



BANK OF THAILAND

2021

PAYMENT SYSTEMS REPORT



**Thai Payments
and the Next Step into the Digital World**







Executive Summary

Over the past few years, the Thai payment system has advanced tremendously due to the cooperation among payment system providers, government agencies, and the regulator, the Bank of Thailand (BOT). The collaborative efforts in planning and driving policies to promote digital payments have led to various digital payment services, such as PromptPay services, Smart Financial and Payment Infrastructure for Business, and cross-border payments and fund transfers. The COVID-19 pandemic is also another significant catalyst for digital payments to gain popularity. Thai digital payments have increased fivefold in the last five years, from

63 times per person per year in 2017 to 312 times per person per year in 2021.

In addition, the BOT has created an enabling environment for innovation development and financial technology adoption by providing a regulatory sandbox framework for businesses to test their innovations and new technologies and evaluate their risk management and consumer protection arrangements before offering them publicly. Examples of participating projects include cross-agency identity verification via the NDID platform, biometrics for customer identification and authentication, peer-to-peer lending platforms,

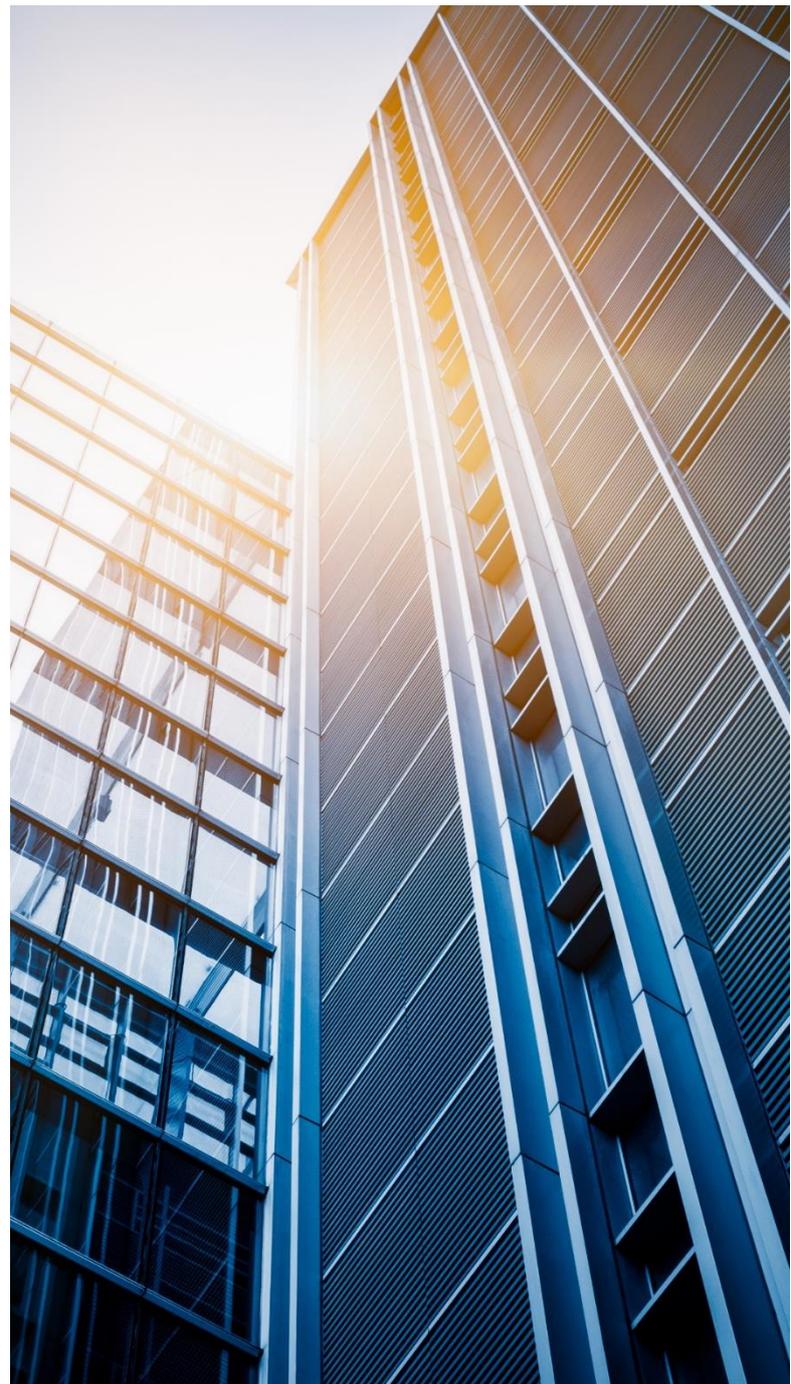




and applications of blockchain technology for financial services. Meanwhile, to foster confidence in digital payments, the BOT attaches importance to the oversight of Thai payment systems to ensure their stability, security, and continuity of services, as well as adequate risk management and consumer protection. In this regard, the BOT has revised regulations and enhanced supervisory tools to balance supporting financial innovation with maintaining timely risk management in the digital era.

The next step into the digital era for Thai payment systems will be driven by policies focusing on the continuous development of payment systems. In 2022, the BOT has prepared the **Payment Directional paper on "Directions for Development of Payment Systems under the New Financial Sector Landscape of Thailand"** to guide the development of Thai payment systems, with the vision that "Digital Payments would be the preferred choice among all user groups and would also improve the quality of life, enhance competitiveness and transition Thailand to a 'less-cash' society." The BOT envisages Thailand having efficient payment services that serve the needs of all sectors, including the public, business, and government sectors, in terms of convenience, speed, security, and

reasonable prices. The BOT intends to leverage technology, data, and open access to payment infrastructure to foster competition and innovation, promote public awareness, and ensure appropriate oversight, to smoothly drive digital payments as the preferred choice for Thais in the digital age.





Payment Systems Committee

Payment Systems Committee (PSC) is one of the main committees of the Bank of Thailand and is responsible for formulating policies on payment systems for the Bank of Thailand that is consistent with business developments and technological advancement.



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Governor



Vice Chairman

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Deputy Governor Financial Institutions Stability



Committee Member

Miss Vachira Arromdee

Deputy Governor Corporate Development



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Mr. Payong Srivanich

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Committee Member

Miss Kanittha Sahamethapat

Principal Advisor on Information and Communication Technology, The Revenue Department



Committee Member

Mr. Ariya Banomyon

President, Transformational Company Limited



Committee Member

Mr. Auttapol Rerkpiboon

President and Chief Executive Officer, PTT Public Company Limited



Secretary

Miss Siritida Panomwon Na Ayudhya

Assistant Governor, Payment Systems Policy and Financial Technology Group

As of 30 June 2022

Key Payment Statistics in 2020 – 2021

	2020	2021	
Total population	66.2	66.2	Million
Nominal Gross Domestic Product (GDP)	15,636.9	16,178.7	Billion Baht
Technological Infrastructure			
Number of fixed-line telephone numbers	5.0	4.6	Million
Number of mobile phone subscribers	116.3	120.8	Million
Payment Statistics			
Number of Thai commercial bank branches	6,150	5,633	Branches
Number of Foreign commercial bank branches	17	17	Branches
Number of 6 Specialized Financial Institutions branches	2,475	2,463	Branches
Number for Automated machines (ATMs/CDMs) ¹	65,132	63,315	Machines
Number for EFTPOS terminals ²	881,337	915,410	Terminals
Number of ATM cards	10,688,019	11,219,440	Cards
Number of Debit cards	64,051,972	64,846,431	Cards
Number of Credit cards	24,603,787	25,145,787	Cards
Number of Mobile/ internet banking accounts	103,643,083	123,232,927	Accounts
Number of PromptPay registration	56,241,457	68,639,304	IDs
Currency in circulation per capita	27,387.5	31,274.90	Baht per person
Volume of cheque usage	82,663,385	69,277,804	Cheques
Monthly average value of credit card payments ³	4,469	4,134	Baht per card
Monthly average value of debit card payments ⁴	232	221	Baht per card
Monthly average value of cash withdrawals via debit card	7,786	6,536	Baht per card
Monthly average value of cash withdrawals via ATM card	3,266	3,261	Baht per card

¹ Automated machines include Automated Teller Machines (ATMs) and Cash Deposit Machine (CDM).

² EFTPOS (Electronic Funds Transfer at Point of Sale) or EDC (Electronic Data Capture) terminals are machines that banks or service providers install at retailers to transmit payment transactions made via debit and credit cards.

³ Refers only payments for goods and services made with domestically issued credit cards at EFTPOS terminals in Thailand and overseas, including with domestic spending of foreign credit cards.

⁴ Refers only to payments for goods and services made with domestically issued debit cards at EFTPOS terminals in Thailand and overseas, including with domestic spending of foreign debit cards.



Payment in Thailand

2021



Bank branch

No. of bank branches
(Thousand branches)

8.1



ATM/CDM

No. of ATM/CDM
(Thousand machines)

63.3



Card

No. of ATM cards
(Million cards)

11.2

No. of Debit cards
(Million cards)

64.8

No. of Credit cards
(Million cards)

25.1



Card machine

No. of EDCs
(Thousand terminals)

915.4



Payment in Thailand

2020



Mobile/ internet banking

No. of accounts (Million accounts)	123.2
Total volume (Billion transactions)	15.3
Total value (Trillion Baht)	86.4



QR Code

No. of Acceptance points (Million points)	7.3
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PromptPay

Registrations (Million IDs)	68.6
with Citizen ID (Million IDs)	39.1
with mobile phone number (Million IDs)	25.1
Transaction volume per day (Million transactions)	36.2
Transaction value per day (Billion Baht)	112.6

No. of bank branches (Thousand branches)	8.6
No. of ATM/CDM (Thousand machines)	65.1

No. of ATM cards (Million cards)	10.7
No. of Debit cards (Million cards)	64.1
No. of Credit cards (Million cards)	24.6
No. of EDCs (Thousand terminals)	881.3

Mobile/ internet banking

No. of accounts (Million accounts)	103.6
Total volume (Billion transactions)	9.9
Total value (Trillion Baht)	66.9

QR Code

No. of Acceptance points (Million points)	6.9
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PromptPay

Registrations (Million IDs)	56.2
with Citizen ID (Million IDs)	34.3
with mobile phone number (Million IDs)	21.1
Transaction volume per day (Million transactions)	20.2
Transaction value per day (Billion Baht)	74.3



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10 Thai Payment Highlights in 2021

Thai digital payments have grown fivefold over the past five years. In 2021, Thai digital payments rose to 312 times per capita per year, a five-time increase from 63 times per capita per year in 2017. *as of December 2021



Making payments overseas is now more convenient and faster. Funds transfers between Thailand-Singapore via the PromptPay-PayNow linkage are quick, with lower fees. Cross-border QR payments are accepted in Vietnam, Indonesia, Malaysia, and Singapore.

The digital world never stops raising the bar for cyber risk responses and taking proactive measures to prevent and control payment fraud to foster confidence in online transactions.



The Thai financial sector is ready for PDPA enforcement through the push for Guidelines and cooperation mechanisms among financial sector regulators.

Some segments prefer cash despite the digital trend. In spite of the growing popularity of digital payments, the payment diary survey found that some individual groups rely solely on cash for psychological reasons such as emulating close acquaintances, store requirements, and income-receiving channels.



The government's co-payment scheme is a critical turning point for Thai digital payment behaviors. This project has played a vital role in encouraging Thais to learn, experiment, and embrace digital payments.

The "PromptBiz" will be a game changer for the payment systems. The development of Smart Financial and Payment Infrastructure for Business will facilitate the linking of trade, payment, and tax data in the business sector.



Bangkok Fintech Fair 2021, "Shaping Digital Finance in the New Decade", promoted leveraging the digital economy to propel the economic development and recovery following the COVID-19 pandemic.

"robotic process automation" has emerged as a critical engine for improving regulatory efficiency. By utilizing this technology, regulators can streamline processes and reduce time spent examining and supervising business providers.



Payment regulations have been amended in response to digital economy following the Regulatory Impact Assessment (RIA) framework to ensure practical policy deployment while keeping up with technological changes and emerging risks.



I. Major Developments in Thai Payments



- The Success of the Payment Systems Roadmap No.4
- Smart Financial and Payment Infrastructure for Business
- Digital Payments Connecting Thailand to the World
- New Financial Technology and the Thai Financial World of the Future
- Directions for Development of Payment Systems under the New Financial Sector Landscape of Thailand

The Success of the Payment Systems Roadmap No.4

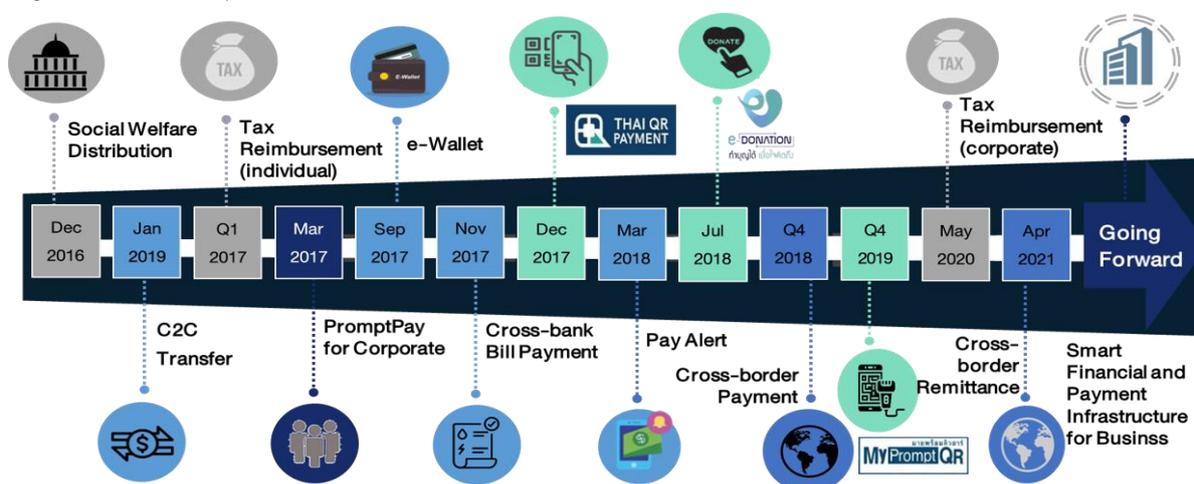
The BOT promotes Thai payment system development to deliver efficient and secure payment system services at reasonable and potentially declining costs. To this end, the BOT has encouraged the development of critical payment system infrastructures such as the PromptPay system, launched in late 2016, and has been expanded to include various services such as QR payments, tax refunds via PromptPay, and e-Donation.

During 2019 - 2021, the BOT worked with related parties in the banking, government, and private sectors to **enhance Thai payment system capabilities as outlined by the Payment Systems Roadmap No. 4** in five key development areas or 5Is, namely Interoperable Infrastructure, Innovation, Inclusion, Immunity, and Information. Key initiatives include promoting the development of PromptPay service extensions to accommodate business transactions and cross-border payment

connectivity and driving infrastructure development and financial technology adoption. Concurrently, the BOT has strengthened regulatory oversight of payment systems and payment services providers to keep pace with technological advancements and changing risk environments and laid out a regulatory framework for digital currency, which comes into play in the financial world with possible function as a means of payment.

With the BOT goal of **improving access to payment services and expanding service options**, Thai payment has significantly evolved, particularly digital payments, in terms of service coverage and a variety of service alternatives. As a result, Thai people can enjoy convenient, fast, and secure e-Payment services with lower fees, progressing towards the vision of the 4th Payment System Roadmap of **digital payments being the most preferred payment option for Thai people.**

Figure 1: Thai Payment Development





The BOT has upgraded the payment system infrastructures to ensure their stability, security, and compliance with international standards, as well as their capability to support fast-growth transactions, the expansion of innovations, interoperability, and cross-border connectivity. The key actions are as follows.

Interoperable Infrastructure

1) Implement the ISO 20022 message standard in the PromptPay system to improve data transmission capacity for integrated payment, trade, and tax data. The enhancement promotes business process efficiency by reducing cost and saving time, such as decreasing time spent verifying individual trade document transactions, reducing paper handling and storage, and facilitating easier transaction auditing. The improvement helps speed up payments and increase liquidity for the business sector.

The ISO 20022 standard has been gradually introduced to new PromptPay services, including (1) domestic QR payments where a merchant scans a customer's QR code for payment (B scan C) or the MyPromptQR service; (2) Cross-border QR payments; and (3) Cross-border funds transfers using mobile phone numbers (Proxy ID). Further, the standard was implemented in the bulk payment system in January 2021 and will be applied to the new BAHTNET system (BAHTNET NextGen) as well as the development of Smart

Financial and Payment Infrastructure for Business in the next phase.

2) Develop Smart Financial and Payment Infrastructure for Business (PromptBiz) by leveraging the ISO 20022 standard to provide digital payment services capable of accommodating end-to-end trade transactions to the business sector. The service will increase convenience and speed while lowering costs and creating digital footprints that will help small and medium enterprises (SMEs) gain access to credit and facilitate the development of other financial services in the next phase.

3) Develop the National Digital Identity (NDID) infrastructure to facilitate inter-agency identity authentication and verification based on customer consent without requiring customers to be physically present at the service provider's premises. The NDID service promotes digital services in the financial, business, and government sectors by increasing convenience, speed, and security while reducing duplicate data entry. Financial services using the NDID functionality include opening bank accounts or investment accounts, purchasing insurances, obtaining credit reports for loan applications, filing personal income tax returns, and verifying tax deductions. The BOT also supports expanding the NDID service to other government and financial services.

4) Upgrade PromptPay reliability. As a critical payment infrastructure supporting



broad public use, the PromptPay system requires stability and performance to handle growing transaction volumes, which have increased from only 240,000 transactions in its first year of operation to 36.2 million transactions per day today. Accordingly, the BOT ensures continuous improvement of the system's stability and performance and readiness to communicate with the service's users in the event of a system failure.

Innovation

Payment service innovation development will promote payment services tailored to users' needs. So far, the BOT has encouraged innovation through various PromptPay service extensions, notably the MyPromptQR service and **cross-border payments and fund transfers**. In addition, the BOT has established **a regulatory sandbox framework to foster financial innovation** by allowing service providers to test their services in a limited scope to control risk and undergo close evaluation before public launch. Participating projects include the use of biometrics technology for e-KYC, the NDID platform, the peer-to-peer lending platform, the Letter of Guarantee on Blockchain, and cross-border remittance using blockchain technology.

Inclusion

Over the years, the BOT has driven the expansion of payment services coverage through payment infrastructure development. The BOT focuses on maintaining the stability of such

infrastructure and expanding payment services in response to the public, business, and government needs domestically and internationally. Further, the BOT has encouraged the expansion of QR payment acceptance points, Electronic Data Capture (EDC), and e-Money terminals. At the same time, the BOT has constantly educated the public to improve **their understanding of payment services and the safe use of financial services**. Over the past three years, Thai digital payments have steadily increased from 89 transactions per capita per year in 2018 to 312 per capita per year in 2021. By the end of 2021, the number of registered PromptPay users had risen to 68.6 million, with an average daily transfer volume of 36.2 million transactions valued at 112.6 billion baht. Most transactions were less than 5,000 baht, with an average of 700 baht per transaction. The continual decline in transaction value suggests that PromptPay is used more frequently for daily spending. The COVID-19 pandemic is also a major catalyst for digital payments becoming a preferred payment option for the Thai people.

Immunity

The BOT **underscores the oversight of payment systems and payment service providers** to ensure responsive risk management, service continuity, security, and adequate user protection to foster public confidence in payment services. Previously, the BOT has continually developed



tools and **issued regulations on risk supervision and monitoring**. For example, the BOT issued the Regulation on Know Your Customer (KYC) for Activating the Use of e-Money Service and the Policy Guideline on Know Your Merchant (KYM) to promote an environment where customers and businesses are known to be safe and trustworthy. The BOT has also revisited existing regulations under the Payment Systems Act B.E. 2560 (2017) by adopting the Regulatory Impact Assessment (RIA) framework to ensure that the regulations are effective, pragmatic, and keeping pace with technological developments and changing risk landscape.

Moreover, the BOT has **updated and issued regulations on IT risk supervision to ensure that payment systems are secure and better respond to cyber threats**. For example, the BOT published the IT risk management framework and cyber hygiene guideline for e-Payment service providers, the Cyber Resilience Assessment Framework (CRAF), the guiding principles for mobile banking security, and the Intelligent-led Penetration Testing Guideline (red-teaming). These revisions aim to enhance the BOT's cyber risk oversight to align with business and technology models and continuously build supervisory cooperation on cybersecurity with relevant authorities to strengthen the Thai financial sector.

The BOT has **urged regulated business providers to prepare to comply with the Personal Data Protection Act (PDPA) B.E. 2562 (2019)**, which took effect June 1, 2022. This is to ensure that personal data is managed appropriately, rigorously, and securely and that business providers' practices do not harm the public.

Information

Today's era is centered on harnessing big data generated by digital transactions. Previously, the BOT has promoted the utilization of payment data by **initiating a pilot program to integrate payment data** and experiment with designing analytical structures and leveraging transactional payment data. The results are beneficial to various sectors, for instance, enhancing public (data subject) understanding, extending service provider offerings, decreasing the long-term regulatory reporting burden on service providers, and supporting the BOT policy formulation and supervision. Moreover, the BOT has launched **the Payment Diary survey to explore and understand Thai payment behaviors** to support developing policy to promote digital payments being a primary payment option. In addition, the BOT regularly publishes payment statistics or analyses such as Bi-Monthly Payment Insight for public education and further use.



Smart Financial and Payment Infrastructure for Business

A payment infrastructure developed based on the ISO 20022 message standard allows the integration of payment data with trade and tax data. Such an infrastructure facilitates the development of end-to-end digital processes in the business sector to satisfy the need to improve the existing business process efficiency. Business providers currently need to process paper documents such as delivering trade documents, verifying payments, filing taxes, and maintaining tax documents. These processes are costly, time-consuming, and labor-intensive.

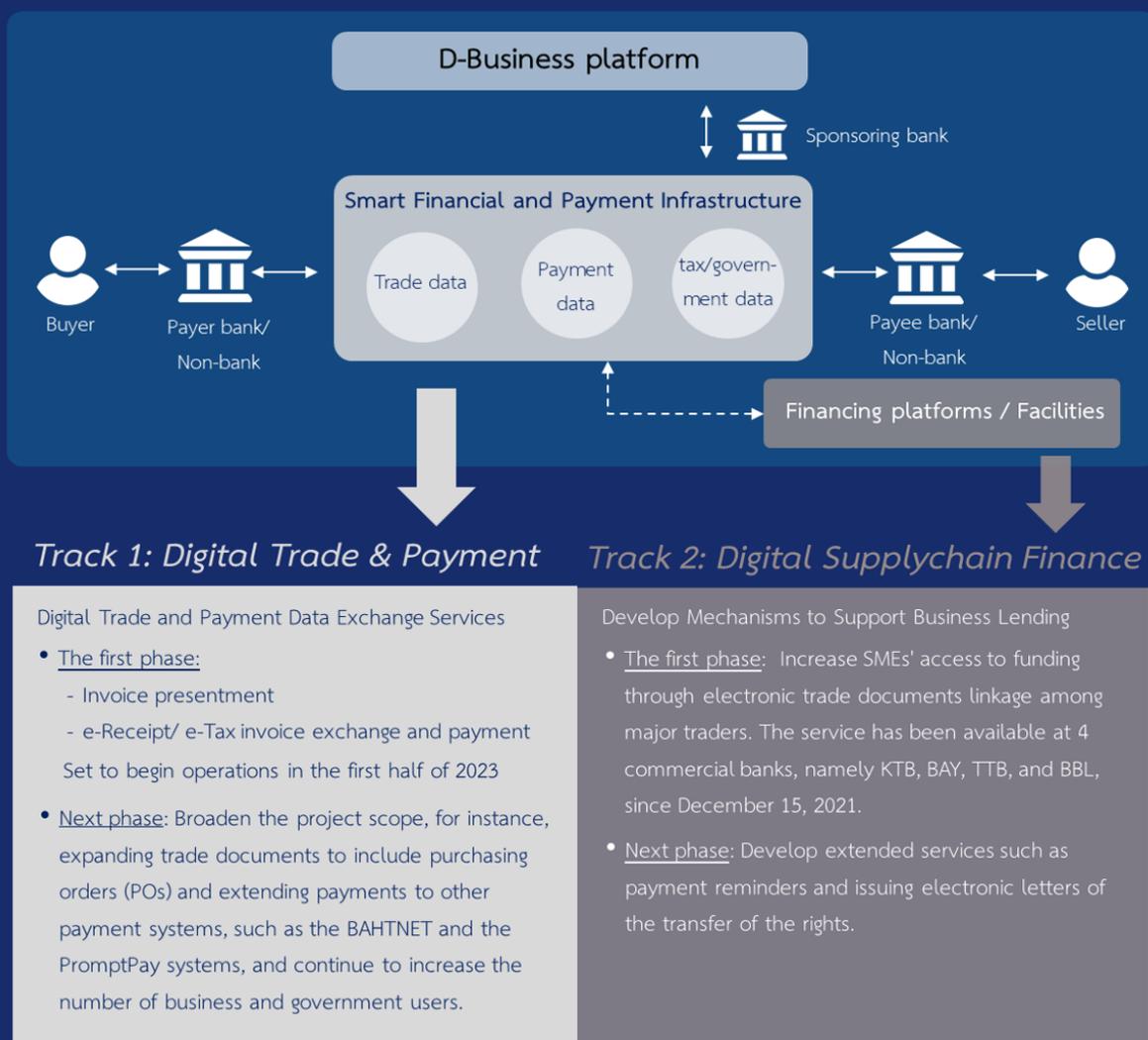
Therefore, the BOT, in collaboration with the banking, business, and government sectors and related agencies, has initiated the development of **the Smart Financial and Payment Infrastructure for Business (PromptBiz)** to facilitate the integration of trade, payment, and tax data with financial service providers' databases and government tax databases. The integration facilitates business process digitization, thereby increasing efficiency, lowering costs, simplifying audits, and reducing processing risks. The digital business process also allows businesses to receive payments faster and create digital footprints, which benefits the business sector in expanding trade. SMEs, in particular, will have access to revolving credit sources, and the financial sector will be able to extend the

development of financial products and services. The project consists of two main development areas. First, *Digital Trade & Payment services* focus on exchanging trade, billing, and digital payments data and linking them to digital tax services such as e-Tax Invoices and e-Receipt. Second, *Digital Supply Chain Finance* emphasizes leveraging trade and payment data to support business lending, particularly for SMEs. The service will facilitate invoice verification and double financing examination and can be extended to other services, such as regulatory reporting and creditor transfer, which will benefit various sectors, as shown in the following figure.





Figure 2: Development of the Smart Financial and Payment Infrastructure for Business



Read more at PAYMENT INSIGHT: [Smart Financial and Payment Infrastructure for Business](#)

Digital Payments Connecting Thailand into the Digital World

Under the ASEAN Payment Connectivity initiative introduced by the BOT in 2019, there has been a continuous push for payment system linkages with different countries to enhance cross-border payment and funds transfer services. The upgraded services are convenient, fast, and safe, with lower fees. The efforts also encourage retail customers and businesses to use local currencies in border trade, tourism, and labor remittances, contributing to Thai economic growth.

The year 2021 marks an important milestone in Thai payments connectivity with many countries. QR payment linkages with Vietnam, Malaysia, and Indonesia have added conveniences for tourists to pay for products and services using mobile applications. Another notable accomplishment is the remittance linkage with Singapore between Thailand's PromptPay system and Singapore's PayNow system. This innovative service is the world's first real-time cross-border funds transfer via mobile applications, meeting the need for a quick, easy, convenient, secure, and lower fees remittance service.

The BOT and relevant parties will continue to expand the payment systems connectivity between ASEAN and non-ASEAN countries by increasing the number of service providers, expanding service offerings, and

establishing new linkages with other countries. The achievement will be a key mechanism supporting ASEAN's economic growth.

Figure 3: Cross-Border Payment and Funds Transfer Linkages

2018

QR payment  Japan

2019

QR payment  Laos

2020

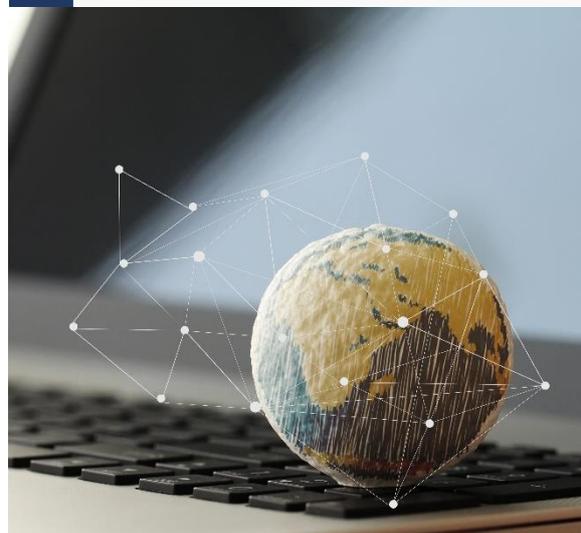
QR payment  Cambodia

2021

QR payment  Vietnam  Malaysia

 Indonesia  Singapore

Real-time remittance  Singapore



New Financial Technology and the Thai Financial World of the Future

New technologies and financial innovations facilitating daily life have come into play in the world of finance and payments and have become essential factors in the transition into the digital world. The BOT has fostered financial innovation development by providing testing in the regulatory sandbox and pushing for the infrastructure for digital identity verification and authentication. The BOT has also driven financial technology development through the Bangkok Fintech Fair 2021. Details are as follows.

1) Support financial innovation through the regulatory sandbox

The BOT values financial service innovation development and provides the regulatory sandbox framework, allowing the business sector to experiment with innovation and technology under appropriate and adequate risk management and consumer protection.

By the end of 2021, 45 business provider projects had participated in the sandbox. Examples include cross-agency identity verification via the NDID platform, customer verification using biometric technology, the peer-to-peer lending platform, real-time cross-border remittance, and the use of blockchain technology in financial services



such as cross-border funds transfer and issuance of e-Letter of Guarantee (e-LG). The latter helps improve operational efficiency by reducing processing times to less than one day (compared to the previous 3-7 days).

In addition, the BOT has increased flexibility by allowing business providers to experiment with their innovations under their own sandbox frameworks for use cases that would not main infrastructure or central standards or do not require entering the BOT's regulatory sandbox. In these cases, business providers must have rigorous risk management in place.

2) Digital identity infrastructure: NDID

The BOT, together with government agencies and the private sector, developed the NDID platform as an infrastructure that supports cross-agency data exchanges for identity verification and authentication with the customer's consent via NDID participating



service providers' websites or mobile applications. Without requiring a customer to visit the service provider's premises, the service improves convenience and speed, reduces duplicate data entry, and enhances the security of various financial transactions, such as opening deposit or brokerage accounts, requesting credit reports from the National Credit Bureau Co., Ltd. to apply for loans, filing personal income tax, and verifying tax deductions. As of 2021, 10 banks and 1 non-bank service providers have undergone testing in the regulatory sandbox, and more than 4 million customers registered for the NDID service. The BOT also encourages expanding the services to other government and financial services and pushes forward the development of corporate identity verification, which will be available in the next phase.

3) Promote financial technology through the Bangkok Fintech Fair

Since 2018, the BOT has hosted the Bangkok FinTech Fair annually to promote financial innovation development and foster cooperation between the public and private sectors in creating an enabling environment for financial technology adoption to improve services and business efficiencies. The event focuses on experts and practitioners from various fields exchanging perspectives and experiences on the application of technology on finance services and sharing the progress in financial technology.





Box 1: Bangkok FinTech Fair 2021

Now in its 4th year, the Bangkok FinTech Fair was held on October 18-19, 2021, under the theme “**Shaping Digital Finance in the New Decade**” The event focused on propelling the digital economy and economic recovery following the COVID-19 pandemic, directions for future technology adoption, and tangible adjustment in the government and business sectors to cope with the rapidly changing digital world.

Governor’s Speech
by Dr. Sethaput Suthiwartnarueput



Key Take Aways from the Bangkok FinTech Fair 2021

1

FinTech policy towards a new way of finance in the next decade.

Financial service providers must change their ways of thinking and digitize their internal business processes. Simultaneously, the BOT needs to increase its agility in facing new challenges while promoting financial innovation development according to the 3Os principle to improve access to financial services that meet consumer needs and to support digital financial products that add value to the economy and society.

3Os Principles

Open Environment

Promote fair competition

Open Infrastructure

Develop shared infrastructures for stakeholders

Open Data

Encourage data utilization.

Change the Game with Digital Financial Infrastructure. Adaptation is not an option but a “**necessity**” for every business industry. The business may start with (1) trying something new, (2) collaborating with customers or business partners to develop innovations, (3) quickly adapting and creating new services, (4) thinking regionally or globally, (5) attracting new generation personnel, and (6) paying attention to personal data.

2

Current and Next Steps in Financial Innovation

3

- **Use data powerfully and sustainably.** Behavior/lifestyle data, such as transactional payment data from food delivery applications and shopping platforms, should be exploited to expand access to financial services and credits for small businesses.
- **Unlock cross-border payments for regional development** with QR payment and real-time remittance to help increase convenience and speed at lower fees.

Work together to shape the future of the financial world without borders. The transition into the era of cryptocurrencies, stablecoins, central bank digital currency (CBDC), or the age of decentralized finance (DeFi) will be rapid. The public, business, and government sectors must join forces, embrace and understand technology evolution, and be prepared to adapt and manage security risks that come with new technology adoption.

4

read more at [the Bangkok FinTech Fair 2021, "Shaping Digital Finance in the New Decade"](#)

Directions for Development of Payment Systems under the New Financial Sector Landscape

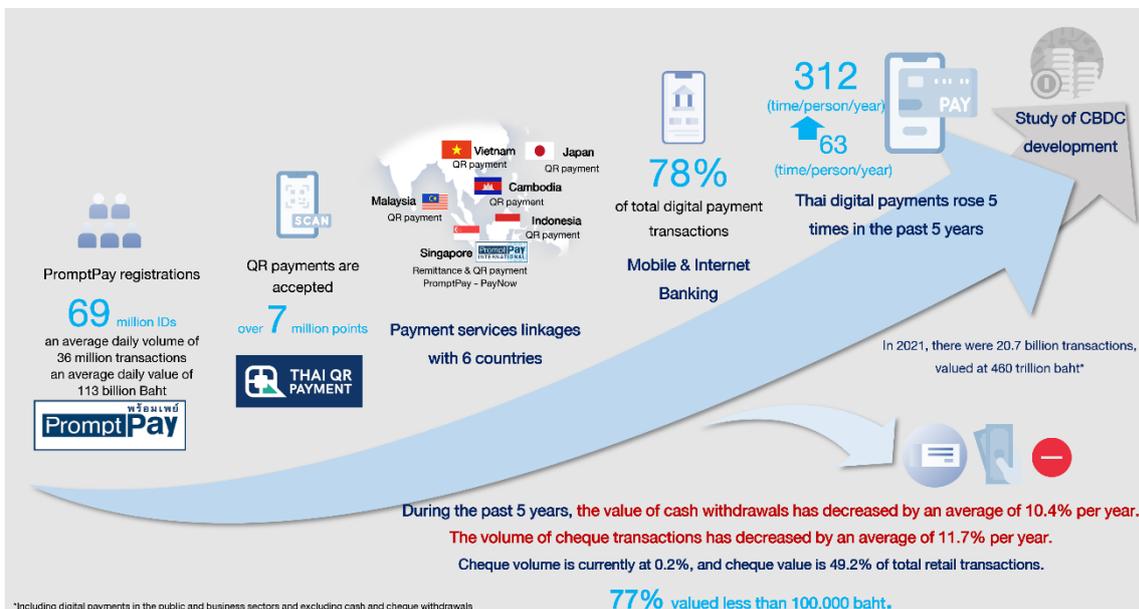
Development of Payment Systems



Payment systems are a crucial mechanism ensuring smooth and efficient economic and financial transactions and supporting the economic development. Over the past two decades, Thai payment systems have consistently laid the foundations for the transition to digital payment in terms of infrastructure, laws, and regulations. Digital payment infrastructure has evolved dramatically in the past five years. Significant developments are as follow:

The PromptPay system and the Thai QR Code standard. These infrastructures not only support payments for the public, business, and government sectors but also support the extension of innovations and a wide range of domestic and cross-border payment services, resulting in the widespread use of digital payment services. The public digital payments have grown fivefold, from 63 times per person per year in 2017 to 312 times per person per year in 2021. Covid-19 is another major accelerator of digital payments, leading Thailand to become one of the region's payment leaders and one of the global leaders initiating the development of Wholesale CBDC to prepare for the financial world of the future.

Figure 4: Developments of digital payment infrastructure over the past 5 years





To continuously adapt to technology evolution and the digital world, Thai payment systems must continue to advance to keep up with such progress. However, developing payment system directions consistent with the vision laid out required **the consideration of various challenging factors**; for instance, the emergence of new technologies, the depth and variety of services and payment providers, the rise of cyber threats and various scams, and the advent of “Digital assets,” a new financial model. Designing directions for payment system development necessitated a thorough evaluation of multiple factors; hence, the BOT invited comments and suggestions from interested parties, including the general public.

A summary of valuable recommendations for the development directions is as follows:

1) A payment system governance structure should be established to ensure the balanced participation of various bank and non-bank players in the effective implementation of the BOT policies through a systematic and standard agreement. These governing bodies should also drive widespread adoption and development of new services and innovations and oversee the management of domestic critical payment infrastructures

for maximum mutual benefits, at reasonable prices, subject to adequate risk oversight.

2) Doubling the target of Thai digital payments usage in three years is feasible as Thais increasingly turn to digital payments. **Efforts should be made to create proactive driving forces for digital payment adoption and to encourage all sectors to work together to accelerate the continued reduction of cash and cheque usage.** Meanwhile, attention must be paid to those not ready for digital payments. These efforts should be run in parallel with education on how to use the service safely.

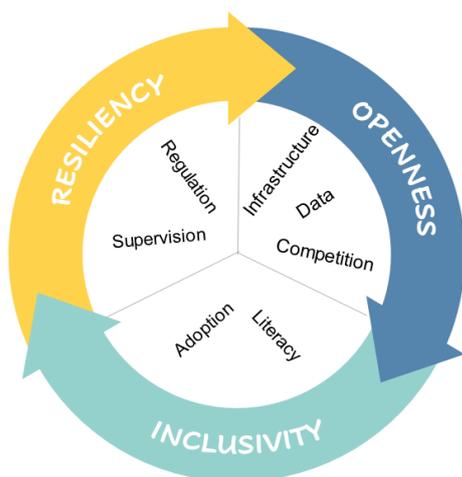
3) Emphasis should be placed on personal data protection, along with data utilization. Due to the considerable number of users, the BOT should lead efforts to integrate payment data, such as connecting with government applications.

4) Develop retail CBDC that can be applied to financial services, such as conditional government welfare payments, to ensure efficient and reliable payments. Offline payments without a smartphone and internet connection should be possible. Wallet topping up should be simple, with multiple channels and no need for a bank account, with multiple levels of e-KYC and multiple forms of ID being critical success factors. In addition, new types of business licenses, such as using digital assets as a means of payment, should be granted.

Directions for Development of Payment Systems Under New Financial Landscape

Based on challenges and stakeholders' feedback, the BOT has formulated the Payment Directional paper on “**Directions for Development of Payment Systems Under the New Financial Sector Landscape of Thailand**” over a three-year period (2022 - 2024) to guide the payment development directions under the principles of Openness, Inclusivity, and Resiliency. Key strategic plans are as follows:

Payment Strategic Direction



1. Openness: Leverage shared payment infrastructure to increase efficiency and promote competition. Payment systems provide access to payment infrastructure, data, and utilization of technologies in innovation development to create an environment conducive to competition in 3 areas:

(1) Open Infrastructure aims to leverage interoperable payment infrastructure to reach a diverse range of players and public and business users under appropriate governance

and pricing structures and prepare for a new financial world. Key initiatives include (1) developing a financial and digital payments infrastructure for businesses, or the PromptBiz system; (2) enhancing the usage of international and central standards in payment systems; (3) studying, developing, and testing the CBDC infrastructure; and (4) establishing a payment systems governance structure and reviewing the payment system and service pricing structure.

(2) Open Data aims to broaden the utilization of digital payment data under adequate data governance in terms of personal data protection and data security. Actions include integrating payment data in the financial and government sectors and developing new payment data structures as part of the Regulatory Data Transformation (RDT) project.

(3) Open Competition focuses on creating an environment conducive to competition among payment service providers and fostering the adoption of new technologies to develop domestic and cross-border payment services and innovations. Plans include improving guidelines and standards to allow various service providers to share critical payment infrastructure and promoting Thailand’s role in cross-border payments regionally.

2. Inclusivity: Promote accessibility and digital financial literacy

The BOT envisions digital payment to be the most preferred choice for Thais, thereby pushing for more comprehensive digital payment services and channels and promoting confidence in digital payments through the following initiatives.

(1) **Adoption** focuses on promoting digital payment usage in the public, business, and government sectors by expanding services in public sector applications, closing the gaps in business payments, and soliciting government support.

(2) **Literacy** focuses on building confidence in digital payments by promoting understanding and raising awareness of safe usage. The implementation plans include adjusting the knowledge-building approach to be more proactive and integrated and fostering cooperation at the financial sector level and between the financial and the government sectors to achieve broader and tangible results.

3. Resiliency: Adopt flexible regulatory supervision adaptable to changes and risks in the digital age

In a digital world where technology, service models, and consumer behaviors are rapidly changing, the oversight of payment service providers needs to be sufficiently flexible to allow service providers to adapt while also striking the right balance between fostering technological innovation developments and managing and responding to risks.

(1) **Regulation** emphasizes the flexibility of payment systems regulations to accommodate innovations and emerging risks. Initiatives include reviewing the payment systems regulatory framework by applying the Regulatory Impact Assessment (RIA) and risk-proportionality concepts and developing regulations to facilitate new financial models, such as using digital assets or CBDC as a means of payments in the next phase.

(2) **Supervision** aims to improve the supervisory framework to accommodate the digital world by employing supervisory technology, reshaping governance models and methods, creating cooperation mechanisms with relevant agencies, and strengthening supervisory personnel's capabilities to keep up with the changes.





II. Oversight of Payment Systems Stability



- Supervision of Important Payment Systems
- Supervision of Designated Payment Business Providers
 - New payment business providers
 - Development of Payment Business Provider Supervision
 - Regulations Amendment to Accommodate Financial Innovation
- Challenges in Thai Payments Oversight



In addition to supporting Thai payments development and innovations, another critical aspect is **the supervision of the Thai payment systems**. The BOT oversees the payment systems to ensure their stability, reliability, security, and continuity of service and that adequate risk management and consumer protection are in place to foster confidence in the safe usage of digital payment services. The BOT provides oversight in two aspects. The first is **the supervision of the Systemically Important Payment System**, namely, *the Bank of Thailand Automated High-value Transfer Network (BAHTNET)*, and two Prominently Important Retail Payment Systems, namely *the Imaged Cheque Clearing and Archive System (ICAS)* and *the PromptPay system*. The other is **the supervision of designated payment**

business providers, which focuses on enhancing payment business to promote access to and expand options for payment services as well as ensuring that their business operations are appropriate and adaptable to rapidly evolving risks and technologies, particularly cyber risk. Through supervision and examination, the BOT has promoted rigorous cybersecurity and cyber incident response readiness and issued, amended, and drafted Regulations and Notifications following the Regulatory Impact Assessment (RIA) framework to ensure that regulations do not hinder business operations. Further, the BOT advocates for designated payment business providers to prepare for the Personal Data Protection Act, B.E. 2562 (2019). Key actions in 2021 are as follows.



Supervision of Important Payment Systems

The BOT oversees the payment infrastructures to ensure that they are stable, secure and that appropriate risk management is in place and in compliance with international standards such that the systems will not pose a systemic risk through the following significant supervisory activities:

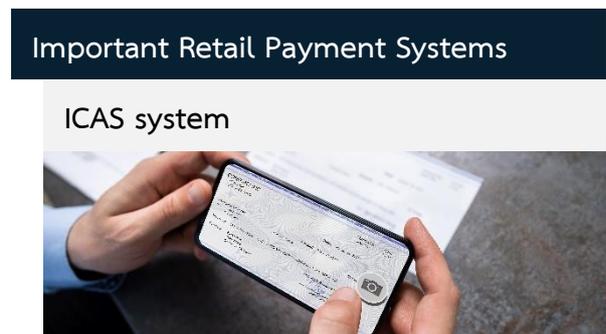


The Bank of Thailand Automated High-value Transfer Network (BAHTNET) system is the BOT-operated system that facilitates large-value transfers and interbank settlement on a real-time gross settlement system (RTGS) basis. The BAHTNET also offers payment finality to reduce risks in the payment systems and enable fast and secure transactions. Key BAHTNET services include interbank funds transfer, Third-party funds transfer, and settlement of interbank retail funds transfers such as transactions from the ICAS and the PromptPay. Hence, liquidity risk and settlement risk are crucial.

The BOT manages these risks by requiring all BAHTNET members to maintain sufficient liquidity through deposits in their current account at the BOT and collateralized securities. The requirement helps ensure



adequate liquidity for uninterrupted funds transfers and settlements to avoid any impacts that may lead to systemic risk. These risks are monitored closely and promptly managed to prevent any pending transactions that could significantly affect the settlement. In addition, operational risks are addressed to ensure the continuity and security of operations in normal and crisis conditions.



The Imaged Cheque Clearing and Archive System (ICAS) is an image-based cheque clearing system where cheque images are used in place of physical cheques in the collection process. The ICAS aims to shorten the cheque clearing cycle nationwide, lower the costs and risks of cheque loss incurred during the transportation of physical cheques



in the collection process, and lessen banks' responsibilities of storing data and physical cheques by accessing image cheques archives provided by the ICAS instead. The significant risk of the ICAS system is operational risks arising from system security.



In 2021 the volume of cheque payments totaled 41.2 million cheques, equivalent to 25.2 trillion baht in value terms. Cheque payments accounted for 0.4% and 38.3% of the volume and value of total retail transactions, respectively. The volume and value of cheque payments continued to decline and dropped significantly from the previous year by 13.7% and 8.9%, respectively.

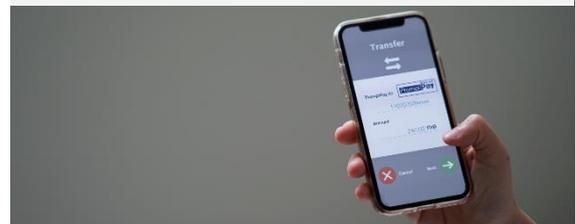
The decline in cheque usage is mainly due to the shift toward digital payments. For example, the general public and securities firms are turning to electronic funds transfers instead of cheques, coupled with the COVID-19 pandemic disrupting business operations and financial transactions. The trend is evident in the steady decline in the average daily volume of interbank cheques. In 2021, the average daily volume of interbank cheques was 170,990 cheques, equivalent to an average

daily value of 104.6 billion baht. Moreover, 75.6% of interbank cheques remained valued at less than 100,000 baht.

As for the supervision and risk management of the ICAS in 2021, the system operated uninterruptedly. The BOT has continued to provide rigorous supervision on cybersecurity in accordance with international standards.

Important Retail Payment Systems

PromptPay system



The PromptPay system is an interbank retail funds transfer system operated by the National ITMX Company Limited (NITMX), facilitating convenient, fast, and cost-efficient interbank funds transfers and payments. PromptPay supports various service extensions such as cross-bank bill payments, welfare payments, personal and corporate income tax returns, and domestic and cross-border QR payments. As the PromptPay system supports transactions across various sectors, the risk associated with its ability to handle large volumes of transactions (capacity risk) is deemed significant.

In 2021, the volume of transactions via the PromptPay system reached 9,277.5 million transactions with a total value of 31.8 trillion



baht, accounting for 91.4% and 48.3% of the total retail transactions volume and value, respectively. PromptPay transactions exhibited an upward trend. Around 90% of PromptPay transactions were less than 5,000 baht, with an average value of 700 baht per transaction, decreasing steadily from the previous years, suggesting that the public increasingly adopts PromptPay for their daily spending.

In terms of risk management, the BOT has supervised the NITMX in developing and monitoring the PromptPay system to maintain sufficient capacity to support transaction volume and business continuity and set up a monitoring mechanism to track the traffic volume. Further, the BOT insisted that the NITMX and its member banks coordinate and provide solutions to customers in case of system failures to foster public confidence in the PromptPay. Moreover, the BOT also required rigorous cybersecurity arrangements in compliance with international standard

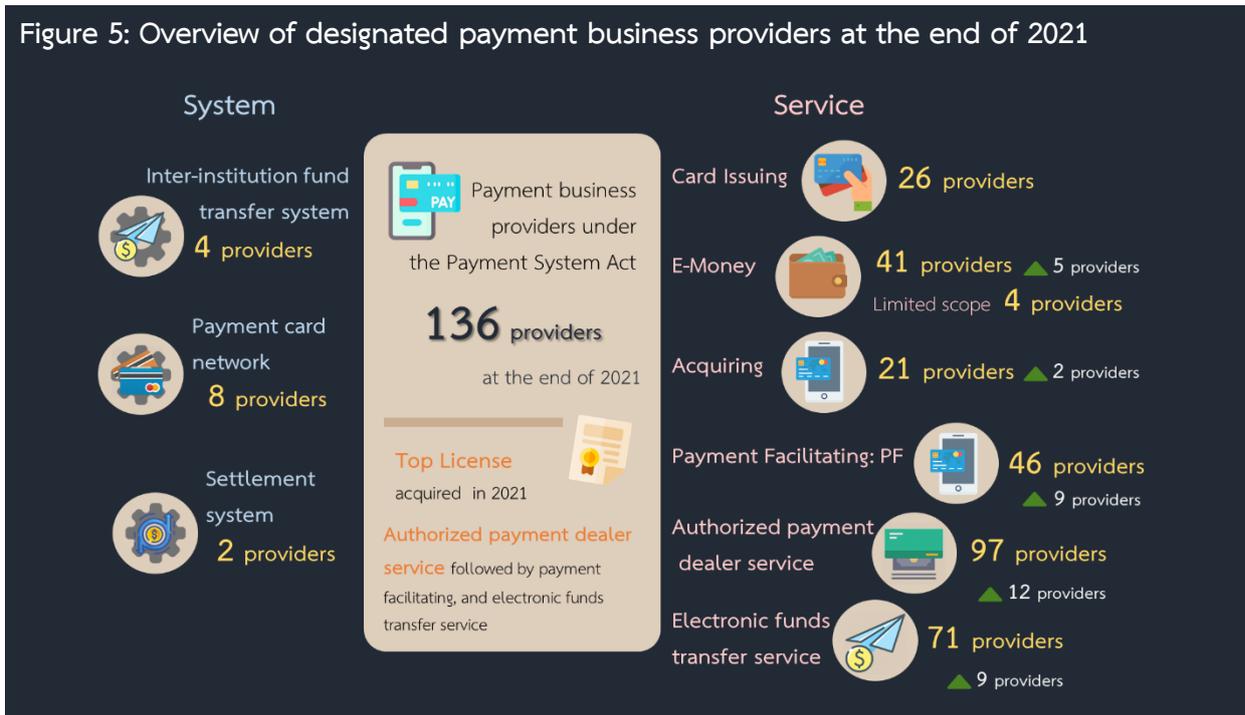


Supervision of Designated Payment Business Providers

New payment business providers

The BOT continued to grant new payment business provider licenses to broaden service coverage and options for the public and business sectors. As of 2021, a total of 133 licenses and 4 registration certificates have been issued to 136 payment business providers, an increase of 13 business providers from last year. Details are shown in the figure below.

Figure 5: Overview of designated payment business providers at the end of 2021



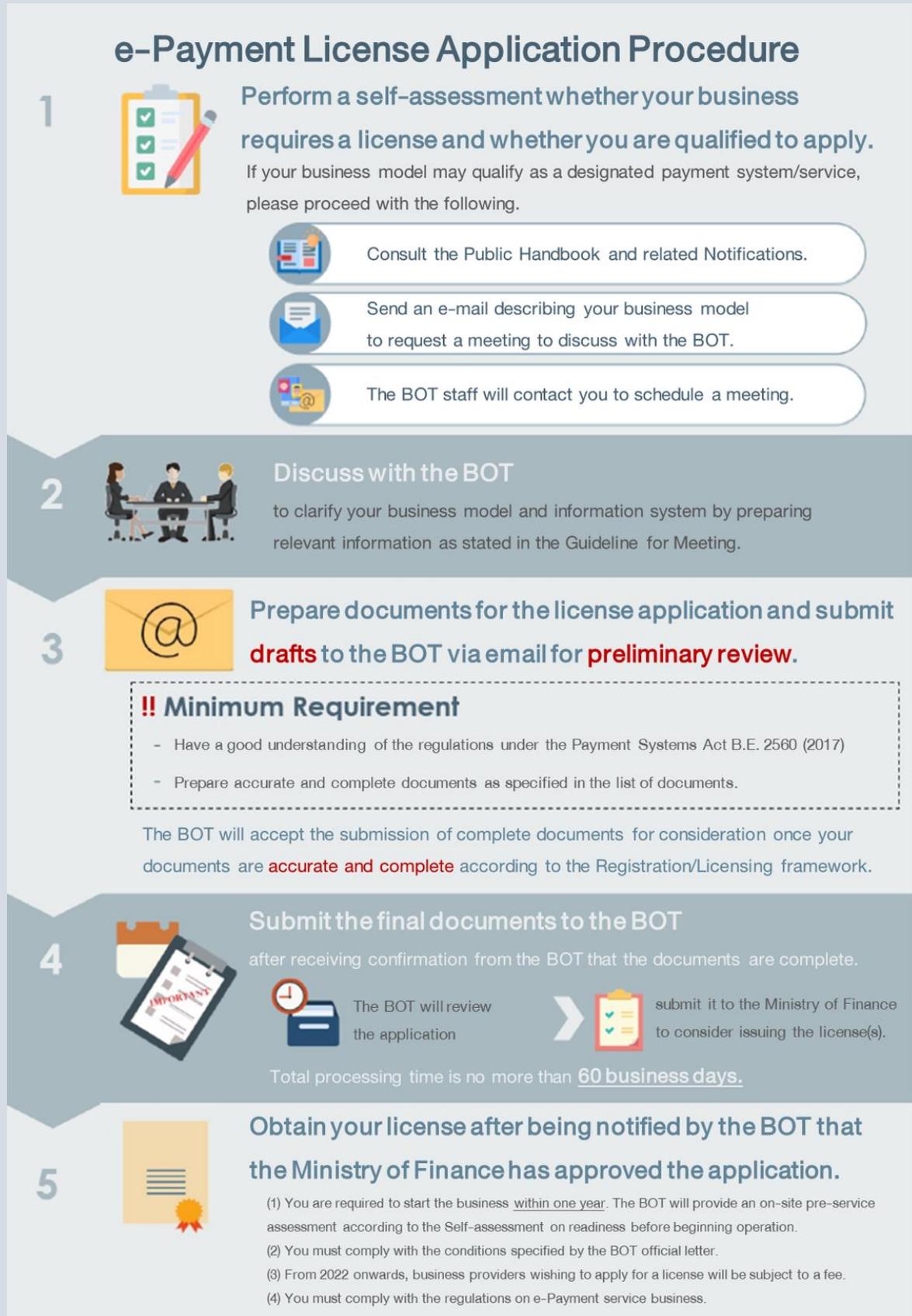
The verification of designated payment business providers can be done via the [BOT License Check](#)



The BOT has facilitated communication and knowledge sharing with payment business providers by redesigning the presentation of payment business licensing procedures and related regulations on the BOT website in an easy-to-understand infographic format. The illustrations are intended to assist new payment business providers unfamiliar with the BOT's procedures, regulations, and legislations in learning and understanding the process to better prepare for obtaining the licenses conveniently.



Figure 6: Application for an e-Payment License



Read more at [e-Payment License Application Procedure](#) (Thai version only)

Development of Payment Business Provider Supervision



The BOT has taken steps to promote payment business and continuously improve the supervision of payment business providers to keep up with emerging risks. To facilitate business operations, the BOT has adopted robotic process automation to help reduce the process and time required to review data reported by business providers. The BOT has also redesigned the regulatory reporting templates and centralized data reporting channels to ease the regulatory reporting burden for business providers.

As for regulatory development, the BOT has implemented a supervisory dashboard to add agility, enable timely monitoring of critical risks such as compliance risk and operational risks, and support early detection of irregularities in business providers' operations.

Moreover, to prevent and mitigate risks to the public posed by illegal payment business providers, the BOT has cooperated with relevant authorities such as the Royal Thai Police and the Office of the Attorney

General on monitoring, detecting, coordinating work processes, exchanging information, and sharing knowledge.

In 2021, the BOT, in collaboration with the Office of the Attorney General, organized training on digital payments and related regulations and law enforcement to enhance knowledge and understanding of the Attorney General's Office personnel on payment transactions, risks, and relevant work processes to promote effective coordination. In the next phase, the BOT will expand such collaboration and work with other agencies to maintain a safe and trustworthy payment ecosystem.



The exponential growth of digital payments amid the COVID-19 pandemic reflects the shifts in Thai payment behaviors toward the digital age. Hence, the BOT underscores building the payment service users' trust in service continuity and security of payment systems.

The BOT ensures that critical IT systems infrastructures are upgraded and

adequately stable to provide continuity of service to the public and that appropriate prevention, monitoring, and response mechanisms are in place to provide security to service users. The BOT also ensures that the payment system infrastructures are ready in all aspects, including IT systems, personnel, work processes, and cooperation mechanisms with relevant agencies. In 2021, the financial regulators, namely the BOT, the Office of Insurance Commission (OIC), and the Securities and Exchange Commission (SEC), joined together to raise awareness and knowledge on cyber risks through the Seminar on the Cyber Resilience Leadership: Herd Immunity. In addition, the BOT, in collaboration with the Thailand Banking Sector CERT (TB-CERT), organized in-depth technical training on service system security monitoring and incident responses, particularly related to supply chain risk. Further, the BOT and the TB-CERT organized a recruitment campaign to address the shortage of cyber specialists through the Financial Cybersecurity Boot Camp and the Tech Career Coaching under the theme of “Boosting Your Excellent and Step Toward Success.” Additionally, the BOT also participated in Thailand's National Cyber Exercise 2021, hosted by the National Cyber Security Agency (NCSA), to strengthen defense against cyber threats.

Challenges in overseeing the security of rapidly changing IT systems are adapting

the supervisory framework to keep up with such changes and keeping abreast of evolving international standards. In 2021, the BOT revised IT risk management regulations and cyber hygiene guidelines to require payment business providers to conduct regular readiness self-assessments. In addition, the BOT released an updated Cyber Resilience Assessment Framework (CRAF version 2.0) to address new threats to ensure payment system security and foster user confidence.



Nowadays, frauds and online financial scams are rising and becoming more sophisticated in their models and methods. Consequently, the number of financial service users exposed to online fraud scams has increased. The BOT has cooperated with relevant agencies, both the public and private sectors, in finding solutions, laying out proactive measures to prevent such problems, and constantly educating and warning the public through various actions. For example, 1) Instruct financial institutions and banking agents to tighten their account opening process in compliance with the regulation on KYC to prevent identity fraud; 2) Encourage financial institutions to implement monitoring tools to track and quickly detect irregularities



in financial transactions so that suspicious transactions can be suspended and the service user is notified before any damage occurs; and 3) Establish the 1213 Financial Consumer Protection Center call center to handle complaints and provide advice on financial services issues. In addition, the BOT also set up a system for validating licensed financial business providers via the BOT's

website (BOT License Check) to allow the public to verify legitimate service providers. Further, the BOT, in collaboration with the Thai Bankers' Association and financial institutions, has consistently raised public awareness and alerted the public via various BOT and financial institutions' channels such as websites, social media, and mobile applications.

Box 2: Online Transaction Security Precautions

Consumers nowadays prefer to shop online or “e-Commerce.” Particularly during the COVID-19 pandemic, online credit/debit card payments for goods and services have increased dramatically.

To strengthen the security of online transactions, the BOT has issued measures requiring financial institutions to tighten detection and user notification, including **the detection of irregularities in small transactions**, notification of all transactions, and identity verification when using debit cards online. The BOT also **worked with other regulators and law enforcement agencies to integrate litigation processes and include cases** where people may be affected by financial damage unintentionally. Additionally, the BOT has cooperated with related industries to improve long-term protection against other threats and to constantly educate and disseminate various precautionary actions to the public.





6 things to do to conduct online financial transactions with credit and debit cards safely



Notice

Conduct financial transactions with a trusted online store. Avoid transacting or binding your debit and credit cards with online stores that do not use a One-Time Password (OTP) authentication system or 3D Secure technology.



Maintain

Retain records of financial transactions. Do not share personal and financial information with others, such as debit/credit card numbers and the last number on the back of the credit card (CVV). Do not forward the OTP under any circumstances.



Limit

Set an appropriate online financial transaction limit or reduce the transaction limit to zero when there is no need to make an online payment for products and services.



Check

Check your balance regularly and enable notification services from service providers, such as notification of incoming and outgoing funds from your bank account or credit and debit cards.



Contact

Immediately notify the card issuing bank if you suspect or discover unusual account entries.



Monitor

Regularly update news from the bank's official channels.



Regulations Amendment to Accommodate Financial Innovation

The BOT held hearings and collected feedback from payment business providers to assess problems and obstacles posed by regulations under the Payment Systems Act B.E. 2560 (2017). The findings led to **regulatory improvement based on the Regulatory Impact Assessment (RIA) framework**, ensuring that regulations are practicable and responsive to technological advancements and changing risks. Based on the assessment results, the BOT planned to improve its regulations in 3 phases: (1) *In the short-term*, improving regulations clarity and adding details to enhance business providers' understandings, which was completed in 2021; (2) *In the medium-term*, amending regulations in their essence to reflect changes in business models as well as other applicable regulations, which can be completed by 2022; and (3) *In the long-term*, improving regulations from a policy standpoint, which require study and discussion at the policy level.

In 2021, the BOT issued **the Policy Guideline on Know Your Merchant (KYM)**, effective on January 1, 2022, for business providers to adopt as a minimum standard practice in establishing the process of knowing their merchants and monitoring and managing associated risks commensurate with the merchant's risk level. The regulation helped improve the security and credibility of growing e-Payment transactions.

Furthermore, the BOT has issued guidelines for business providers in applying technology to financial services. The regulation aims to encourage new technology adoption while rigorously managing technology risks to maintain the confidence and security of financial services. On June 4, 2021, the BOT issued **the Guideline for Blockchain Technology Adoption in Financial Services**. The BOT recognized the importance of and opportunities presented by blockchain technology in improving the efficiency of financial services and furthering financial innovation and the Thai financial system. Examples of use cases include the validation of financial transactions, cross-border funds transfers, the issuance of electronic letters of guarantee, and other financial infrastructure development. The Guideline will help ensure that data management on the blockchain network is secure, credible, and immutable, with reduced work processes, thereby lowering data validation costs, improving operational efficiency, and expanding the development of various financial services.



Box 3: Thai Financial Sector Preparation for the PDPA Effective on June 1, 2022

In collaboration with other financial sector regulatory authorities and the Office of the Personal Data Protection Commission (PDPC), the BOT pushed the Thai financial sector to support the business sector in preparing for PDPA compliance. The BOT encouraged the Thai Bankers' Association to establish **the Guideline on Personal Data Protection for Thai Banks** to promote member banks' understanding and facilitate their implementation of the PDPA law. The Guideline also serves as a standard for the financial business sector to prepare for the PDPA to ensure the proper and secure management of customer personal data. The Guideline is divided into key topics, namely Key principles of personal data protection, Personal data protection practices categorized by the data life cycle, Data subject rights, and Roles and responsibilities of the personal data controller and processors.

The BOT also encouraged business providers to be proactive and prepared on an ongoing basis. Previously, the BOT organized an online seminar on **“PDPA before enforcement...what must be ready”** to educate business providers and the public. The BOT also **issued a readiness self-assessment for business providers under supervision**, including banks, non-banks, and specialized financial institutions (SFIs). The BOT also followed up with business providers to ensure their readiness before the law took effect on June 1, 2022, and has continued to raise public awareness.

Furthermore, the BOT has **established a cooperation framework for personal data protection in the financial sector with the SEC, the OIC, and the PDPC** to ensure smooth coordination after the law comes into force. The four agencies signed a joint memorandum of understanding (MOU) on April 28, 2022, with the scope of cooperation divided into 4 areas, namely 1) Defining roles and responsibilities in personal data protection oversight; 2) Developing policies, regulations, and supervisory guidelines on personal data protection; 3) Information exchange; and 4) Knowledge building





and personnel development to promote knowledge and understanding of regulations related to personal data protection.

The cooperation between the four regulators under this MOU will ensure consistent and non-overlapping supervision and protection of personal data in the financial sector and the coordination of related processes. Personal data will be used confidently for various financial transactions, and the risk management of the development of financial services will be enhanced.

To learn more: (Thai version only)

- [Guideline on Personal Data Protection for Thai Banks](#)
- The seminar on [“PDPA before enforcement...what must be prepared.”](#)
- The MOU Signing Ceremony, [“The Memorandum of Understanding Signing Ceremony for Cooperation on Personal Data Protection in the Financial Sector between the BOT, the OIC, the SEC, and the PDPC.”](#)





Box 4: Raising Confidence in Digital Payments

The volume of payments at the point of sale and online continues to grow. The BOT has therefore urged business providers to know and verify the identity of their customers (Know Your Customer: KYC) and their service stores (Know Your Merchants: KYM) to increase confidence and prevent risks associated with digital payment transactions.

See the figure below to learn more about the differences between KYC and KYM.

What are KYC and KYM?

What benefits do users receive?

What are the procedures?

What are the verification channels?

KYC Know Your Customer

The verification of the customer's identity when opening a deposit or e-Money account for the first time.

Safe and trusted financial transactions. Protection against fraudulent impersonation.

Increase convenience by having electronic channels for identity verification when opening an account.

A business provider collects and verifies evidentiary data to confirm that they match the person who opened the account.

Evidentiary data include

- full name
- address
- identification card.

* Information and proof of identity vary depending on the type of services and channels of activation.

KYM Know Your Merchant

The merchant's identity verification by payment business providers when offering the service for the first time.

Confidence in the merchants' legitimacy reduced the chances of being frauded.

Secure and trusted e-payment gateways. Prevent merchant fraud and money laundering.

A business provider collects and verifies evidentiary data from a store to confirm that the store is credible and exists.

Evidentiary data include

- the details of the store owner
- The evidence of business operations, such as types of goods and services and commercial registration certificates.

* Information and proof of identity vary depending on the type and risk of the store.

Note: Information and proof of identity requirements are based on the Anti-Corruption Commission regulations.

Customers and merchants can verify their identity at service branches or via electronic channels such as applications.

Bank of Thailand

Read more at: (Thai version only)

- [Regulations on Know Your Customer Regulations for Activating the Use of e-Money Services](#)
- [Policy Guideline: Know Your Merchant \(KYM\)](#)



Challenges in Thai Payments Oversight

The payment world is continually and rapidly evolving from cash and cheques to digital payments. In recent years, it has entered the world of digital currencies, which have been proposed as a means of payment. The BOT has also studied and tested issuing its own retail CBDC. Certainly, rapid changes in payment technologies, business models, and players pose several challenges to payment oversight. Among these challenges are the following:



1) Rapidly changing and complex business models and technologies, such as blockchain and biometrics technologies, are used to improve financial services' efficiency. However, the introduction of these technologies must take into account appropriate risk management and consumer protection. Such considerations require the technology to be tested on a limited scale under a regulatory sandbox framework before being offered publicly. Further, as digital assets come into play in the Thai financial sector, relevant regulators need to thoroughly assess the risks and impacts to determine the scope of supervision.



2) Diverse new players with different business models and fundamentals necessitate the need for communication on related payment business

regulations to improve their understanding. Besides, current regulations must be revisited to ensure they are flexible, not a hindrance, reduce business burden, and prevent inequality in competition among business providers.



3) Formulating strategies or directions for Thai payments has become more difficult and complex.

The BOT needs to balance its roles in promoting payment service innovation and ensuring appropriate and responsive risk supervision. In a rapidly changing and increasingly complex world, setting strategies or directions for Thai payments must be considered in a timely manner while thoroughly assessing the environment.



4) Timely regulatory oversight adaptation is a major challenge for the BOT in planning regulatory oversight improvement to be sufficiently flexible for payment providers to adapt, innovate, and respond to significant new risks. Examples include revising regulatory guidelines to suit the risks of more diverse business providers and amending regulations to facilitate actual practices. Moreover, adopting technology to improve the agility of supervision and facilitate quick risk monitoring helps to shorten supervisory processes and times.



III. Key Trends in Payment Service

“The Way We Pay”



- Thai Payment Behaviors Through the Payment Diary
- Thais are increasingly turning to digital payments
- Thai spending behaviors have changed
- Cash is declining and might not be the primary option in the future
- Payment channels have evolved in response to behavior



In recent years, the Thai general public, government, and business sectors have increasingly shifted their payment behaviors towards a digital world as the services are convenient, fast, and inexpensive. The COVID-19 pandemic is also a major accelerator of digital payments to rapidly become a preferred payment option for Thai people. **At the end of 2021, Thai digital payments stood at 312 times per capita per year**, increasing from 202 times per capita per year in the previous year with a steadily growing trend.

To better understand Thai payment behaviors and support the planning for broadening digital payment adoption, the BOT has initiated **the Payment Diary survey project**. A total of 6,020 samples were subjected to face-to-face interviews and phone calls. These samples were distributed by gender, age group, residence area, and occupation and covered 7 regions throughout Thailand. The survey was carried out between February and April 2021, prior to the third wave of the COVID-19 pandemic.

This survey is the first in Thailand and Asia to apply the socio-psychology model in structuring the questionnaire to obtain more detailed and accurate data than traditional survey models. According to the survey findings, Thai people still preferred cash for psychological reasons such as emulating close acquaintances, following store preferences and referencing income-receiving channels. Still,

digital payments displayed favorable trends. Government initiatives have provided significant incentives for Thai people to experiment with and turn to digital payments. Meanwhile, merchants have also been adapting to accepting digital payments.

When looking into the 2021 payment statistics, Thai payment behaviors have continuously shifted towards conducting online transactions, which have replaced transactions via bank branches and ATMs/ CDMs. The shift corresponded to the gradual decline in the number of payment service channels due to these changing behaviors. Similarly, cash withdrawals and deposits also exhibited a downward trend. Later, cash may be superseded by popular new payment services, such as QR payment, which can be done via mobile banking without the need to carry or touch cash. Such trends are evident in the steady increase in mobile banking transactions over the years and the gradual decline in the average value per transaction, indicating the increased usage in daily spending.

The 2021 payment outlook reflects Thailand's transition towards a less-cash society, which requires cooperation from all sectors to promote and adjust long-term behaviors to encourage Thais to embrace digital payments more expansively and inclusively. These shifts are reflected in payment statistics and trends, which the BOT constantly monitors. The summary of key statistics is as follows.

Thai Payment Behaviors Through the Payment Diary

According to the 2021 Payment Diary survey, most Thais still preferred cash as their primary means of payment. All survey participants still carried cash, and about 50% of the sample used cash exclusively for their daily spending. Further, the findings revealed that a small group of participants chose digital payments as their main payment option. Therefore, it may be concluded that the constant increase in digital payments has been concentrated solely in certain segments. Consequently, promoting the widespread adoption of digital payments among all groups of Thai people is a significant challenge.

The survey also found that most Thais have been well-equipped with devices such as smartphones that support digital payments and have previously tried digital payments. However, some may still prefer cash as the main means of payment. Further, government programs such as the co-payment subsidy scheme were key motivators to encourage

Thai people to get to know, try, and adapt their behavior to e-Payments through the "Pao Tang" application. At the same time, the programs allowed merchants, whether restaurants, small grocery stores, flea market stands or food delivery services, to adapt to accept digital payments. Interestingly, the survey found that once the government programs ended, only 27% of the participants intended to continue using their "Pao Tang" wallets, and 36% planned to increase mobile banking usage. In contrast, more than 65% of the samples intended to return to using cash.

This survey delved into the reasons behind Thai payment behaviors and discovered two key variables influencing payment behaviors, namely, *Payment Habits*, where previous cash usage induces the current choice of using cash, and *Payment Intent*, which is mutually affected by other variables and has a continuing effect on payment behaviors.

Figure 7: Interesting Payment Diary Survey Results





“My partner and friends use cash,
so I only use cash.”

Payment behaviors of close acquaintances and people with similar characteristics, such as partners or spouses, friends, and people of similar ages and lifestyles, have a greater influence on participants' payment options than those of their parents, children, or grandchildren.

The acceptance or demand for payment methods by merchants is a critical factor for the survey participants to opt for the accepted payment medium. For instance, cash is accepted in markets and street restaurants; even those familiar with digital payments still need to pay in cash.

“I think the store would prefer cash,
so I pay in cash.”

“I get paid in cash,
so I spend with cash.”

The income-receiving channel is another important factor. When participants receive money through a particular channel, they often spend it through the same channel.

Individual attitudes toward a payment channel influence their payment choice. Even those primarily using digital payments still consider cash payments faster than digital payments.

“I think it's faster to pay in cash,
so I usually use cash.”

These are key reasons why Thais still prefer cash, despite having payment devices or prior experiences with digital payments. Changing these habits takes time. Therefore, it is necessary to develop guidelines to foster knowledge, understanding, and confidence and to motivate Thai people to embrace digital payments in the long term. Based on findings from the payment diary survey, the guidelines for promoting digital payments can be summarized in the following figure.

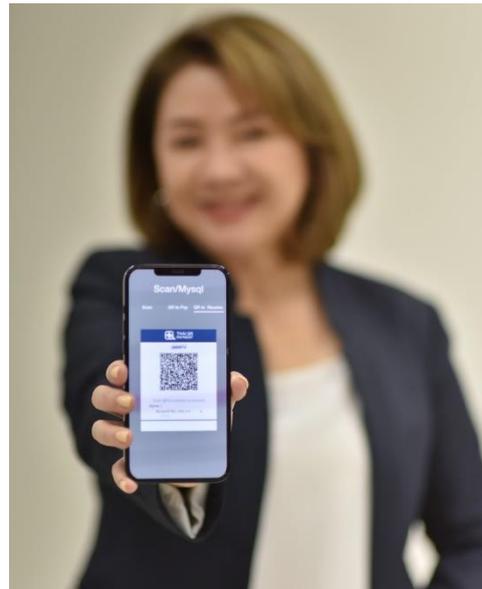
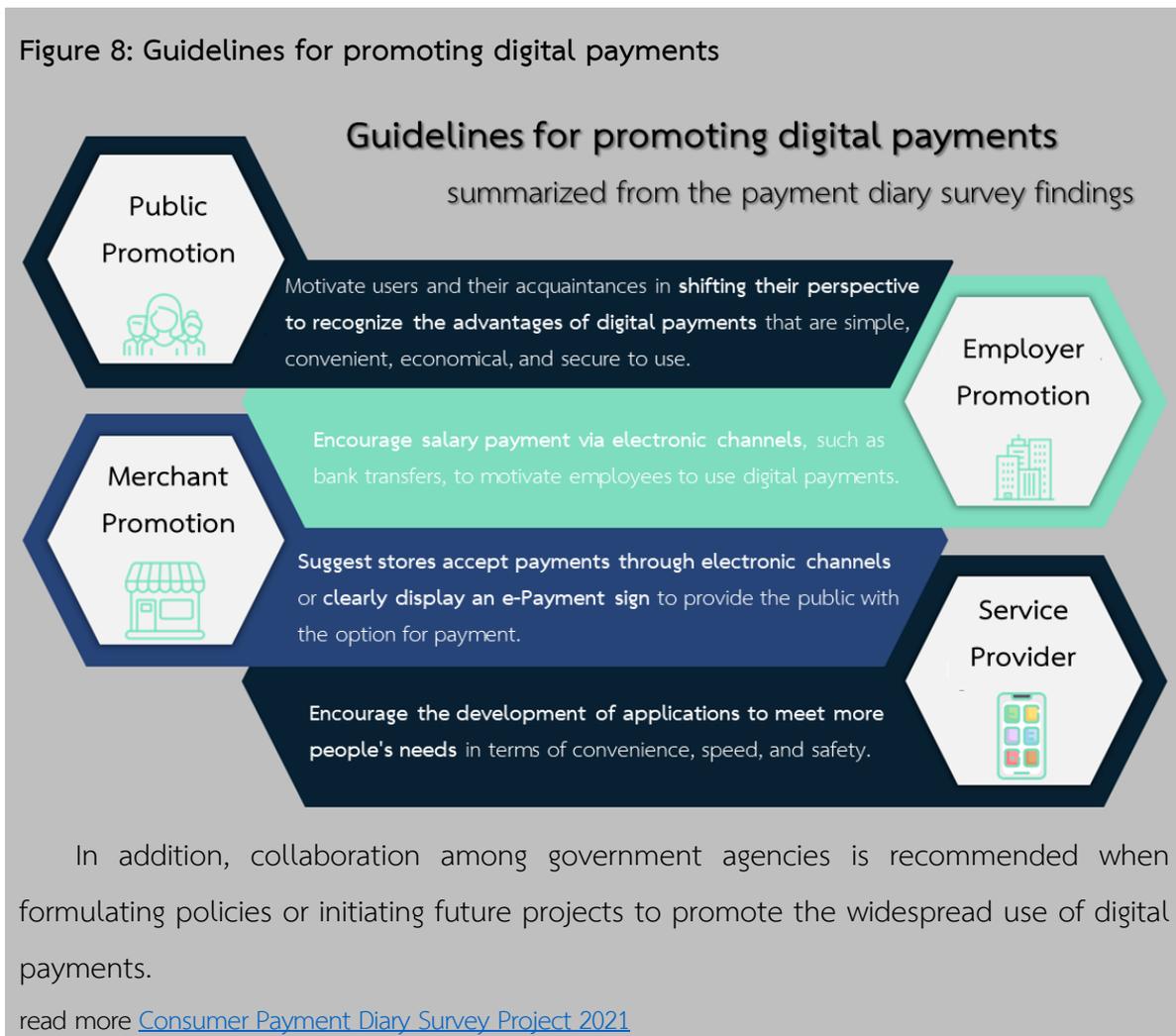


Figure 8: Guidelines for promoting digital payments



Thais are increasingly turning to digital payments

Thais are increasingly using digital payments, as shown by an exponential growth over the past five years, from 63 times per capita per year in 2017 to 312 times per capita per year in 2021. The upward trend has been driven by the popularity of funds transfers, mobile banking, and QR payments, which can be used almost anywhere, from large department stores to retail outlets, street vendors, flea market stalls, wet markets, and public transportation. Even donations to temples or foundations can now be made digitally instead of in cash. In addition, e-Money applications have also gained attention as new service providers gradually emerged, offering promotions or

discount coupons to entice Thais to try their services. E-Money has increased convenience, encouraging Thai people to turn to digital payment as their primary alternative. Nonetheless, compared to countries where digital payments are the primary payment channel, Thailand still has plenty of room to push further digital payments.

During the COVID-19 pandemic, the government has developed the “Pao Tang” application to facilitate government measures. The co-payment scheme and the “We Travel Together” campaign, in particular, have led to over 30 million registered users and widespread use, suggesting that Thais are becoming accustomed to digital payments.

Figure 9: Thailand’s digital payment transactions per capita per year

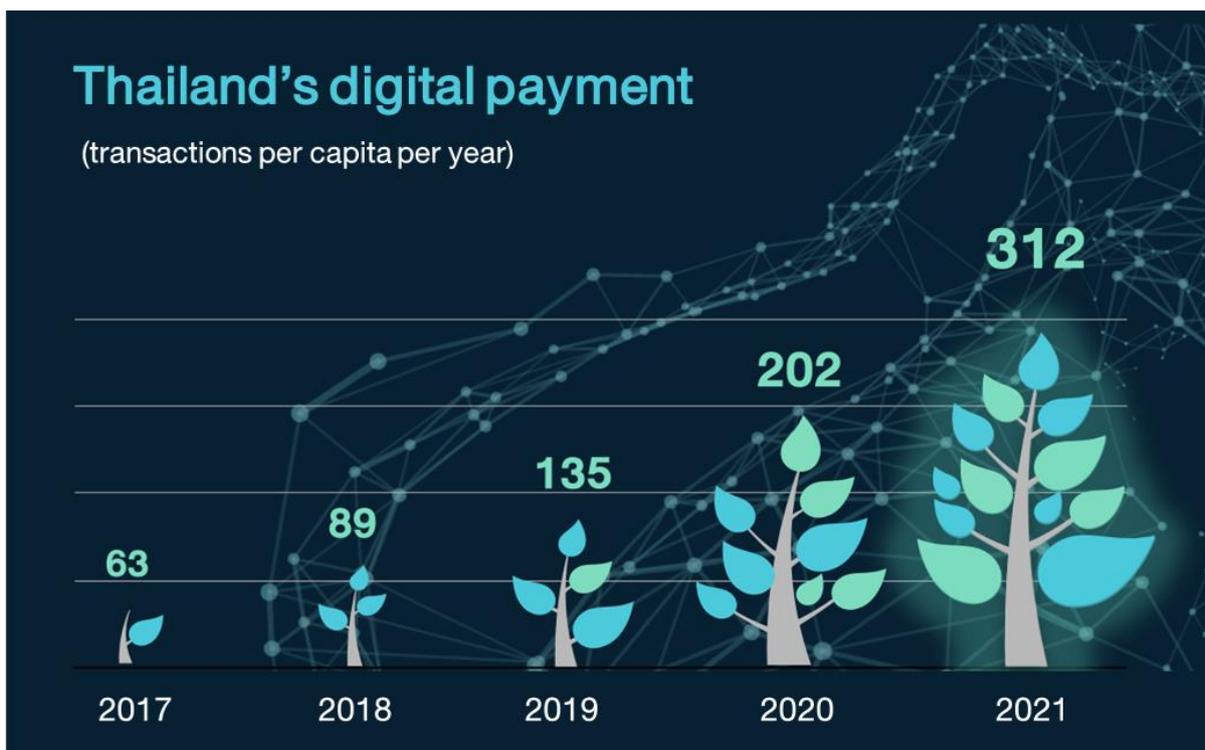
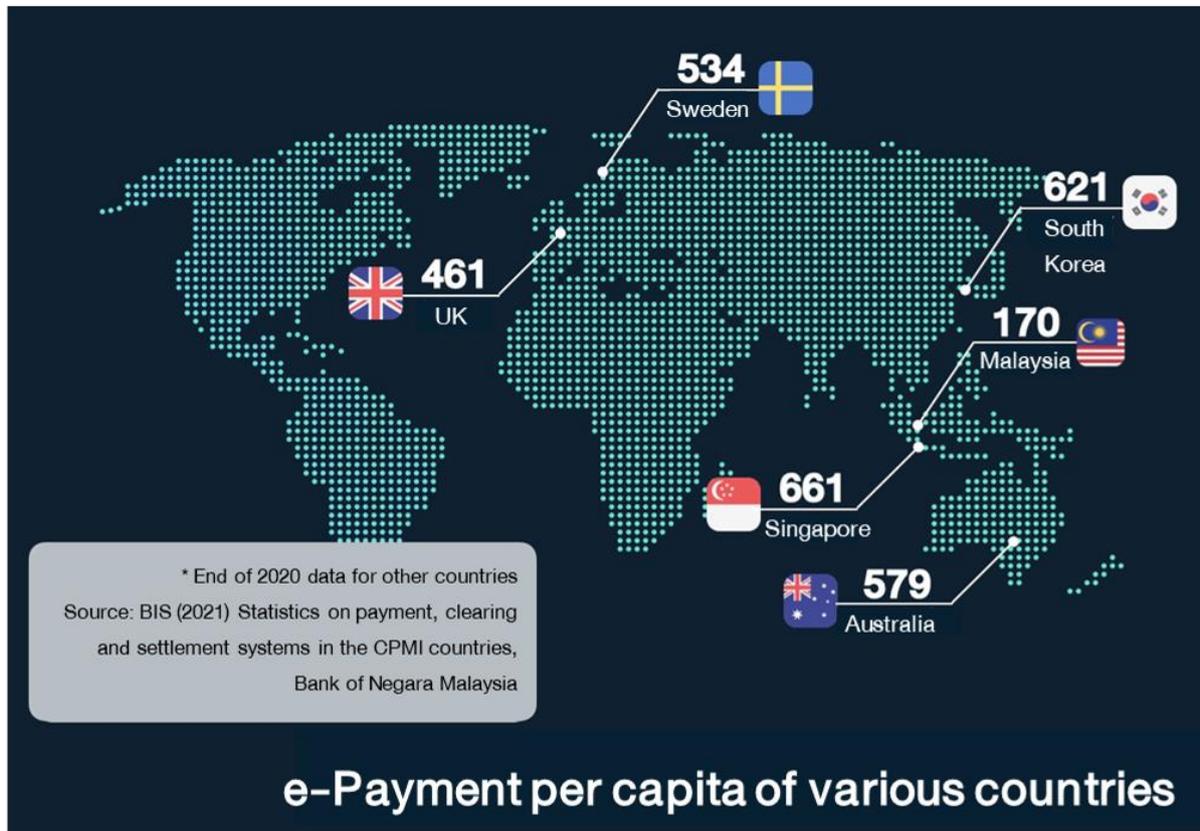


Figure 10: Volumes of e-Payment per capita of various countries*



General Public In 2021

Volume of transactions **20.6 Billion**
 +42.1% YoY

Value of transactions **63.4 Trillion Baht**
 +28.4% YoY

In 2021, the volume and value of public digital payment transactions grew steadily from the previous year by 42.1% and 28.4%, respectively. **Fund transfers and payments via mobile banking/ internet banking** remained to gain popularity and ranked first, with a growth rate of 63.6% from the previous year. These services accounted for the highest proportion of public transactions due to their ease of use, convenience, speed,

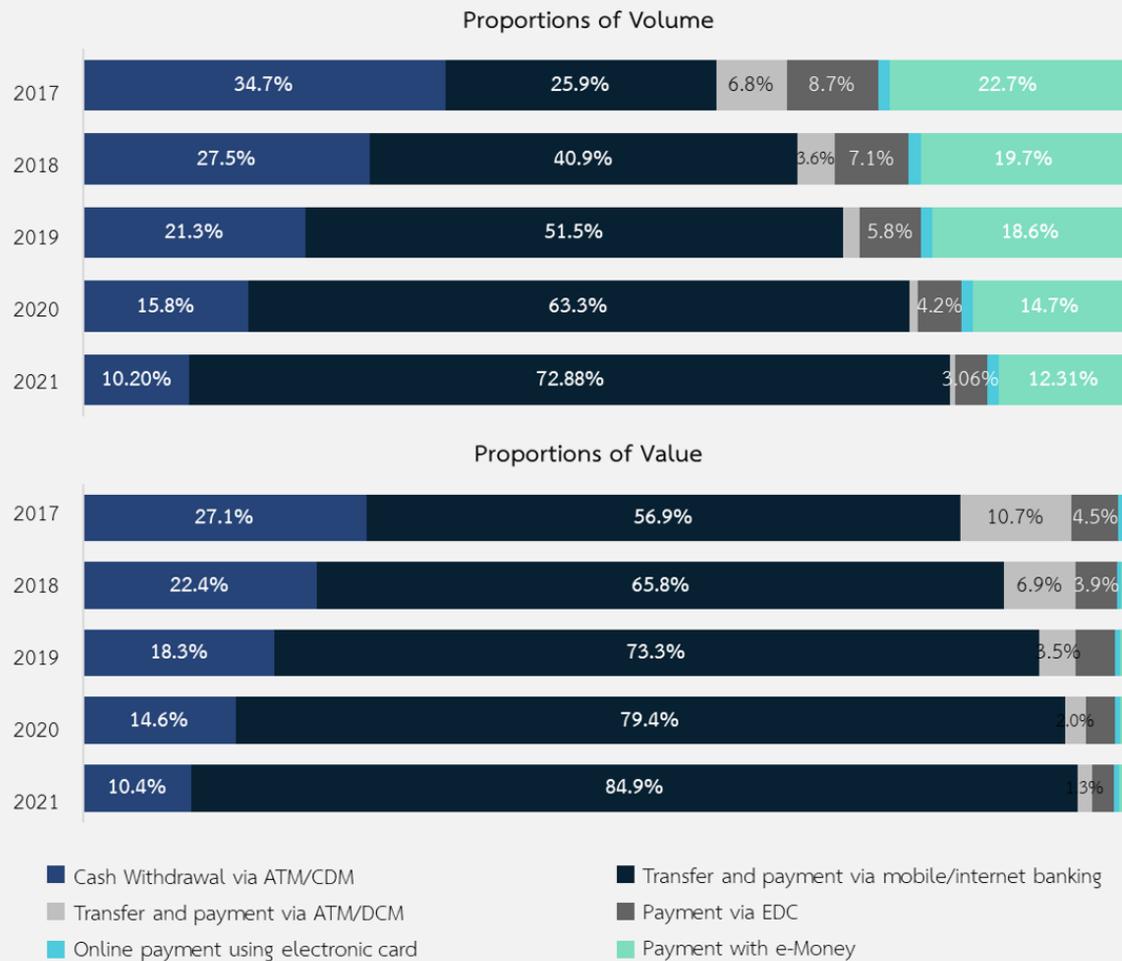
and increasing application in everyday life. Such increases were evident in the average transaction value of less than 4,000 baht in 2021, a steep decline from over 12,000 baht in 2017. Similarly, **e-Money** continued to grow in popularity because of its ease of use, and attractive discounts or promotions offered by service providers, whether for food, fares, or miscellaneous expenses.

Regarding the **PromptPay** service, 68.6 million numbers were registered, of which 39.1 million were registered with ID numbers and 25.1 million with mobile phone numbers. The average daily volume reached 36.2 million transactions, equivalent to an average value of over 112.6 billion baht. Most transactions were made via mobile banking and e-Money

top-ups for spending. Meanwhile, electronic **card payments** through the EDC terminals rose slightly from last year by 4.7% due to the easing of the pandemic and the government's lockdown measures. Despite having a lower transaction volume than that of EDC terminals,

online card payments also trended upward as a result of the convenience of not having to visit a store and the popularity of e-Commerce platforms, which constantly organized promotional events to entice the public.

Figure 11: Proportions of payments during 2017 – 2021 (General Public)





Business and Government
In 2021

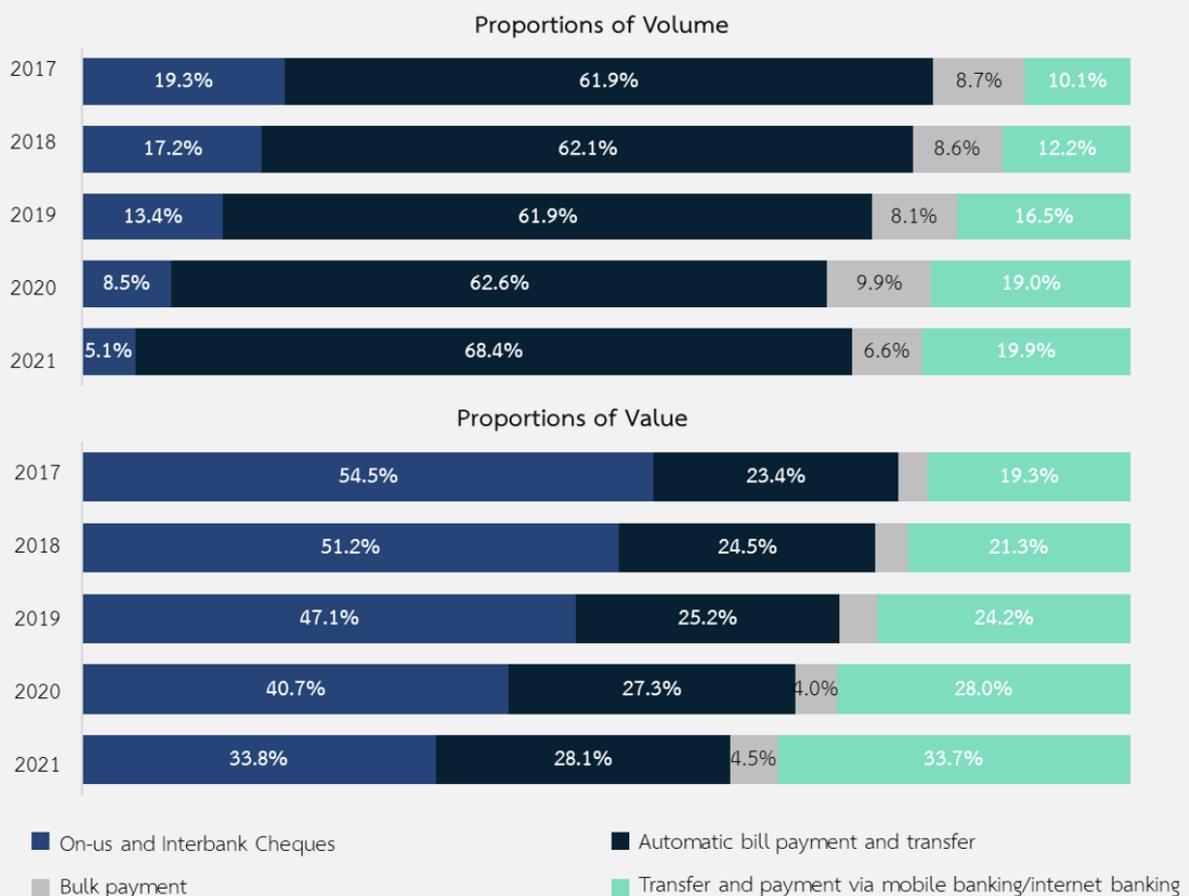
Volume of transactions **1.4 Billion**
+40.9% YoY

Value of transactions **111.3 Trillion Baht**
+5.8% YoY

Business and government transactions increased in volume and value by 40.9% and 5.8%, respectively, over the previous year. Around 69% were **direct debit/direct credit** transactions, such as salary payments and payments to business partners. In terms of

value, the proportion of business and government transactions via internet banking/mobile banking has significantly increased. Such increases may result from the business sector starting to pay higher-value transactions via internet banking, which now accommodates up to 2 million baht per transaction. In contrast, **cheque usage** continued to decline in both volume and value, at 16.2% and 12.3%, respectively. Still, cheques are unlikely to disappear any time soon owing to their unique properties, such as being used as collateral for loans or evidence in court.

Figure 12: Proportions of payments during 2017 – 2021 (Business and Government Sectors)

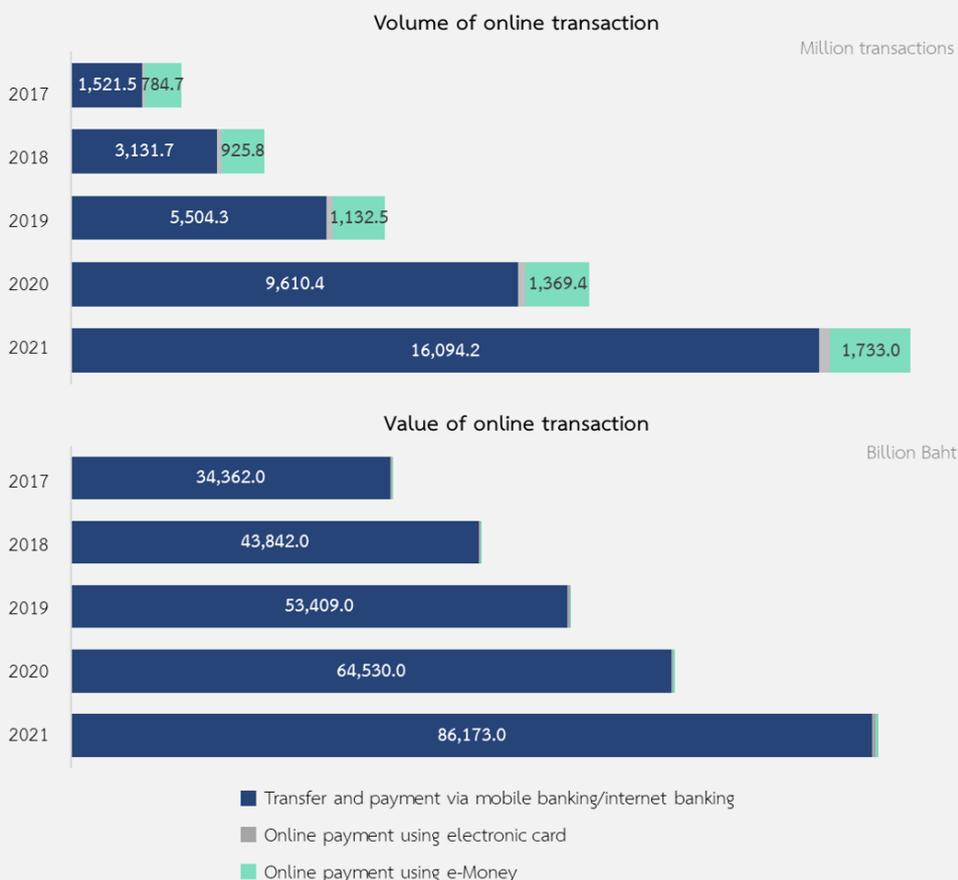


Thai spending behaviors have changed

An analysis of Thai spending behaviors by channel revealed that the volume of offline transactions at points of sale, such as ATMs/CDMs and bank branches, dropped steadily at 18.7% and 24.9%, respectively. Payments via in-store EDC and e-Money terminals showed an increasing trend over the past year due to the decline of the pandemic and the easing of government measures. However, overall offline payments grew by merely 3%, below online payments such as mobile banking/ internet banking, online electronic card payments, and e-Money, which in total grew drastically by more than 61.9% compared to last year.

In 2021, online payments accounted for 92.2%, while point-of-sale transactions fell to only 7.8%. The highest proportion of online transactions was from funds transfers and payments via mobile banking/internet banking, with over 67.5% and 33.5% in volume and value, respectively. The number of mobile banking/ internet banking applications rose by more than 19.6 million accounts last year, totaling 123.2 million accounts, owing to their convenience and ability to transact anywhere, anytime, serving the needs of Thai people.

Figure 13: Volume and value of online transactions during 2017–2021

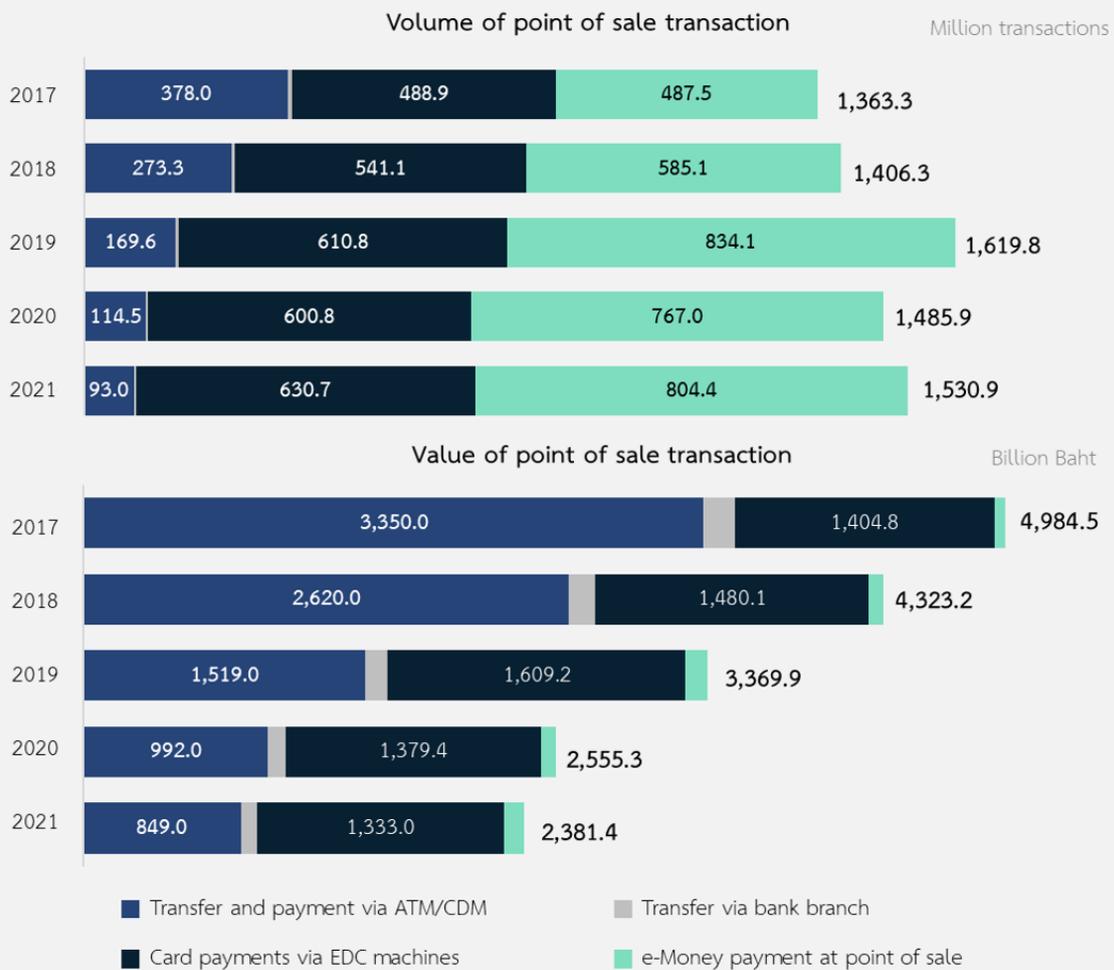


Online e-Money exhibited upward trends in volume and value, with a growth of 26.6% and 58.3%, respectively, over the previous year. These increases were driven by the usability of applications, similar to mobile banking, and are consistent with an increase in e-Money accounts from 19.6 million to 116.3 million accounts in 2021. As for electronic card payments, the transaction volume increased by 34.8% from last year as public behaviors have shifted to online shopping, which has become a new familiarity since the onset of the COVID-19 pandemic in 2020. In particular,

online shopping with home delivery services via websites of stores or department stores and food delivery via online platforms continued to grow dramatically with a double growth rate compared to last year.

Meanwhile, transaction volume at the point of sale increased slightly in 2021 due to the growth of e-Money and electronic card payments via EDC machines, which registered 4.9% and 4.7%, respectively. Card payments rose in the automotive, public transportation, and restaurant categories. Still, its growth was relatively low compared to online payments.

Figure 14: Volume and value of point of sale transactions during 2017–2021

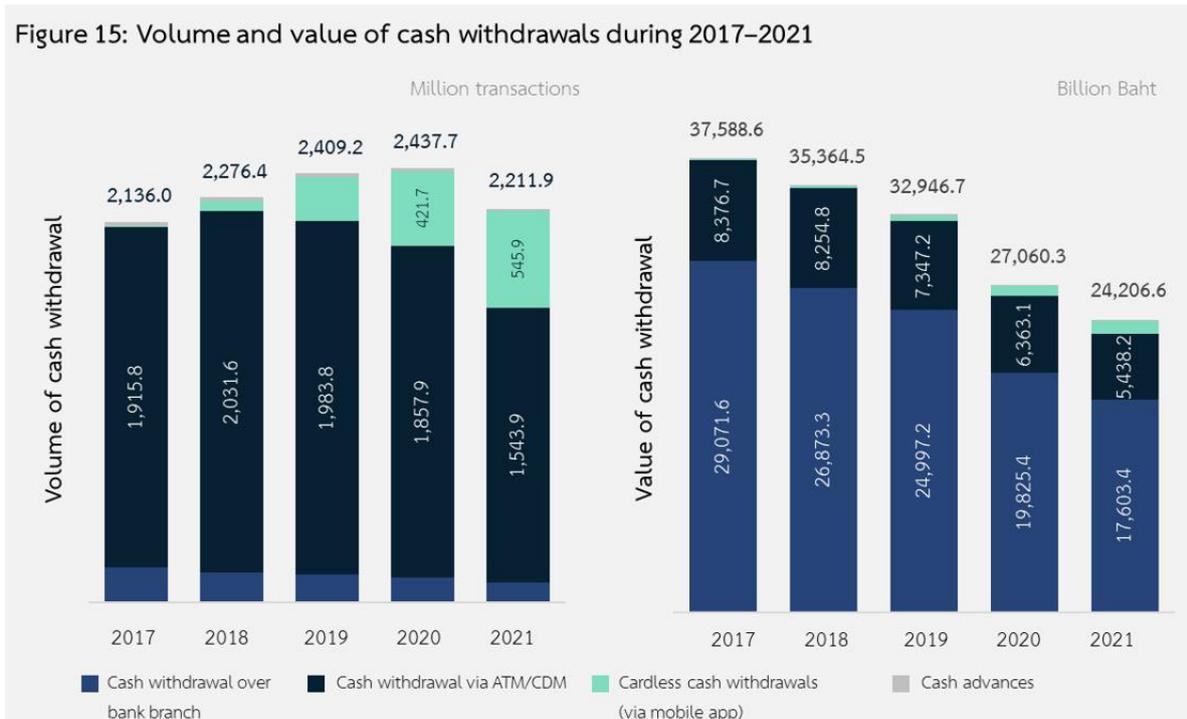


Cash is declining and might not be the primary option in the future

Although the Payment Diary survey found that most Thais still prefer cash as their primary mode of payment, statistics revealed that such behavior is on a downward trend. This is evident by the steady decline in cash withdrawals value of 10.5% and a decrease in cash withdrawals volume, which began to fall

for the first time this year by 9.3% compared to last year. The shrinkage in cash usage is due to the migration to digital payments in the public, business, and government sectors, coupled with the changing behavior that the COVID-19 pandemic might compel people to reduce their exposure to cash, being a critical accelerator.

Figure 15: Volume and value of cash withdrawals during 2017–2021



In terms of channels for cash withdrawal, the main channel was via ATMs/CDMs, with a transaction volume of over 95% and an average transaction value of around 3,100 baht per transaction. The volume of cash withdrawals via ATMs/CDMs began to fall by 8.4% from the previous year, resulting in a decline in total cash withdrawals. Meanwhile,

the volume and value of over-the-counter cash withdrawals continued to decline by 22.4% and 11.2%, respectively.

In addition, Thai people have increasingly turned to cardless withdrawals. The service allows people to conveniently withdraw via mobile banking applications and receive money at ATM/CDM machines

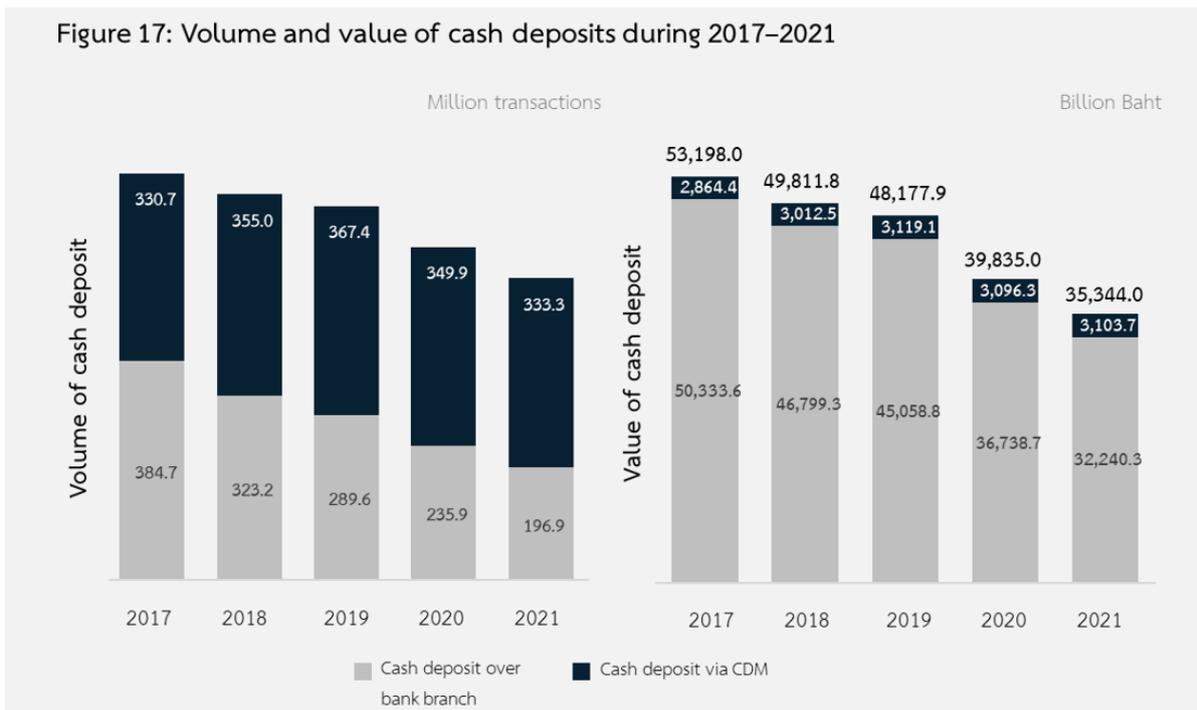
without having to pay an annual fee like using a card. As a result, the service has grown in popularity. The volume of cardless withdrawals

increased significantly in 2021, accounting for 24.7% of the total cash withdrawal volume.



Similar to cash withdrawals, cash deposits also trended downward. The volume and value of cash deposits decreased by 9.5% and 11.3%, respectively, compared to the previous year. Over the past 5 years, the decline in cash deposits was primarily seen at bank branches, in part because

people have switched to more convenient CDM machines. However, the value of CDM deposits averaged only around 9,300 baht per transaction, whereas high-value deposits were still made over the counter, as can be seen from the higher average value per transaction of about 164,000 baht.



Payment Channels have evolved in response to behavior

As Thai payment behaviors have increasingly shifted to digital payments, such as fund transfers via mobile banking and QR payments, payment services through bank branches or ATM/CDM machines have declined.



- Bank Branches:** As of the end of 2021, the number of financial institutions branches stood at 8,113 branches, a decrease of 529 branches from the previous year. The largest decrease was in the Bangkok and vicinities region with 212 branches, followed by the central region with 177 branches and the northeastern region with 56 branches.

- ATMs/CDMs:** Similar to bank branches, the number of ATM/CDM machines continued to decline. At the end of 2021, there were a total of 63,315 machines, a decrease of 1,817 from the previous year.

Despite the decline in their numbers, the proportion of ATMs/CDMs recorded at 957 machines per million inhabitants, on par with Australia and England, which totaled 1,051 and 835 machines per million inhabitants, respectively. The ratio was higher than those of cashless society countries such as Sweden and Singapore, which recorded only 193 and 528 machines per million inhabitants.

- Electronic Data Capture (EDC):** At the end of 2021, the number of EDC terminals reached 915,410 terminals, an increase of 34,073 terminals from last year. However, the proportion of EDC terminals recorded at 13,834 terminals per million inhabitants, lower than other countries such as Australia, England, Sweden, and Singapore, whose EDC ratios were 35,979, 38,476, 31,971 and 56,279 terminals per million inhabitants, respectively.



Figure 19: Numbers of ATMs/CDMs and EDCs per million capita of various countries

	 Thailand	 Malaysia	 Australia	 UK	 Sweden	 Singapore
No. of ATM/CDM machines*	957	N/A	1,051	835	193	528
No. of EDC terminals*	13,834	24,212	35,979	38,476	31,971	56,279

* End of 2020 data for other countries and end of 2021 data for Thailand and Malaysia

Source: BIS (2020) Statistics on payment, clearing and settlement systems in the CPMI countries. Bank of Thailand and Bank of Negara Malaysia (2021) Payment Statistics.

Meanwhile, digital payment terminals such as QR codes continued to gain popularity. More merchants, such as large stores, small retailers, street vendors, wet markets, flea markets, taxis, and motorbike taxis, have increasingly displayed QR codes to

accept payments to provide customers with more payment options and reduce cash payments. At the end of 2021, there were over 7.3 million QR payment acceptance points nationwide.





IV. Appendix





Glossary and abbreviation

ATM	Automated Teller Machine
BAHTNET	Bank of Thailand Automated High-Value Transfer Network
BOT	Bank of Thailand
CDM	Cash Deposit Machine
CBDC	Central Bank Digital Currency
e-Money	Electronic Money
EDC	Electronic Data Capture
EFTPOS	Electronic Funds Transfer at Point Of Sale
ICAS	Imaged Cheque Clearing and Archive System
ISO	International Organization for Standardization
KYC	Know Your Customer
KYM	Know Your Merchant
NDID	National Digital Identity
NITMX	National ITMX
Non-bank	Non-Financial Institutions
OIC	The Office of Insurance Commission
ORFT	Online Retail Funds Transfer
PDPA	Personal Data Protection Act
PDPC	The Office of the Personal Data Protection Commission
PSC	Payment Systems Committee
QR Code	Quick Response Code
RIA	Regulatory Impact Assessment
RTGS	Real Time Gross Settlement
SEC	The Securities and Exchange Commission
SFIs	Specialized Financial Institutions



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**Table 1: Basic statistical data**

	2016	2017	2018	2019	2020	2021
Population (millions)	65.9	66.2	66.4	66.6	66.2	66.2
GDP current price (billion Baht)	14,590.3	15,488.7	16,373.3	16,892.4	15,636.9	16,178.7
GDP per capita (Baht)	221,295	234,008	246,535	253,796	236,254	244,497
Exchange rate vis-à-vis US\$ (at year-end)	35.82	32.66	32.42	30.12	30.01	33.38

Sources: Bank of Thailand, Department of Provincial Administration, National Economic & Social Development Board

Table 2: Technological infrastructure

	2016	2017	2018	2019	2020	2021
Total fixed network telephone subscribers¹ (millions)	4.7	5.2	6.1	5.4	5.0	4.6
Total mobile telephone subscribers (millions)	118.4	121.5	125.1	129.6	116.3	120.8
Postpaid	22.7	26.5	29.4	32.6	32.6	35.2
Prepaid	95.6	95.0	95.7	97.0	83.7	85.6
Total Internet users (millions)	43.9	45.2	47.5	50.1	49.6	52.2
Penetration rates						
Fixed network telephone (%)	7.1	4.0	9.1	8.1	7.6	7.0
Mobile telephone (%)	179.5	183.6	188.4	194.7	175.7	182.6

Sources: Division of Telecommunication Economics Research and Information Center Telecommunication Policy and Resource

Management Bureau Office of National Broadcasting and Telecommunications Commission (NBTC)

¹ Data was reviewed and edited by source since 2017.**Table 3: Narrow money (at year-end, million Baht)**

	2016	2017	2018	2019	2020	2021
Narrow money (1+2)	1,864,165	2,038,860	2,095,155	2,214,391	2,529,200	2,883,750
1. Currency outside Depository Corp.& Central Gov.	1,335,952	1,437,558	1,504,449	1,590,842	1,812,689	2,069,505
Banknotes in circulation	1,627,997	1,734,078	1,784,153	1,859,539	2,094,450	2,319,376
Coins in circulation	63,986	68,755	73,599	77,344	80,300	82,183
Less: currency held by Central Gov.	1,115	830	875	1,424	1,845	2,839
Less: currency held by Depository Corp.	354,916	364,445	352,428	344,617	360,215	329,215
Held by commercial banks	301,309	306,968	297,832	287,914	304,285	272,012
Held by finance companies	0	0	0	0	1	1
Held by Specialized Financial Institution	53,211	57,240	54,341	56,360	55,611	56,988
Held by savings cooperatives	396	237	255	342	319	215
Held by money market mutual funds	0	0	0	0	0	0
2. Transferable deposits at Depository Corp.	528,213	601,302	590,706	623,549	716,511	814,245
Transferable deposits at Bank of Thailand	5,050	4,974	1,907	801	1,060	862
Transferable deposits at commercial banks	518,085	590,676	585,207	617,318	707,142	804,290
Transferable deposit at SFIs	5,078	5,652	3,592	5,430	8,308	9,093

Source: Bank of Thailand

Table 4: Settlement media used by non-banks (at year-end, billion Baht)

	2016	2017	2018	2019	2020	2021
Currency outside Depository Corp. & Central Gov. ¹	1,336	1,438	1,504	1,591	1,813	2,070
Transferable deposits at Depository Corp.	528	601	591	624	717	814
Narrow money	1,864	2,039	2,095	2,214	2,529	2,884
Broad money ²	18,289	19,206	20,110	20,841	22,952	24,062

Source: Bank of Thailand

¹ Banknotes outside depository corporations and coins issued by central government.² Narrow money and quasi money (other deposits at Depository Corp.+securities other than shares)

Table 5: Settlement media used by banks (at year-end, billion Baht)

	2016	2017	2018	2019	2020	2021
Balances held at central bank	110.1	123.0	135.3	127.9	152.0	174.7
Stock of high-quality liquid assets ¹	3,585.6	3,627.0	3,860.8	4,049.7	4,942.7	5,354.1
Required reserves	-	-	-	-	-	-
Free reserves	-	-	-	-	-	-
Transferable deposits at other banks	4.1	5.2	4.5	6.2	6.3	7.2
Memorandum item:						
Institutions borrowing from central bank	69.5	33.9	3.4	0.0	106.1	242.0

Source: Bank of Thailand

¹ From 2016, depending on Bank of Thailand Notification No. FMOG 56/2558, Prescription on the Maintenance of Reserve Requirement by Commercial Banks, Commercial banks are required to maintain reserve assets on average over a fortnightly period, starting on a Wednesday and ending on a second Tuesday thereafter, equaled to 1 percent of the previous period's average level of commercial banks' deposits and short-term foreign liabilities base.

Table 6: Indicators of the use of various cashless payment instruments - Volume of transactions (in thousands)

	2016	2017	2018	2019	2020	2021
Paper-based:	118,754	113,783	109,964	99,769	82,662	69,277
In-house cheque ¹	49,309	48,001	46,684	42,299	34,935	28,068
Interbank cheque	69,446	65,782	63,280	57,469	47,727	41,209
Electronic payment cards:	4,003,352	4,348,061	4,701,143	5,137,506	5,111,260	5,245,935
ATM card	411,513	301,822	237,597	182,047	128,992	120,296
for cash withdrawal via ATM	318,681	239,280	200,285	163,155	121,118	113,111
for other purposes ²	92,832	62,542	37,312	18,892	7,874	7,185
Debit card ³	2,015,466	2,231,425	2,352,871	2,271,979	2,135,853	1,820,160
for cash withdrawal via ATM	1,505,916	1,690,437	1,847,291	1,837,496	1,747,801	1,435,145
for purchasing purpose via EFTPOS	71,008	91,656	123,239	136,923	141,213	169,590
for other purposes ⁴	438,543	449,332	382,341	297,560	246,839	215,425
Credit card ⁵	500,072	542,579	599,664	717,783	710,264	768,108
for purchasing purpose	465,730	510,763	565,803	679,089	674,490	732,901
for other purposes ⁶	34,343	31,816	33,861	38,695	35,774	35,207
e-Money ⁷	1,076,300	1,272,235	1,511,011	1,965,696	2,136,151	2,537,371
Automated:	392,645	415,546	460,813	524,874	719,144	1,031,156
Direct credit ⁸	234,202	244,733	276,667	327,169	464,202	776,591
Direct debit ⁹	107,630	114,944	123,636	132,571	153,684	159,825
ITMX Bulk Payment	46,801	51,646	56,054	60,484	96,564	89,991
BAHTNET ¹⁰	4,013	4,224	4,456	4,651	4,694	4,749

Source: Bank of Thailand

¹ Some banks do not report in-house provincial cheques and inter-provincial cheques.

² Data include purchasing goods and services, deposit and funds transfer.

³ Domestic and oversea spending of Thai debit cards and domestic spending of foreign debit cards.

⁴ Data include purchasing goods and services via other channels, deposit and funds transfer.

⁵ Domestic and oversea spending of Thai credit cards and domestic spending of foreign credit cards.

⁶ Data include cash withdrawal, cash advance, deposit and funds transfer.

⁷ Data exclude top-up cards.

⁸ Intra-bank pre-authorized direct credit.

⁹ Intra-bank pre-authorized direct debit.

¹⁰ Data include funds transfer, third party funds transfer and Multilateral Funds Transfer.

Table 7: Indicators of the use of various cashless payment instruments - Value of transactions (billion Baht)

	2016	2017	2018	2019	2020	2021
Paper-based:	60,895	59,530	56,812	52,247	42,852	37,560
In-house cheque ¹	23,762	23,651	21,780	18,344	15,199	12,358
Interbank cheque	37,133	35,879	35,031	33,904	27,653	25,202
Electronic payment cards:	15,367	15,176	14,496	12,725	10,587	9,492
ATM card	1,951	1,476	1,168	837	505	506
for cash withdrawal via ATM	1,403	1,076	888	668	428	424
for other purposes ²	548	400	280	169	77	82
Debit card ³	11,500	11,662	11,113	9,377	7,939	6,685
for cash withdrawal via ATM	6,876	7,389	7,471	6,782	5,992	5,040
for purchasing purpose via EFTPOS	161	187	225	233	179	171
for other purposes ⁴	4,463	4,085	3,417	2,362	1,768	1,474
Credit card ⁵	1,825	1,912	2,010	2,232	1,834	1,833
for purchasing purpose	1,574	1,672	1,758	1,964	1,631	1,653
for other purposes ⁶	251	240	252	268	204	180
e-Money ⁷	90.9	126.2	204.0	279.3	309.6	468.0
Automated:	901,257	918,687	882,366	852,770	980,941	941,707
Direct credit ⁸	16,623	18,000	19,827	20,825	21,644	24,263
Direct debit ⁹	7,588	7,567	7,727	7,096	7,429	6,897
ITMX Bulk Payment	2,941	3,060	3,436	3,924	4,258	4,937
BAHTNET ¹⁰	874,106	890,060	851,375	820,925	947,610	905,610

Source: Bank of Thailand

¹ Some banks do not report in-house provincial cheques and inter-provincial cheques.

² Data include purchasing goods and services, deposit and funds transfer.

³ Domestic and overseas spending of Thai debit cards and domestic spending of foreign debit cards.

⁴ Data include purchasing goods and services via other channels, deposit and funds transfer.

⁵ Domestic and overseas spending of Thai credit cards and domestic spending of foreign credit cards.

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⁷ Data exclude top-up cards.

⁸ Intra-bank pre-authorized direct credit.

⁹ Intra-bank pre-authorized direct debit.

¹⁰ Data include funds transfer, third party funds transfer and Multilateral Funds Transfer.

Table 8: Use of credit cards and debit cards via EFTPOS (monthly average per card, Baht)

	2016	2017	2018	2019	2020	2021
Credit card ¹	4,988	5,081	4,955	5,126	4,469	4,134
Debit card ²	196	224	241	303	232	221

Source: Bank of Thailand

¹ Domestic and overseas spending of Thai credit cards via EFTPOS and domestic spending of foreign credit cards.

² Domestic and overseas spending of Thai debit cards via EFTPOS and domestic spending of foreign debit cards.

Table 9: Cash withdrawal via ATM (monthly average per card, Baht)

	2016	2017	2018	2019	2020	2021
ATM card	5,658	4,764	4,154	3,380	3,266	3,261
Debit card ¹	10,885	10,679	9,798	8,820	7,786	6,536

Source: Bank of Thailand

¹ Domestic and overseas cash withdrawal of Thai debit cards via ATM and domestic cash withdrawal of foreign debit cards.

**Table 10: Notes and coins (at year-end, million Baht)**

	2016	2017	2018	2019	2020	2021
Notes and coins	1,773,469	1,878,237	1,933,082	1,986,827	2,269,785	2,491,668
Notes:	1,709,483	1,809,482	1,859,483	1,909,483	2,189,485	2,409,485
500000 Baht	152	157	160	160	161	161
1000 Baht	1,317,006	1,402,484	1,460,469	1,506,320	1,748,763	1,930,172
500 Baht	173,682	184,638	164,088	162,662	178,387	206,070
100 Baht	155,103	152,363	159,570	162,991	182,012	189,965
80 Baht	152	152	152	152	152	152
70 Baht	1,393	1,393	1,393	1,393	1,393	1,393
60 Baht	1,247	1,247	1,247	1,247	1,247	1,247
50 Baht	19,208	22,941	25,728	26,514	28,251	29,702
20 Baht	37,885	40,453	43,022	44,391	45,464	46,968
10 Baht	3,329	3,328	3,328	3,327	3,327	3,327
5 Baht	196	196	196	196	196	196
1 Baht	121	121	121	121	121	121
50 Satang	9	9	9	9	9	9
Coins:	63,986	68,755	73,599	77,344	80,300	82,183

Source: Bank of Thailand

Table 11: Institutional infrastructure

	2016	2017	2018	2019	2020	2021
Central Bank						
Number of Institutions	1	1	1	1	1	1
Number of Branches	3	3	3	3	3	3
Number of Accounts ¹	186	184	184	181	195	196
Value of Accounts (million Baht) ¹	265,970	352,586	546,015	482,091	665,815	551,186
Thai Commercial Banks						
Number of Institutions	19	19	19	19	19	18
Number of Branches	6,998	6,766	6,717	6,491	6,150	5,633
Number of Accounts	90,648,406	94,846,533	99,882,718	101,635,499	106,540,470	113,745,234
Value of Accounts (million Baht)	12,433,454	13,062,173	13,591,551	13,272,010	14,748,055	15,331,447
Specialized Financial Institutions						
Number of Institutions	6	6	6	6	6	6
Number of Branches	2,468	2,471	2,475	2,477	2,475	2,463
Number of Accounts	68,569,387	74,242,903	72,594,911	76,547,332	81,752,909	83,772,832
Value of Accounts (million Baht)	4,450,107	4,686,137	4,940,815	5,095,488	5,513,693	5,828,172
Foreign Bank Branches						
Number of Institutions	11	11	11	11	11	11
Number of Branches	18	18	18	17	17	17
Number of Accounts	68,580	68,819	71,202	80,680	86,779	89,247
Value of Accounts (million Baht)	908,302	814,701	812,854	872,996	793,769	866,702

Sources: Bank of Thailand

¹Data exclude regional office.

Table 12: Payment instructions handled by selected interbank settlement systems
Volume of transactions (in thousands)

	2016	2017	2018	2019	2020	2021
Paper-based:	69,446	65,782	63,280	57,469	47,728	41,209
Intra-provincial Cheque in Bangkok and vicinity ¹	47,322	44,664	42,663	38,629	31,532	26,686
Intra-provincial Cheque in Regional Area ²	10,775	10,421	10,212	9,418	8,011	7,226
Inter-provincial Cheque ³	11,350	10,698	10,404	9,423	8,185	7,297
Automated:	192,450	178,878	152,675	125,967	145,173	128,824
BAHTNET ⁴	4,013	4,224	4,456	4,651	4,694	4,749
ITMX Bulk Payment	46,789	51,646	56,054	60,484	96,564	89,991
ORFT-ATM	141,648	123,009	92,165	60,832	43,915	34,084

Sources: Bank of Thailand and National ITMX Co., Ltd.

¹ ICAS was implemented to replaced ECS on 4 February 2012.

² Provincial Cheque Clearing migrated to ICAS since 15 November 2012 and implemented nationwide in December 2013.

³ Inter-provincial Cheques cleared via ICAS since 16 May 2013.

⁴ Data include funds transfer, third party funds transfer and Multilateral Funds Transfer.

Table 13: Payment instructions handled by selected interbank settlement systems
Value of transactions (billion Baht)

	2016	2017	2018	2019	2020	2021
Paper-based:	37,133	35,879	35,031	33,904	27,654	25,202
Intra-provincial Cheque in Bangkok and vicinity ¹	32,852	31,642	30,796	29,964	24,318	22,079
Intra-provincial Cheque in Regional Area ²	3,245	3,189	3,189	3,011	2,558	2,388
Inter-provincial Cheque ³	1,036	1,048	1,046	929	777	735
Automated:	877,955	893,909	855,420	825,262	952,162	910,793
BAHTNET ⁴	874,106	890,060	851,375	820,925	947,610	905,610
ITMX Bulk Payment	2,939	3,060	3,436	3,924	4,258	4,937
ORFT-ATM (Online Retail Funds Transfer)	910	789	609	413	294	246

Sources: Bank of Thailand and National ITMX Co., Ltd.

¹ ICAS was implemented to replaced ECS on 4 February 2012.

² Provincial Cheque Clearing migrated to ICAS since 15 November 2012 and implemented nationwide in December 2013.

³ Inter-provincial Cheques cleared via ICAS since 16 May 2013.

⁴ Data include funds transfer, third party funds transfer and Multilateral Funds Transfer.

Table 14: Securities transfer instructions handled by securities settlement systems - Volume of transactions

	2016	2017	2018	2019	2020	2021
Bond registry system:						
Government securities	511	414	429	736	578	517
Book-entry system:						
Equity securities (in millions)	5.5	5.9	6.1	5.8	6.4	8.2
Government securities (in millions)	0.2	0.2	0.2	0.2	0.3	0.3

Sources: Bank of Thailand and Thailand Securities Depository Co., Ltd.

Table 15: Securities transfer instructions handled by securities settlement systems
Value of transactions (billion Baht)

	2016	2017	2018	2019	2020	2021
Bond registry system:						
Government securities	94.4	82.7	62.8	64.6	46.3	25.3
Book-entry system:						
Equity securities	1,209.1	1,055.4	1,406.7	1,228.0	1,360.2	1,332.0
Government securities	116,869.6	124,323.1	125,642.2	120,280.0	153,590.0	166,640.0

Sources: Bank of Thailand and Thailand Securities Depository Co., Ltd.

Table 16: Number of participants in selected payment and settlement systems

	2016	2017	2018	2019	2020	2021
BAHTNET ¹	66	64	67	66	62	61
Intra-provincial Cheque in Bangkok and vicinity ²	38	36	36	36	36	36
Intra-provincial Cheque in Regional Area ³	23	23	22	22	22	22
Inter-provincial Cheque ⁴	35	36	36	36	35	36
ITMX Bulk Payment	32	33	32	32	32	32
Bond registry system:						
Government securities	461,723	462,309	579,429	661,064	661,273	661,874
Book-entry system:						
Equity securities and Government securities	39	39	39	40	40	40

Sources: Bank of Thailand and Thailand Securities Depository Co., Ltd.

¹Data include funds transfer, third party funds transfer and Multilateral Funds Transfer.

²ICAS was implemented to replaced ECS on 4 February 2012.

³Provincial Cheque Clearing migrated to ICAS since 15 November 2012 and implemented nationwide in December 2013.

⁴Inter-provincial Cheques cleared via ICAS since 16 May 2013.

Table 17: Number of Automated machines¹ and EFTPOS terminals²

	2016	2017	2018	2019	2020	2021
Total of Automated machines	66,812	67,376	67,641	66,652	65,132	63,315
Bangkok	17,547	17,367	16,968	16,455	15,780	14,694
Central	23,027	23,649	23,900	23,862	23,643	23,598
Northeast	10,257	10,267	10,390	10,294	10,304	10,315
North	7,630	7,634	7,772	7,722	7,602	7,431
South	8,351	8,459	8,611	8,319	7,803	7,277
Total of EFTPOS terminals	470,835	708,976	870,454	876,149	881,337	915,410
Bangkok	194,002	260,677	338,831	352,943	355,985	364,248
Central	127,983	203,030	252,439	254,177	257,528	272,385
Northeast	42,102	78,439	90,311	87,701	90,789	95,647
North	47,571	81,204	92,405	86,533	86,533	90,087
South	59,177	85,626	96,468	94,795	90,502	93,043

Source: Bank of Thailand

¹Automated Teller Machines (ATM) and Cash Deposit Machines (CDM)

²Data include commercial banks and some credit card companies.

**Table 18: Number of electronic payment cards**

	2016	2017	2018	2019	2020	2021
Total	94,020,965	97,984,264	101,831,553	104,089,905	99,343,778	101,211,658
Credit card ¹	20,230,257	20,571,634	22,373,369	23,998,653	24,603,787	25,145,787
ATM card	19,638,033	18,380,892	17,390,984	15,318,234	10,688,019	11,219,440
Debit card	54,152,675	59,031,738	62,067,200	64,773,018	64,051,972	64,846,431

Source: Bank of Thailand

¹Data include non-bank.**Table 19: Sources of payment revenues of Thai commercial banks (million Baht)¹**

	2016	2017	2018	2019	2020	2021
Total	87,648	92,197	92,918	92,859	81,880	79,384
Credit card	33,210	34,009	36,364	38,393	30,498	29,722
ATM/Debit card and e-banking	31,575	33,350	33,354	33,255	29,655	27,806
Money transfer and collection	21,051	23,227	21,682	19,742	20,567	20,874
Cheque-related fee	1,812	1,611	1,518	1,469	1,160	982

Source: Bank of Thailand

¹From 2013, data exclude securities custodian and letter of credit**Table 20: Sources of payment revenues of foreign bank branches (million Baht)¹**

	2016	2017	2018	2019	2020	2021
Total	4,153	4,289	4,573	4,955	4,381	4,389
Credit card	2,903	2,935	3,291	3,713	3,189	2,969
ATM/Debit card and e-banking	42	45	44	44	103	91
Money transfer and collection	1,109	1,216	1,154	1,118	1,025	1,275
Cheque-related fee	99	93	84	80	64	54

Source: Bank of Thailand

¹From 2013, data exclude securities custodian and letter of credit**Table 21: Daily averages of BOT payment services - Volume of transactions**

	2016	2017	2018	2019	2020	2021
BAHTNET ¹	16,446	17,310	18,188	19,061	19,317	19,705
Intra-provincial Cheque in Bangkok and vicinity ²	193,941	183,047	174,136	158,317	129,760	110,730
Intra-provincial Cheque in Regional Area ³	44,160	42,708	41,682	38,597	32,968	29,983
Inter-provincial Cheque ⁴	46,516	43,845	42,467	38,617	33,683	30,278
ITMX Bulk Payment	191,758	211,663	228,792	247,884	397,383	373,407

Source: Bank of Thailand

¹Data include funds transfer, third party funds transfer and Multilateral Funds Transfer.²ICAS was implemented to replaced ECS on 4 February 2012.³Provincial Cheque Clearing migrated to ICAS since 15 November 2012 and implemented nationwide in December 2013.⁴Inter-provincial Cheques cleared via ICAS since 16 May 2013.**Table 22: Daily averages of BOT payment services - Value of transactions (billion Baht)**

	2016	2017	2018	2019	2020	2021
BAHTNET ¹	3,582	3,648	3,475	3,364	3,900	3,758
Intra-provincial Cheque in Bangkok and vicinity ²	135	130	126	123	100	92
Intra-provincial Cheque in Regional Area ³	13.3	13.1	13.0	12.3	10.5	9.9
Inter-provincial Cheque ⁴	4.2	4.3	4.3	3.8	3.2	3.0
ITMX Bulk Payment	12.0	12.5	14.0	16.1	17.5	20.5

Source: Bank of Thailand

¹Data include funds transfer, third party funds transfer and Multilateral Funds Transfer.²ICAS was implemented to replaced ECS on 4 February 2012.³Provincial Cheque Clearing migrated to ICAS since 15 November 2012 and implemented nationwide in December 2013.⁴Inter-provincial Cheques cleared via ICAS since 16 May 2013.

**Table 23: Peak day figures of BOT payment services - Volume of transactions**

	2016	2017	2018	2019	2020	2021
BAHTNET ¹	28,827	28,077	36,044	30,433	42,581	38,567
Intra-provincial Cheque in Bangkok and vicinity ²	445,684	429,714	386,101	313,828	272,614	301,207
Intra-provincial Cheque in Regional Area ³	83,358	79,595	83,420	69,958	56,273	58,337
Inter-provincial Cheque ⁴	190,831	186,206	187,085	146,742	129,930	130,156
ITMX Bulk Payment	615,266	744,926	790,750	705,591	1,885,551	2,776,787

Source: Bank of Thailand

¹Data include funds transfer, third party funds transfer and Multilateral Funds Transfer.²ICAS was implemented to replaced ECS on 4 February 2012.³Provincial Cheque Clearing migrated to ICAS since 15 November 2012 and implemented nationwide in December 2013.⁴Inter-provincial Cheques cleared via ICAS since 16 May 2013.**Table 24: Peak day figures of BOT payment services - Value of transactions (billion Baht)**

	2016	2017	2018	2019	2020	2021
BAHTNET ¹	4,610.3	4,845.0	4,684.5	4,875.3	5,664.3	5,805.0
Intra-provincial Cheque in Bangkok and vicinity ²	248.6	212.6	248.9	218.0	160.6	181.0
Intra-provincial Cheque in Regional Area ³	22.4	22.3	22.2	21.4	16.8	15.3
Inter-provincial Cheque ⁴	13.7	13.4	15.8	10.7	9.7	10.5
ITMX Bulk Payment	83.1	47.7	63.4	52.1	68.5	82.5

Source: Bank of Thailand

¹Data include funds transfer, third party funds transfer and Multilateral Funds Transfer.²ICAS was implemented to replaced ECS on 4 February 2012.³Provincial Cheque Clearing migrated to ICAS since 15 November 2012 and implemented nationwide in December 2013.⁴Inter-provincial Cheques cleared via ICAS since 16 May 2013.**Table 25: Use of mobile banking**

	2016	2017	2018	2019	2020	2021
No. of agreements	20,883,147	31,779,042	46,004,931	60,084,598	68,696,872	84,291,262
Volume of transactions	584,983,180	1,228,270,303	2,727,906,573	5,041,044,908	8,875,629,084	14,607,400,874
Value of transactions (billion Baht)	5,361	8,997	16,828	27,277	38,924	55,055

Source: Bank of Thailand

Table 26: Use of internet banking

	2016	2017	2018	2019	2020	2021
No. of agreements	15,095,696	19,899,583	23,861,834	29,404,921	34,946,211	38,941,665
Volume of transactions ¹	240,461,111	248,478,233	418,783,675	507,029,519	476,923,355	668,676,700
Value of transactions (billion Baht)	29,706	23,513	27,177	26,764	25,694	31,341

Source: Bank of Thailand

¹Enquiry transactions were excluded.

Table 27: Interbank funds transfer - Volume of transactions (in thousands)

	2016	2017	2018	2019	2020	2021
Total	298,975	463,248	1,177,194	2,502,335	5,067,477	9,346,427
ATM	141,648	123,009	92,165	60,832	43,915	34,084
Counter	9,702	8,781	6,802	5,296	3,590	2,696
Internet banking and mobile banking	147,624	331,458	1,078,227	2,436,207	5,019,972	9,309,647

Source: Bank of Thailand

Table 28: Interbank funds transfer - Value of transactions (billion Baht)

	2016	2017	2018	2019	2020	2021
Total	2,184	3,042	6,870	13,394	20,712	32,133
ATM	910	789	609	413	294	246
Counter	183	171	145	125	99	88
Internet banking and mobile banking	1,091	2,082	6,116	12,856	20,319	31,799

Source: Bank of Thailand

Table 29: Bill payment at counters - Volume of transactions (in thousands)

	2016	2017	2018	2019	2020	2021
Total	479,106	510,820	475,062	382,739	305,676	347,065
Total bill payment at bank counters	113,367	120,891	104,171	69,002	57,047	46,169
Cash	104,354	107,590	88,578	63,508	51,679	40,677
Cheque	3,007	3,624	3,627	3,221	2,905	2,513
Others	6,006	9,677	11,967	2,272	2,463	2,980
Total bill payment at non-bank counters	365,739	389,929	370,891	313,737	248,629	300,896
Cash	362,038	385,640	367,768	311,211	246,867	299,558
Cheque	358	362	377	370	331	291
Others	3,342	3,927	2,746	2,156	1,430	1,047

Source: Bank of Thailand

Table 30: Bill payment at counters - Value of transactions (billion Baht)

	2016	2017	2018	2019	2020	2021
Total	7,461	7,906	6,994	5,537	4,792	4,217
Total bill payment at bank counters	6,608	7,010	6,123	4,716	4,137	3,641
Cash	2,802	3,077	2,856	2,180	1,860	1,719
Cheque	2,705	2,970	2,324	1,570	1,404	1,122
Others	1,102	963	943	966	874	800
Total bill payment at non-bank counters	853	896	871	821	655	576
Cash	845	887	863	814	649	572
Cheque	4	4	5	4	3	3
Others	4	5	4	3	2	2

Source: Bank of Thailand



Table 31: Use of e-Money¹

	2016	2017	2018	2019	2020	2021
No. of cards/accounts	39,181,287	53,171,877	91,747,747	82,343,836	96,733,993	116,332,334
Volume of transactions	1,076,300,313	1,272,235,125	1,511,010,671	1,965,696,357	2,136,397,113	2,537,482,323
Value of transactions (million Baht)	90,946	126,172	204,038	279,305	309,551	467,317

Source: Bank of Thailand

¹Data exclude top-up cards.

Table 32: Fraud through specific payment channels and payment instruments¹ (million Baht)

	2016	2017	2018	2019	2020	2021
Total fraud	593	753	896	1,204	732	1,557
Payment channels ²	224	377	519	674	237	349
Payment instruments ³	369	376	377	530	495	1,208

Source: Bank of Thailand

¹Data collect from banks, some special financial institutions and some credit card companies.

²Fraud through cheque payment and specific payment channels include phone banking, mobile banking, internet banking, pass book and other channels.

³Fraud via specific payment instruments include credit card, ATM card, debit card, prepaid card and other cards.

Notes of statistical tables

Symbols used in tables	Explanation
"-"	No data
"nav."	Data not available
"neg."	Negligible in value compared to all other
"0"	Zero or near zero in value

Table 1 - Gross Domestic Product expressed in current price

- Using the average foreign exchange rate

Table 6-7 - Data on cheque includes both in-house and interbank cheques and is compiled from all commercial banks as well as Specialized Financial Institutions

- Data on volume of credit card transactions includes bank cards, affinity

cards, non-bank cards/affinity cards, and foreign credit cards used in Thailand

- Data on credit card spending includes information on non-bank credit cards

- Data on e-Money excludes pre-paid card for mobile phones

- Direct credit refers to pre-authorized in-house direct credit funds transfers

- Direct debit refers to pre-authorized in-house direct debit funds transfers



	- BAHTNET data consists of data relating to interbank funds transfers, third party funds transfers and multilateral funds transfers
Table 8	- Average value of monthly transactions by debit cards and credit cards via EFTPOS terminals within and outside the country
Table 11	- Excludes data on the number of accounts and outstanding amounts held by Bank of Thailand's regional offices
Table 12-13	- BAHTNET data includes data relating to interbank funds transfers, third-party funds transfer and multilateral funds transfer
Table 14-15	- Equity securities settlements are processed via scripless book-entry system only
Table 17	- Include ATMs and CDMs - Data on the number of EFTPOS terminals represents information consolidated from commercial banks and some credit card companies
Table 18	- Data on the number of credit cards includes non-bank credit cards
Table 21-24	- BAHTNET data includes data relating to interbank funds transfers, third-party funds transfer and multilateral funds transfer
Table 26	- Excluding enquiry transactions
Table 31	- Electronic money data does not include data on top up of mobile cards

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