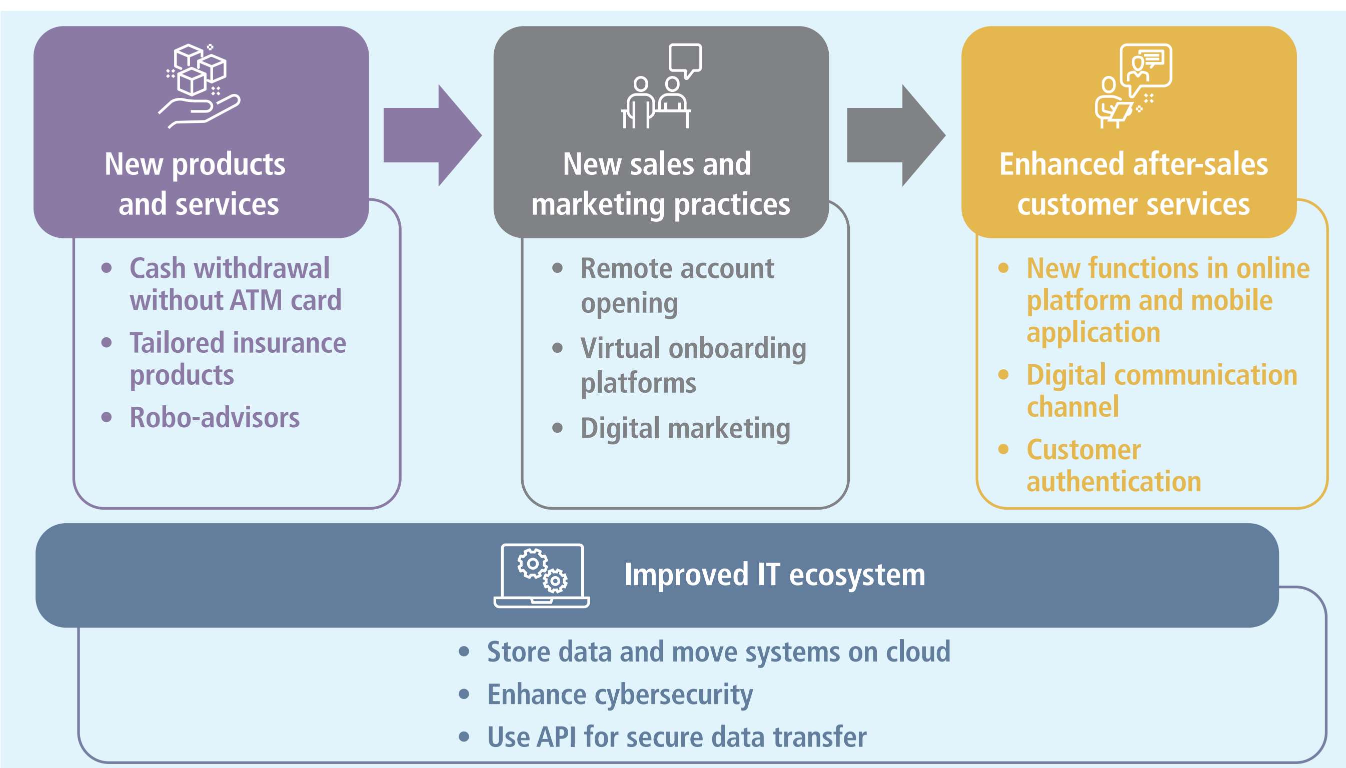
Source: HKIMR staff compilation based on the COVID-19 Survey.

50% of the survey respondents also stated that they improved their online platforms and mobile applications during the pandemic. Furthermore, financial innovations, adopted along the full value chain, allowed financial institutions to increase their competitiveness, maintain customer relationships and enhance their own IT ecosystem (Chart 4.5).

New products and services

Financial institutions have introduced new products and services to provide better customer experience during the pandemic. Although people are more willing to use contactless payment options during the pandemic, some customers still need to use physical cash. Due to the shortened business hours of bank's branches, customers may need to withdraw cash from ATMs more frequently. To provide more convenient services, some banks have introduced cash withdrawal

Chart 4.5: Financial innovations along the value chain



Source: HKIMR staff compilation based on the COVID-19 Survey.

[40] *One-third of survey respondents had already planned to adopt financial innovations before the pandemic and did not alter their adoption plans.*

without an ATM card. Customers can initiate cash withdrawal instructions in the mobile application, and then withdraw money using a QR code or the NFC connection of the ATM.

Looking to other sectors of the financial services industry, the pandemic has led to an increased demand for tailored insurance products. Insurers have responded by utilising financial innovations to distribute customisable products. Telematics and smart devices make it possible to offer usage-based insurance products, such as pay-per-mile motor insurance. Insurers have also adopted big data analytics to improve pricing accuracy and claim efficiency of tailored insurance products with specific coverage, such as flight delay insurance.

In the securities sector, financial innovations have also been adopted to enhance the investment advisory services provided to retail and institutional clients. Drawing on advances in artificial intelligence and big data analytics, some securities firms have partnered with fintech firms to develop robo-advisory platforms, which can provide automated investment advice for clients. Robo-advisors can assess the investment goals and risk tolerance of each client with artificial intelligence and utilise real-time market data to analyse the market environment, enabling tailored investment advice provided with reference to the characteristics of each client.

New sales and marketing practices

Due to the shortened business hours of physical branches, some banks and securities firms have introduced remote account opening services, which allows prospective customers to open accounts through digital channels. Functions of the remote account opening system have also been improved, such as enhancing the system to accept new ID cards and introducing an electronic know-your-customer checking function.

In the insurance sector, banks and insurance intermediaries were the most common distribution channels before the pandemic. As face-to-face meetings were not feasible during the pandemic, insurers relied on digital channels. The TFMs introduced by the IA have prompted some larger insurers to develop their own virtual onboarding platforms. These virtual onboarding platforms are equipped with co-browsing and screen sharing functions, so that customers can have a similar experience to physical meetings. Smaller insurers with fewer resources can use the virtual onboarding solution developed by the HKFI, which has been pre-vetted by the IA.

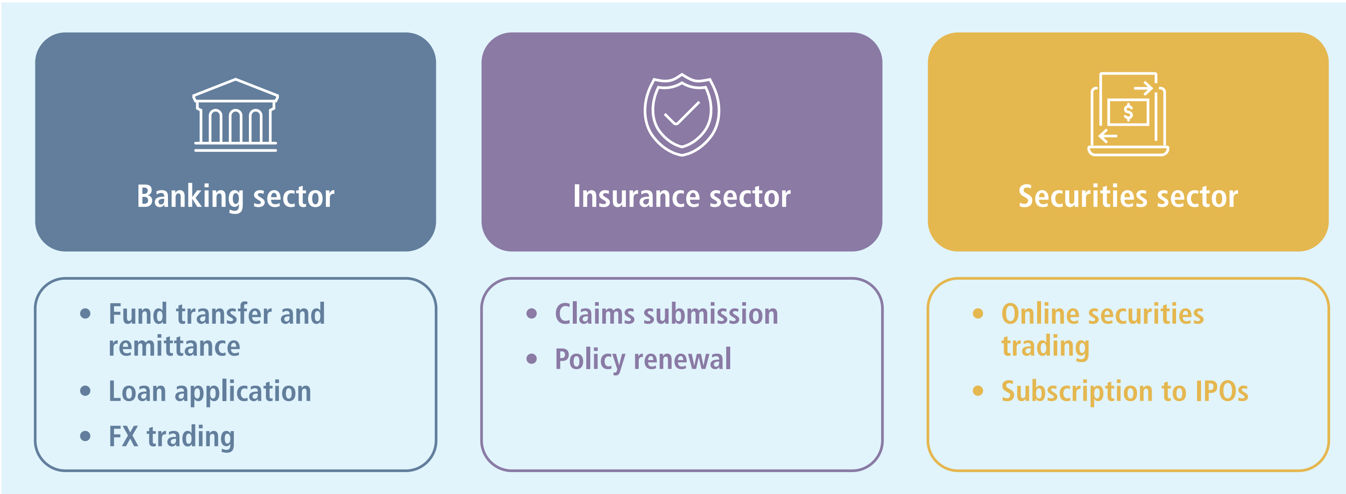
The social distancing measures in place during the pandemic also affected traditional face-to-face marketing, so financial institutions have enhanced their online platforms and mobile applications for marketing purposes. For example, some securities firms have uploaded promotional videos to their online platforms and developed more interactive functions in their mobile applications to enhance customer engagement.

Enhanced after-sales customer services

Financial institutions have enhanced their online platforms and mobile applications through introduction of new functions (Chart 4.6). Some banks have launched fund transfer and remittance, personal loan application and foreign exchange (FX) trading functions in their digital channels. Besides, some insurers have added new functions to allow policyholders to submit claims and renew policy through online platforms and mobile applications. Securities firms have also improved their digital channels for securities trading and subscription of initial public offerings (IPOs).

Financial institutions have also enhanced their ability to provide timely responses to customer enquiries by launching instant messaging tools to answer enquiries around the clock. Some firms have also introduced chatbots to respond to customer enquiries. Utilising artificial intelligence and natural language processing, these chatbots can directly answer some simple enquiries, allowing customer service representatives to handle more complicated requests. Video conferencing tools have also been used to enhance client communication.

Chart 4.6: New functions added to financial institutions' digital channels



Source: HKIMR staff compilation based on the COVID-19 Survey.

Furthermore, customer authentication has been strengthened by introducing multi-factor authentication, such as sending a one-time password through messages. Fingerprint and face recognition, soft token and e-signature capabilities have also been used to prevent fraudulent representation.

Improved IT ecosystem

Some interviewees stated that during the pandemic they accelerated the practice of storing part of their data on their cloud infrastructure. They have also encrypted their data during both data transmission and data storage. Part of their systems were also moved to the cloud infrastructure, giving staff convenient access to the mainframe IT systems while working from home. To ensure the stability of data stored on the cloud, one bank representative who was interviewed stated that regular data recovery drills are conducted.

In addition, financial institutions have strengthened the security controls of their systems. For example, they have introduced multi-factor authentication and upgraded their content management platforms and firewalls to enhance security. In revising the cybersecurity framework, some respondents stated that they made reference to international cybersecurity standards.

With the increased use of digital channels, data security and privacy during the transmission of data were also a priority. Financial institutions have utilised Application Programming Interfaces (APIs) as a secure channel for data transfer within the company and between partner institutions. For example, some interviewed insurers have developed mobile applications to allow their intermediaries to fill in application forms with customers. When the intermediaries submit the forms through the mobile applications, data are securely transmitted to the insurer's system through APIs.

To meet new customer expectations on the digitalisation of financial services, financial institutions have developed and adopted financial innovations along their value chains, supported by enhanced IT ecosystem.

Chapter 5
What's Next?

Preliminary considerations for Hong Kong's financial services industry

HIGHLIGHTS:

- Over the next five years, approximately 25% of staff in the financial services industry are expected to be working from home, and financial institutions expect digital channels to play an increasingly important role in conducting business.
- In light of the experience during the pandemic in 2020-2021, financial institutions will continue to develop and adopt financial innovations to further digitalise financial services. Most of them also support industrywide data sharing initiatives.
- Supervisory guidelines, public-private partnerships and knowledge sharing are factors for establishing industrywide data infrastructure for financial institutions to further digitalise financial services.
- Financial institutions indicated that in the near future cyberattacks, data breaches, business continuity planning and hybrid work models were areas that could benefit from regulatory guidance.

5.1. NEW LANDSCAPE OF THE FINANCIAL SERVICES INDUSTRY

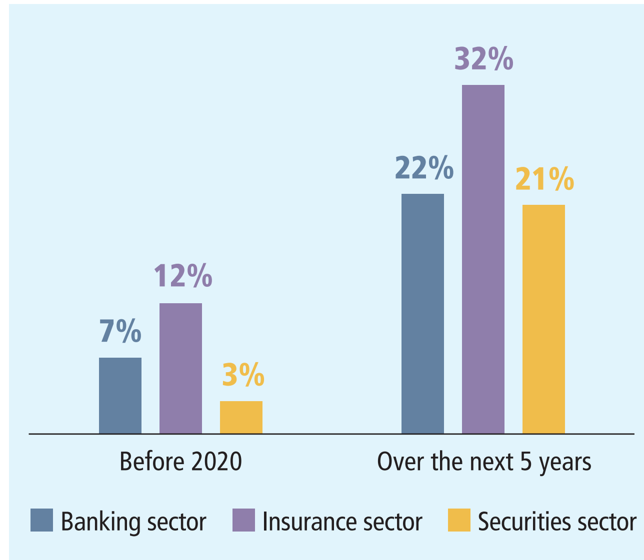
The COVID-19 pandemic has been and still is a real-life stress test for financial institutions in Hong Kong. To manage the extent of this crisis, they have been agile in utilising their BCPs, adopting staff deployment arrangements, and serving their customers through the adoption of financial innovations. Although it is premature to draw definitive conclusions, the emerging trends experienced during the past years together with the survey results allow us to provide some preliminary considerations for Hong Kong's financial services industry going forward.

Revisions of operating procedures

The pandemic highlighted the benefits of an effective BCP implementation. Our survey results show that the financial institutions that did not have a pandemic-related BCP before the inception of the health crisis have now recognised the importance of including sufficient risk scenarios in a BCP, and will take pandemics into account going forward. The results demonstrate that financial institutions in Hong Kong are conscious of the importance of developing and implementing a BCP to cope with the impact of a pandemic.

Financial institutions in Hong Kong have also reviewed their staff deployment strategies. More specifically, the prolonged remote working arrangement during the pandemic allowed financial institutions to experience the benefits and challenges of a hybrid work model. Although some financial institutions stated that they would require their staff to work at the office in the aftermath of the pandemic, others planned to adopt hybrid working models over the next five years. The results of the survey suggest that approximately 25% of staff across the financial sectors are expected to be working from home over the next five years, a level that is significantly higher than the pre-pandemic one (Chart 5.1).

Chart 5.1: Percentage of staff working from home over the next five years



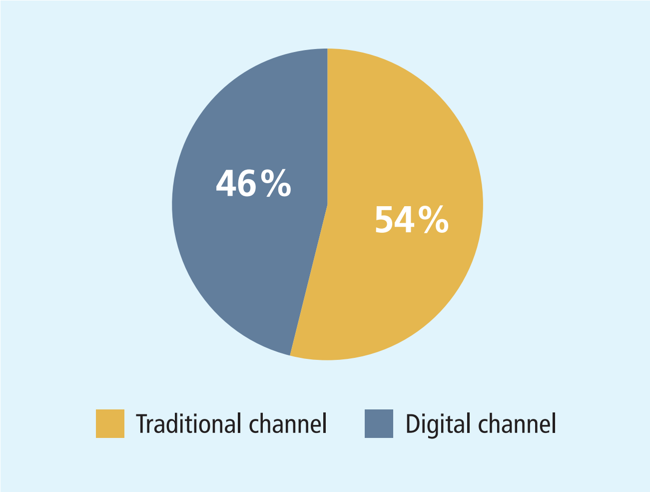
Source: HKIMR staff compilation based on the COVID-19 Survey.

Importance of the digital channels

During the pandemic, prolonged social distancing measures and changes in customer behaviour influenced the way that financial institutions serve their customers. The shortened opening hours of branches and the infeasibility of face-to-face meetings prompted financial institutions to increase the proportion of business conducted through digital channels, resulting in an almost equal split in business conducted through the two channels.

Financial institutions felt that consumers' preferences and expectations had been changed by the pandemic, with over 70% of respondents predicting that customer receptiveness to using new technology would increase. Financial institutions now expected the mix of business conducted through traditional and digital channels to be evenly split over the next five years (Chart 5.2).

Chart 5.2: Channels for conducting business over the next five years

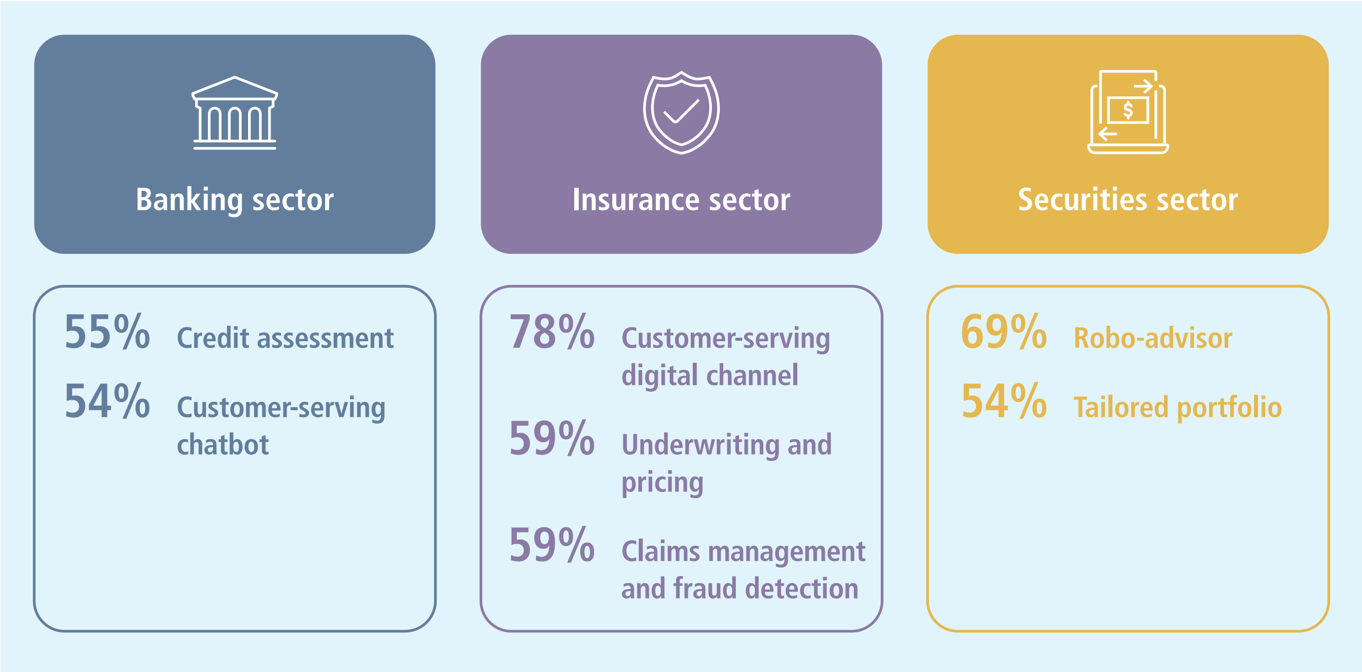


Source: HKIMR staff compilation based on the COVID-19 Survey.

Momentum in digitalisation of financial services

The survey results suggest that the adoption of financial innovations to better cater for customers' needs will be an ongoing trend. As customers have become more receptive to using new technology, financial institutions will further digitalise their services to enhance their competitiveness after the pandemic. Chart 5.3 presents a list of financial services that over half of the surveyed financial institutions will develop and adopt financial innovations for further digitalisation of financial services in each sector.

Chart 5.3: Financial services to be digitalised in the aftermath of the pandemic



Source: HKIMR staff compilation based on the COVID-19 Survey.

Chapter 5

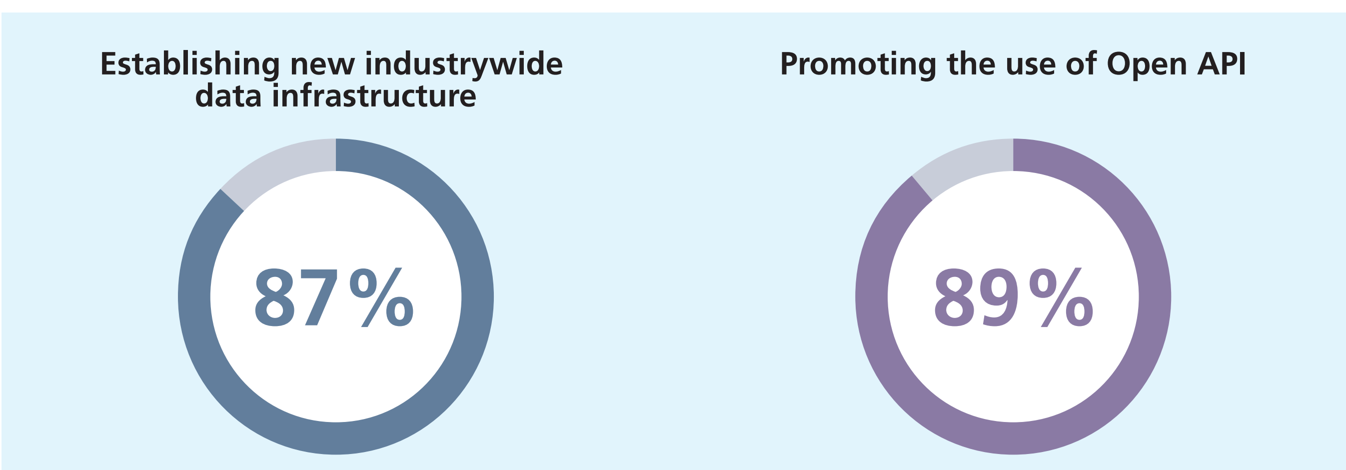
Industrywide data sharing initiatives

Most financial services slated to be digitalised require the use of artificial intelligence and big data analytics. Major challenges faced by financial institutions relate to data quality and governance.[41] As an enhanced data infrastructure can improve the data quality and its governance, most financial institutions support industrywide data sharing initiatives (Chart 5.4).

The establishment of new industrywide data infrastructure initiatives can provide an additional reliable data source for financial institutions. For example, a key initiative promoted by the HKMA in its 'Fintech 2025' strategy is the establishment of Commercial Data Interchange (CDI) that collects sales and business data from merchants and enterprises and shares them with financial institutions for credit assessment purposes with the consent of the data owners. The HKMA has successfully completed a Proof-of-Concept study of the technical feasibility of the CDI. The CDI has entered the pilot launch stage, which involves eight pairs of banks and data providers. Once CDI is established, financial institutions will be able to access more high-quality data, which can facilitate their adoption of financial innovations to better serve their customers. The HKMA has encouraged banks to develop plans to connect their systems to CDI, with banks with material SME financing business expected to join CDI by the end of 2022.[42]

Partner institutions can also supply data. A secure data transmission channel, such as API, can be used to ensure data security and privacy. Since the introduction of the Open API framework by the HKMA in 2018, over 20 banks have launched more than 800 Open APIs, covering a wide range of products and services.[43] At the same time, other financial institutions, including insurers and securities firms, have also leveraged the Open APIs offered by banks to provide services to their customers. The positive experience facilitated support for the use of Open APIs. The IA has also recently established a task force on Open APIs in the insurance sector. As more Open APIs are launched, financial institutions will have access to a wider range of data sources in a secure environment.

Chart 5.4: Market views on industrywide data sharing initiatives



Source: HKIMR staff compilation based on the COVID-19 Survey.

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41 *Hong Kong Institute for Monetary and Financial Research (2021).*

42 *See https://www.hkma.gov.hk/media/chi/doc/key-information/guidelines-and-circular/2021/20211223c2.pdf for further details.*

43 *Hong Kong Monetary Authority. (2021b).*

Most financial institutions support industrywide data sharing initiatives, including the establishment of new industrywide data infrastructure and the promotion of Open Application Programming Interface.

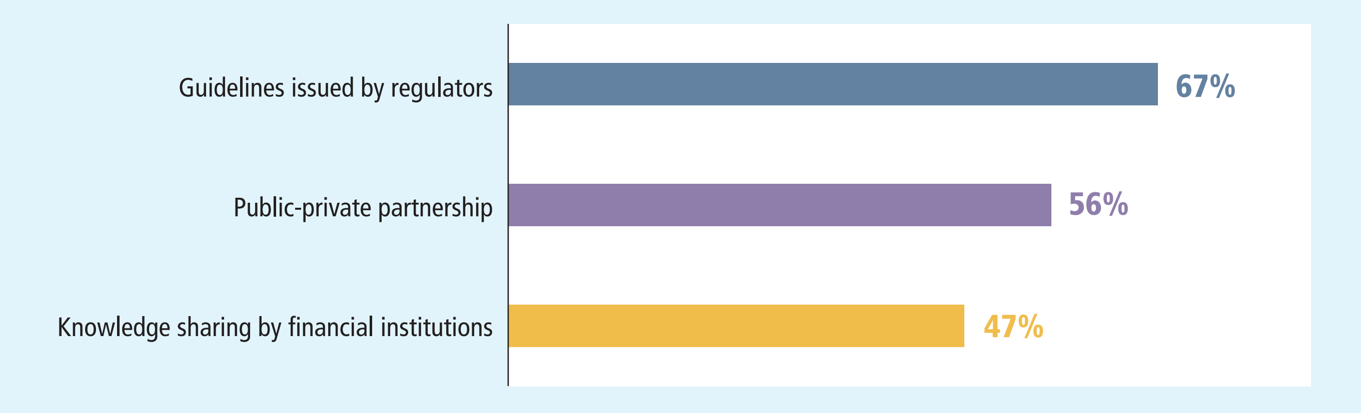
As the availability of high-quality data is crucial to the digitalisation of financial services, industrywide data infrastructure can serve as an alternative data source. In establishing such infrastructure, the surveyed financial institutions indicated that regulators can function as both a gatekeeper and a facilitator. From the supervisory perspective, over 60% of the surveyed financial institutions expected regulators to issue guidelines related to industrywide data infrastructure (Chart 5.5). For example, the HKMA is developing a CDI governance framework, which will specify the guiding principles and rules for a safe, efficient, and effective sharing of commercial data under the CDI regime. These guidelines will allow financial institutions to take regulatory expectations into account when developing the frameworks for data collection, usage, handling and sharing.

At the same time, more than 50% of the surveyed financial institutions were in favour of public-private partnerships. The interviewees indicated that cooperation between industry members and other parties is the main challenge to the adoption of financial innovations. If the public sector is involved, financial institutions will be more willing to share their data. For example, because the CDI was introduced by the HKMA, financial institutions and other organisations were more willing to participate in this data infrastructure.

It is worth noting that many financial institutions also planned to support the establishment of industrywide data infrastructure. In the COVID-19 Survey, nearly 50% of the surveyed financial institutions supported knowledge sharing of successful use cases. By reviewing such cases obtained from their peers, financial institutions can appreciate the benefits of utilising new data sources, providing an additional incentive for their support of the establishment of industrywide data infrastructure.

Supervisory guidelines, public-private partnerships and knowledge sharing are factors for establishing industrywide data infrastructure for financial institutions to further digitalise financial services.

Chart 5.5: Factors for establishing industrywide data infrastructure



Source: HKIMR staff compilation based on the COVID-19 Survey.

5.2. REGULATORY GUIDANCE

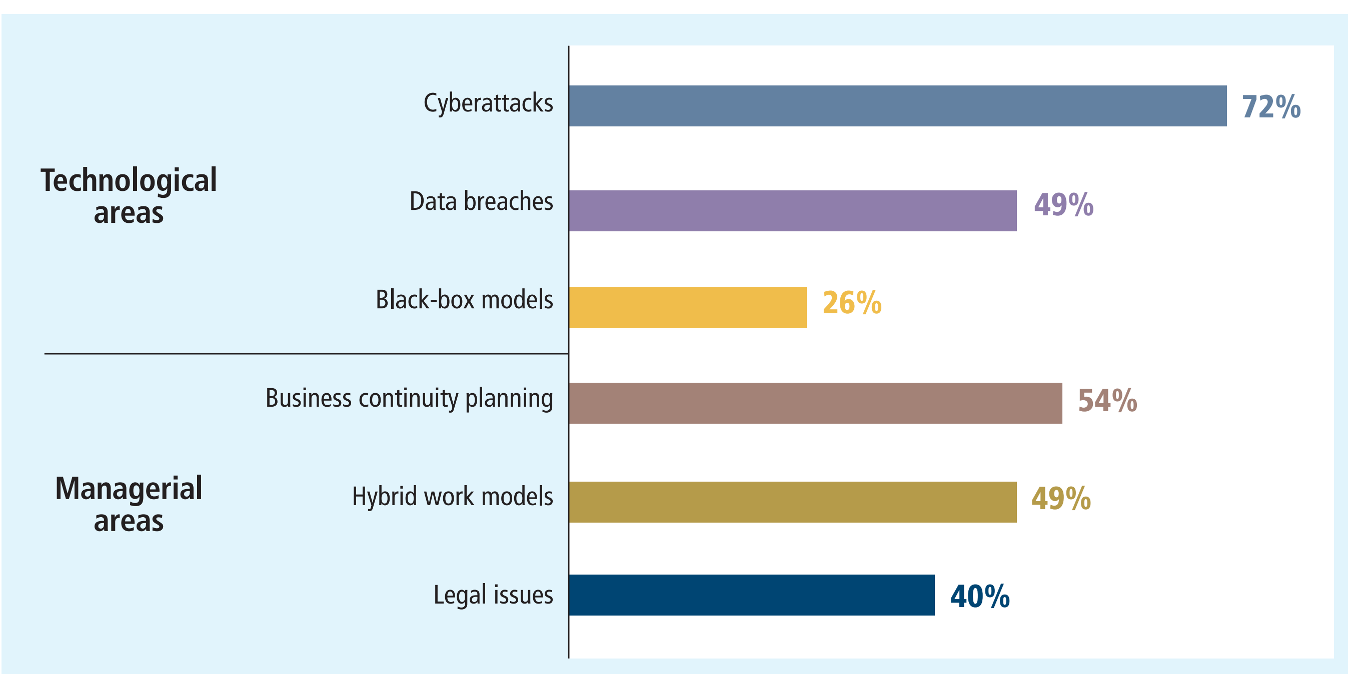
During the COVID-19 Survey, we invited financial institutions to express their views on the role of regulators in fostering the continual development of the financial services industry. Interviewees explained that as financial institutions have tended to be risk averse in response to the pandemic, they would be in closer collaboration with financial regulators when growing their businesses. It is therefore important to understand how the pandemic has changed the areas of supervisory focus that can facilitate a healthy development of the industry.

Regarding the areas that can benefit from regulatory guidance in the near future, respondents highlighted the risks of cyberattacks and data breaches (Chart 5.6). With technology being essential for financial institutions' adoption of new staff deployment strategies and further digitalisation of their services, financial institutions were aware of the potential risks related to cybersecurity, data security and data privacy with the increasing adoption of financial innovations.

At the same time, the COVID-19 pandemic has alerted financial institutions to the need to develop response plans to manage future disruptions. Having gained experience with remote working, some financial institutions plan to allow their staff to work from home over the next five years. The financial institutions surveyed considered business continuity planning and hybrid work models to be the major management areas that can benefit from regulatory guidance in the near future.

Financial institutions indicated that in the near future cyberattacks, data breaches, business continuity planning and hybrid work models were areas that could benefit from regulatory guidance.

Chart 5.6: Areas that can benefit from regulatory guidance in the near future



Source: HKIMR staff compilation based on the COVID-19 Survey.

5.3. POSSIBLE WAYS TO ENSURE OPERATIONAL RESILIENCE WHILE CAPTURING NEW OPPORTUNITIES

Although the COVID-19 pandemic is not yet over, the experience in the past two years can provide preliminary lessons helpful for the financial services industry towards fostering its healthy development (Chart 5.7).

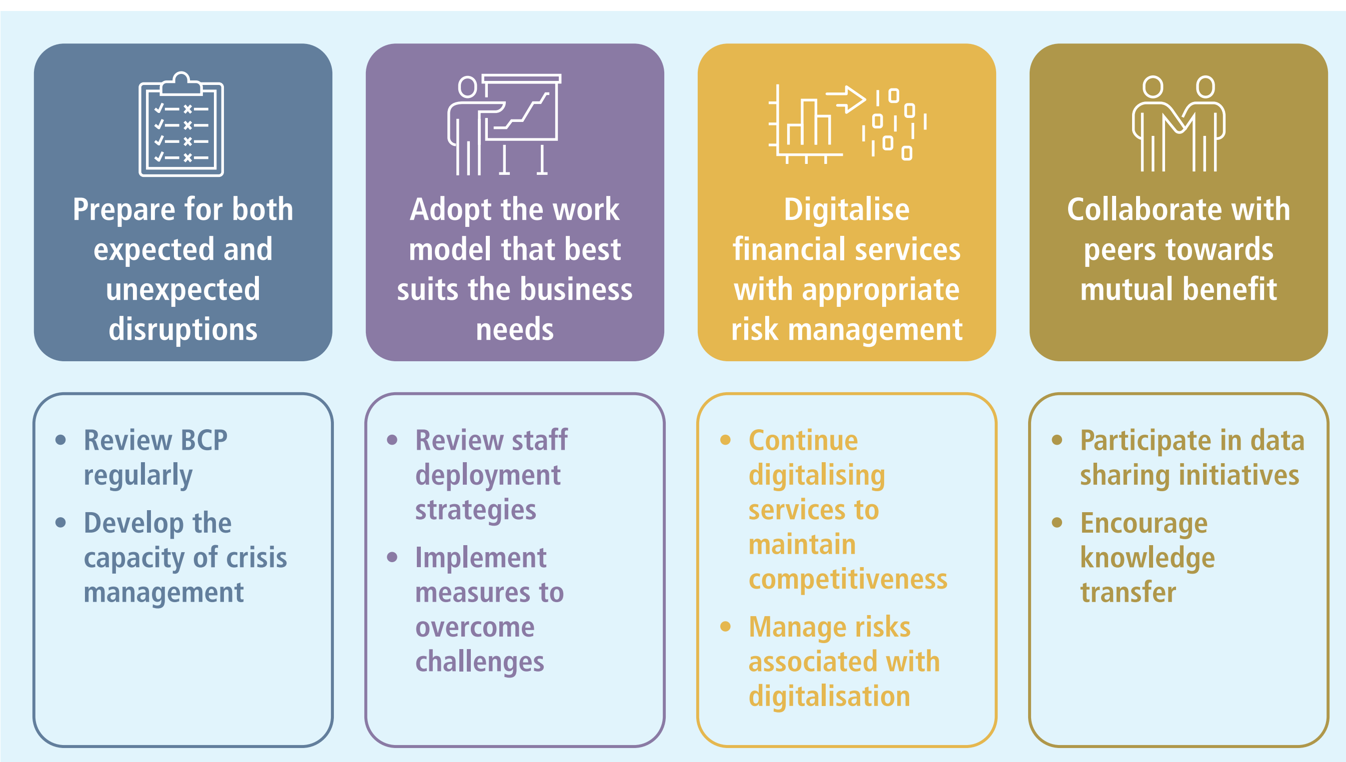
Prepare for expected and unexpected disruptions

One of the key factors of achieving operational resilience is the smooth implementation of pandemic-related BCPs, highlighting the importance of incorporating suitable disruptive scenarios in business continuity planning. However, data availability is a salient challenge in quantifying the impact of disruptive events. Interviewees stated that when they were developing pandemic-related BCPs, quantifying the impact of a pandemic was a challenge, as the previous pandemic of this scale was over a century ago (the 1918 flu pandemic). Therefore, it is important for financial institutions to review their BCPs regularly, identify new potential disruptive events to include, and collect data to quantify the impact of these new events.

Although expected disruptive events can be tackled by BCPs, financial institutions also have to handle unexpected disruptions that will have an unknown impact on operations. To manage a crisis, financial institutions should have suitable people, processes and mindset in place. In this regard, they should build capacity for crisis management with reference to industry best practices. These attributes could help them develop agile and prompt responses under unexpected disruptions.

For example, climate change could lead to widespread and prolonged disruptions to financial institutions. Financial institutions could develop climate related BCPs and collect climate risk data to quantify the

Chart 5.7: Potential implications by preliminarily reviewing the recent pandemic experience



Source: HKIMR staff compilation.

impact of climate-related events. At the same time, as climate risks are evolving over time, the likelihood and severity of climate-related events could be underestimated.[44] Financial institutions should therefore enhance their crisis management ability to respond to unexpected climate-related events of severe and uncertain impact.

Adopt the work model that best suits business needs

WFH arrangements during the COVID-19 pandemic have proven that some functions can be performed outside the office. For example, one bank representative who was interviewed stated that their bank had adopted new technology to support call recording, so that customer services officers can handle phone calls while working from home. WFH arrangements can also benefit financial institutions in several ways, such as enhancing staff well-being. In the wake of the pandemic, financial institutions could review their staff deployment strategies, adopting hybrid work models where appropriate.

Financial institutions that adopt a permanent hybrid work model should also implement measures to overcome related challenges, such as a lack of team coordination. Several interviewees stated that they had started to redesign the office, to provide more open spaces and meeting rooms to facilitate collaboration. They have also revised policies to facilitate staff working from home and support their well-being. Commitment from senior management is essential to the successful adoption of hybrid work models. Some interviewees recognised that staff tend to work at the office if senior executives return to the office every day, so senior management should take the lead in making hybrid work models feasible.

If the hybrid work model is implemented over the long term, some employees of financial institutions may work entirely from home and only return to the office on occasion.

Digitalise financial services with appropriate risk management

The digitalisation of financial services is an irreversible trend. During the COVID-19 pandemic, financial institutions adopted financial innovations to provide services to customers, with positive feedback. In the wake of the pandemic, customers are more willing to access financial services through new technology, and business conducted through digital channels will remain at an elevated level. Therefore, financial institutions should continue digitalising their services to maintain competitiveness.[45]

It is equally important for financial institutions to manage the risks of financial innovations. As the digitalisation of financial services facilitates the collection of personal data from individuals and corporations, financial institutions have to implement measures to mitigate cybersecurity risks and maintain data security and privacy. For example, they can establish robust data policies and procedures, enhance the security of their data infrastructure, strengthen third-party risk management and provide staff training. With these mitigation measures in place, financial institutions can ensure the proper digitalisation of financial services.

Collaborate with peers for mutual benefit

When digitalising financial services, the availability of quality data is essential for analysis. Although the establishment of industrywide data infrastructure can

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[44] *BSI Group (2014).*

[45] *In respect of digitalisation of financial services, the introduction of the eMPF Platform aims to drive greater efficiency, flexibility and reliability of the operation of MPF schemes through standardisation, streamlining and automation of administration processes. The eMPF Platform is targeted to complete its development by end-2022 at the earliest and become fully operational in 2025.*

provide timely and quality data, the volume of data available will determine the success of data infrastructure. Therefore, financial institutions should participate in data sharing initiatives. If more financial institutions participate, the industrywide data infrastructure could provide mutual benefits to all contributors.

In addition to data sharing, knowledge transfer initiatives should be encouraged as they could also bring mutual benefits to financial institutions. For example, financial institutions considered knowledge sharing of successful use cases would be beneficial to establishing industrywide data infrastructure. At the same time, by reviewing use cases, financial institutions may gain new insights on how to utilise data, helping them enhance their data analytic capabilities.

Furthermore, gathering and analysing information related to cyberattacks and data breaches is important for managing cyber risks. Nevertheless, some interviewees indicated that they obtained this information only through peer sharing and the news media. There are currently several initiatives in place for sharing information on handling cyberattacks, such as the Cyber Intelligence Sharing Platform[46] for the banking sector and Cybersec Infohub Private Group for the insurance sector.[47] Financial institutions could join these initiatives to enhance their cyber risk management.

To remain operationally resilient and contribute to financial stability, financial institutions can prepare for both expected and unexpected disruptions, adopt work models that best suit their business needs, digitalise financial services with appropriate risk management and collaborate with peers for mutual benefit.

[46] *The Cyber Intelligence Sharing Platform was launched by the HKMA in collaboration with the Applied Science and Technology Research Institute and the Hong Kong Association of Banks. It provides an infrastructure for sharing intelligence on cyberattacks.*

[47] *The Cybersec Infohub is a reliable platform for cybersecurity information exchange jointly administered by the Office of the Government Chief Information Officer and the Hong Kong Internet Registration Corporation Limited. A private group for the insurance sector has been set up on the platform to facilitate sharing and collaboration.*

Conclusions

Hong Kong's financial services industry has exhibited a high level of operational resilience during the first two years of the COVID-19 pandemic. A key factor contributing to this operational resilience has been the effective implementation of BCPs by financial institutions. To minimise the risk of infection spread, financial institutions have also developed hybrid work models and arranged some staff to work from home. They recognised the benefits of remote working arrangements and implemented multiple measures to overcome associated technological and managerial challenges.

External enhancers including policy support, financial and data infrastructure and the adoption of financial innovations have helped financial institutions achieve operational resilience. Like their international counterparts, financial regulators in Hong Kong have implemented measures and provided guidance during the pandemic. Financial and data infrastructure has also been robust in the past two years, allowing financial institutions to conduct business smoothly even during disruptive events. The accelerated adoption of financial innovations, supported by enhanced IT ecosystem, has also helped financial institutions meet new customer expectations.

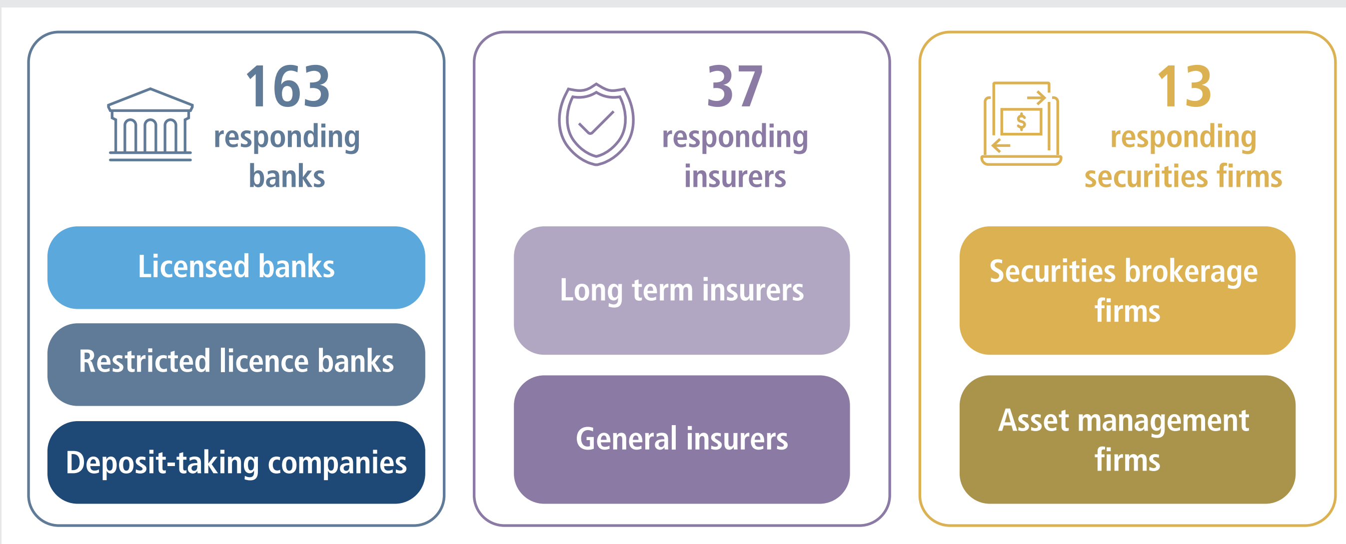
Financial institutions have observed the emerging trends in the wake of the pandemic and planned to revise their future staff deployment and business strategies. They predicted that the proportion of staff working from home and the amount of business conducted through digital channels over the next five years would be higher than the pre-pandemic levels. Recognising these trends, financial institutions will continue to broaden their adoption of financial innovations. As data is important to the digitalisation of financial services, they are also receptive to industrywide data sharing initiatives such as industrywide data infrastructure and Open Application Programming Interface.

The experience from the last two years has highlighted that preparing for disruptions, adoption of work models in accordance with business needs, digitalisation of financial services with appropriate risk management and collaboration with peers for mutual benefit are crucial to remaining operationally resilient during disruptive events.

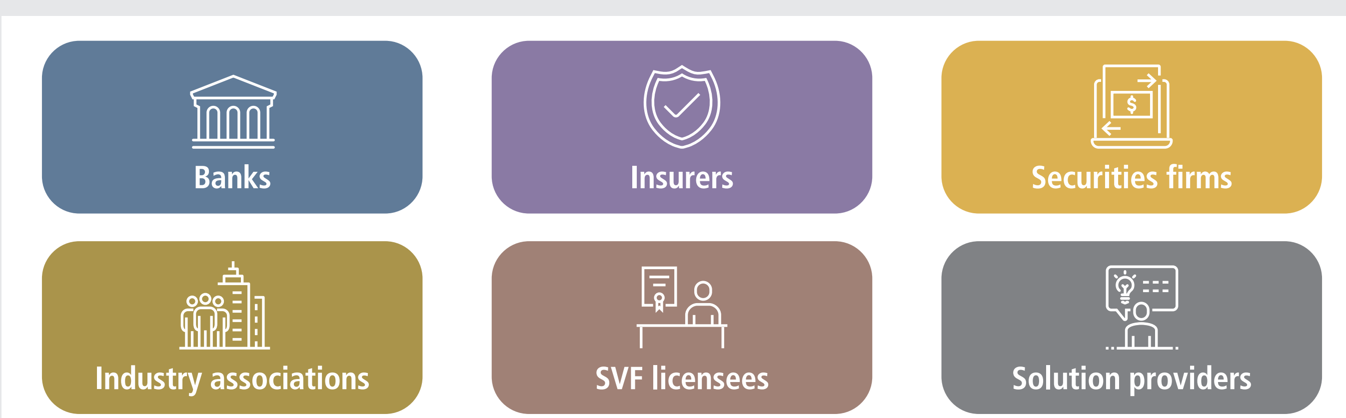
Appendix A: Background of the COVID-19 Survey

The COVID-19 Survey was designed to collect the views of financial institutions to understand the measures they used to mitigate the impact of COVID-19, and the roles of financial infrastructure and innovations in ensuring the smooth functioning of the financial system in Hong Kong during the pandemic.

The HKIMR distributed the survey questionnaires to banks, insurers and securities firms in July 2021 with the help of industry associations, and a total of 213 responses were received. Over 85% of the authorized institutions regulated by the HKMA participated in the survey; the participating insurers together accounted for around 46% of the total gross premiums of the Hong Kong insurance industry for 2020.



Apart from the survey questionnaires, 17 interviews were conducted to obtain more in-depth insights and suggestions from the respondents. To capture views from players in the wider industry, interviews were also conducted with representatives of industry associations, Stored Value Facility (SVF) licensees, and solution providers such as fintech firms, data specialists and cybersecurity specialists.



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