



ธนาคารแห่งประเทศไทย
BANK OF THAILAND

Directions for Development of Payment Systems under the Financial Landscape of Thailand

Payment Directional Paper



September 2025

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What success looks like

1. Executive Summary

The Bank of Thailand [BOT] has developed this Payment Directional Paper to set the strategic direction of Thailand's payment system in alignment with both the domestic and global developments. The BOT continues to transition towards digital payment as the primary choice, driving the Thai economy in all sectors –from grassroots to businesses and international trade. The directions also aim to support all service providers, financial institutions, non-financial institution [non-bank], FinTech companies, in leveraging technology to develop diverse innovative financial products and services that meet the needs of all user segments, while utilizing data for further benefits beyond payment—for example, to improve access to credit, facilitate financial planning, investment, and insurance tailoring to user behavior.

Digital payment usage in Thailand has continued to accelerate, particularly through mobile banking and PromptPay, which support account-to-account [A2A] transactions. Meanwhile, cash usage has declined significantly, reflecting global trends. The BOT places importance on and is preparing to address key policy challenges including: [1] Thailand's economic structure which features a sizeable informal sector where cash remains dominant. Transactions are often unrecorded, and the overall readiness for digital transition is limited. [2] The need to adapt to emerging technologies such as Distributed Ledger Technology [DLT], tokenization, and Artificial Intelligence [AI], which may introduce new types of risks. [3] Safeguarding payment systems against fraud and misuse including their potential exploitation for illegal activities. Moreover, addressing geopolitical risks is becoming increasingly severe.

The strategic key directions for payment system development over the next 3–5 years are as follows:

1) Leveraging on the existing infrastructure by enhancing PromptPay, the main payment system in Thailand, to support the development of new innovations and services. This will be complemented by efforts to promote availability and interconnectivity of sufficient data to enable diverse data utilization. The regulatory framework will be designed to foster innovation while ensuring alignment with appropriate risk levels [risk proportionate]. At the same time, the efficiency of cash management across the system will be improved to reflect the declining role of cash.

2) Modernizing BAHTNET by uplifting technical foundation of Thailand's systemically important payment system [BAHTNET] to ensure high resiliency and adaptability to technological advancement and emerging risks. The upgrade will also enhance business capabilities to better support payment innovation.

3) Paving the way for future payment by carefully balancing financial stability and innovation. The BOT recognizes the potential benefits of payment instruments that leverage technologies such as DLT and tokenization, while remaining vigilant about associated risks to users and the financial system – particularly risks related to threats to singleness of money, potential misuse for money laundering or fraud, and insufficient user protection. Accordingly, the BOT is establishing regulatory clarity for tokenized money within a robust risk management framework and is developing infrastructure capable of supporting new forms of payment and evolving technologies.

Through this development framework, the future of Thailand's payment system is envisioned to be greater trustworthiness, stability, security, and efficiency. It will also promote economic inclusion, across both payment and financial services, enabling businesses and the public to confidently transition to the digital system. This transformation will drive resilient and sustainable economic growth within Thailand's financial landscape.

Directions for the Development of Payment Systems in Alignment with Thailand's Context



2. Introduction

Payment systems globally have rapidly transitioned into the digital era over the past decade, bringing significant advancements and becoming an integral part of people’s daily lives. Consumers now enjoy a wider range of payment options. The number and diversity of service providers have also increased—including banks, non-banks, and fintech— competing to deliver seamless, convenient, and secure payments, with user-centric solutions designed to address the distinct needs of retail users and businesses. Wholesale payments have also evolved, with greater stability, resilience, and innovation, which is reflected in the growing number of central bank digital currency [CBDC] pilots worldwide, along with ongoing efforts to enhance cross-border payment connectivity.

Technological advancement is a key driver of payment service development. Emerging technologies such as DLT and tokenization are increasingly recognized for their potential to enhance payment system efficiency. **However, applying these innovations may introduce new forms of risk**—potentially affecting users, enabling fraudulent activities, or posing threats to financial system stability. It is therefore essential to conduct a comprehensive assessment of both the benefits and potential impacts of these innovations. Appropriate regulatory oversight is needed to ensure that technology adoption remains safe and beneficial, striking a balance between innovation and risk management.

Digital payments are evolving beyond “transfer-receive-pay” functions, increasingly generating value for users through payment data that serve as reliable digital footprints. Financial institutions and e-commerce platforms are leveraging these data to design more tailored financial services—such as behavior-based micro lending and personalized product recommendations. Expanding the use of digital footprints within the financial system can significantly improve access to financial services, particularly for individuals and SMEs previously underserved. This development is an important enabler of a fully integrated smart economy.

While digital payment adoption is growing, cash remains in use across many countries. In jurisdictions where cash usage has declined significantly, governments have implemented policies to ensure continued cash access—particularly for vulnerable groups who still rely on cash, thereby supporting inclusive access to payment services. As cash usage continues to fall, efficient cash management is becoming increasingly important in this context.

The BOT recognizes the importance of preparing Thailand’s payment system for the future—ensuring it keeps pace with global developments while remaining aligned with the country’s economic and social context. A well-functioning payment system is expected to play a key role in expanding access to financial services, supporting the transition toward a digital economy, and fostering sustainable growth in line with Thailand’s financial landscape.

8 Statistics from 8 Years of Digital Payment¹

Over the past eight years, following the launch of PromptPay services in 2017, Thailand's payment system has undergone the following key transformations.



¹Remark:

1/ Annual data as of July 2025 compared to the Year 2017

2/ Mobile/ Internet banking: A2A [account-to-account] fund transfer and payment transactions conducted by individuals and businesses via mobile or internet banking platform, such as PromptPay fund transfer and bill payment

3/ e-Money: fund transfer and payment transactions using prepaid money stored in electronic wallet including fare cards, gift cards, e-wallet application

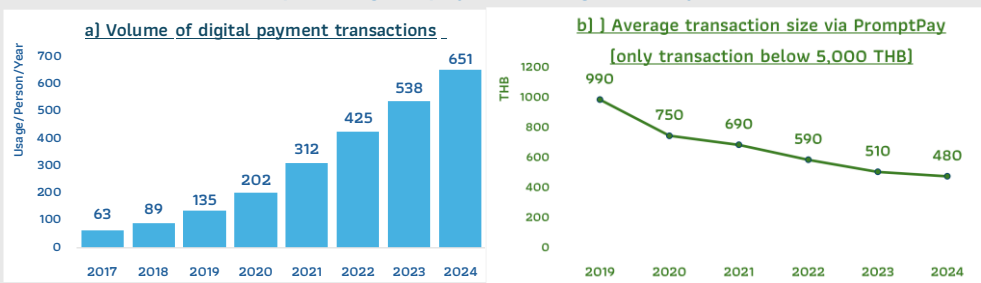
4/ Card: Transactions using debit and credit cards issued by domestic card issuers for the payment of goods and services, both domestically and internationally

5/ Electronic Payment Terminals includes electronic data capture [EDC] terminals, e-money terminal, and QR code payment points that are actively used at least once per month [Active QR Code]

3. Development of Thai's payment system

The BOT, in collaboration with public and financial sectors, continues to promote digital payments as a primary method of payment, advancing Thailand's transition toward a less-cash society. Accelerated by the COVID-19 pandemic and government measures that increasingly emphasized digital channels, digital payment usage has continued to grow—even post-crisis. Both consumers and businesses have shifted their daily behaviors toward greater use of digital payments, including more frequent online purchases. This trend is reflected in the decline of point-of-sale cash transactions² to 54% of total transaction value in 2023, down from 63% in 2021, alongside higher transaction frequency and increased usage for low-value payments. However, certain groups such as the elderly, low-income individuals, and those engaged in traditional activities like religious donations, giving money as a festive tradition, or purchases at fresh market, still prefer to use cash.

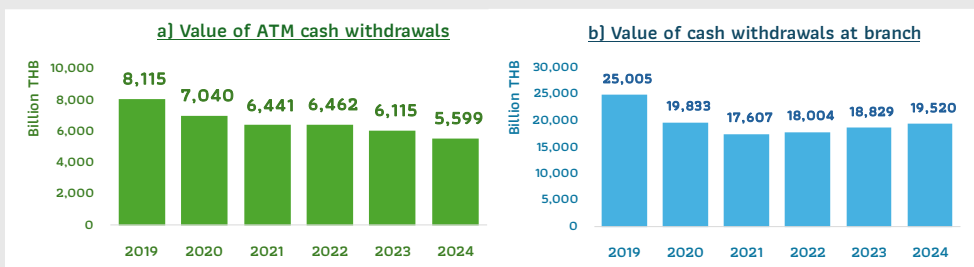
Graph 1: Digital payment usage in daily life



In 2024, the average yearly number of digital payment transactions per capita rose to 651 per year (around 1.8 times per day). In addition, 95% of transactions processed through PromptPay were valued below THB 5,000 with the average transaction size declining to THB 480, indicating greater use of digital payments in daily life.

Although cash usage for payments and ATM withdrawals has continued to decline, overall cash in circulation remains high. Notably, cash withdrawals at bank branches have increased over the past 3 years, with more than 65% of withdrawal value consisting of transactions exceeding THB 1 million—likely reflecting precautionary cash holdings or cash usage outside the formal system. Moreover, cash management entails significant costs in several areas such as storage, transportation, and banknote quality sorting. As cash usage as a means of payment declines while cash remains abundant in the system, the cost per transaction continues to rise, underscoring the need for more efficient cash management.

Graph 2: Cash withdrawal behavior



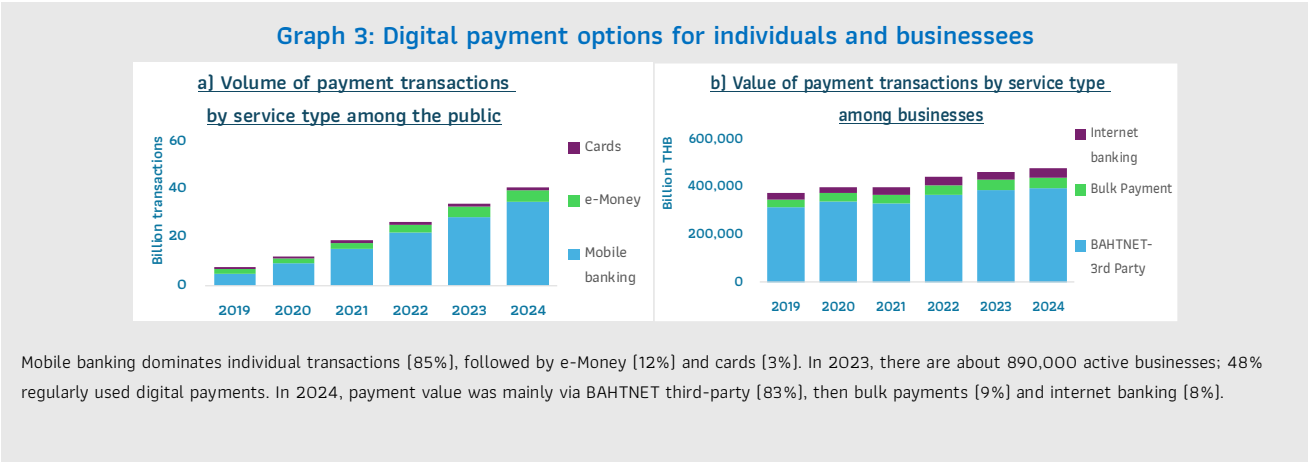
From 2019–2024, the value of ATM cash withdrawals fell by an average of 7.2% per year, with an 8.4% decline in the most recent year. The value of cash withdrawals at branch initially declined but has increased over the past three years by an average of 4.1% per year.

² Data from the 2023 Payment Diary, conducted by the Bank of Thailand, surveying payment behavior of the population using statistical random sampling to ensure national representativeness. Participants recorded their actual daily spending transactions for 3–7 days, following the same approach adopted by many central banks to study payment behavior.

The volume of digital payment usage among the public has grown significantly, with more than 85% using mobile banking for A2A (account-to-account) transactions. Most of these transactions are processed through the PromptPay system, the country’s payment infrastructure, with commercial banks serving as the primary service providers. Non-bank entities have also expanded their role, accounting for 12% of digital payment volume through e-Money services, often integrated with their own e-commerce platforms and offering additional services such as Buy Now Pay Later (BNPL) and in-app fractional investment features. In contrast, credit card usage has shown modest growth, and debit cards remain less popular.

Thailand has also advanced cross-border payment connectivity by enabling QR code payments with more than 10 countries through PromptPay. These linkages—through system integration with service providers partnerships—facilitate payments for both Thai users and foreigners, particularly from countries with close labor and tourism ties to Thailand such as Malaysia, Singapore, Japan, and South Korea. The development of tourist wallets further enables tourists to make QR code payments while in Thailand. Although cross-border QR payments grew by 4.5 times year-on-year, overall usage remains low compared to other payment methods such as credit cards.

Digital payment usage among businesses has continued to grow, particularly among medium- and large-sized enterprises that utilize a range of services such as BAHTNET third-party, bulk payment, and internet banking. However, adoption remains low among small businesses, and SMEs which still rely heavily on cash and paper cheques-often due to tax concerns and the use of cheques as collateral. This reliance generates hidden costs for the system, including transportation and storage of cheques, while cash usage results in high operational cost and a lack of reliable financial data. Consequently, fewer than half of SMEs can access formal business credit³, highlighting the gap in promoting digital payments and leveraging payment data to enhance financial services that better meet the needs of the business sector.



³ Credit data from the Bank of Thailand’s database and SMEs figures from the Office of Small and Medium Enterprises Promotion [OSMEP]

4. Challenges of the Payment System in Thailand's Context

Setting the strategic direction for Thailand's payment system requires a comprehensive assessment of both domestic and global contexts including user behavior, the structure of the Thai economy, and international developments. The BOT has identified key issues and is actively preparing to address anticipated changes, as outlined below.

4.1 Transformation into a Digital Economy

Promoting digital payments and advancing digital transformation are key priorities, building upon the policy direction under Thailand's Financial Landscape. Digital payments play an important role in enhancing financial inclusion, particularly for individuals and SMEs. They facilitate participation in the digital economy by improving overall economic efficiency and helping create a meaningful digital footprint. This footprint, which reflects the behavior of individuals and businesses, can serve as credible evidence to expand opportunities for accessing to financial services—with users' consent.

However, **Thailand's large informal economy—where cash remains dominant and transactions are often unrecorded—poses significant challenges to the digital transition.** The lack of verifiable data in the system limits SMEs' access to credit and financial services, creates opacity, generates hidden costs, and fails to reflect actual economic value. It also constrains the availability of reliable data required for effective and targeted government policy planning.

Concurrently, **the incomplete digitization of trade and payment processes presents another key challenge in Thailand's transition to a digital economy.** Contributing factors include: **[1] services that do not fully meet business needs and uneven levels of digital readiness across firms**—due to capital and technological constraints—resulting in fragmented processes ranging from paper-based documentation and cash payments to disconnected digital platforms, thereby increasing operational costs, **[2] a lack of standardized digital trade data,** which prevents interoperability across different systems and leads to data being fragmented among businesses and service providers, limiting its broader usefulness, and **[3] misperceptions that digital transactions would be subject to stricter regulatory scrutiny and lead to higher tax burden,** causing some SMEs to avoid making transactions through digital channels.

Despite these challenges, Thailand already possesses diverse trade and payment infrastructures. Strengthening the connectivity and interoperability of existing platforms can reduce complexity and unlock the full potential of available data to support more efficient and inclusive financial services.

4.2 Emerging Technology

Innovation in the payment system has advanced rapidly, aiming to enhance efficiency in meeting the diverse needs of users, while also improving security and speed of service. Recently, the application of DLT and tokenization has begun to play a significant role in the payment as they can enhance services across multiple dimensions: [1] improved payment efficiency by reducing transaction time, costs, and reliance on intermediaries; [2] enabling programmability, which allows pre-defined conditions to be embedded into transactions and more tailored and flexible payment use cases; [3] enhancing transparency in the storage and auditability of transaction data; [4] supporting atomic settlement, a new mechanism that enables simultaneous and instantaneous settlement of both money and assets under a Delivery versus Payment [DvP] framework. Use cases such as cross-border remittances, programmable payments, and inter-institution settlements demonstrate the growing role of these technologies. Their integration is expected to further transform the landscape of financial transactions in the future. However, they may also introduce new risks, such as the absence of custodial accountability, lack of user fund protection, and potential misuse for illicit activities⁴—requiring the establishment of appropriate regulatory safeguard.

Additionally, **emerging technologies like AI and quantum computing are also shaping the development of payment system.** AI is increasingly applied in behavioral analytics, anomaly and fraud detection, and personalized financial services offerings. Though still nascent, quantum computing has the potential to redefine encryption standards in the future. While these technologies offer significant opportunities for innovation, they also introduce new risks—such as highly realistic phishing content generated by generative AI, automated scams that are harder to detect, and the possibility of rapid decryption of traditional encryption by quantum computing.

To ensure a secure and innovation-friendly ecosystem, Thailand’s payment system must strike a balance between supporting technological advancements and managing risk management. This requires upgrading payment infrastructure, standards, and regulatory frameworks to enable seamless, stable, and inclusive service delivery that enhances user confidence and accommodates the diverse needs of all users.

4.3 Risk in the Payment System

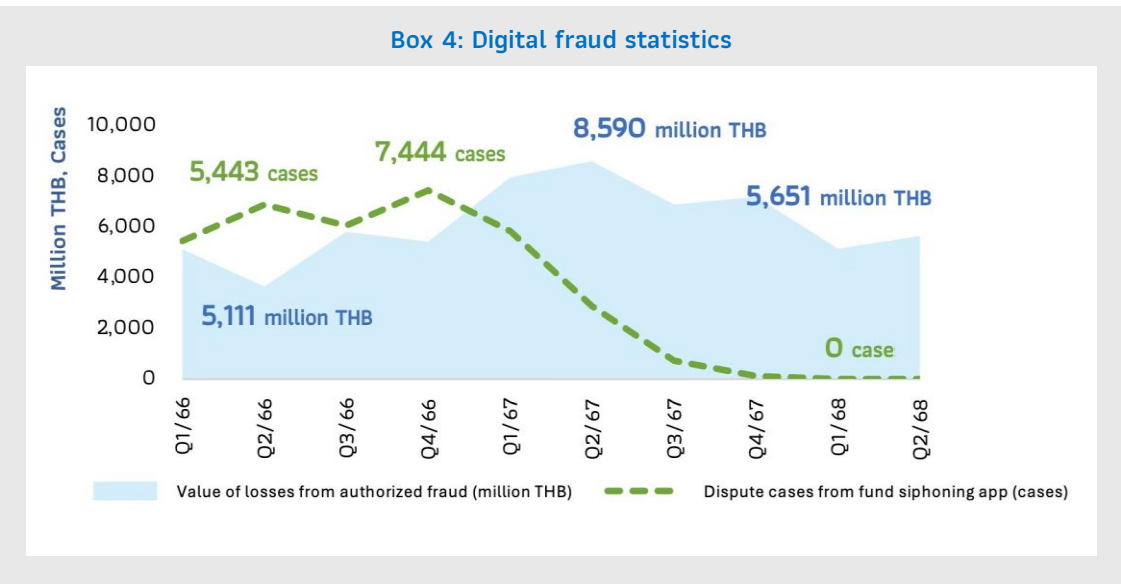
The BOT closely monitors key risks in the payment system to ensure stability, efficiency, and service continuity—thereby maintaining trustworthiness among consumers and businesses. Critical risks that could disrupt payment systems or financial institutions include IT and operational risk, settlement risk, and emerging technology risk. These risks may increasingly affect

⁴ Illicit activities (for example: money laundering, bribery)

users and are likely to intensify as technologies advance and business models become more complex, posing ongoing regulatory challenges to ensure continuity of system development.

Thailand's payment system also faces risks of being exploited for fraudulent activities, including unauthorized payment fraud, in which fraudsters impersonate customers to conduct transactions, authorized payment fraud, in which customers are deceived or coerced into transferring funds to scammers. Such incidents have caused widespread harm to the public and have adversely affected the overall economy. In response, the BOT, in collaboration with relevant agencies, has implemented urgent measures, while service providers have strengthened their systems' security, resulting in zero losses from money-siphoning applications. However, losses from authorized scams remain high, averaging approximately THB 5 billion per quarter in 2025. The BOT must therefore impose additional regulations to protect consumers and support fund recovery, while maintaining an appropriate balance between transaction convenience and security.

Going forward, the BOT will further enhance its fraud management framework to address financial fraud more effectively, particularly by leveraging technology to strengthen prevention, detection, and response to irregular financial activities. This includes developing detection systems that utilize deep data from financial service providers, interbank transaction data, and the Central Fraud Registry [CFR]⁵ to identify suspicious transactions and abnormal account activity in real time, as well as upgrading the CFR to enable faster fund tracing and blocking through the use of Application Programming Interface [API] integration and automation, thereby improving the efficiency of recovering funds for victims. Nonetheless, as fraudsters continuously evolve their tactics and techniques for scamming and money movement, a key challenge is ensuring that service providers consistently strengthen their fraud prevention and incident response capabilities to effectively counter new and emerging threats in a timely manner.



⁵Central Fraud Registry [CFR] is a system for exchanging financial transaction route information among financial service providers, enabling every subsequent receiving financial institution to be informed and to suspend the transaction.

Cash and digital assets may be exploited for illicit activities due to limitations in traceability and oversight. Investigations have shown that many grey-market businesses are closely linked to cash usage. Meanwhile, digital assets—capable of rapid, cross-border transfers without intermediaries and often difficult to trace—pose increasing risks of being used for unlawful or fraudulent activities.

Geopolitical risk is another critical concern globally. It may affect the continuity of Thailand's payment systems that rely on or connect to foreign networks, such as international card schemes and cross-border payment and remittance systems. Service disruptions could affect financial institutions, businesses, and individuals who depend on these services. While foreign systems provide modern technology, innovation, and strong security features that enhance Thailand's payment infrastructure, it remains essential to prepare for potential disruptions in order to ensure resilience, stability, and operational continuity in Thailand's payment system.



5. Key Policy Directions

Challenges arising from both external and domestic factors, along with Thailand's unique context, have shaped the future direction of Thailand's payment system. The BOT remains committed to strengthening the stability and security of the payment system while promoting inclusive access to both payment services and broader financial services. Over the next three to five years, the BOT will focus on the following three key policy directions.



5.1. Leveraging on the existing infrastructure

5.2. Modernizing BAHTNET

5.3. Paving the way for future payment

5.1

Leveraging on the existing infrastructure



5.1 Leveraging on Existing Infrastructure

Green Line

- ✓ 1. Digital payment becomes a primary option, enhancing speed and convenience, reducing costs, and promoting transparency in the payment system.
- ✓ 2. Thailand's payment system is efficient, stable, and secure, meeting international standards and fostering public and business confidence.
- ✓ 3. Payment systems and services are continuously evolving to meet user needs and remain responsive to future changes.
- ✓ 4. Payment data is instrumental in enhancing access to financial services and credit, and in supporting government policy measures aimed at assisting SMEs through standardized and trustworthy digital footprint.

Red Line

- ✗ 1. Imposed service conditions adversely affect small merchants and the basic needs of consumers, and may hinder digital payment adoption—for example, abrupt service changes or fee adjustments made without proper impact assessment.
- ✗ 2. Regulatory mechanisms are ineffective in managing risks that undermine public trust, and payment systems have been misused for illicit activities.

5.1.1 Enhanced PromptPay

PromptPay plays a critical role in payment transactions across the public, government, and business sectors. It is designated as a Systemically Important Retail Payment System [SIRPS], requiring strengthened development and oversight to ensure robust risk management and to establish key enablers that support long-term service innovation. The BOT will focus on two priority areas:

1) Supporting system and service enhancement to align PromptPay with international standards. This includes safeguarding against emerging risks and preventing misuse of payment systems for illegal activities, as well as strengthening PromptPay's readiness for cross-border connectivity to facilitate economic activity and promote tourism. Key improvements may include enhancing risk management mechanisms, such as ensuring a clear separation between transaction types [i.e., transfers and payment], and adopting standardized Merchant Category Codes [MCC] to help service providers classify merchant types and mitigate risks of misuse.

2] Promoting innovation in services and products on PromptPay to better meet diverse user needs—for example, enabling payment services that help to ensure secure online purchases and replacing inefficient legacy payment methods like paper cheques. This requires upgrading system rules and standards to support broader utilization, foster competition, and encourage innovation including:

[1] Access Criteria: access to PromptPay should not be limited only to banks. High-quality and capable payment service providers that meet defined criteria—such as strong security capabilities, effective risk management, and adequate consumer protection mechanisms—should be allowed direct system access. This will help prevent risks to service providers, users, and PromptPay’s stability, while encouraging broader participation in the ecosystem.

[2] Fee structure: It is essential to ensure fair and market-based fee structures which could reflect reasonable service costs, enable service providers to maintain business viability while retaining incentives to innovate and improve more services that deliver greater value to the public. At the same time, fees must not impose a burden on small merchants or consumers’ basic needs. Any fee adjustments should also consider appropriate timing to minimize potential disruption.

Examples of global innovations in fast payment⁶

 Escrow service A financial arrangement where a trusted third party securely holds funds until all agreed transaction conditions are met.	 Cross bank direct debit & recurring payment Automatic deduction of funds from an account in one bank to make payments or transfers to an account in another bank.	 Account based NFC payment Tap-to-pay using NFC technology, where payments is directly linked to a bank account.
 Installment payments Payments made in scheduled installments over a set period.	 QR payment with CBDC A payment method using QR codes that support transactions from both bank accounts and central bank digital currencies (CBDC).	 Biometric payment a payment authenticated using biometric data e.g. fingerprint, palm, eyes.

5.1.2 Enhanced Data Utilization

The BOT aims to foster an ecosystem that supports the systematic, secure, and non-fragmented use of digital transaction data across all business segments, under principles of personal data protection and explicit user consent.

This includes strengthening the integration of payment data, trade data, and financing through trusted infrastructure [trusted source] to enhance business efficiency and facilitate businesses in utilizing digital data generated from their operations. Such integration will support

⁶ A fast payment system refers to a system that enables funds to be transferred from one account to another instantly (in real time) or nearly instantly (near real time), operating 24 hours a day, every day, including weekends and public holidays. An example is the PromptPay system.

better liquidity management and facilitate access to a broader range of credit and financial services to businesses such as invoice financing and supply chain financing, as well as support government SMEs-assistance policies . Key initiatives include:

[1] Developing an integrated trade and payment platform that provides end-to-end services by leveraging existing infrastructure—such as PromptBiz⁷ to improve usability for businesses. This will help small enterprises collect payments and reconcile transactions more conveniently and efficiently, reducing time and operational costs while ensuring complete linkage between trade and payment data.

[2] Collaborating with government, businesses, and platform providers to explore a way to establish common standards for business processes, data formats, data interoperability, and consent management, enabling fragmented or heterogeneous trade data to be seamlessly connected.

[3] Promoting widespread adoption of platforms and standards through government-led incentive measures to drive participation among all stakeholder groups.

To further expand the utilization of digital trade and payment data in alignment with the evolving financial landscape, it is essential to recognize that such data represent critical insights into the origin and nature of income and expenditures, as well as the users' financial behavior. Strengthening the circulation and accessibility of such data will enhance their effective use across relevant sectors. Expansion efforts will focus on two mechanisms: [1] Consent-based data exchange procedure [under Your Data⁸ project] and [2] Big data integration across multiple sources governed by strong data governance frameworks, enabling service providers and agencies such as National Credit Guarantee Agency [NaCGA⁹] to assess user behavior and risk, and to develop more inclusive financial services, especially for underserved individuals and SMEs.

A complete digital footprint and a comprehensive data ecosystem, combined with appropriate risk management, will help enhance access to credit for SMEs. This will enable the development of more tailored financial products, strengthen business competitiveness, and improve overall credit quality, thereby reducing systemic financial risk. Collectively, these factors will serve as a strong foundation for building an economy that is resilient, transparent, and capable of supporting sustainable economic growth.

⁷ PromptBiz: A unified financial infrastructure for cross-bank digital transmission of trade and payment data in business processes.

⁸ Your Data Project: A project initiated by the BOT and relevant agencies to create a mechanism that allows service users to exercise their right to share their own data—held by financial service providers and other entities—with providers of their choice through secure and convenient digital channels. This enables users to access more tailored financial services, such as loan applications and personalized financial management.

⁹ National Credit Guarantee Agency (NaCGA): A collaborative initiative from between the BOT and the Ministry of Finance.

5.1.3 Enabling Regulation

Fostering the development of financial services and innovation requires more than open infrastructure—it also demands adaptive regulatory framework. To ensure access to diverse, convenient, secure, and high-quality financial services, regulatory guidelines must evolve in tandem with rapidly changing business models and financial technologies. A holistic approach to regulation is essential for unlocking innovation across the ecosystem.

The BOT will undertake a comprehensive review of the regulatory framework and processes governing payment service providers—from licensing through business exiting. Key enhancements include aligning supervisory requirements with risk proportionality to enhance business agility and facilitate market entry for capable providers, while maintaining robust risk management and user protection. BOT’s approach draws on global best practices which may include:

- **License restructuring** to allow multiple services under a single license, reducing process redundancy and improving operational flexibility.
- **Expanding the scope for e-money providers** to allow offering related payment services, subject to adequate risk controls and financial soundness.
- **Enhancing the regulatory sandbox mechanisms for more efficiency**, for instance, broadening technology eligibility and enabling more flexible testing timelines suited to each provider, thereby supporting better post-sandbox business planning, and promoting innovations that are aligned with BOT policy priorities [e.g., improving SMEs’ access to credit and liquidity].
- **Strengthening ongoing supervision and enforcement** through faster, more effective and risk-based oversight calibrated to the nature, scale, complexity, and risk profile of each business.

Given the rapid advancement of emerging technologies such as AI and quantum computing, which are increasingly shaping financial services, the BOT will explore appropriate regulatory approaches to risk management in their application to financial and payment services. This covers considerations related to governance and cybersecurity, including impact assessments on the payment system, and the development of policy and supervisory frameworks that ensure safe and responsible adoption of new technologies.

New technologies that increasingly play an important role in financial services



1. Artificial Intelligence: AI

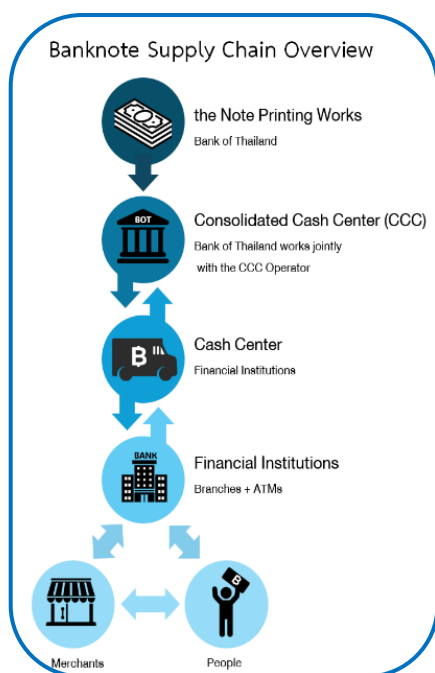
AI enhances the efficiency of digital financial systems—whether through deep data analytics, anomaly detection in transactions, or improvements in risk management frameworks. However, it also poses risks when misused, such as the creation of deepfakes for fraud, increasingly realistic phishing schemes, and automated scams that are difficult to detect.



2. Quantum Computing

Quantum computing, though still in its early stages, is poised to redefine encryption standards. Its ability to rapidly break traditional cryptographic methods could compromise the security of financial transactions—from everyday transfers to cross-border payments.

5.1.4 More Cost-effective Cash Management System



BOT promotes digital payments as the primary payment option to enhance system efficiency, reduce costs, and improve transparency, which may also help mitigate risks associated with the use of cash in illicit activities. While cash remains widely circulated, the growing adoption of digital payments has gradually diminished its role. Some population groups have shifted from using cash as their main payment method to using it as an alternative. Inefficiencies persist across various aspects of cash management, and the declining use of cash has further increased per-transaction cash handling costs, prompting cash-related service providers to improve efficiency and adapt to market dynamics—such as consolidating service points, centralizing cash operations, and adjusting fees for better reflection of actual costs.

The BOT is committed to enhancing the efficiency of cash production and management throughout the entire lifecycle—from printing to distribution. This includes ensuring the optimal circulation of high-quality banknotes before issuing new ones and promoting shared infrastructure to reduce duplication in cash management processes, such as establishing a Consolidated Cash Center [CCC] to streamline banknote sorting and distribution, and promoting the use of White Label Smart Machines [WSM¹⁰] to improve ATM service efficiency and reduce redundancy in cash handling.

At the same time, the BOT continues to oversee and monitor the adequacy and accessibility of cash, particularly for vulnerable groups for whom cash remains a critical payment medium in emergency situations where digital payments may be unavailable such as power outages, network failures or natural disasters. The BOT also monitors service providers to ensure that any fee adjustments are implemented with appropriate timing and reasonable principles, avoiding undue burden on vulnerable populations and essential consumption. At the same time, the BOT supports reducing unnecessary cash usage by promoting digital payments as a more efficient alternative, especially for high-value transactions and payments by businesses and government entities.

¹⁰ A White Label Smart Machine (WSM) is an electronic cash withdrawal and deposit machine operating under the service provider's business branding. It allows bank customers to deposit, withdraw, and check account balances across all banks. For the public, WSMs function just like conventional bank ATMs, offering the same range of basic cash services regardless of the customer's bank.

5.2

Modernizing BAHTNET



5.2 Modernizing BAHTNET

BAHTNET—the Bank of Thailand Automated High-value Transfer Network—is Thailand’s Real-time Gross Settlement [RTGS] system operated by the BOT and has served as a significant mechanism supporting financial stability for over 30 years.

As the technological landscape and risk environment continue to evolve, the **BOT recognizes the need to modernize BAHTNET to enhance its resilience and technological adaptability. This transformation aims to support innovation, expand payment services that meet user needs and strengthen the system’s ability to manage emerging risks** under both current and long-term conditions. Given Thailand’s continued reliance on fiat money within the payment system, the RTGS infrastructure remains essential for inter-institution settlements that require central bank money to safeguard financial stability. At the same time, the next phase of RTGS development should be designed to accommodate emerging forms of payment beyond traditional currency. The BOT’s development of the BAHTNET system will be guided by the following principles:

Green Line

- ✓ 1. Resilient and adaptable to technological changes and future risks, ensuring continuous service under both normal and crisis conditions.
- ✓ 2. Effectively supports business payment operations.
- ✓ 3. Enhances capability to accommodate payment innovations and technologies.

Red Line

- ✗ 1. Unable to provide continuous service or keep pace with technological changes, resulting in widespread disruption and undermining confidence in the payment system and financial stability.
- ✗ 2. Failing to adequately support emerging developments and innovations.

5.2.1 Uplifted Technical Foundation:

To ensure that BAHTNET functions as a resilient and future-ready payment infrastructure capable of operating seamlessly under both normal and crisis conditions, the system must be designed with flexibility to adapt swiftly to change and support the evolution of payment services. Key strategic initiatives include:

[1] Rearchitecting the system to enhance adaptability and problem-solving capabilities. This includes boosting service capacity to accommodate the growing digital payment volumes and enabling interoperability with other infrastructures across the broader ecosystem.

[2] Strengthening risk management capabilities, particularly in response to emerging risks—such as implementing multiple-site functionality to support operations across various locations, improving system recovery speed through parallel operations across multiple data centers, reducing reliance on international networks, and preparing for advanced cyber threats; for example, incorporating post-quantum cryptography arrangements, a new encryption technology designed to withstand attacks from quantum computers.

5.2.2 Enhanced Business Capabilities:

To elevate payment capabilities for the business sector and strengthen the system's capability to accommodate payment innovations, the BOT will pursue the following strategic initiatives:

[1] Enhancing business payment rail to reduce concentration risk from reliance on a single settlement channel, while expanding the system's ability to support new types of payment transactions.

[2] Implementing a liquidity-saving mechanism to optimize the use of collateral and improve operational efficiency and convenience.

[3] Transitioning to an automated operating model to enable greater scalability, efficiency, and readiness for handling increasing transaction volumes.

[4] Strengthening data-verification and analytics capabilities to support regulatory compliance, unlock insights from transaction data, and streamline onboarding processes for new participants.

5.3

Paving the way for future payment



5.3 Paving the Way for Future Payment

The BOT aims to strike a balance between promoting innovation and delivering benefits to the real economy, while safeguarding financial stability and preventing risks to users. The BOT has outlined regulatory approaches to support the application of modern technologies as follows:

5.3.1 Regulation Clarity on Tokenized Money

In recent years, DLT and tokenization—the process of converting asset rights into digital tokens that operate on blockchain or DLT platforms— have gained increasing attention.

Tokenization and DLT can enhance payment efficiency due to their ability to embed automatic conditions into payment instructions. This enables the development of payment services that more seamlessly align with various transaction types, such as programmable payments or faster settlement of tokenized assets.

However, the forms of payment instrument utilizing tokenization and DLT technology vary widely. Some forms may pose risks to users and financial system stability, such as highly volatile digital assets or those lacking credible underlying value. Such instruments may also be exploited for money laundering or fraud. Therefore, it is essential to establish clear regulatory directions for the use of tokenization-based payment instruments such as tokenized money, to ensure that their adoption yields genuine economic benefits [Green Line] while effectively managing risks to users and the financial system to prevent undesirable outcomes [Red Line]. The Green Line and Red Line are defined as follows:

Green Line

- ✓ 1. Enhances financial service efficiency through technologies like DLT, reducing intermediary costs and transaction times.
- ✓ 2. Develops innovations and new services that address financial-sector challenges, particularly those specific to Thailand, such as improving access to credit for SMEs and individuals.
- ✓ 3. Promotes competition by encouraging new entrants to develop services that expand public access to financial services.

Red Line

- ✗ 1. Undermines the stability of the financial system.
- ✗ 2. Undermines the singleness of money when digital assets are widely used in place of the Thai baht without maintaining a stable exchange value, or when multiple units of account emerge (e.g., Baht A, Baht B, Baht C having different values), increasing costs for the system and the public.
- ✗ 3. Facilitates money laundering and fraud when used without appropriate supervision.
- ✗ 4. Has inadequate consumer protection, causing harm to users and merchants.
- ✗ 5. Creates fragmentation in payment systems, preventing interoperability and increasing costs for service providers and the public.

The BOT, like most central banks, emphasizes maintaining the singleness of money, i.e., ensuring all forms of money [e.g. banknotes, deposits, e-money, and other forms of payment instrument] hold equal value against the Thai baht and are exchangeable at par value [fixed rate of one baht for one unit of each form of money]. This principle underpins trust in the financial system. Otherwise, it could create unnecessary complexity, raise costs, and erode confidence. For example, if people begin to doubt whether 1 baht in one bank account holds the same value as 1 baht in another form, such uncertainty could undermine confidence in bank's deposits and potentially weaken trust in the entire financial system. Therefore, preserving this singleness of money and minimizing exchange rate volatility across different forms of money are essential to efficiently facilitate economic activities.

BOT has carefully weighed the promotion of innovation alongside the need to safeguard financial stability and recognizes the potential benefits of DLT and tokenization. Accordingly, the BOT plans to promote the following forms of innovations that can enhance the efficiency of financial services, while retaining a robust risk management framework:

1. Existing regulated payment services adopting DLT such as tokenized deposits and e-Money on DLT. These innovations improve efficiency, reduce costs, and enable new use cases, while maintaining the underlying reliability. This approach aligns with the Bank for International Settlements [BIS], which considers tokenized deposits as a key element of the future financial systems.

2. New forms of services possessing the properties of money such as 'electronic data units' pegged to the Thai baht's value, designed to mitigate risks associated with typical digital assets and follow the BOT guidelines for the Programmable Payment under the Enhanced Regulatory Sandbox and must be under supervision to support their wide adoption. The key characteristics are as follows:

- **Fixed value pegged to the baht (1 unit = 1 baht):** ensuring trust and eliminating price volatility.
- **Full baht-backed reserve (100% baht-backed):** requiring issuers to maintain segregated bank deposit reserves equal to the total value of units issued
- **Redemption rights:** ensuring that unit holders have the absolute right to exchange their units back for baht at the defined value.
- **Special customer fund protection:** granting customers priority claims over other creditors in the event of provider insolvency—such as bankruptcy—ensuring that customers receive a full refund.
- **Stringent controls:** requiring service providers to adhere to KYC and KYM standards and requirements, and to implement IT security measures and business continuity plans.

Both forms of services described above are highly reliable to be used as a payment instrument. Therefore, they are well-suited for developing various use cases such as escrow payments where funds are released only upon successful delivery of goods or services –enhancing transparency, traceability, and fraud prevention. They can also support efficient settlements of digital token and cross-border transfers. The BOT thus aims to support the application of appropriate digital asset technologies to foster financial innovations that meet the needs of the Thai economy and people. In addition, the BOT will enhance flexibility of regulatory frameworks and testing mechanism to better accommodate such developments.

BOT will enhance the Regulatory Sandbox to support the development of payment services such as tokenized deposits and e-money on DLT, allowing regulated private-sector entities to test innovations more flexibly. Priority will be given to services that address national needs, such as improving payment efficiency and business operations for SMEs, expanding access to credit, and enhancing liquidity management for households and SMEs. **The BOT will also consider the need to issue a new regulation to oversee new payment services emerging from the Enhanced Regulatory Sandbox, with appropriate supervisory criteria.**

For other forms of service beyond those mentioned above, the BOT remains open and supportive where digital assets are used as backend mechanisms to enhance the efficiency or quality of financial services, provided that the public is not required to hold or use such assets directly and that risks are properly managed. For example, digital assets may be used for settlement between service providers in cross-border transfers to reduce processing steps and costs, while customers continue using conventional currencies for their transaction.

5.3.2 Infrastructure to support technologies

The BOT will consider enhancing and developing its payment infrastructure to support the settlement of tokenized money and assets, particularly for real-time high-value transactions. This will improve the efficiency of wholesale payments by leveraging new technologies while reducing settlement risk through the use of funds that financial institutions hold at the BOT. The BOT will also explore the development of infrastructure that enables interoperability among different types of tokenized money and assets.

6. What success looks like

What success looks like

1) Promote access to payment and financial services [Inclusion]

- The public has broad and inclusive access to payment services.
- Individuals and SMEs have broad and inclusive access to financial services.

Utilizing digital footprints and trade and payment data to obtain higher-quality credit.



2) Enhance efficiency in payments [Efficiency]

- Individuals and SMEs increasingly use digital payments as the primary option.
- Digital payments continue to evolve.
Offering services and innovations that meet diverse user needs and keep pace with technological changes.
- Cash management processes have become more efficient.



3) Build confidence for individuals and businesses [Trustworthiness]

- **Provide payment systems with enhanced security**
Raising the level of security measures to enhance system safety and prevent misuse of payment systems for illegal activities. This will help build trust among users—both the public and the business sector—while maintaining a balance between convenience and safety in financial transactions.
- **Establish a highly stable and resilient payment infrastructure**
Ensuring that services can be provided continuously during both normal situations and crises, are resilient and adaptable to technological advancements, support innovation, and expand services to meet the needs of users. The system should also be able to manage various types of risks effectively in payment operations.

