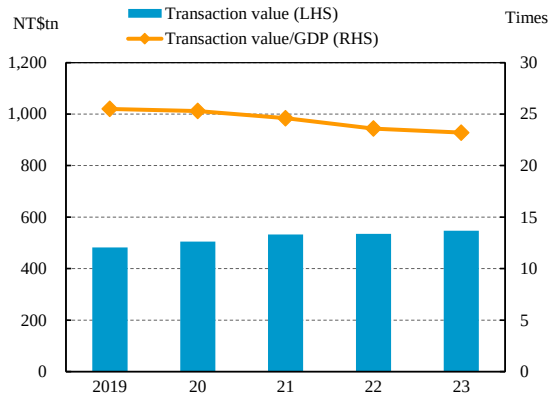
3.3 Financial infrastructure

In 2023, Taiwan's payment and settlement systems operated smoothly, and the shared infrastructure for retail payments was further strengthened, thereby promoting the development of electronic payments. Meanwhile, the FSC assisted Taiwan's insurance industry in aligning with international standards, continually promoted the early identification and assessment of climate change-related risks in the financial industry, enhanced the management of crypto asset platforms, and persistently amended regulations to facilitate the stable development of the financial sector.

Chart 3.56 Funds transferred via the CIFS



Note: Figure for GDP in 2023 is published by DGBAS on May 30, 2024.
Sources: CBC and DGBAS.

3.3.1 Payment and settlement systems

In 2023, the operation of the CBC's CIFS and the FISC's IFIS both functioned smoothly, along with steady growth in their transaction values. The FISC continued to strengthen the shared infrastructure for retail payments. With an increase in the public's willingness to use e-payment instruments, consumer spending related to these instruments has also been expanding.

Overview of the CIFS's operation

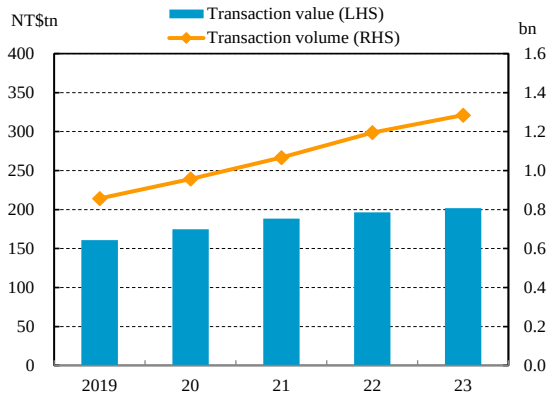
The CIFS deals with large-value fund transfers among financial institutions and the final settlements for domestic securities, bills, bonds, and retail payments. In 2023, the amount of funds transferred via the CIFS was approximately NT$547 trillion, nearly 23.2 times the size of the GDP for the year (Chart 3.56).

In terms of retail payments, they are primarily processed by the IFIS, which utilizes the funds deposited by financial institutions in the Interbank Funds Transfer Guarantee Special Account (hereinafter the Guarantee Account)[60] under the CIFS to clear and settle interbank payment

[60] The Guarantee Account, established jointly by financial institutions with the Central Bank, holds funds for clearing interbank transactions. When the public makes interbank withdrawals or transfers, the FISC system promptly deploys these funds to clear transactions between financial institutions.

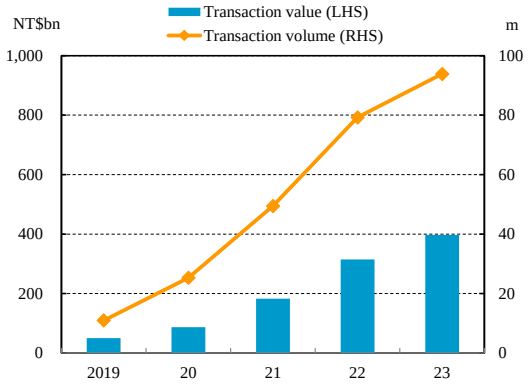
transactions on a trade-by-trade basis.[61] In 2023, approximately 1.28 billion transactions were processed by the IFIS, with the value totaling NT$202 trillion (Chart 3.57), representing increases of 7.48% and 2.63%, respectively, compared to 2022.

Chart 3.57 Transaction value and volume processed by the IFIS



Source: CBC.

Chart 3.58 Transaction value and volume via QR Code payment standard



Source: CBC.

Development of shared infrastructure for retail payments

To enhance the convenience of using mobile payments for the public, the Bank had urged the FISC to establish a common QR Code payment standard, which had successively offered various functions such as transfers, bill payments, and shopping payments. From its launch in September 2017 to the end of 2023, 41 banks, nine e-payment institutions, and over 390,000 affiliated merchants had joined this initiative. The accumulated volume of transactions processed through this common standard exceeded 260 million transactions, with a total value of approximately NT$1.05 trillion. The value and volume of transactions in 2023 increased by 26.09% and 18.41%, respectively, compared to the previous year (Chart 3.58).

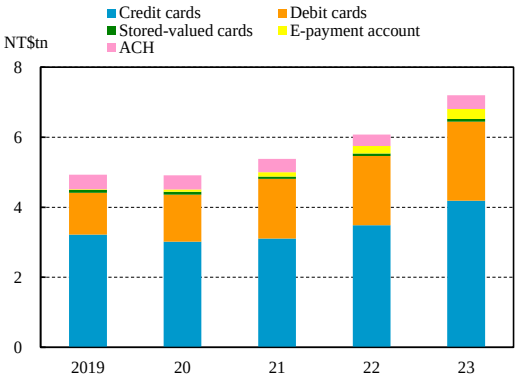
Additionally, to facilitate the interconnection of information flows and cash flows between banks and e-payment institutions, the FISC established a shared platform for cross-institution e-payments in October 2021. This platform subsequently added various functions, such as transfers, utility bill payments, and tax payments. In October 2023, the function of "e-payments for shopping" on the platform went live. Meanwhile, Taiwan's common QR Code payment standard was officially labeled as "TWQR." Through the apps of e-payment institutions, the public can seamlessly conduct transfers, bill payments, tax payments, and shopping transactions across different e-payment and financial institutions (Box 1).

[61] Interbank payment transactions include remittances, automated teller machine (ATM) withdrawals, transfers (including online and mobile transfers), tax payments and corporate funds transfers.

Domestic consumption via e-payment instruments

In 2023, the overall expenditure via e-payment instruments reached NT$7.21 trillion (Chart 3.59), an increase of 18.67% year on year. Among these payment instruments, spending via credit cards, debit cards, and e-payment accounts increased by NT$695.8 billion, NT$281.3 billion, and NT$83.6 billion, respectively. This growth can be mainly attributed to an enhancement in convenience of e-payments, supported by the continuous improvement of the shared infrastructure for retail payments.

Chart 3.59 Consumption via non-cash payment tools



Notes: 1. The consumption statistics of debit cards include consumer purchases with domestic chip bank cards, VISA and other international debit cards, UnionPay cards, and ATM transfers for shopping payments.
2. ACH interbank collection refers to the handling by payment institutions of funds deducted from and transferred to the relevant accounts through the ACH system of the TCH on behalf of customers.

Sources: CBC, FSC and FISC.

Box 1
Taiwan's common QR code payment standard

Riding the wave of rapid growth in electronic payments, a large number of payment institutions have entered the market, providing consumers with more diverse payment options. The payment function is an integral part of financial businesses, and promoting security and efficiency of the payment system helps sustain financial stability. Particularly, QR code payment has been increasingly popular in recent years. Many countries have successively launched national common QR code payment standards. Taiwan also established such a standard as early as 2017, allowing customers of different financial institutions to make payments and transfers via QR codes, thereby contributing to a more convenient and secure mobile payment environment.

1. Many countries have launched common QR code payment standards

Payment services exhibit "network effects," where the more people use the services, the higher the value for themselves. Therefore, payment services should be made as accessible as possible to take full advantage of network effects. However, considering operating profits and business competition, payment institutions tend to develop independent, closed and non-interoperable systems individually, which only serve their own customers and provide no cross-institutional services, leading to a phenomenon of "fragmentation" in the payment market. Not only does it cause inconvenience for users but hinders healthy competition in the market. Over time, the market may even be dominated by a small number of payment institutions, thus becoming monopolistic or oligopolistic, which is detrimental to healthy market development. In addition, in a fragmented market structure where payment institutions are allowed to develop their own systems separately without collectively adopting secure and efficient common platforms and standards, once an anomaly or failure occurs in the system of a payment institution, it could disrupt the operation of the payment market as a whole and impact financial stability, and would potentially be more serious if it's one of the few dominant payment institutions.

In order to bring the network effects of payment services into full play, preserve the long-term competitiveness in payment markets, and ensure financial stability, international efforts have been aimed at actively implementing policies to enhance the interoperability of payment systems, mainly by urging payment institutions to adopt secure and efficient

common platforms and standards. Therefore, aside from establishing retail "fast payment systems"[1] to provide real-time settlement services year-round by integrating the movement of messages and funds among various payment institutions on the back end, many countries have recently also introduced national standardized QR code payment standards on the front end of payment interfaces (Table B1.1).[2] These initiatives have addressed challenges such as incompatible QR code specifications that hindered interoperability, where merchants had to interface with individual payment institutions, leading to increased operational costs and inconvenience for the public to identify and use.

Table B1.1 Launch of common QR code payment standards in selected countries in recent years

Country/ jurisdiction	QR standard	Time of launch
India	BharatQR	September 2016
Taiwan	TWQR	September 2017
Thailand	Thai QR	October 2017
Singapore	SGQR	September 2018
Hong Kong	HKQR	September 2018
Indonesia	QRIS	August 2019
Australia	NPP QR Code Standard	June 2019
Malaysia	DuitNow QR	July 2019
Japan	JPQR	August 2019
Philippines	QR Ph	November 2019
Vietnam	VietQR	June 2021

Sources: Yulius et al. (2023) and websites of selected countries.

2. Development of Taiwan's common QR code payment standard

While other countries only began to launch fast payment systems in recent years (for example, the FedNow service introduced by the US in 2023), Taiwan established the IFIS, operated by the FISC, as early as in 1987. Later, the IFIS began to offer 24-hour payment services in 1991. Then, coordinated efforts among financial institutions led by the FISC were made to introduce the common QR code payment standard in September 2017, which preceded those in many neighboring countries, and enabled financial institutions' customers to make payments and transfers by scanning QR codes.

In October 2021, the FISC established a shared platform for cross-institution e-payments to facilitate the interconnection of information and cash flows between e-payment institutions, as well as between financial institutions and e-payment institutions, which further expanded the scope of retail fast payment services. This platform subsequently served various additional functions, such as cross-institutional e-transfers, e-payments for taxes and utility bills. In October 2023, the function of e-payments for shopping went live on the platform. Meanwhile, Taiwan's common QR code payment standard was officially

labeled as "TWQR" (Chart B1.1), and the FISC collaborated with financial institutions as well as e-payment institutions to jointly promote TWQR on the platform, marking the beginning of participation by both financial institutions and e-payment institutions in the TWQR payment ecosystem.

Chart B1.1 TWQR label

Source: Official TWQR website.

3. Future development of TWQR

In the future, the FISC will continue to extend the usage scenarios of TWQR, including facilitating its adoption by the transportation industry so that the public can use TWQR on e-payment or mobile banking apps when taking public transportation. Furthermore, in December 2021, the FISC teamed up with its Japanese counterpart and launched a TWQR-based cross-border e-payment for shopping services, which was later expanded to South Korea in January 2024. Taiwanese citizens are expected to benefit from enhanced security and convenience of mobile payment through this service when traveling abroad.

Notes: 1. A fast payment system refers to a system in which the transmission of the payment message and the availability of the final funds to the payee occur in real time or near real time on a 24/7 basis. For more detail, please see Bech, Morten and Jenny Hancock (2020), "Innovations in Payments," *BIS Quarterly Review*, March.

2. See Yulius, Davids Tjhin et al. (2023), "Interoperable QR Code Payment Ecosystem in ASEAN: What It Means for the World," BCG and ASEAN Business Advisory Council, September.

3.3.2 Taiwan set out to align with IFRS Sustainability Disclosure Standards

To increase comparability of cross-country sustainability information and prevent greenwashing, the IFRS Foundation's International Sustainability Standards Board (ISSB) issued IFRS Sustainability Disclosure Standards S1 General Requirements for Disclosure of Sustainability-related Financial Information and S2 Climate-related Disclosures in June 2023. The above-mentioned standards require an entity to provide sustainability disclosures about governance, strategy, risk management, and metrics and targets. Among them, IFRS S1 emphasizes the connection between sustainability information and financial statement information, including the consistency of reporting entity, materiality criteria, and disclosure timing. S2 highlights that an entity should develop transition plans, use climate-related scenario analysis to assess its climate resilience, and disclose climate-related information relevant to the cross-industry and industry-based metrics and targets, as well as the targets set by itself.

After gathering stakeholder feedback, the FSC released the Roadmap for Taiwan Listed Companies to Align with the IFRS Sustainability Disclosure Standards in August 2023, which aimed for direct adoption of the IFRS Sustainability Disclosure Standards.[62] According to the Roadmap, starting from 2026 (financial year), the FSC will take a phase-in approach for listed companies to adopt the IFRS Sustainability Disclosure Standards in three phases depending on capital size.[63] Moreover, in line with the spirit of information connectedness between S1 and disclosures in the financial statements, listed companies are required to disclose sustainability information in a dedicated chapter in their annual reports and to publish ahead of time the sustainability information in concurrence with their financial statements. Meanwhile, the FSC also set up a task force to promote the adoption of the IFRS Sustainability Disclosure Standards to help companies with smooth adoption of the Standards.

3.3.3 The Bank and the FSC strengthened the research and action related to climate change scenario analysis of the banking industry

Since the release of the CBC Strategic Plan to Address Climate Change Issues in December 2022, the Bank has initiated research on climate risk assessment and measurement methodologies. The international practices and experiences of major economies (e.g., the US,

[62] Starting from 2026, the initial application of IFRS Sustainability Disclosure Standards will include S1 and S2, and the FSC will continue assessing and endorsing each upcoming set of standards issued by the ISSB, based on the development of IFRS Sustainability Standards.
[63] Listed companies with capital over NT$10 billion, over NT$5 billion and less than NT$10 billion, and other listed companies will be required to adopt from 2026, 2027, 2028, respectively.

UK, EU, France, Japan and Australia) in developing climate risk-related macro-stress tests have been collected and studied to serve as an important reference in the future.

Meanwhile, to review the risks and capabilities of the domestic financial industry, the FSC required domestic banks to disclose climate-related financial information from 2023 onwards. Furthermore, the FSC took climate-related factors into account for prudential supervision in the Green Finance Action Plan 2.0. It also commissioned the BAROC to develop a climate change scenario analysis module applicable to all domestic banks.

Following international practices, the aforementioned module assumes three stress scenarios (Table 3.3) covering two physical risk factors (i.e., extreme torrential rain /flood and drought) and one transition risk factor (i.e., carbon price). Risk assessment for all the three scenarios is made for two horizons, 2030 and 2050, using bottom-up and static balance sheet approaches for analysis.

Table 3.3 Scenarios used in domestic banks' climate change scenario analysis modules

Scenarios	Corresponding scenarios	Analysis objectives
Orderly transition	The NGFS Net Zero 2050 scenario and the IPCC RCP 2.6 scenario	To assess the potential risks of the gradual implementation of global transition policies to achieve net zero emissions by 2050
Disorderly transition	The NGFS delayed transition scenario and the IPCC RCP 2.6 scenario	To assess the potential risks of meeting the 2050 net zero emissions target despite the delayed transition
No policy	The NGFS current policies scenario and the IPCC RCP 8.5 scenario	To assess the potential risks of no transition policies (only physical risks in this scenario)

Notes: 1. The corresponding scenarios in this Table refer to the NGFS Phase II and IPCC AR5 scenarios.
2. Based on the severity of climate change at the end of the century, the IPCC AR5 scenarios divide the trends of greenhouse gas concentrations into Representative Concentration Pathway (RCP) 8.5, RCP 6.0, RCP 4.5 and RCP 2.6 scenarios, where the RCP 8.5 scenario represents no transition policies and the highest physical risks, and the RCP 2.6 represents the most aggressive transition scenario to control carbon emissions.

Source: FSC.

The banking industry completed a pilot climate change scenario analysis in 2023 and reported their results. In the "deployment" aspect of the Green Finance Action Plan 3.0, the FSC planned to urge individual financial institutions to conduct and modify their stress tests or scenario analyses associated with climate change. In 2024, the BAROC was commissioned to further improve the existing scenario analysis modules, including how to incorporate the scenarios of the Network for Greening the Financial System (NGFS) Phase IV and of the Intergovernmental Panel on Climate Change (IPCC) Sixth Assessment Report (AR6) into the existing modules, so as to improve the granularity of the modules and make the assessment more closely represent the real situation.

3.3.4 The FSC announced transitional measures for the adoption of IFRS 17 and TW-ICS for insurers

In order to assist domestic insurers to smoothly adopt the IFRS 17 (Insurance Contracts) and the new-generation solvency regime for the insurance industry, referred to as TW-ICS, by 2026, the FSC has successively released transitional measures aligned with the international system. In July 2023, the FSC devised the localization and transitional measures pertaining to the adoption of market risk components within TW-ICS, specifically addressing equity, real estate, and policy-based infrastructure for insurers (as shown in Table 3.4).

Table 3.4 The investment items for the adoption of the localization and transitional measures aligned with TW-ICS

Investment items	RBC risk factor	TW-ICS risk factor
Stocks listed on TWSE/TPEx	TWSE stocks: 21.65% TPEx stocks: 30%	35% (Average increment and alignment over 15 years starting from 2026)
Real estate	7.81%	15% (Average increment and alignment over 15 years starting from 2026)
Policy-based infrastructure	1.28%	Years 2026-2030: 1.28% (Localized risk factor will be separately mulled with reference to international standards and local conditions, by an average increment over 10 years)

Source: FSC.

Furthermore, the FSC proposed an interest rate shift measure for the adoption of IFRS 17 and Phase 2 transitional measures of TW-ICS by insurers in November 2023. The content of the measure included the following: (1) a 50 bps illiquidity premium is given to liability discount rates on interest rate policies with reserve rates above 6% or higher (i.e., high interest rate policies); (2) setting a 15-year phase-in period starting from the date of TW-ICS adoption (i.e., 2026) for insurers to increase through linear increment the interest rate risk factor from 50% of the TW-ICS risk factor to 100%; (3) allowing insurers to recognize the net asset effect (i.e., the net effect resulting from the recognition of assets and liabilities at fair value) in a 15 year period starting from the date of adoption.

To encourage domestic insurers to continuously improve their financial and business development and asset-liability management capabilities, the FSC proposed Phase 3 localization and transitional measures, as well as differentiated management measures in April 2024 as follows: (1) allowing callable bonds, held by insurers prior to the end of 2023, to be

included in eligible assets; (2) allowing insurers to linearly increase their capital charge for emerging risks[64] (including longevity, policy surrender, expenses and catastrophe risks) from 0% to 100% over the course of 15 years; (3) adding a support measure of increasing insurer's asset allocation flexibility and an incentive measure of decreasing the risk factor for insurers who endeavor to increase both capital and the contractual service margin (CSM), so as to help insurers gradually align with international standards.

In the future, the FSC will conduct system reviews based on the actual implementation status of insurers every 5 years after the adoption of TW-ICS. In addition, the FSC will continue to pay attention to the latest development of international systems as published by the International Association of Insurance Supervisors (IAIS) and will accordingly adjust and review the relevant systems in a timely manner.

3.3.5 Strengthening the management of platforms involving crypto assets and digital lending

In light of foreign crypto asset service providers successively filing for bankruptcy in recent years, such as the collapse of the crypto asset exchange FTX in November 2022 that took a financial toll on domestic investors, the Executive Yuan designated the FSC as the competent authority for platforms involving financial investments or payment-related crypto assets in March 2023. Accordingly, the FSC released the *Guiding Directions for the Administration of Virtual Asset Platform or Transaction Service Providers (VASPs)* (hereinafter the *Guiding Directions*) in September 2023. The *Guiding Directions* covers transaction information transparency, the methods for custody of customer assets, VASP internal controls and audits, and assistance from external experts.[65] Moreover, the FSC encouraged VASP-related industry associations to formulate self-disciplinary rules in compliance with the aforementioned *Guiding Directions*, so as to lead VASPs to strengthen internal controls and thereby enhance protections for the rights and interests of their customers. In addition, the *Guiding Directions* confine virtual assets, which can be issued through the platforms, to non-stablecoins first. Should stablecoins be used widely as payment tools, they could influence Taiwan's currency sovereignty, monetary and FX policies, and financial stability. In this view, the management of domestic stablecoins will be discussed as appropriate in the future.

[64] Longevity risk refers to the risk of adverse effects such as insufficient premium income and inadequate reserves resulting from average life expectancies exceeding expectations. Policy surrender risk refers to the risk of policies becoming invalid or being surrendered prematurely.

[65] The *Guiding Directions* consists of 10 items, including (1) management of crypto assets issuance; (2) review procedures for listing and delisting of crypto assets; (3) separate custody of VASP assets and customer assets; (4) transaction fairness and transparency; (5) making contracts, advertising solicitation, and complaints handling; (6) operating systems, information security, and cold/hot wallet management; (7) information disclosures; (8) internal control systems and institutional audits; (9) individual VASPs; and (10) foreign VASPs.

Moreover, after reviewing relevant domestic operational practices and taking reference at regulatory requirements internationally, the FSC issued the *Guidelines for Peer-to-Peer Lending Platform Operators* (hereinafter referred to as the *Guidelines*) in October 2023. The *Guidelines* serve as a reference for P2P platform operators in conducting business, for financial institutions and platform operators in engaging in business transactions, and for consumers in assessing and choosing transaction platforms. The primary scope covered by the *Guidelines* is as follows: (1) stipulating that services provided by a P2P operator may not involve any financial business for which special approval is required, such as accepting deposits or receiving stored funds; (2) risk management mechanisms to be adopted by P2P operators, such as a real-name account system for borrowers and lenders, segregation of P2P operators' own funds from customer funds, control of borrowing caps, and measures to prevent illegal activities; (3) consumer protection measures required of P2P operators, such as a mechanism for confirming the veracity of creditor claims, protection of personal data, information disclosure, security of data transmission, and customer dispute handling mechanisms. Furthermore, in order to assist P2P operators in enhancing their risk management mechanisms and consumer protection measures, the FSC mandates that financial institutions should understand P2P operators' actual situation in operation, assess their risks, and conduct anti-money laundering reviews when engaging in transactions (e.g., deposits, loans, payment services, and fund custody) with them.

3.3.6 The FSC published the core principles and guidelines for AI applications of financial institutions

In recent years, financial institutions have increasingly used AI. Although AI technology brings benefits to financial institutions and consumers, it has also given rise to many problems and risks. Consequently, how to appropriately supervise AI usage to ensure consumer rights and financial stability has become a key issue for supervisory authorities around the world. In order to help financial institutions leverage the benefits of AI technology while effectively managing related risks, international organizations and major central banks have successively proposed regulatory requirements or guidelines for the use of AI by financial institutions. The FSC also published the *Core Principles and Policies for AI Applications in the Financial Industry* in October 2023, which outlined six core principles and eight supporting policies. In December 2023, the FSC released a draft of the *Guidelines for AI Applications in the Financial Industry* based on the aforementioned six principles. The aforementioned draft *Guidelines* lay out the key points and feasible measures to serve as a reference for financial institutions to follow when using AI, so as to encourage them to introduce, use and manage AI systems in the context of controllable risks (Box 2).

Box 2
Potential risks and supervision trends in the use of artificial intelligence (AI) technology by financial institutions

In recent years, financial institutions have increasingly used artificial intelligence (AI). AI technology can effectively improve operational efficiency and customer service experience and thereby benefit financial institutions and consumers, but it may also pose problems such as financial exclusion,[1] privacy infringement, black box operations, high outsourcing concentration and herd behavior, which could affect financial stability. Therefore, while AI technology innovation is encouraged, how to appropriately regulate AI to ensure consumer rights and stability of the financial system has become an important issue for supervisory authorities across the world. The following section briefly describes the benefits and potential risks of AI, introduces the international trends in the supervision of the use of AI in the financial industry, and gives account of Taiwan's policies and guidelines for AI usage in financial institutions devised by referencing international supervision trends.

1. Benefits and potential risks of AI

At present, there is no consistent definition of AI accepted by supervisory agencies around the world. The most commonly cited one is from the Financial Stability Board (FSB):[2] "the theory and development of computer systems able to perform tasks that traditionally required human intelligence." Generative Artificial Intelligence (GenAI), which has been booming recently, refers to related AI systems that can generate content simulating human intelligence. The content in GenAI includes articles, images, audio, videos, and program codes, but it is not limited to the above-mentioned applications.

AI technology can process large amounts of data quickly through strong computing power and produce great benefits such as improving forecasting capabilities, optimizing operations and customizing services. Related applications include automating internal processes, analyzing customer information to provide customized suggestions, and streamlining the processes of customer services through technologies such as facial recognition and image recognition. GenAI technology, which has emerged in recent years, has also brought substantial changes to human life. People are able to obtain results in a very short time by simply inputting their needs and related data into the GenAI system, significantly reducing manual work time.

Although the use of AI technology has many benefits, its applications in the financial

industry may bring about the following potential risks, which, if not properly supervised and managed, could harm financial consumer rights and financial stability.

(1) For financial consumers: There are concerns such as breach of personal privacy, bias or discrimination in prediction results.

(2) For financial institutions: They face risks such as AI black-box operations, unclear responsibilities, and concentration in operations outsourced to a limited number of third-party providers.

(3) For financial markets: AI applications such as high-frequency program trading may cause herd behavior or increase market connectivity.

In addition, "The Global Risk Report 2024"[3] (hereinafter referred to as the Report) released by the World Economic Forum (WEF) in January 2024 listed "AI-generated misinformation and disinformation" as the second largest risk in the world in 2024 and the top risk in the next two years. The Report pointed out that if AI is not properly managed and thus misused, it might cause concerns such as hate crimes and terrorism, loss of job opportunities, crime and cyber-attacks, prejudice and discrimination, and even impact the global political system, economic markets and national security.

2. International supervisory trends in the use of AI in the financial industry

As the use of AI in the financial industry becomes increasingly popular, how to regulate it appropriately to safeguard consumer rights and financial stability has caused greater attention from international organizations and financial authorities around the world. In 2019, the Organization for Economic Cooperation and Development (OECD) first proposed the "Recommendation of the Council on Artificial Intelligence,"[4] listing five important principles, including: (1) inclusive growth, sustainable development and well-being, (2) human-centered values and fairness, (3) transparency and explainability, (4) robustness, security and safety, and (5) accountability. The five principles have been adopted by the G20 members. Since then, international financial organizations have successively issued supervisory recommendations for AI usage by financial institutions, and the EU has passed the *Artificial Intelligence Act*. Major countries have also successively proposed supervisory principles or guidelines for AI applications by taking reference from the recommendations of international organizations.

2.1 International financial organizations proposed principles or recommendations for the use of AI by financial institutions

The International Organization of Securities Regulators (IOSCO) issued a guidance document in September 2021,[5] proposing six supervisory measures for the use of AI by market intermediaries and asset management institutions. The six measures included requiring financial institutions to: (1) establish appropriate governance, control and supervision structures; (2) continuously monitor the development, testing, operation and performance of AI; (3) ensure that personnel have sufficient knowledge, skills and experience to use and supervise the outputs from AI systems; (4) understand their dependence on third-party AI service providers and establish appropriate management and supervision mechanisms; (5) provide sufficient transparency and information disclosure to investors, competent authorities and stakeholders; and (6) establish appropriate control mechanisms to ensure that bias in data and system performance is minimized.

Moreover, the Financial Stability Institute (FSI) under the BIS released an AI supervision report in August 2021,[6] recommending that financial supervisory agencies should adopt AI-related supervision measures based on four principles: (1) transparency, (2) trustworthiness and soundness, (3) accountability, and (4) fairness and ethics, and should consider proportionality. The report also recommended that the use of AI in the financial sector should be divided into two categories based on whether it interacts with customers. For AI systems that face customers, supervisory agencies should adjust the intensity of supervision based on the systems' impacts on consumers (for instance, chatbots have a lower impact and credit scores have a higher impact). If AI systems do not face customers, supervisory agencies should strengthen supervision of systems requiring approval (such as statutory capital adequacy assessment), while adopting moderate supervision of those without requirement (such as internal operations).

2.2 Major countries/regions published supervision principles or guidelines for AI applications in the financial industry

In December 2023, the EU passed the *Artificial Intelligence Act*,[7] dividing AI systems into four supervision levels according to risk levels. The government can supervise AI systems with specific risk levels when necessary and should appropriately retain space for technological innovation. The four supervision levels are as follows: (1) unacceptable risk level, (2) high risk level, (3) limited risk level, and (4) low risk level: not subject to mandatory regulation.

Many developed countries or regions, such as the US, the UK, Singapore, Hong Kong, France, and the Netherlands, have issued relevant principles or guidelines for AI applications in the financial sector, taking into account the recommendations of

international organizations. These guidance documents include five common principles: (1) reliability and robustness, (2) accountability, (3) transparency, (4) fairness, and (5) ethics. The first three principles are similar to the traditional model supervision concepts, allowing supervisory agencies to fine-tune based on the standards of traditional models. The principles of "fairness" and "ethics," whose concepts are to prevent AI models from producing discriminatory or biased results, may require newly-formulated standards. Moreover, "data privacy," "third-party dependency," and "operational resilience" are also key concerns in many guidance documents.

In addition, in order to establish a risk management framework for the use of GenAI in the financial industry, the Monetary Authority of Singapore (MAS) released an executive summary of the "Emerging Risks and Opportunities of GenAI for Banks" whitepaper in November 2023,[8] which is the world's first guidance document for GenAI applications in the financial industry. The whitepaper covered seven dimensions of risks while using GenAI in the financial industry: (1) fairness and bias, (2) ethics and impact, (3) accountability and governance, (4) transparency and explainability, (5) legal and regulatory, (6) monitoring and stability, and (7) cyber and data security, aiming to enable the banking industry to use GenAI in a responsible manner. The MAS will gradually apply the seven-dimension risk framework to the entire financial system in the future.

3. Taiwan's FSC also looked at related international principles and published the core principles and guidelines for AI applications in the financial industry

According to a survey conducted by the FSC in May 2023, about 36% (63 financial institutions) of the 175 financial institutions surveyed have adopted AI technology. The application fields included customer relationship management (such as intelligent customer service), risk management and legal compliance (such as suspicious transaction analysis), process optimization (such as back-office process automation), and data analysis. As for GenAI applications, most financial institutions and related units were in the evaluation stage. Only a few planned to introduce GenAI into their financial business or internal operations, but these plans have not yet been officially executed.

In order to assist financial institutions leverage the advantages of AI technology and effectively manage potential risks therefrom, the FSC, taking into account the recommendations of international organizations such as the OECD, released the *Core Principles and Policies for AI Applications in the Financial Industry* in October 2023,[9] which outlined six core principles for the use of AI in the financial industry, including: (1) establishing governance and accountability mechanisms; (2) emphasizing fairness and

human-centric values; (3) safeguarding privacy and customer rights; (4) ensuring system robustness and security; (5) emphasizing transparency and explainability; and (6) promoting sustainable development. The document also included eight supporting policies, such as formulating guidelines, adjusting regulations, and supervising the development of self-regulatory norms.

In addition, the FSC further issued a draft of the *Guidelines for AI Applications in the Financial Industry* (hereinafter referred to as the *Guidelines*) in accordance with the six core principles mentioned above in December 2023. Based on the AI life cycle[10] and the assessed risks, the *Guidelines* proposed key concerns and feasible measures so as to encourage financial institutions to introduce, use, and manage AI systems under the premise of controllable risks. The regulatory direction of the *Guidelines* is broadly the same as the FSI and IOSCO recommendations and the practices of major countries. The FSC also called for relevant associations in the financial industry to formulate new self-disciplinary rules for AI by consulting the FSC's *Guidelines*, or to incorporate the concept into their existing rules.

4. Conclusion

AI technology has great potential in improving the efficiency of financial services, promoting financial inclusion, and deepening customer relationships. However, it should be used properly, and potential risks need to be sufficiently addressed to safeguard consumer rights and financial stability. In response to the increasing influence of AI on the financial system, the FSC has taken into account the recommendations of international organizations and the practices of major countries to gradually strengthen the supervision of AI usage in the financial industry. Based on macro-prudential supervision purposes, the Bank will continue to pay close attention to the development of international supervision, and study and analyze the application and possible impact of AI in the domestic financial industry to ensure a balance between the benefits and risks of AI applications so as to maintain sound development of the financial sector.

Notes: 1. Financial exclusion refers to the phenomenon of economically disadvantaged groups being unable to access mainstream financial products and services. Take credit granting for example: groups that are underrepresented in the AI model dataset may find it difficult to obtain a favorable credit score because the model has learned that these applicants did not obtain enough loans in the past.

2. FSB (2017), "Artificial Intelligence and Machine Learning in Financial Services," November.

3. WEF (2024), "The Global Risks Report 2024," January.

4. See OECD (2019), "Recommendation of the Council on Artificial Intelligence," May. In May

2024, the OECD proposed an updated version. See OECD (2024), "Recommendation of the Council on Artificial Intelligence," May.

5. IOSCO (2021), "The use of artificial intelligence and machine learning by market intermediaries and asset managers," September.
6. Jermy Prenio and Jeffery Yong (2021), "Humans keeping AI in check – emerging regulatory expectations in the financial sector," *FSI Insights on policy implementation No. 35*, BIS, August.
7. Council of the European Union (2024), "Artificial Intelligence Act," January.
8. MAS (2023), "Emerging Risks and Opportunities of Generative AI for Banks – Executive Summary," November.
9. FSC (2023), "Core Principles and Policies for AI Applications in the Financial Industry," October.
10. The life cycle of an AI system can be divided into four stages: (1) system planning and design, (2) data collection and input, (3) model establishment and verification, and (4) system deployment and monitoring.