

Payment Systems Report

2019



BANK OF THAILAND



The First Step of
the Payment Systems Roadmap No.4





BANK OF THAILAND

Payment Systems Report 2019



Executive Summary

Amidst the transition into the digital era, the Bank of Thailand (BOT) has pushed forward payment systems policies and payment innovation to continually promote efficient, stable, and secure Thai payment systems in pursuit of digital payments. The ongoing efforts have resulted in the steady advancement of the Thai payment systems as laid out by the previous three Payment Systems Roadmaps.

The year 2019 marked the “first step” of the Payment Systems Roadmap No.4., which aims to create an ecosystem conducive for digital payments to be the most preferred choice for the Thais within a three-year time frame (2019-2021) through 5 strategic development frameworks. Starting from the Interoperable Infrastructure framework, efforts to enhance payment systems infrastructure through the adoption of the ISO 20022 standard has increased

capability in transmitting richer business data along with payment transactions, paving the way for the Innovation framework or enhancing payment services with innovations and modern technologies involved the introduction of the Thai QR payment standard with MyPromptQR, the first payment service to adopt ISO 20022 that allows merchants to scan customers’ QR code, and the promotion of cross-border payment systems connectivity through QR payments with Singapore, Lao PDR, and Japan. Further, modern technologies such as biometrics and Blockchain technology were unleashed to enhance payment services and supplement with regulations governing their usages. The development of electronic authentication infrastructure (e-KYC) through the National Digital Identity (NDID) platform was another augmentation supporting future digital transactions.



The Inclusion framework is another vital step towards improving public access to digital payment. QR payment acceptance points have been expanded nationwide to small vendors and retail stores. At present, there were 6 million QR payment acceptance points nationwide, both in-store and online. Efforts to promote inclusion also included expanding digital payment usage of public-facing government agencies such as welfare payments and electronic tax refunds and promoting understandings and uses of digital payments continually. Regarding the Information framework, the BOT promoted more efficient utilization of payment data so as to enhance financial access for the public and business sectors, encourage service providers' new financial products and services developments, support national policies formulation, and assist the oversight and supervision of payment service providers. These efforts founded an essential step towards the digital economy of the Thai financial sector.

In addition, another indispensable aspect is the Immunity framework. To ensure payment systems stability, the BOT has strengthened the supervisory framework of both critical payment system infrastructures and retail payment service providers to correspond to risks and rapidly changing technology as well as prepared the Thai financial sector to keep up with cyber threats to promote confidence in digital payment services. This "first step" of the Roadmap No.4 established a solid stepping stone for the subsequent phases in pursuing the goal of promoting digital payments as the most preferred choice of payments for the Thais in the future.





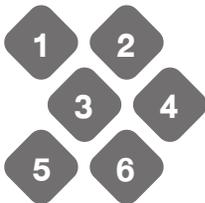
Payment Systems Committee

Chairman
Mr. Veerathai Santiprabhob
Governor



Vice Chairman
Mr. Ronadol Numnonda
Deputy Governor
Financial Institutions Stability

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.



1. Committee Member
Mr. Paiboon Kittisrikangwan
Deputy Governor
Corporate Development

2. Committee Member
Mr. Predee Daochai
Chairman, the Thai
Bankers' Association

3. Committee Member
Mr. Vuttikrai Leewiraphan
Director General Department
of Business Development

4. Committee Member
Mr. Sak Segkhoonthod
Digital Transformation
Consultant, Electronic
Transactions Development
Agency

5. Committee Member
Mr. Auttapol Rerkpiboon
President and Chief
Executive Officer
PTT Public Company
Limited

6. Secretary
Miss Siritida Panomwon Na Ayudhya
Assistant Governor
Payment Systems Policy and
Financial Technology Group

As of 30 June 2020



Key Payment Statistics in 2018 – 2019

	2018	2019	
Total population	66.4	66.6	Million
Nominal Gross Domestic Product (GDP)	16,365.6	16,879.0	Billion Baht

Technological Infrastructure

Number of fixed-line telephone numbers	4.4	3.9	Numbers per 100 persons
Number of mobile phone subscribers	188.4	194.7	Numbers per 100 persons

Payment Statistics

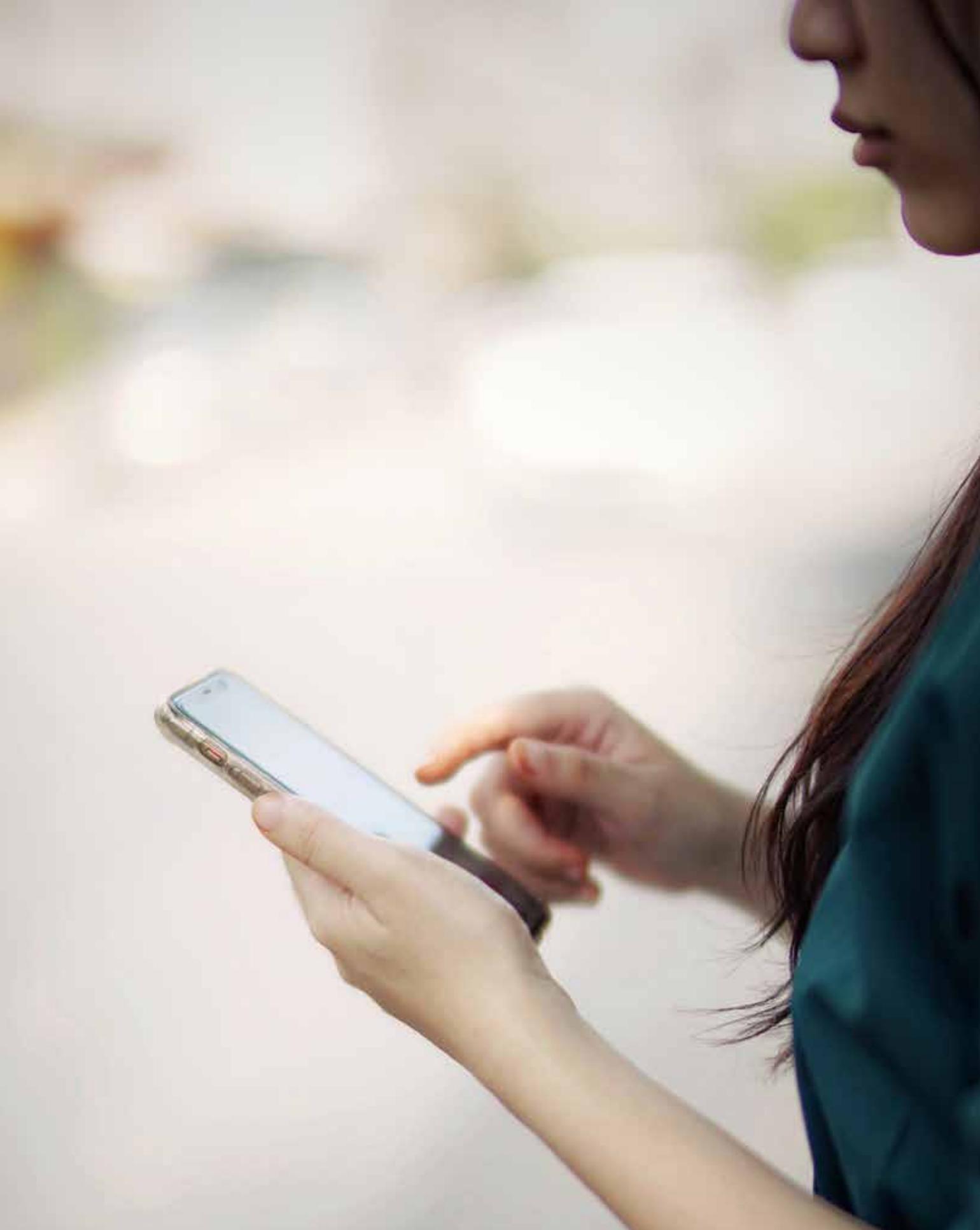
Number of Thai commercial bank branches	6,717	6,491	Branches
Number of Foreign commercial bank branches	18	17	Branches
Number of 6 Specialized Financial Institutions branches	2,475	2,477	Branches
Number for Automated machines (ATMs/CDMs) ¹	67,641	66,652	Terminals
Number for EFTPOS terminals ²	870,454	876,149	Terminals
Number of ATM cards	17,390,984	15,318,234	Cards
Number of Debit cards	62,067,200	64,773,018	Cards
Number of Credit cards	22,373,369	23,998,653	Cards
Currency in circulation per capita	22,652.60	23,901.25	Baht per person
Average cheque usage per capita	1.7	1.5	Cheque per person per year
Monthly average value of credit card payments ³	4,955	5,126	Baht per card
Monthly average value of cash withdrawals via ATM card	4,154	3,380	Baht per card
Monthly average value of debit card payments ⁴	241	303	Baht per card
Monthly average value of cash withdrawals via debit card	9,798	8,820	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

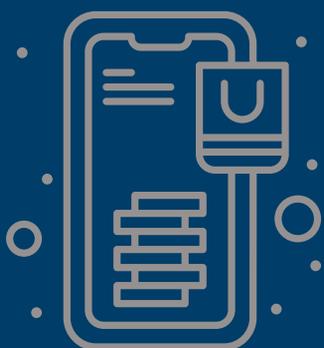
⁴ Refers only to payments for goods and services made with domestically issued debit cards at EFTPOS terminals in Thailand and overseas.





Payment in Thailand 2562/2019

Mobile/Internet
banking



No. of accounts (Million accounts)

89.5

Total volume (Million transactions)

5,609.7

Total value (Trillion Baht)

54.3

PromptPay



registrations
(IDs)

49,761,490

registered with Citizen ID

30,285,083

registered with mobile
phone number

18,861,196

Transaction volume per day

9.6 Million transactions

Transaction value per day

47.8 Billion Baht





No. of bank branches

8,985



No. of ATM cards (cards)

15,318,234

No. of Debit cards (cards)

64,773,018

No. of Credit cards (cards)

23,998,653



No. of EDCs (terminals)

876,149

QR Code



No. of Acceptance points (points)

6,000,000

PAYMENT IN THAILAND 2561/2018

Mobile/Internet banking

No. of accounts

69.9 Million accounts

Total volume

3,146.7 Million transactions

Total value

44.0 Trillion Baht

PromptPay

Registrations

46,554,279

registered with Citizen ID

29,314,279

registered with mobile phone number

16,842,898

Transaction volume per day

4.8 Million transactions

Transaction value per day

26.8 Billion Baht

No. of bank branches

9,210

No. of ATM cards

17,390,984

No. of Debit cards

62,067,200

No. of Credit cards

22,373,369

No. of EDCs

870,454

QR Code

No. of Acceptance points

4.6 Million points



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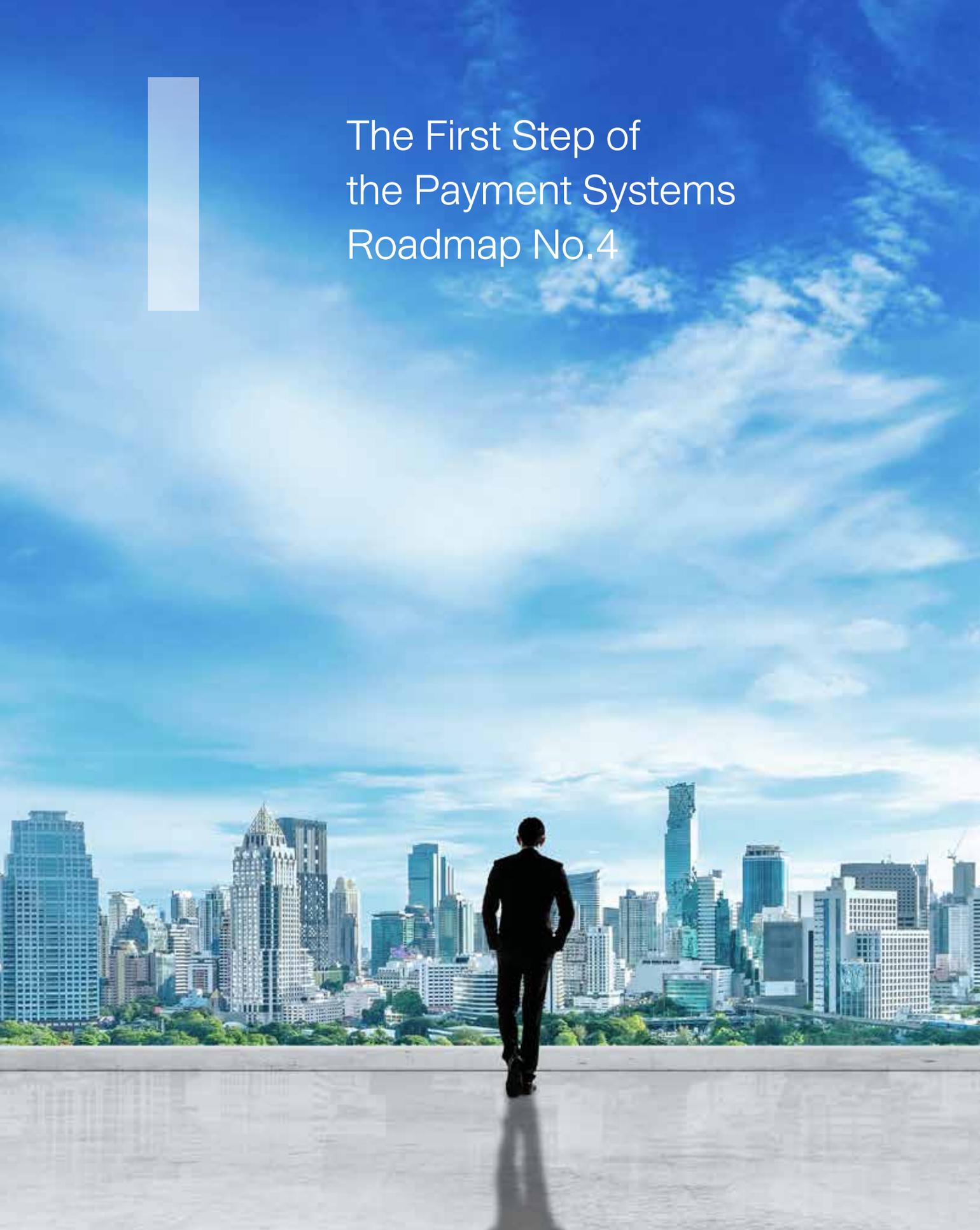
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The First Step of
the Payment Systems
Roadmap No.4



Major developments in 2019

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PromptPay

PromptPay grew significantly in volume with a new high of 12.7 million transactions per day (September 2019)



ISO 20022

Introducing the adoption of ISO 20022 standard in the payment systems with MyPromptQR



Payment data

Initiating payment data integration and data utilization for the benefit of all sectors



Fintech

Promoting the development of financial technology and innovation through the Fintech Fair and Blockchain the series



Oversight

Enhancing supervisory framework through on-going supervision and issuance of key regulations such as Know Your Customer for activating the use of e-Money services



2
4
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8
10

Thai QR standard

Issuing Policy Guideline: Standardized Thai QR code for remittance and payment transactions

QR payment

Expanding QR payment to retail stores with more than 6 million acceptance points nationwide (end of 2019)

Biometrics

Applying biometrics technology for safe and efficient identity verification and authentication.

Cyber resilience

Strengthening Thai financial sector cybersecurity readiness with rigorous regulations and risk-based supervision

Cross-border payment

Collaborating to promote payment systems connectivity through the MOUs with ASEAN and other countries



The BOT formulated the Payment Systems Roadmap No.4 envisioning digital payments to be the most preferred choice in efficient, secure, and low-cost payment systems that meet customers' needs. The Roadmap delineates five development frameworks: Interoperable Infrastructure, Innovation, Information, Inclusion, and Immunity.

Interoperable Infrastructure

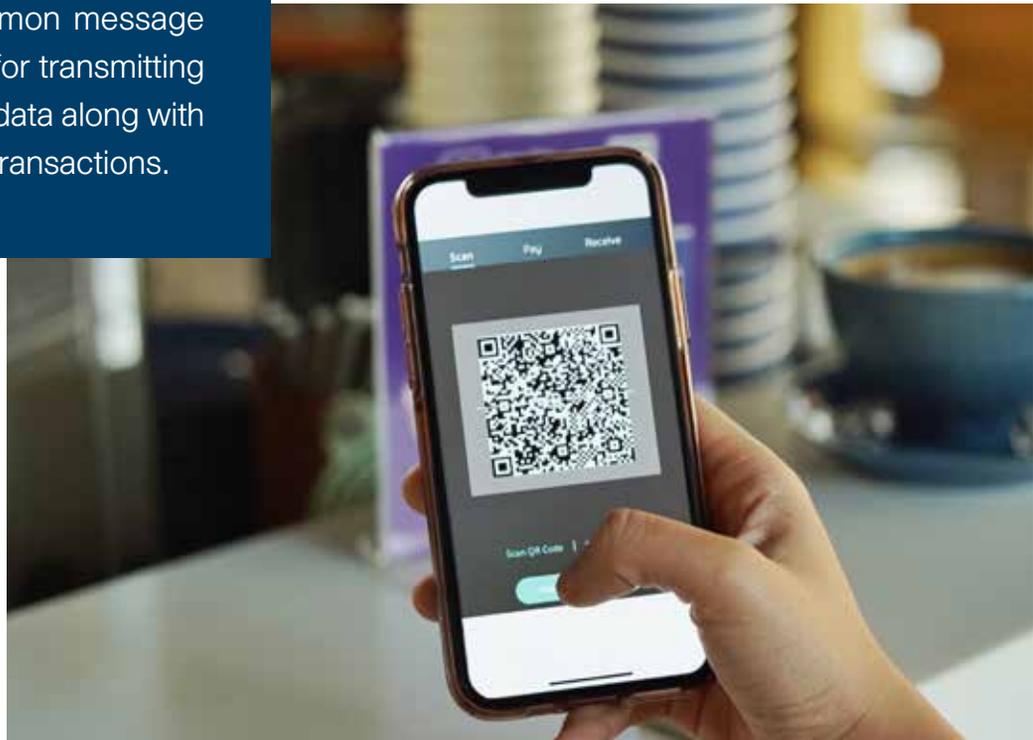
Promoting payment systems infrastructure in
accordance with ISO 20022





Today's technological advancement is a critical contributing factor to rapid increases in digital payment transactions and transformation to digital businesses. It is a key driving force to improve resiliency, security, interoperability, and compliance with international standards of Thai payment infrastructures.

BOT promoted the adoption of ISO 20022 as a common message standard for transmitting business data along with payment transactions.



One of the BOT's key initiatives in 2019 was promoting the adoption of ISO 20022 standard in the payment systems as a common message standard for transmitting business data and enhancing interoperability of domestic and international payment systems. Such adoption helped increase capability in transmitting richer business data along with payment transactions and enable various innovation development for future fund transfers and payment services.



ISO 20022 is an international message standard for transmitting financial transactions between banking, businesses, and government agencies, such as payments, securities, trade services, cards, and foreign exchanges. The standard supports transmissions of large volumes of data along with payment transactions such as trading transactions, which help facilitate end-to-end digital business processes, reduce work procedures and costs, and provide richer data for in-depth analysis beneficial to new products and services development and operational efficiency improvement. Further, the BOT, in partnership with the banking, public, and business sectors as well as critical payment system operators, and the Electronic Transactions



Development Agency (ETDA), applied ISO 20022 to the Thai payment systems and developed message standards that maximize benefits of all sectors with the following goals.



Business sector

is able to integrate end-to-end information from order submission, billing invoice, electronic tax payments to those stored in the Enterprise Resource Planning (ERP) system, which helps cut down processes and papers, support automated reconciliation, and increase business opportunities, especially for the SMEs, to gain access to capitals more easily with trade and payment information.



Banking sector

is able to improve the efficiency of digital financial services and advance financial innovations such as digital lending.



Government Sector

is able to provide fast one-stop services with higher accuracy and efficiencies in payment processes, in supportive of the transition to digital government.

Innovation

Enhancing payment services with innovation and modern technology





Nowadays, every sector places great importance on cutting-edge technology and innovation, particularly the financial and banking sectors. Over the year, the BOT, financial institutions, and payment service providers have introduced new technologies to provide value-added financial services to various user groups such as the QR payment service for both domestic and international payments, the applications of Blockchain and biometrics technology in the financial sector to provide extensive and secure payment services that better meet users' needs at a lower cost. Key initiatives are as follows:



1. Promoting the use of Thai QR payment standard for both domestic and international payments

Domestic Payments

To promote the use of Thai QR payment standards for domestic payments, the BOT has issued the Policy Guideline for Standardized Thai QR Code for Payment Transactions in accordance with international standards on April 17, 2019. The Thai QR Code standard supports all payment instruments, including bank accounts, credit cards, debit cards, e-Wallet accounts via mobile banking applications of banks and non-banks PromptPay participants, and international payments. The standard aims to promote interoperability, prevent fragmentation in the payment systems, reduce e-Payments and cash management costs incurred by stores, particularly small and medium retailers, and leverage payment data to develop financial innovations. The issued Guidelines also incorporated the former

Guideline for the Standardized Quick Response Code (QR Code) for payment and funds transfer dated March 31, 2017.

In addition, the BOT encouraged the extension of the Thai QR payment standard to enable a new payment service, allowing merchants to scan customers' QR codes, namely MyPromptQR, the first payment service in Thailand to adopt ISO 20022 standard. The BOT also plans to extend the Thai QR payment standard applications to include cross-border payments and business payments in 2020 forward. The extension will enable more convenient and faster financial services, increase the efficiency of payments and the overall Thai economy, and improve the country's competitiveness in the globalization world.



Further, the BOT has applied the use of QR code to check and validate transfers and payment accuracy (QR verified slip) to enhance the confidence of payment recipients. Customers can scan the QR code shown on the slip to verify the names and account numbers of both the sender and the receiver, transaction reference

number, amount, and date, to ensure that the payment has been received successfully. The service utilizes the standard Application Programming Interface (API) technology, which has been developed to facilitate easier and more convenient information exchange between related parties.

BOX 1 :
MyPromptQR...
The New Chapter
of QR Payment



MyPromptQR is a payment made via a mobile banking application where customers present the QR code generated for their bank accounts to the merchants to scan for payments. The service helps reduce processes and time spent at the cashier and errors while inputting the payment amount. In some countries, the service is referred to as customer presented mode QR payment.

This new QR payment service helps lessen the merchants' burden of storing and managing cash at the stores and effectively

integrate payment data with the Point of Sale (POS), accounting, trade promotion management, and inventory management systems. Such service accommodates the needs of large or medium enterprises with extensive branch networks such as convenience stores and department stores. Besides, promotional and discount information can be included in MyPromptQR.

MyPromptQR has been gradually rolled out since the fourth quarter of 2019 and is expected to be widely available in stores within 1-2 years.



Cross-border Payments

Regarding the expansion of cross-border payment services, the BOT advocated for payment systems connectivity with other ASEAN countries through various international cooperative forums at both the central bank and the banking association levels and with regional private payment service providers. Cross-border funds transfer and payment services that have been introduced thus far are as follows:

(1) Interoperable QR payment facilitates travelers in paying for goods and services abroad by allowing them to use mobile banking applications

of participating banks to scan QR code and make payments in their respective local currencies, which make cross-border payments convenient, quick, secure, and with competitive exchange rates. The service has been rolled out in many countries, including Singapore, Lao PDR, and Japan. Furthermore, the BOT and other ASEAN central banks are in the process of introducing interoperable QR payments with Cambodia, Vietnam, Malaysia, and Indonesia in the future.

(2) Real-time remittance enables a convenient, safe, and fast cross-border funds transfer at a lower fee. The service benefits the international business and tourism sectors and facilitates remittances made by foreign workers in Thailand.



Table 1: Cross-border funds transfer or payment service linkages

Country	Service type	Launched date	Details
 Singapore	QR payment	October 2018	Thai and Singaporean customers can pay for goods and services in each other's country via mobile applications or mobile banking applications with QR Code scanning.
	Real-time remittance	August 2019	Customers of participating bank in the projects in both countries can transfer money to each other via mobile applications using their bank account numbers.
 Lao PDR	QR payment	November 2019	Thai customers can use mobile banking applications of participating banks to scan Thai QR codes placed in Laos, while Laotian customers can use mobile banking applications of their participating banks to scan QR codes in Thailand to pay for goods and services.
 Japan	QR payment	December 2018	Thai customers pay for goods and services using mobile banking applications of participating banks to scan QR codes at participating stores in Japan.

Source : Bank of Thailand



Moreover, the BOT signed a Memorandum of Understanding on Cooperation in areas of International Payment Systems and Financial Technology with other countries or economic zones, including China, Malaysia, Myanmar, Vietnam, Indonesia, and Hong Kong, to promote payment

systems connectivity. The BOT believes that connecting the Thai payment systems with those of other countries will help boost international trade and tourism and will be a critical step in promoting access to payment services for ASEAN citizens and beyond.



2. Enhancement of payment services through innovations and modern technology

The BOT promotes the development of infrastructure and financial services by applying innovation and modern technology under the regulatory sandbox. The regulatory sandbox allows banks and non-banks to experiment innovative financial services in a well-defined and limited environment to control associated risks with close supervision by the BOT before a full scale launch. Followings are the significant developments throughout the year 2019:

(1) Promoting the development of infrastructure and the adoption of biometrics technology for safe and efficient identity verification and authentication of customers. Both of banks and non-banks have tested the use of biometrics technology in the regulatory sandbox for identity verification and authentication process for opening bank saving accounts and e-wallet accounts. The innovative technology helps strengthen the Know Your Customer (KYC) process to be more

secure, better prevent possible frauds, and also enhance financial services through digital channels. At present, several projects of opening bank accounts services by using biometrics technology have already been approved to exit the regulatory sandbox to be offered to the general public.

Moreover, the BOT issued the guideline for using biometrics technology in financial services which aim to provide the best practice for financial service providers to use biometrics technology in suitable and safe manners and comply with international standards. In terms of infrastructure development, the BOT has supported the development of the National Digital Identity (NDID) platform, serving as an infrastructure for digital identity verification and authentication. It functions by connecting platform members altogether to facilitate an information exchange mechanism in order to verify customers' identities.

BOT supported the development of the National Digital Identity (NDID) platform, serving as an infrastructure for digital identity verification and authentication, including with the adoption of biometrics technology to enhance financial services.





BOX 2:
What is National
Digital Identity
(NDID) ?



The National Digital Identity (NDID) is an infrastructure for identity verification and authentication services. It serves as a platform joined by platform members altogether to facilitate an information exchange mechanism, which starting from information exchange in order to verify customers' identities, similar to a main superhighway that connects all related entities. The NDID platform is operated by the National Digital ID Co., Ltd., jointly invested by Thai commercial banks, specialized financial institutions, securities companies, fund management companies, life and non-life insurance companies, payment service providers, the Stock Exchange of Thailand, and Thailand Post Co., Ltd.

The NDID platform has played a crucial role in facilitating transactions and services applications through digital channels, in either financial, business or government sectors, to be faster, more convenient, and more secure.

Customers no longer need to present a lot of documents as evidence to request services, thereby reducing duplicate preparation and submission of documents in KYC process.

At present, the BOT has already approved commercial banks to test using cross-bank identity verification through the NDID platform for opening bank accounts. The test, under the BOT's regulatory sandbox, will enable customers to open saving accounts with other banks through digital channels such as mobile banking applications by using verification and authentication from accounts which they already have with their existing bank in order to verify their identities using reliable facial recognition technology. This process is convenient and fast as customers neither have to present themselves at bank branches nor fill out duplicate information. In addition, the NDID platform is aimed to be applied with more services to provide customers with greater convenience.



(2) Fostering the development of infrastructure to facilitate the adoption of Blockchain technology in financial sector and elevate financial services.

In this regard, commercial banks jointly established the Blockchain Community Initiative (Thailand) Co., Ltd. to serve as an infrastructure of providing financial services by applying Blockchain technology. The first developing use case has started with an issuance of electronic letters of guarantee since June 14, 2019 with an aim to reduce duplication, lower costs, and enhance operational efficiency.

(3) Promoting the development of financial technology and strengthening collaborations among stakeholders. The BOT has supported many initiatives to create collaborations among stakeholders through numerous occasions, for instance:

- **Bangkok Fintech Fair 2019:** Under the concept of “Collaboration for the Future of Finance,” which aims to foster financial technology development and promote cooperation among domestic and international stakeholders.

- **Blockchain the Series @ BOT,** which aims to promote more understandings and practical uses of Blockchain technology in financial, business, and government sectors.

- **FinTech-RegDay,** a collaborative forum with financial regulators, the Securities and Exchange Commission and the Office of Insurance Commission, and several private entities, including Thai Fintech Association, which intends to share knowledge and provide consultations for FinTech operators and startups.





BOX 3 :
Bangkok FinTech
Fair 2019 :
Collaboration for
the Future of
Finance



The BOT organized the Bangkok FinTech Fair 2019 under the concept of “Collaboration for the Future of Finance” on July 18-19, 2019, at the BOT Learning Center. The objectives were to encourage the development of financial technology and broaden collaborations among public and private sectors in creating an environment conducive to financial technology adoption.

The event included seminars and panel discussions led by local and international accomplished speakers and financial innovations showcases. The event welcomed more than 3,500 participants, represented by financial institutions, payment service providers, FinTech firms, business and government entities, international organizations, consulting firms, and educational institutions.

Highlights from strategic discussions on building collaboration at the Bangkok FinTech Fair 2019 are summarized below.

(1) Developing the financial infrastructure:

It can be designed in a form of an open infrastructure to support development of good services and meet public interests. Many countries use financial technology to strengthen and enhance their national infrastructures, for instance, digital payments under PromptPay system in Thailand, fare payments for public transportation by using Near Field Communication (NFC) technology in England (i.e. Transport for London), and trade finance platform developed by applying Blockchain technology in Hong Kong.

(2) Fostering innovations and financial inclusion: Commercial banks, technology companies, and financial service providers all recognize the importance of transforming their services onto digital platforms, building business partnerships to introduce new customer-centric services, boosting technological know-how of service providers to keep pace with new technologies, and encouraging non-users to use services more through digital channels.



(3) Enhancing cross-border financial services: Financial service providers in ASEAN region are highly enthusiastic. Many new service providers are eager to enter payment businesses. These newcomers set a clear direction to expand digital payment services by using technologies to increase efficiencies and reduce costs. They also form business alliances to facilitate more convenient and faster international transactions, and have an explicit direction to enable interoperability standard of payments among international payment networks.

(4) Leveraging insights: In the digital age, information and data greatly contributes to transformation of business operations and broaden business opportunities. For example, commercial banks use customer behavior data to tailor banking services to fit customers' needs. Further, data analytics can be leveraged in various dimensions, such as formulating business directions and strategies and analyzing economic growth. However, data governance and related laws also need to be taken into consideration.

(5) Cybersecurity: To build trust in financial technology and new financial services, including

ensuring data privacy and service transparency, government agencies and financial service providers have to collaborate by sharing information on cyber-attack incidents and continuously upgrade their security and risk management capabilities. They also need to extend coordination with related international agencies in order to effectively respond to the growing cyber threats due to technology advancement.

(6) Creating an ecosystem in support of financial innovation: Stakeholders, including regulators, financial institutions, and new players like FinTech firms, need to adjust themselves and collaborate to create an enabling environment for healthy competitions and the right incentive structure to guard against fragmentation in the financial system, which will pave the way for uninterrupted innovation developments.

During the Bangkok FinTech Fair, there were press conferences arranged to introduce developments of Thailand's financial infrastructure, including the NDID platform, the platform that connects related entities altogether to facilitate an information exchange mechanism in order to verify customers' identities, and MyPromptQR service, the standardized QR code payments used in business sector.



Information

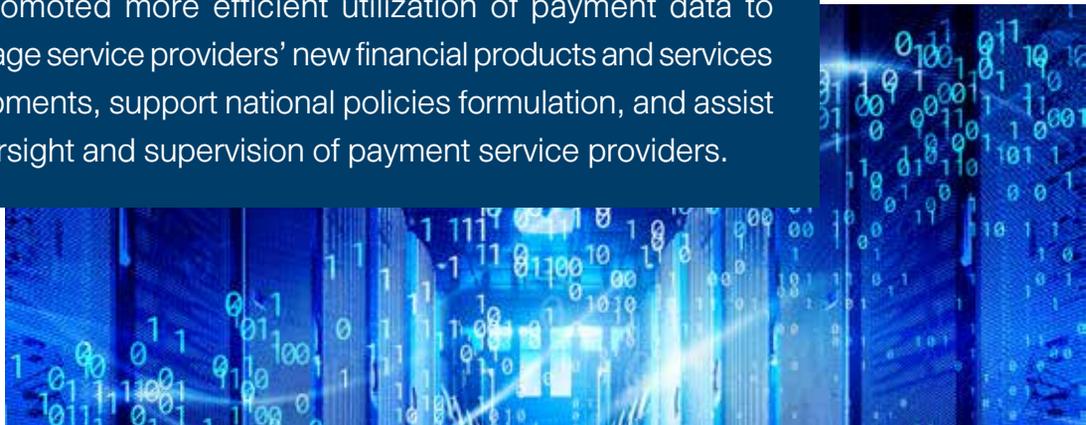
Leveraging payment data for the benefit
of all sectors





Today financial services are complex and interconnected as a result of innovative developments and modern technologies. Moreover, financial consumer behaviors have drastically changed. Payment data are, therefore, crucial for keeping track of such changes.

BOT promoted more efficient utilization of payment data to encourage service providers' new financial products and services developments, support national policies formulation, and assist the oversight and supervision of payment service providers.



Hence, the BOT began to promote greater utilization of payment data to open up options and opportunities to access financial services for both the public and private sectors, enable new financial products and services developments, and support national policy formulation and supervision of payment service providers. The efforts founded an important step towards the digital economy of the Thai financial sector.

In collaborations with relevant parties, the BOT has put forth the payment data integration project. The project aims to develop payment data architecture that is up to standard, secure, and with greater efficiency under good data governance, data management, data privacy, and compliance with applicable laws such as Personal Data Protection

laws. The infrastructure will allow in-depth data analysis with advanced data analytics techniques, yielding greater benefits to those involved, especially the data subject.

The project focuses on establishing appropriate data architecture and data integration guidelines, introducing various tools such as machine learning and data modeling to support in-depth analysis, and ensuring legal compliance for information usage.

Furthermore, the BOT partnered with private organizations to conduct payment data analytics to support economic analysis, develop economic indicators. The BOT also developed an analytical tools to support policy formulation, payment systems supervision, and on-going monitoring of payment trends.



BOX 4:
Case Study –
Development of
payment data
architecture in
other countries



India: One of the example of payment data structure development, the National Payments Corporation of India (NPCI) launched the Unified Payment Interface (UPI) in 2016 with Bharat Interface for Money (BHIM) as the main service. BHIM is a universal mobile application providing account aggregator service across different banks. It serves as an efficient, convenient, and secure facility that seamlessly connects various service providers' financial services.

Key factors rendering the UPI as the primary option for Indian financial transactions are the collaboration of all parties, both the central bank and the service providers, in developing the central infrastructure, and the service popularity among businesses and individuals. The UPI also provides an extensive database with systematic information management facilitating data analytics with advanced tools such as Machine Learning. The analyses enable the development of other value-added services, such as faster and more accurate credit lending, reliable and rapid fraud detection at a lower cost, and various innovations and financial product developments

that better accommodate customers' needs.

United Kingdom: Bank of England and Payment Systems Regulator have designed and developed the New Payment Architecture (NPA), a transactional payment data architecture that integrates data from critical payment systems, i.e., the Bankers Automated Clearing Services Payment Schemes Limited, the Cheque and Credit System Clearing Company Limited, and the Faster Payment Scheme Limited. With predetermined data structure and automated data management, the NPA helps reduce data submission burdens, facilitate data analytics with modern tools, support on-going supervision of payment service providers, and foster competition between service providers by allowing new or small service providers access to the data.

In addition, the NPA is designed to guard against financial crime with measures consisting of reliable identity authentication information exchange, audits and assessment of financial risks, and information exchange among service providers. Through near real-time information linkages with multiple data sources, abnormal financial behaviors can be detected, and suspicious transactions can be suspended accordingly.

Reference

India:

- BIS Papers No 106 The design of digital financial infrastructure: lessons from India by Derryl D'Silva, Zuzana Filková, Frank Packer and Siddharth Tiwari, Monetary and Economic Department
- <https://www.npci.org.in/product-overview/upi-product-overview>
- <https://www.profitbooks.net/upi-unified-payment-interface/>
- <https://economictimes.indiatimes.com/industry/banking/finance/banking/bhim-app-a-technology-ecosystem-for-the-poor/articleshow/56485800.cms>

United Kingdom:

- Payment Strategy Forum, Blueprint for the Future of UK Payments, July 2019



BOX 5:
5 things to know
about the Personal
Data Protection Law



1. What qualifies as personal data?

“Personal data” refer to information relating to an individual that can identify or lead to “the identification of a particular person” such as first name, last name, address, telephone number, citizen identification number, email address, fingerprint, IP address, educational background, financial statements, and health records.

2. What is the Personal Data Protection Law?

The Personal Data Protection Act B.E. 2562 (2019) (“PDPA”) is the law designed to protect personal information from unauthorized use. It encompasses three fundamental principles: (1) the data subject must provide consent for the collection, use, and disclosure of his/her information that will be used for the intended purpose informed to the data subject; (2) the data processor must maintain data security preventing unauthorized access or data modification; (3) the data subject has the right to withdraw consent and to request the data to be erased or destroyed at any time. The PDPA

has been enforced in May 2020, whereas the subsidiary legislation will be enforced in May 2021.

3. Why is the PDPA needed?

The PDPA is intended to improve the protection of personal information of Thai people in preparation for the digital age where data utilization will be more prominent. In addition, the PDPA corresponds to the issuance of the General Data Protection Regulation (GDPR) or the EU law on data protection and privacy in 2018. The GDPR aims at protecting the privacy of citizens in the member states by requiring foreign entities that process or transmit their personal data to have appropriate data protection measures to build confidence in international business.

4. What does the general public need to do?

Prior to giving personal information, all individuals or data subjects should carefully read the purpose of data collection and should not give consent in haste. In addition, individuals may keep records of the request as evidence for filing a complaint in case the information is misused.

5. How does an organization need to prepare for this law?

For an organization or an agency that needs to collect personal information, it is necessary to clearly state the purpose of data collection, maintain data security, and limit access to data, adhering to the guidelines on roles and responsibilities of a data controller and a data processor.

Inclusion

Expanding access to payment services nationwide





To achieve the goal of the payment systems roadmap No. 4 that envisions digital payment as the preferred payment choice, the BOT, in collaboration with financial institutions and related agencies, has promoted greater public access to digital payments. Key initiatives are the following.

1. Expanding QR payment acceptance points in shops and retailers nationwide; for instance, community shops, street food stalls, government agencies, and public transportation services, including taxis, motorcycle taxis, sky trains, and passenger boats. At the end of 2019, there were more than 6 million QR payment acceptance points nationwide both at stores and online.

2. Expanding uses of digital payments in public-facing government agencies by encouraging financial institutions to participate in government policy initiatives; for example, the expansion of digital welfare payments by the Comptroller General's Department to cover 11 categories of welfare recipients in all provinces by 2020 and the use of PromptPay service for personal income tax refund instead of postal checks by the Revenue Department, which plans to extend to corporate income tax refunds in 2020.



3. Raising awareness and understandings of digital payments among the general public along with the correct and safe usage of digital payments to build customers' confidence through various channels such as the BOT website, media's publications, and social media platforms, the Financial User Protection Center, and the BOT Learning Center, etc. Further, the BOT also organized various conferences to promote awareness to the broader public, such as the Bangkok FinTech Fair 2019.



Immunity

Oversight and risk management





Besides the four development areas that propel the efforts to make digital payments more efficient, convenient, economical, safe, and become the preferred payment choice in Thailand, and move the nation a step closer to a less-cash society, other indispensable elements include security, risk management of payment systems and services, financial consumer protections and building confidence in digital payment services.

The BOT thus enhanced the oversight and supervision of payment systems to ensure the stability of critical payment infrastructure such as the Bank of Thailand Automated High-value Transfer Network (BAHTNET), the Imaged Check Clearing and Archive System: ICAS). Similarly, the BOT improved the supervision of retailed payment service providers to be corresponding to risks and rapidly changing technology. In particular, the BOT paid attention to cyber risks frequently arising in the digital age. The BOT promoted rigorous cybersecurity and cyber risk readiness within the Thai financial sector to build confidence in electronic transactions. Examples of the BOT efforts were the revision of the IT risk management practices, the issuance of cyber resilience assessment framework and regulations on mobile banking security, which will be discussed in detail in the next section on Payment Systems Stability.

Further, the BOT revised and drafted related notification on regulations under the Payment

Systems Act B.E. 2560 (2017) by applying the Regulatory Impact Assessment (RIA) process to help reduce regulatory burden and add more flexibility in business operations. Such regulation is the Know Your Customer (KYC) regulation for activating the use of e-money services. The revised regulation aims to enhance the ecosystem for the KYC processes to ensure security and reliability proportionate to risk levels of the products and the channel used to activate e-money services and to promote access to other financial services through digital platforms. This notification requires the service providers to establish a KYC process for activating e-money service consisting of two main steps: (1) customer identification and (2) customer verification. Further, e-Money service providers must comply with regulations related to the KYC processes stipulated under the Anti-Money Laundering Laws in addition to those stipulated by the BOT. This is to ensure that the KYC process is appropriate and tailored to levels of risks associated with each e-money products and activation channels.

Oversight of payment
systems stability





1. Oversight of payment systems stability

The payment systems infrastructure serves as an essential part driving on-going economic activities by supporting financial transactions of financial institutions, the public and private sectors, and the general public. As a payment systems regulator designated by the Payment Systems Act B.E. 2560 (2017), the BOT has emphasized on safeguarding stability, reliability, and safety of Thai payment infrastructure.



The BOT continued to oversee payment systems to ensure resiliency, security, sound risk management, and compliance with international standards and reduce systemic risk to maintain financial stability and confidence in the overall payment systems.

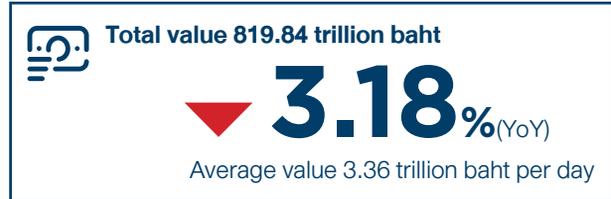
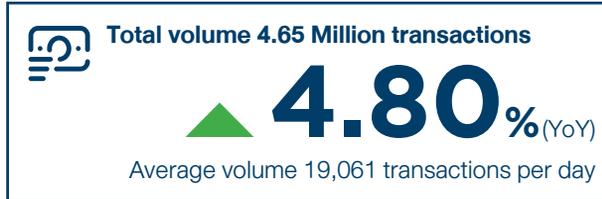
The BOT oversees the Systemically Important Payment System (SIPS), namely the Bank of Thailand Automated High-value Transfer Network (BAHTNET), the BOT operated infrastructure for large value transfers and interbank settlement. The BOT supervisory approach follows the Principles for Financial Market Infrastructures (PFMIs) issued by the Committee on Payments and Market Infrastructures (CPMI) under the Bank for International Settlements (BIS) and the International Organization of Securities Commissions (IOSCO).

The BOT also applies the PFMIs in the supervision of Prominently Important Retail Payment Systems (PIRPS), namely the Imaged Check Clearing and Archive System (ICAS), operated by the BOT and the Interbank Transaction Management and Exchange (ITMX) system, operated by the National ITMX Company Limited (NITMX).

In 2019, key trends and risk management of the payment systems operated by the BOT can be summarized as follows:



Bank of Thailand Automated High-Value Transfer Network (BAHTNET)

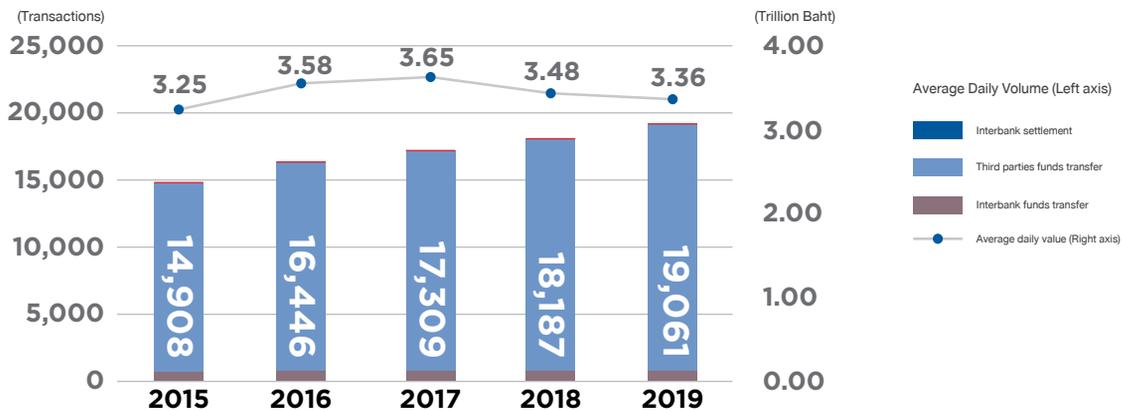


Key Trends

BAHTNET is a real-time gross settlement system that facilitates large-value funds transfer between financial institutions. The volume of funds transfers through BAHTNET continued to increase steadily. In 2019, the volume of transactions increased by 4.80 percent from

the previous year and averaged at 19,061 transactions per day. The value of funds transfers via BAHTNET in 2019 decreased by 3.18 percent from last year, equivalent to an average of 3.36 trillion baht per day.

Figure 1: Volume and Value of transfers via BAHTNET (average per day)



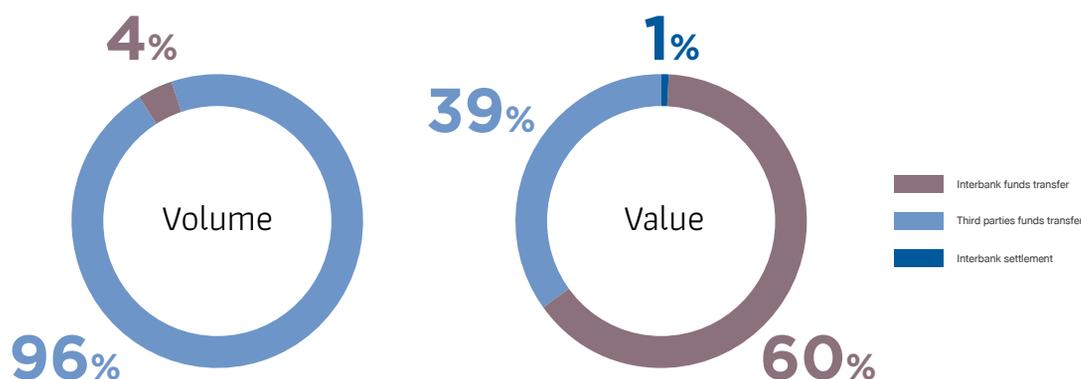
Source : Bank of Thailand

A comparison of the volume of funds transfer via BAHTNET by transaction types indicated that 96 percent of total transfers were third-party funds transfer (e.g., businesses, individuals, and non-residents). The average transaction value registered at 71.56 million baht per transaction. The volume of third-party funds transfer has grown steadily over the past five years, with most

transactions worth less than 500,000 baht, representing 57.15 percent of total transactions. Among these were the third-party fund transfers to or from non-resident accounts. In terms of the transfer value, most BAHTNET transactions were interbank funds transfer, which accounted for 59.77 percent of total transfer values and averaged at 2,588.86 million baht per transaction.



Figure 2: BAHTNET Transfers by Transaction Types



Source : Bank of Thailand

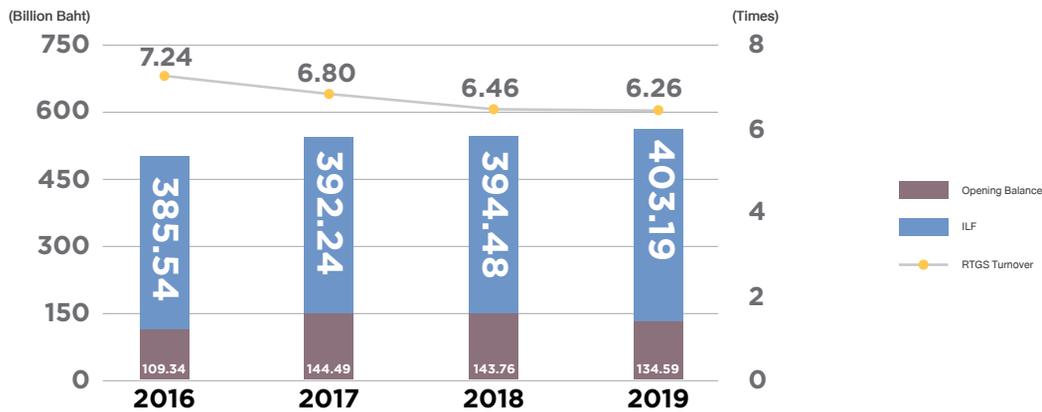
Management of material risks

BAHTNET facilitates high-value interbank transfers and settlement of interbank payment transactions that occurred through retail payment systems, namely the ICAS and the ITMX (e.g., PromptPay and Bulk payment). Each day, these retail payment systems send out members' net settlement positions to be settled in the BAHTNET. Liquidity risk and settlement risk, therefore, are crucial. All BAHTNET members are required to have sufficient liquidity for uninterrupted fund transfers and settlement to avoid any impacts on other members given that insufficient liquidity of a member can lead to systemic risk.

In 2019, members' intraday liquidity provided by opening balances in the Current Account (C/A) averaged at 134.59 billion baht per day and by Intraday Liquidity Facility (ILF) averaged at 403.19 billion baht per day, which is sufficient for BAHTNET real-time funds transfer without incurring settlement risk. Pending transactions, which usually resolved in less than 5 minutes, accounted for 6.75 percent of total transactions. In terms of the RTGS turnover, which derived from the ratio of average daily transfers value to members' daily intraday liquidity, the ratio decreased slightly from 6.46 times to 6.26 times due to the decline in the average daily fund transfers value.



Figure 3: Intraday Liquidity and RTGS Turnover



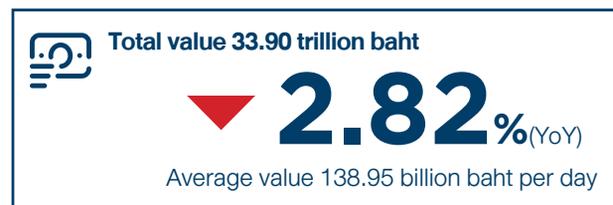
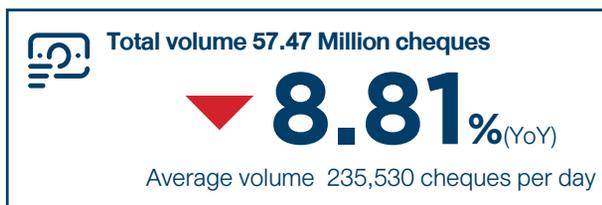
Source : Bank of Thailand

In addition, operational risk is another substantial risk in the BAHTNET. The business continuity arrangement is, therefore, vital in supporting the smooth functioning of the system. As the operator and the regulator of the BAHTNET, the BOT established the 2019 target system availability of 99.9

percent. At the end of 2019, the BAHTNET achieved system availability higher than the target. The BOT continually monitors BAHTNET's system availability and regularly reports the results to concerned management and the PSC.



Imaged Cheque Clearing and Archive System: ICAS



Key Trends

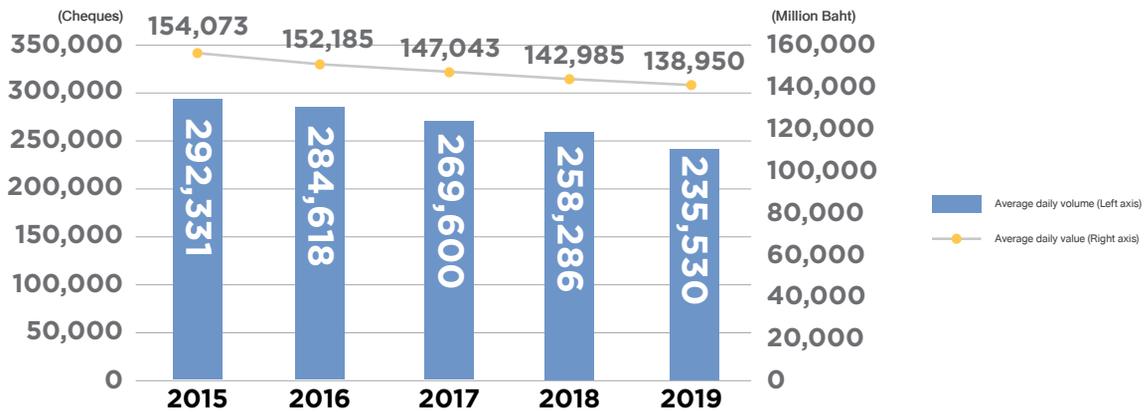
ICAS is an image-based cheque clearing system where cheque images are used in place of physical cheques in the collection process. In 2019, cheque transactions made up the highest proportion of total retail transactions¹ and totaled 33.85 trillion baht, accounted for 63 percent of total transactions. However, in 2019, the average daily

volume and value of cheque transactions declined by 8.81 percent and 2.82 percent, respectively. These declines were driven by the use of digital payments in place of cheques. In 2019, the volume of daily interbank cheques averaged at 235,530 cheques per day, equivalent to an average value of 138.95 billion baht per day.

¹ Retail transactions including cheque payment and interbank funds transfer.



Figure 4: Volume and Value of Nationwide Interbank Cheques

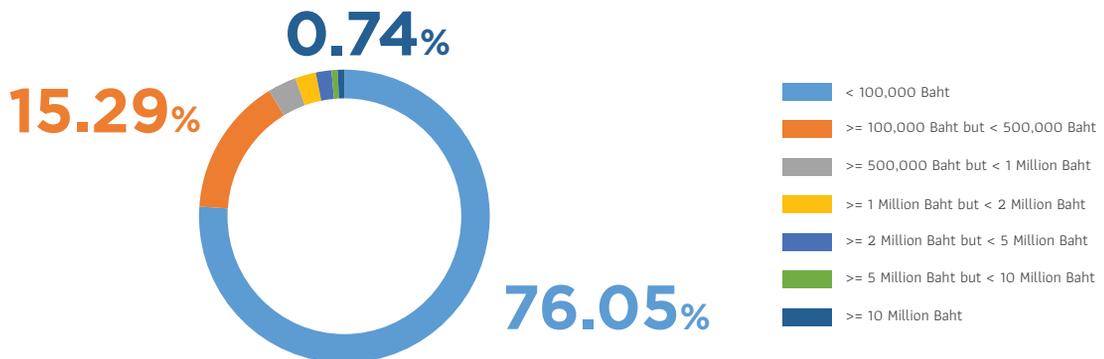


Source : Bank of Thailand

In terms of the value of interbank cheques per transaction, in 2019, a majority of interbank cheques were less than 100,000 baht in value, representing 76.05 percent of total interbank cheques. This is followed by interbank cheques of between 100,000 – 500,000 baht, equivalent to 15.29 percent of total interbank cheques. Interbank cheques of greater than 10 million baht merely accounted for 0.74 percent of total interbank cheques. Note

that, the declining trends in interbank cheques were noticeable among two groups; i.e., interbank cheques of less than 100,000 baht, which dropped 8.90 percent, and interbank cheques of between 100,000 – 500,000 baht, which shrunk by 9.15 percent. One of the reasons behind these declines was the change in consumer behaviors migrating towards digital payments, which now support transactions up to 699,999 baht per transaction.

Figure 5: Proportion of Interbank Cheques by Values



Source : Bank of Thailand



Management of Material risks

The BOT continually managed operational risks and business continuity management of the ICAS, whereby the target system availability in 2019 was set at 99.8 percent. At the end of 2019, the ICAS

achieved higher than the target system availability. The BOT continually monitored the ICAS system availability and reported results to concerned management and the PSC regularly.

2. Oversight and supervision of e-Payment service providers

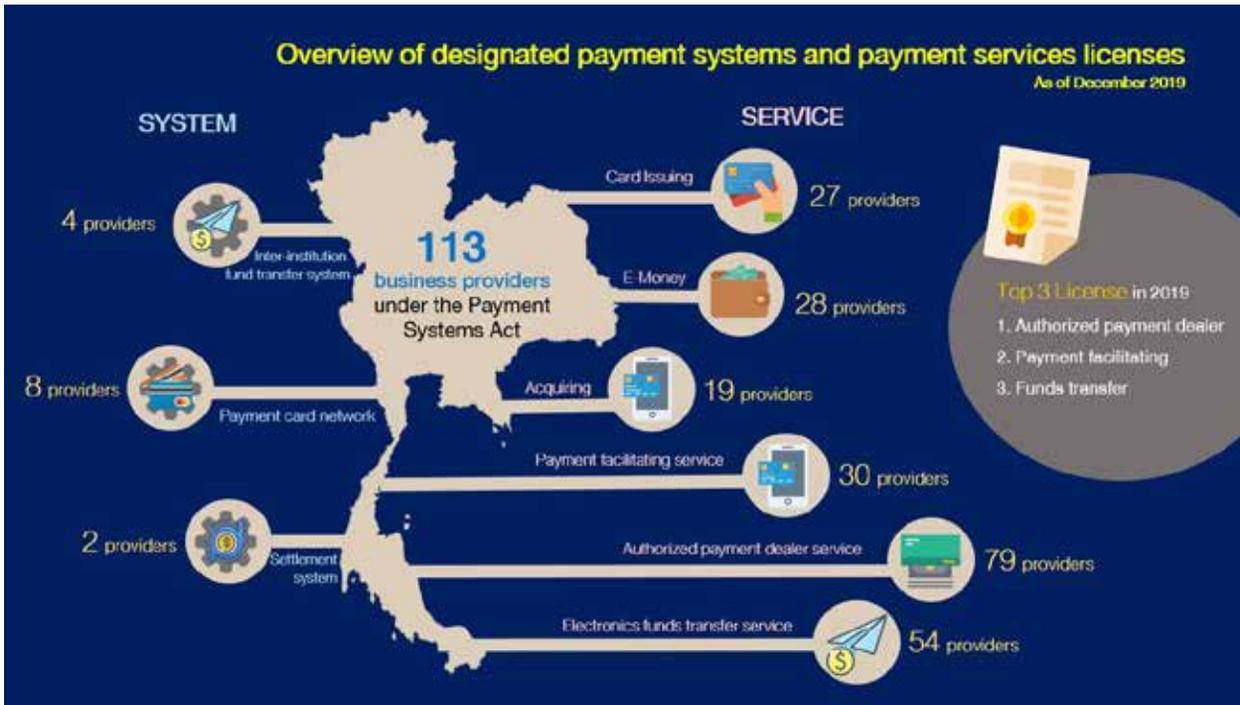
In addition to providing oversight for payment systems infrastructure, the BOT also paid close attention to the oversight and supervision for payment system operators and payment service providers that directly serve the general public. Such efforts aim to build public confidence in digital payments by ensuring that payment service providers put in place sound risk management systems, maintain strong business continuity management, and implement appropriate consumer protection arrangements.

There are currently 113 payment business providers, representing 248 licenses and 3 registration certificates. In 2019, 10 payment business providers were granted a total of 19 licenses under the Payment Systems Act B.E.2560 (2017), including Authorized Payment Dealer Service, Payment Facilitating Service, Electronic Money Transfer Service, and Electronic Money Service (e-Money). Further, the BOT granted permission for existing

business providers to expand their scope of services, which help broaden payment services at a lower cost, promote competition, and access to digital payments for small business providers and retail shops. The list of payment business providers can be found on the BOT Website under “Payment Systems” > “Payment Systems Act.” > “List of Payment Business Providers.”



Figure 6: Overview of designated payment business providers at the end of 2019



Source : Bank of Thailand

Moreover, to enhance oversight and supervision of payment business providers, the BOT has adopted a risk-based supervision approach that focuses on examining significant activities related to digital

payment transactions. In addition, the BOT also developed risk monitoring tools to support on-going oversight of e-Payment business providers and a risk-based supervision efficiently.



3. Modernizing the Thai financial sector to keep pace with technology and cyber threats

Nowadays, Information Technology (IT) has been exploited by financial service providers as the primary mechanism to improve service delivery efficiency. However, technology also poses new risks, both IT risks such as system failures and cyber risks that continue to grow every day. Such risks can cause severe and widespread impacts and deteriorate trust in the Thai payment system.

The BOT, therefore, advocated for enhancing the Thai financial sector readiness to ensure that financial institutions maintain rigorous and adequate security arrangements proportionate to their risk levels and to lessen impacts on customers and the overall system, especially those related to electronic banking transactions. Key actions are the following.

1. Laying the foundation of IT and Cyber risk management through the issuance of new or revised regulations on enhancing oversight and supervision of IT risks in all aspects. For example, the BOT revised IT risk management guideline² mandating at least one of the financial institution's board members to possess IT experiences or knowledge and requiring dedicated senior management responsible for cybersecurity. Further, the BOT issued the cyber resilience assessment framework³ necessitating financial institutions to continually assess cyber risks and readiness, which encompasses risk identification, risk prevention and surveillance,

and rapid incident response. Moreover, the BOT established guidelines to oversee risks arising from connections to or uses of third-party IT services.

2. Providing oversight of specific risks

The use of technology in delivering services also posed certain types of risks. Thus, in addition to instituting sound risk management, the BOT issued regulations focused on these risks, such as Guiding Principles for Mobile Banking Security⁴. The guideline defines minimum requirements of IT systems and customer support measures, such as prohibiting the usage of rooted or jailbroken mobile devices or devices with obsolete operating systems and mandating additional security measures such as setting more complex PIN and password or broadening the scope of fictitious applications investigation. The Intelligence-led Penetration Testing Guideline⁵ : iPentest guideline also prescribes a realistic penetration test (red-teaming) by simulating cyber-attack to evaluate

More details can be found from the BOT website, home > Payment Systems > Payment Systems Notification & Circulars (https://www.bot.or.th/App/FIPCS/Thai/PFIPCS_list.aspx)

² Regulations on Information Technology risk of Financial Institutions and Third-Party Risk Management Implementation Guidelines

³ Cyber Resilience Assessment Framework

⁴ Guiding Principles for Mobile Banking Security

⁵ Intelligence-led Penetration Testing Guideline: iPentest



financial institutions' cybersecurity readiness in terms of prevention, detection, and response to cyber threats. Further, the BOT also supervises data governance and management of risk posed by new technologies, including cloud computing, Blockchain, Artificial Intelligent (AI), Machine learning (ML), and biometrics, to improve oversight of risks corresponding to changing business models and technologies.

3. Conducting on-going supervision in responding to rapid changes and encouraging financial institutions to regularly conduct self-assessment on cybersecurity readiness in keeping with current environments.

4. Establishing cooperative oversight to strengthen the Thai financial sector and the related business sectors. The BOT focused on fostering

on-going coordination with various domestic and international organizations to promote information and knowledge sharing, threat warnings exchange, and collaborations for the benefits of all parties. Examples of key initiatives included creating a cyber-related body of knowledge, enhancing cyber incident responses, conducting cybersecurity exercises at the banking sector and the financial sectors, developing staff capability, and raising public awareness and understandings.

Additionally, the BOT has required commercial banks to disclose statistics on IT system failures that impact critical services to inform the general public about the quality of services, particularly electronic financial transactions, and useful information when a system failure occurs.



BOX 6:
Elevating
cybersecurity
readiness of the
Thai financial
sector and ASEAN

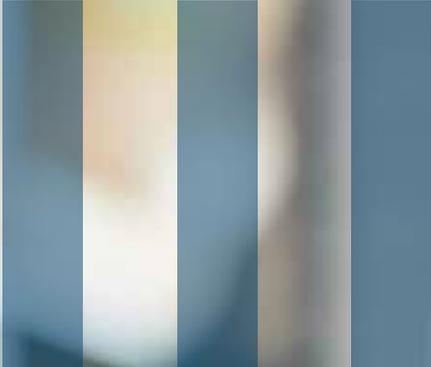


In 2019, the BOT, in collaboration with the Securities and Exchange Commission (SEC) and Office of Insurance Commission (OIC), organized the 2nd Financial Sector Cyber Exercise to rehearse cyber incidents responses in terms of techniques, procedures, coordination, and communications.

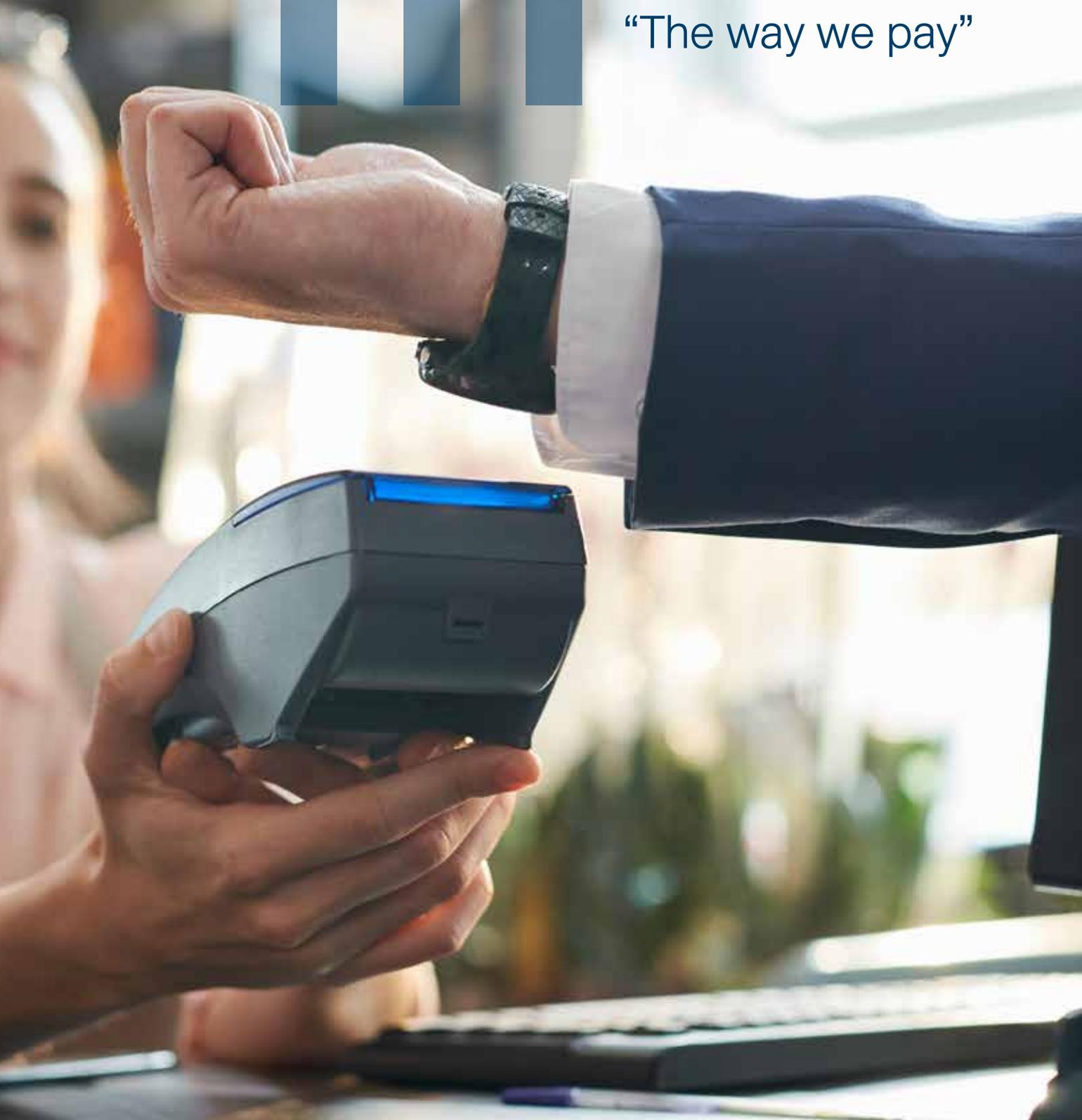
In addition, in partnership with the Bank for International Settlements (BIS), the BOT hosted the “ASEAN Financial Regulators’ Program on Cyber Resilience” for executives and operational staff of ASEAN financial regulators to enhance knowledge and understanding of cyber risks and effective responses. The seminar also provided a forum for exchanging viewpoints and experiences,

creating networking opportunities, and establishing a collaborative network among seminar participants and cybersecurity experts from central banks and leading international organizations. This seminar was part of an annual program that the BOT regularly provides to ASEAN members.





Key Trends in
Payment Services
“The way we pay”





1. Overview of Payment Services in 2019

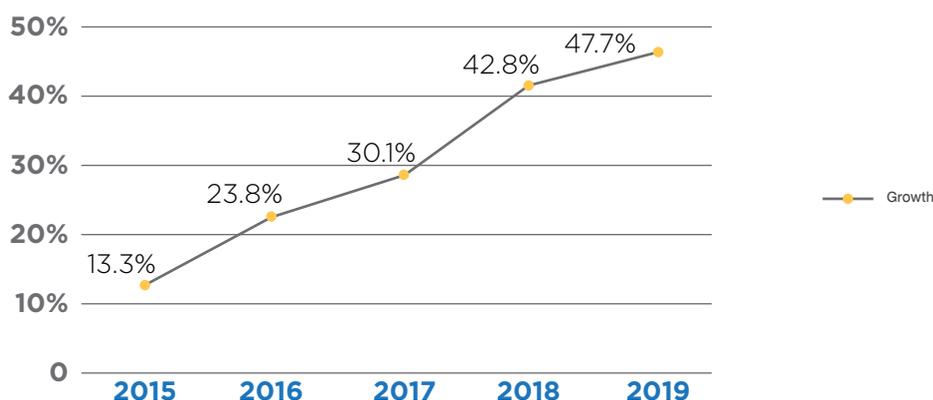
Thai people increasingly prefer digital payments.

In 2019, digital payment transactions totaled at 8,985 million transactions, equivalent to a growth rate of 47.7 percent from the previous year. The main driver of such drastic growth was the continual increase in mobile banking and internet banking transactions. As of 2019, mobile banking/internet banking grew at 74.7 percent in volume and 21.0 percent in value compared to last year. These

growths resulted from the services being easy to use, convenient, fast, secure, and free for most transactions since the fund transfers fees reduction announced by commercial banks in 2018.

At the end of 2019, total number of Thai digital payment transactions stood at 135 times per capita per year, increasing from 89 times per capita per year from last year. This drastic growth emphasized the growing adoption of digital payment and its potential, according to the implementation of the Payment Systems Roadmap No.4, which aims to promote digital payments as a preferred choice for the Thais and move Thailand towards a less-cash society in the near future.

Figure 7: Growth of digital payments in 2015-2019



Source : Bank of Thailand



Figure 8: Thailand's digital payment transactions per capita

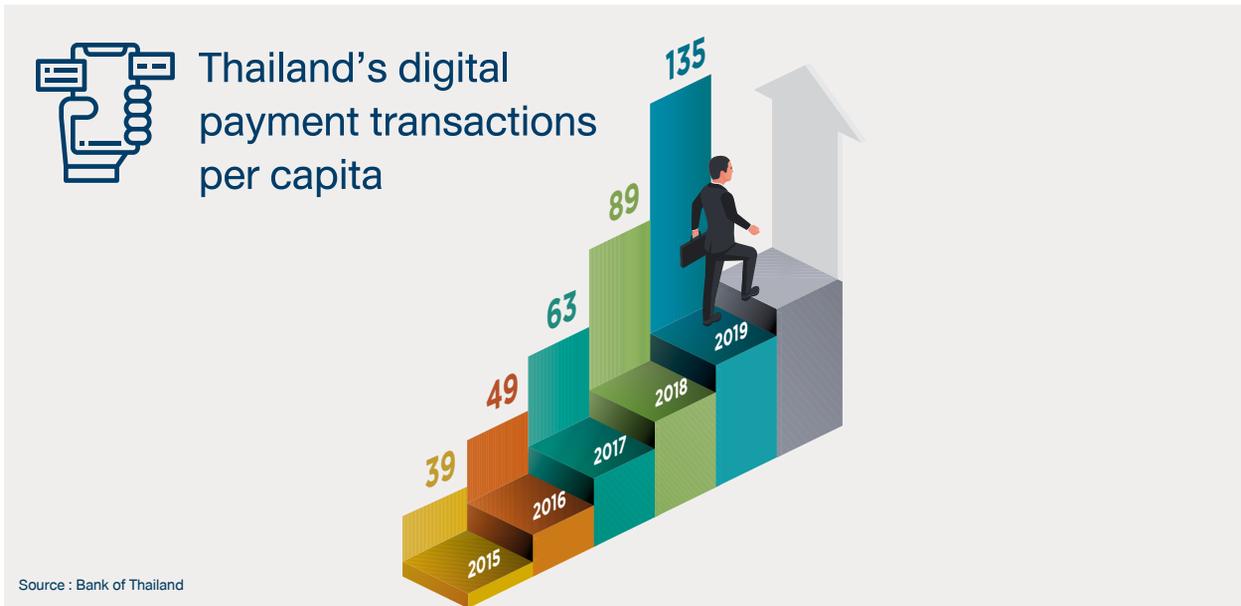
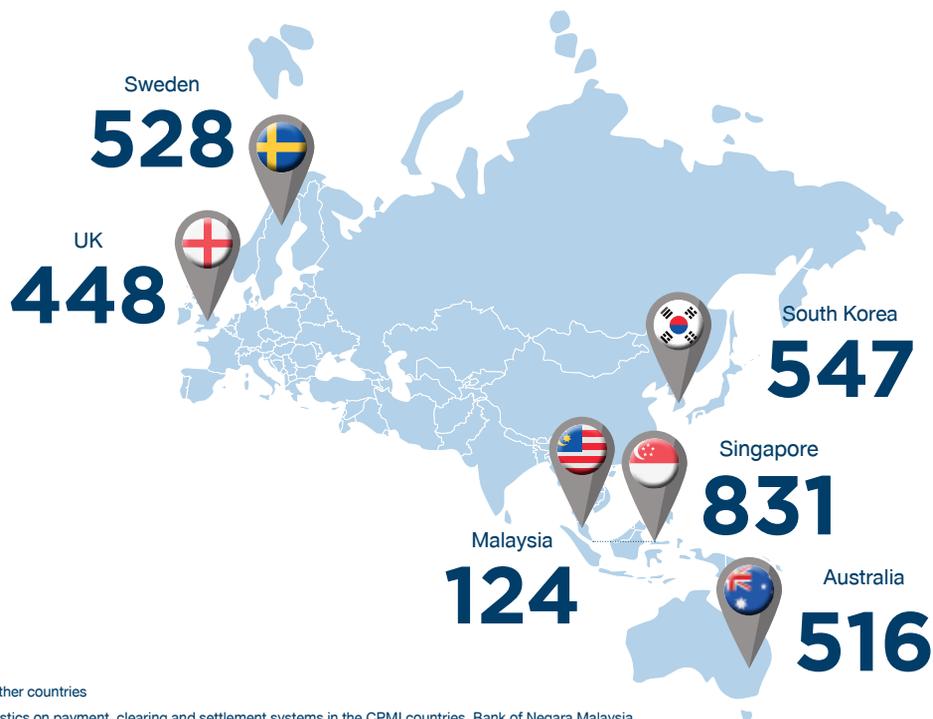


Figure 9: Volumes of e-Payment per capita of various countries*

Volumes of e-Payment per capita of various countries*



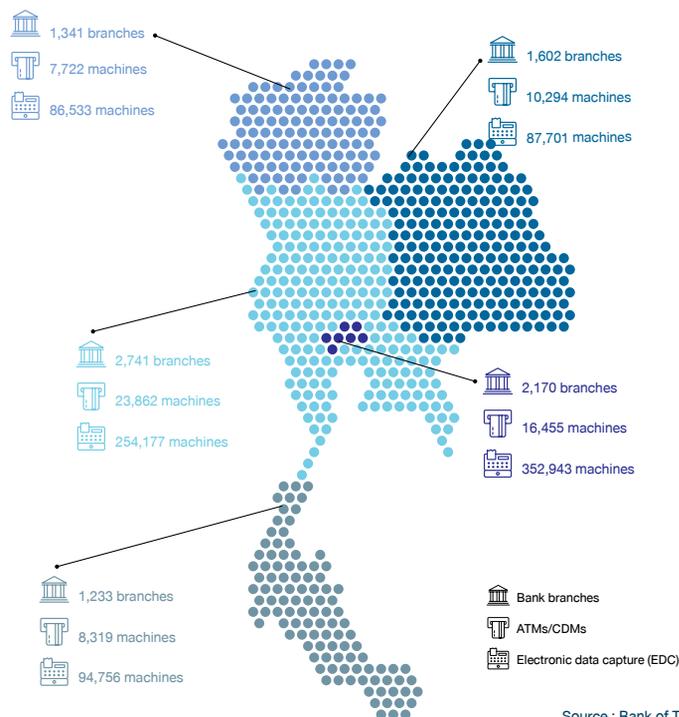
* End of 2018 data for other countries

Source: BIS (2018) Statistics on payment, clearing and settlement systems in the CPMI countries, Bank of Negara Malaysia



2. Payment service channels in 2019

Figure 10: Payment service channels in 2019



Source : Bank of Thailand

At the end of 2019

Number of financial institution branches **8,985** branches

ATMs/CDMs **66,652** machines

Electronic data capture (EDC) **876,149** machines

QR Payment **More than 6** Million QR payment acceptance point

With the growing popularity of mobile payments, many financial institutions have adapted to these changing payment behaviors.

Bank branches: at the end of 2019, the number of financial institution branches stood at 8,985 branches decreased by 225 branches from the previous year due to higher costs than other service channels.

- Thai commercial banks branches decreased by 226 branches
- Foreign bank branches reduced by 1 branch.
- Specialized Financial Institutions branches expanded by 2 branches.

A comparison by region indicated that Bangkok had the largest decrease in number of bank branches of 109 branches, followed by Central and Northern regions of

51 and 33 branches, respectively.

ATMs / CDMs: as of 2019, ATM/CDM registered at 66,652 machines, continued to decrease by 989 machines from the previous year. The continual decline was mainly due to the growing popularity of mobile banking/internet banking.

Compared to other countries, the number of ATM / CDM machines in Thailand stood at 1,001 machines per million inhabitants, comparable to those of Australia and the UK, which totaled 1,198 and 993 ATM / CDM machines per million inhabitants, respectively. However, ATM/CDM machines per capita were still far from those of cashless society countries such as Sweden and Singapore, which totaled 295 and 532 ATM / CDM machines per million inhabitants, respectively.



The QR payment acceptance points increased following the rising popularity of mobile payment

Electronic data capture (EDC): at the end of 2019, the number of EDCs machines totaled 876,149 machines, partly due to the expansion of e-payment terminals nationwide in 2017. Compared to the beginning of the project, the number of EDC machines rose more than 500,000 machines and averaged at 12,918 EDC machines per million inhabitants. Nonetheless, Thailand's EDCs per capita was relatively low compared to countries such as Australia, UK, Sweden, and Singapore, which EDCs per capita totaled at 38,985, 40,550, 27,027, and 35,645 machines per million inhabitants, respectively.

Comparing EDCs machines with new payment channels via mobile banking applications such as QR payment, an EDC machine's installation was costlier. Some merchants, therefore, switched to QR payment, resulting in a record of more than 6 million QR payment acceptance points at the end of 2019.

Table 2: Numbers of ATMs/CDMs and EDCs in various countries

Unit: Numbers of ATMs/CDMs and EDCs per million citizen

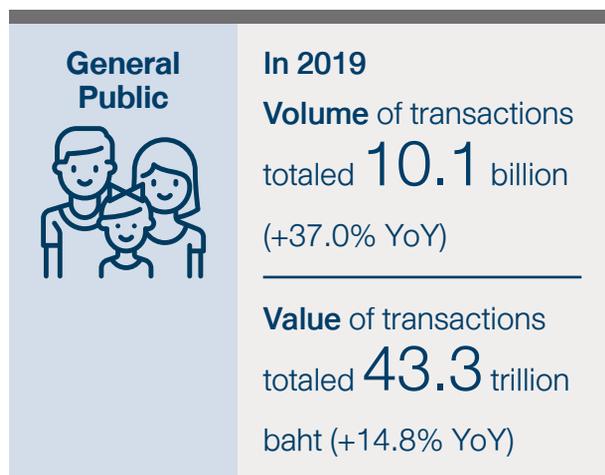
	THAILAND	MALAYSIA	AUSTRALIA	UK	SWEDEN	SINGAPORE
NO. OF ATMS / CDMS*	1,001	N/A	1,198	993	295	532
NO. OF EDC*	12,918	20,000	38,985	40,550	27,027	35,645

* End of 2018 data for other countries; End of 2019 data for Thailand and Malaysia

Source: BIS (2018) Statistics on payment, clearing and settlement systems in the CPML countries, Bank of Negara Malaysia.

3. Thai Payment behaviors

1) General Public, Businesses, and Government Payments



In 2019, the volume and value of public payment transactions continued to grow considerably at 37 percent and 14.8 percent, respectively, compared to the previous year. Most transactions from mobile banking/ internet banking transactions were growing because the services are easy-to-use, convenient, fast, and secure. Further, the transactions can be done anywhere anytime with low costs due to the fee waiver following commercial banks' fee reduction announcement made in 2018 and the ongoing



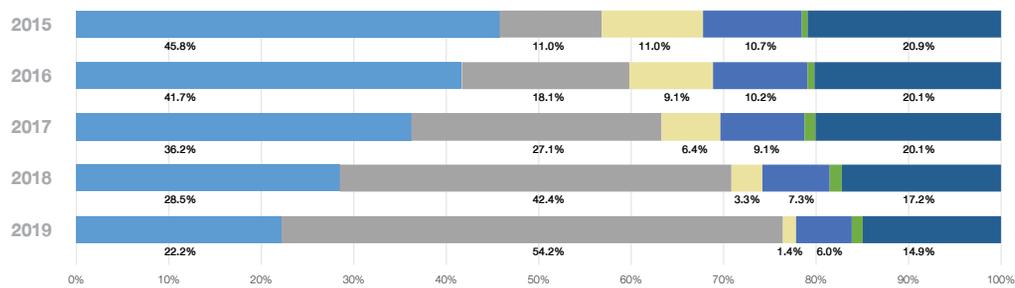
promotion of PromptPay and Thai QR Payment. Consequently, mobile banking/internet banking transactions showed a remarkable growth of 75.2 percent and 28.1 percent, in volume and value terms, respectively, compared to 2018. On the other hand, funds transfer and payments via ATM/CDM using electronic cards contracted steadily by more than 40 percent in both volume and value terms.

Furthermore, individuals have increasingly switched to mobile banking/internet banking for

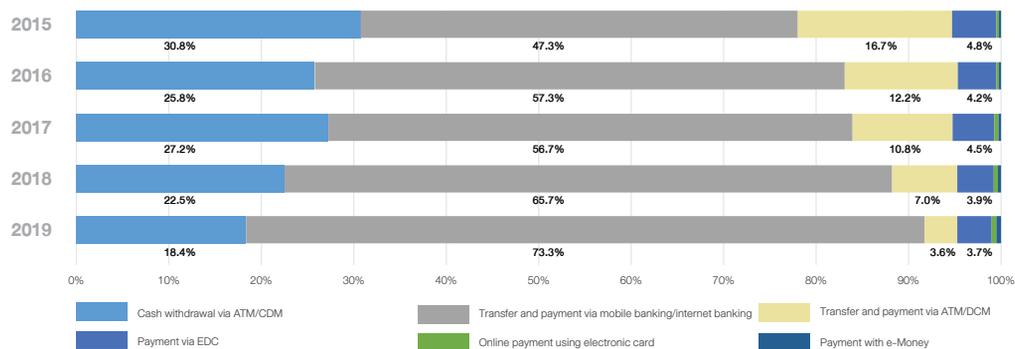
funds transfer and payments. In 2019, the volume of transactions conducted via mobile banking/internet banking was 2.4 times of cash withdrawals via ATM / CDM machines, which shrank steadily. As for electronic card payments, most transactions were made via EDCs machine rather than online. E-Money has also gained popularity with a growth rate of over 30 percent in both volume and value terms, and averaged at 140 baht per transaction, suggesting the use for daily expenditure.

Figure 11: Proportions of Payments during 2015 – 2019 (General Public)

Proportion of Volume



Proportion of Value



Source : Bank of Thailand



The Business Sector and the Government Sector

In 2019
Volume of transactions totaled **744.4** million (+14.2% YoY)

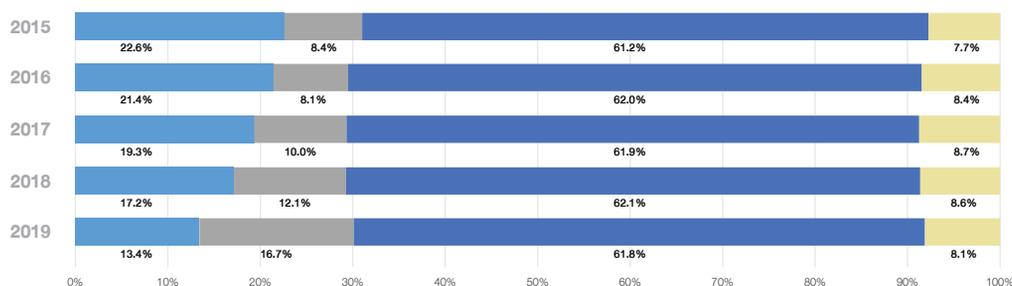
Value of transactions totaled **113.8** trillion baht (+1.6% YoY)

E-payments in the business and the government sectors in 2019 grew steadily, with most transactions being automatic direct debit/ direct credit transactions. Meanwhile, commercial banks have focused on developing new services to meet

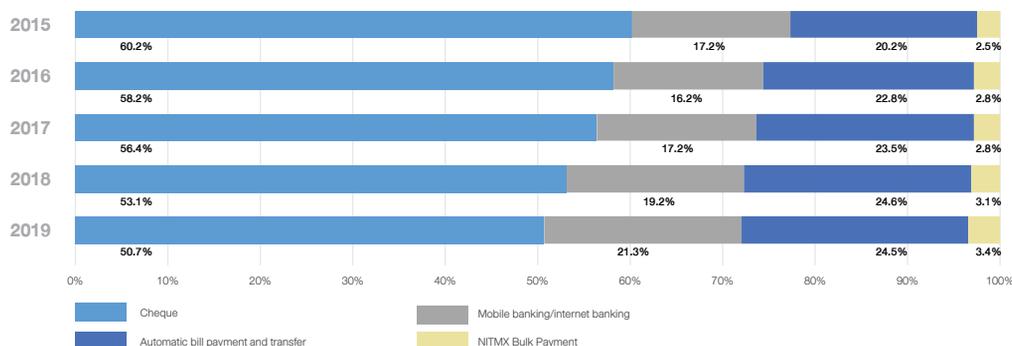
businesses' needs, concurrent with digital payments expansion in government agencies. As a result, the volume and value of funds transfer and payments via mobile banking/internet banking rose with the strongest growth of 57.6 percent and 12.8 percent, respectively. In contrast, the volume and value of cheque usage shrank dramatically at 10.8 percent and 3.0 percent from last year. Such decline was partly because the Revenue Department has abandoned the use of cheques for personal tax refund and switched to fund transfers via PromptPay. Additionally, many businesses migrated to mobile banking/ internet banking for funds transfer and payment, which at present can facilitate transactions worth up to 699,999 baht per transaction.

Figure 12: Proportions of Payments during 2015 – 2019 (Business and Government Sectors)

Proportion of Volume



Proportion of Value



Source : Bank of Thailand



2) Cash withdrawals and deposits

Although most Thai people are still accustomed to using cash for their everyday purchases, the volume of cash withdrawals in 2019 persistently increased by a constant rate of 6 percent. The cash withdrawal value continued to decline at 7.4 percent compared to the previous year. The Thais preferred to make withdrawals in small amounts via ATM / CDM with an average value of 3,500 baht per transaction, which comprised cash withdrawal via in-house machines, cash withdrawals via machines abroad, cash advance via credit cards, and cardless cash withdrawals via machines or mobile applications.

In 2019, Thai people withdrew cash primarily via ATM/CDM, on average 34 times per person per year, which accounted for 93.5 percent of total cash withdrawals through various channels. The remaining 6.5 percent were over-the-counter cash withdrawals. The volume of cash withdrawals via ATM/CDM grew at a constant rate of 6.7 percent, compared to last



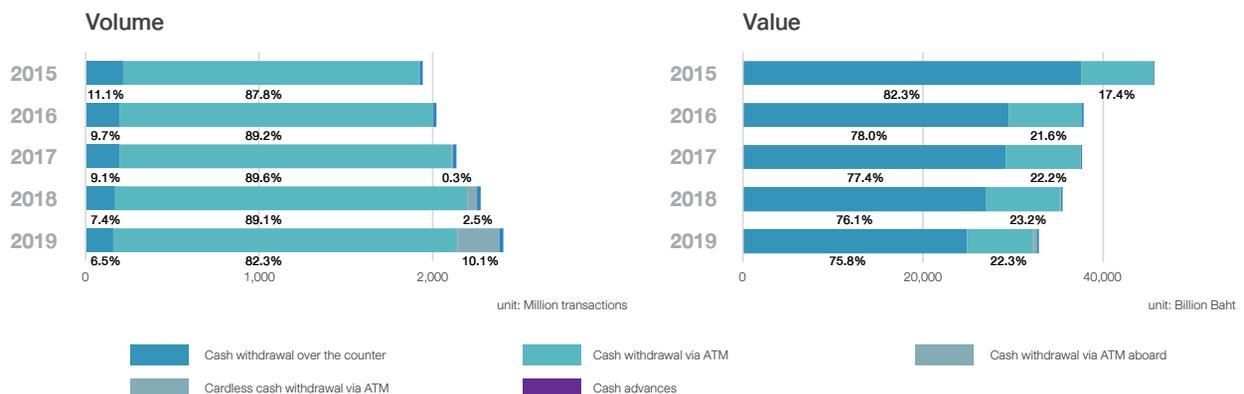
Cash withdrawals and deposits exhibited a downward trend similar to last year



year, while the volume of over-the-counter cash withdrawals grew at a decreasing rate at 6.5 percent, in line with a downward trend of bank branches.

It is interesting that the Thais increasingly switch to withdrawing cash using mobile applications (cardless withdrawal) via in-house ATM/CDM instead of withdrawing cash using cards. The average volume of cardless withdrawal stood at 20.4 million transactions per month, representing an increased share of 10.1 percent of total cash withdrawal volume, compared to a share of 2.5 percent in 2018. The volume and value of cardless withdrawal increased 3.3 times and 3.6 times, respectively, from the previous year.

Figure 13: Volume and value of cash withdrawals in 2019



Source : Bank of Thailand



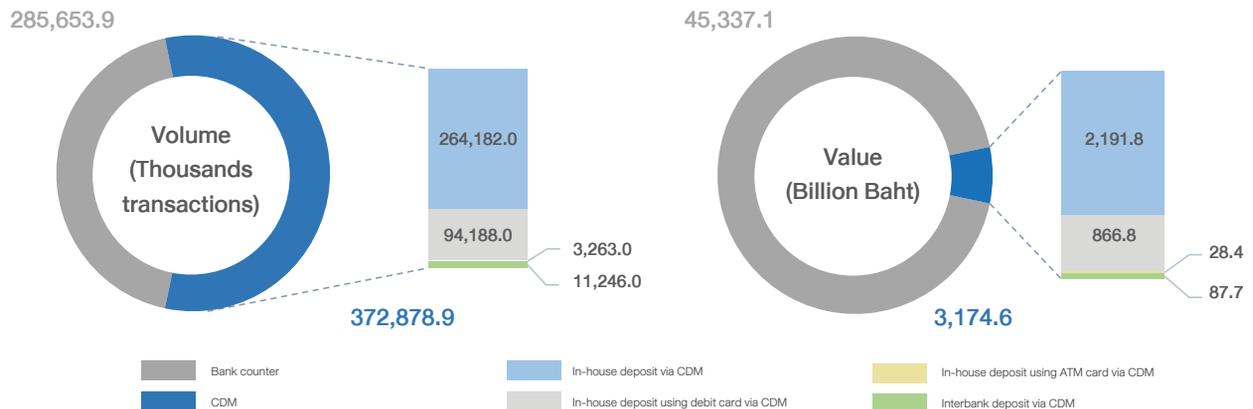
However, in terms of transaction value, the contrary was witnessed. Most withdrawals in 2019 occurred over the counter, which valued at around 25 trillion baht, 3 times higher than the cash withdrawals via ATM/CDM, and accounted for 75.8 percent of total cash withdrawals. The average value of over-the-counter withdrawals stood at 158,500 baht per transaction, indicating that most people preferred to conduct the transaction over the counter in case of a large withdrawal. As for withdrawals via ATM/CDM, the value of cash withdrawals via ATM/DCM stood at 8 trillion baht, decreased by 6.3 percent from the previous year with an average of 3,500 baht per transaction.

The average value of an ATM withdrawal continued to decline

Cash deposits contracted by 3.9 percent from last year as people shifted to electronic funds transfer instead of depositing cash. The decline of the over-the-counter deposits was mainly driven by the growing preference towards more convenient CDM deposits, whose share increased from 53 percent in 2018 to 57 percent in 2019. However, in terms of value, the general public still preferred to make large deposits over the counter, indicated by the average value of 158,700 baht per transaction, which was higher than the average value of CDM deposits of 8,500 baht per transaction.

Thai people started to prefer withdrawing cash through mobile applications

Figure 14: Volume and value of cash deposits in 2019



Source : Bank of Thailand



3) Electronic card usage

The number of electronic cards (credit, debit, and ATM cards): at the end of 2019 totaled 104.1 million cards, an increase of 2.2 percent from the previous year. Debit and credit cards registered at 64.8 million cards and 24.0 million cards, growing by 4.4 percent and 7.3 percent, respectively, from 2018. Meanwhile, ATM cards amounted to 15.3 million, decreasing by 11.9 percent from the previous year.

The decline of ATM cards was partly because many customers have switched to debit cards as the latter offered additional features supporting payments for products and services at payment terminals in stores and online along with complimentary benefits. In addition, the decline was driven by the growing appreciation of cardless cash withdrawals



The number of ATM cards decreased significantly, partly due to the conversion from magnetic stripe cards to chip cards to enhance security



or mobile application withdrawals. Further, the BOT issued security guidelines mandating the migration from magnetic stripe cards to chip cards for fraud and skimming prevention to raise security standards and boost card users' confidence.



Transfers and payments using cards at ATM/CDM continued to decline as a result of the increasing popularity of mobile banking/ internet banking



Table 3: Number and Proportion of Electronic cards at the end of 2019 and the growth/decline rate (compared to 2018)

Card type	No. of card (million cards)	Proportion (%)	Growth (%) (comparing 2018-2019)
ATM cards	15.3	14.7	-11.9
Debit cards	64.8	62.2	4.4
Credit cards	24.0	23.0	7.3
Total	104.1	100.0	2.2

Source : Bank of Thailand

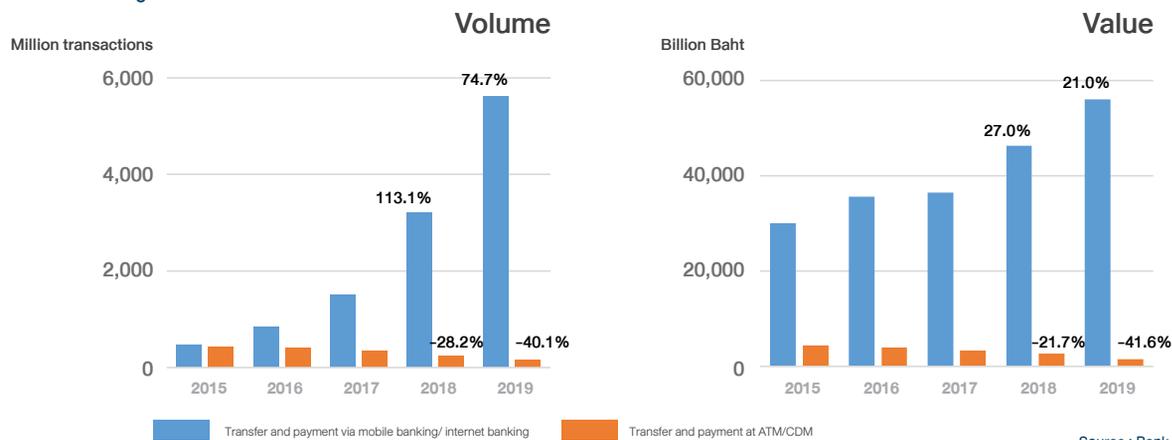
Electronic card usage: The volume of transfers and payments using electronics card at ATM / CDM in 2019 totaled 146.7 million transactions, equivalent to a value of 1,547.4 billion baht,

exhibiting significant declines of more than 40 percent from the previous year, in terms of both volume and value. One reason behind these drops was the convenience and lower fee that prompted



the public to switch to mobile banking/internet banking for funds transfer and bill payments instead of transfers and payments at ATM / CDM.

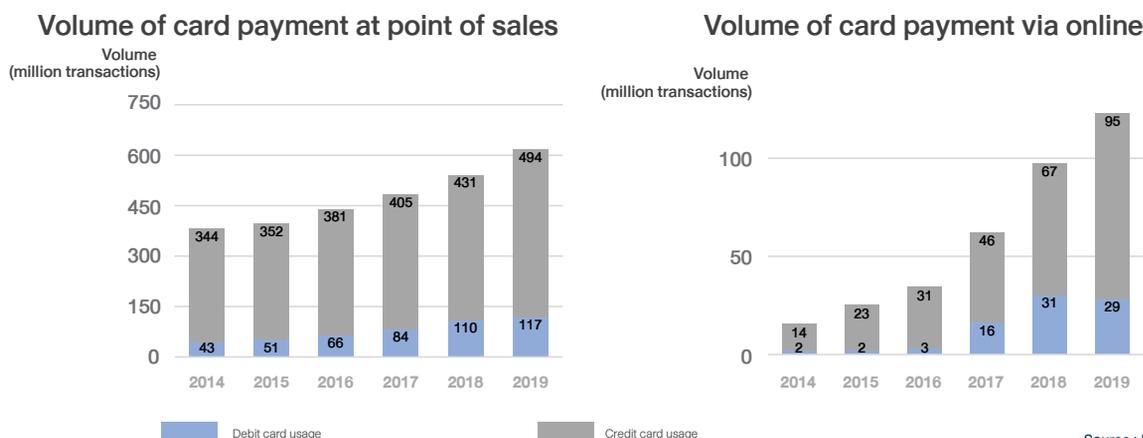
Figure 15: Volume and value of funds transfer and payment of ATM cards and debit cards at ATM/CDM comparing to via mobile banking/ internet banking channels



Although the use of electronic cards via ATM / CDM machines has declined, electronic cards usages for payments for goods and services at points of sale, in stores, and online in 2019 continued to gain traction, indicating the growing popularity of online purchases. Uses of electronic cards at the points of sale recorded at 610.8 million transactions and valued at 1,609.2 billion baht, representing a growth rate of 12.9 percent and 8.7 percent, respectively,

compared to 2018. The usages were higher than those of electronic cards via online channels, which registered at 123.1 million transactions in volume and 231 billion baht in value, equivalent to an increase of 26.1 percent and 32.3 percent, respectively. In this regard, credit cards remained the more preferred method for payments for goods and services via online channels and at the point of sale.

Figure 16: Volume of debit and credit card payments at the point of sale and online





STAT & FACT 1: Top 5 rankings from card purchasing

Each year, Thai people's spending via debit and credit cards continued to grow as the services are convenient and fast, eliminate the need to carry cash, and offer various benefits.

The 2019 statistics revealed that the top 5 most popular businesses that Thai people purchase products and services, either at the points of sale or through online channels, were:

Payments at stores or points of sale



No. 1
41%

Retail shops E.g., Payments for consumer products at stores, supermarkets, department stores



No. 2
20%

Energy (gas and fuel station)
E.g., Payments for oil and gas at petrol stations



No. 3
10%

Restaurants E.g., Payments for restaurants and fast food



No. 4
5%

Telecommunication
E.g., Payments for IT equipment, telephone bill, and internet bills



No. 5
5%

Services
E.g., Payments for insurances

Payments via online channels



No. 1
35%

Retail shops E.g., Payments for consumer products at stores, supermarkets, department stores



No. 2
17%

Transportation and logistics
E.g., Payments for car ride hailing service, travel agency service, car rental service



No. 3
13%

Services



No. 4
12%

Telecommunication
E.g., Payments for IT equipment, telephone bill, and internet bills



No. 5
4%

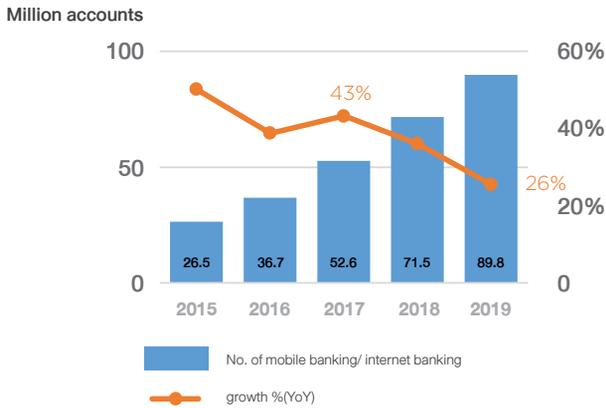
Airways
E.g., Payments for airline tickets

Source : Bank of Thailand



4) Mobile banking and Internet banking

Figure 17 : Number of Mobile Banking / Internet Banking Accounts



Source : Bank of Thailand

Over the years, digital payments have become more prevalent. Consequently, the number of mobile banking/internet banking accounts in 2019 increased to 89.8 million accounts from 71.5 million accounts in 2018. Over the past three years, the number of mobile banking/internet banking accounts had grown at a decreasing rate, from 43 percent in 2017 to 26 percent in 2019. The decline is owing to the relatively large number of accumulated accounts compared to the Thai population. Still,

The general public, private, and government sectors continued to increasingly transfer funds and make payments via mobile banking/internet banking.





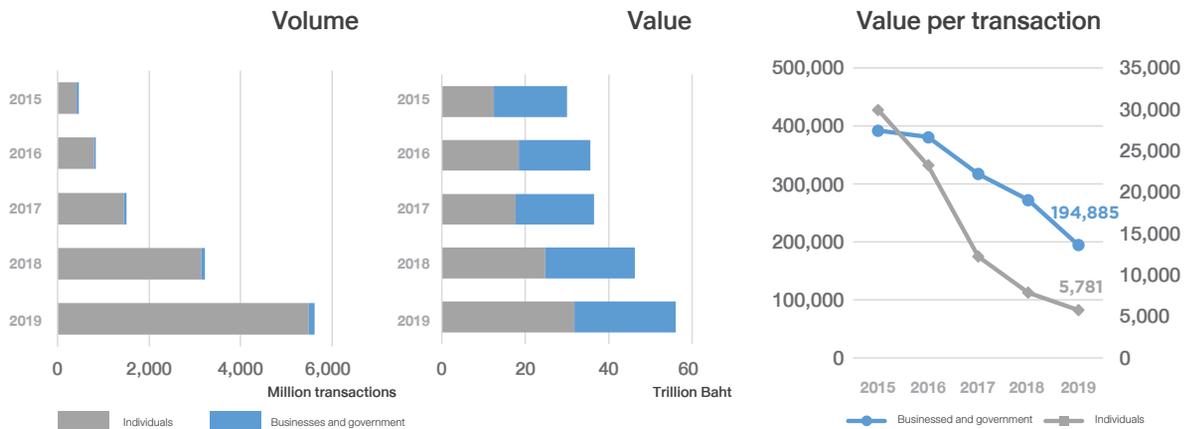
despite the declining growth in the number of accounts, the number of transactions had risen significantly.

In 2019, Thais showed an increasing preference for funds transfer and payments via mobile banking and internet banking. The volume of the transactions registered at 5,494.9 million transactions, while the value of the transactions totaled 31.7 trillion baht, equivalent to a growth rate of 75.2 percent and 28.1 percent, respectively, compared to the year earlier. Such growth was driven by the convenient, fast, and secure services, together with the promotion of PromptPay and Thai QR payments. Examining payment behaviors revealed that the average value

per transaction continued to decline from 7,905 baht in 2018 to merely 5,780 baht in 2019, suggesting increasing uses in daily life.

Similarly, the businesses and government sectors increasingly migrated to digital payments and funds transfers. The growth rate was 57.6 percent in terms of volume and 12.8 percent in terms of value, compared to last year. The average value per transaction decreased from 272,251 baht to 194,885 baht, encompassing major transactions such as payments of goods and services, salaries and wages payments, welfare payments, and personal tax refunds via electronic channels instead of cheques.

Figure 18: Volume and Value of Mobile banking/ internet banking classified by involved party type



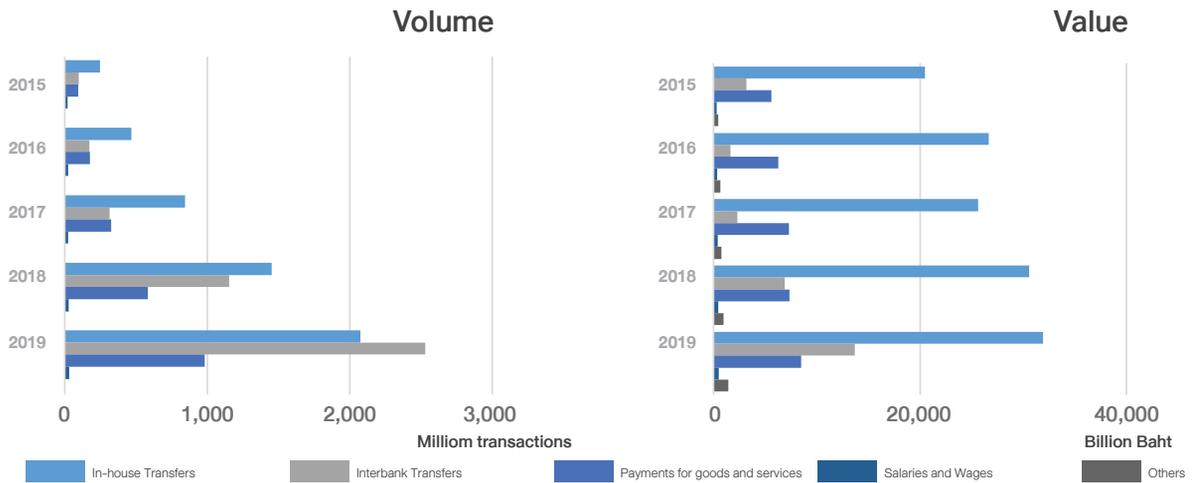
Source : Bank of Thailand



Additionally, analysis of transactions in 2019 classified by objective reveals that the volume of interbank funds transfers grew dramatically at 119 percent, with the proportion of interbank transfers increasing from 35.9 percent in 2018 to 45 percent in 2019. Such growth again resulted from the increasing popularity of digital payments.

The decline in the average value per transaction suggested increasing uses in daily life.

Figure 19: Volume and Value of Mobile banking/ Internet banking transactions classified by objective



Source : Bank of Thailand



STAT & FACT 2: The Thais' confidence in PromptPay and QR payment is on the rise.

PromptPay was a significant turning point in the Thai payment systems. Since 2017, PromptPay has stimulated an exponential growth of mobile banking/internet banking transactions. Thai people increasingly adopt PromptPay for their daily payments, such as paying for goods and services, transferring funds to business partners, family members, and friends, and making donations. Interesting statistics are as follows.



Thai QR Payment is an extended service on top of PromptPay. The Thai QR Payment standard represents another turning point in the Thai payment system that allows Thai people to make payments conveniently, easily, and safely. Thai QR payments have been adopted by various businesses, ranging from large shopping malls to street food stalls and public transport services such as sky train, subway, taxis, or motorcycle taxis. Its coverage also expanded to provincial areas.

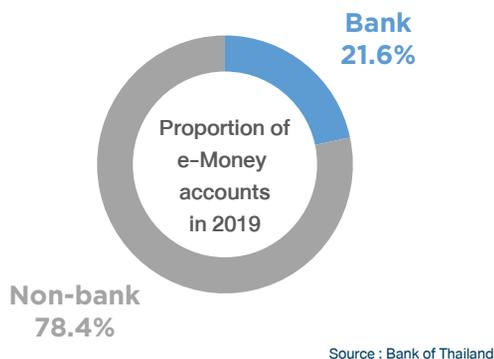
The number of QR payment acceptance points has increased exponentially to 6 million acceptance points at the end of 2019, including both in-store points and online channels. The volume of transactions totaled 80 million transactions, equivalent to 160 billion baht in value with an upward trajectory.

Source : Bank of Thailand



5) e-Money

Figure 20: Number of e-Money accounts (Bank and Non-bank)



Payment usage of e-Money for products and services increased especially with convenience stores purchases and public transportation fare



e-Money is an electronic payment medium that fulfills the new generation’s preference for convenience and speed in their daily life. With various service options, including cards and mobile applications, for payments for goods and services at convenience stores or via online channels, e-Money has gained growing popularity, denoting by the continual increase in the numbers of accounts¹ and transactions each year.

The number of e-Money service providers at the end of 2019 registered at 28 e-Money service providers² under the Payment Systems Act, consisting of 22 non-bank service providers and 6 bank service providers.

The number of e-Money accounts at the end of 2019 totaled at 89.4 million accounts, dropped by 2.6 percent from the previous year as follows:

- Non-bank: 70 million accounts, a decrease of 4 million accounts from the previous year.
- Banks: 19.4 million accounts, an increase of 1.7

million from the previous year.

One explanation was that commercial banks have started to offer e-Money services allowing users to exchange foreign currency in advance for payments for goods and services abroad without having to exchange cash. The service has provided greater convenience for Thai people traveling abroad.

E-Money Usage: In 2019, the use of e-Money continued to grow. The total transaction volume was 1,965.9 million transactions, equivalent to a total value of 279.3 billion baht, exhibiting growth rates of more than 30 percent in terms of volume and value. The volume of e-Money service provided by commercial banks rose to 137.4 million transactions, 3.6 times higher than that of 37.7 million transactions in 2018. Such increase resulted from e-Money transactions made via state welfare cards that allow cardholders to withdraw cash under predetermined conditions.

¹ Including both card-based and network-based e-Money accounts.

² The list of e-Money service providers under the Payment Systems Act B.E. 2560 (2017) can be found at www.bot.or.th under "Payment System" > "Payment Systems Act" > "List of Payment Business Providers."



E-Money Spending Behavior: Most e-Money usages were for payments for goods and services, representing the highest proportion of 44.2 percent. The average value per transaction was approximately 140 baht. In terms of value, e-Money transactions valued below 100 baht accounted for 83 percent of total transactions and averaged at only 40 baht per transaction. The low-value transaction suggested daily usages such as payments at convenience stores and public transportation networks for additional convenience and reducing times. These transactions also included payment abroad using

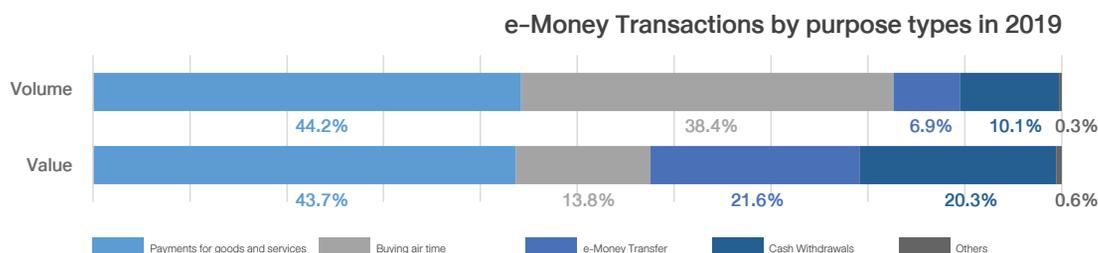


**Average value
per transaction was
approximately 140 baht**



e-Money preloaded with foreign currencies exchanged in advance, which accommodate travelers' needs. Other e-Money usages in sequential order were air-time payments (mobile phone top-up), cash withdrawals, and funds transfer.

Figure 21: e-Money Transactions by purpose types in 2019



	PAYMENTS FOR GOODS AND SERVICES	BUYING AIR TIME	E-MONEY TRANSFER	CASH WITHDRAWALS	OTHERS
VOLUME (MILLION TRANSACTIONS)	868.8	755.8	135.5	199.3	6.4
VALUE (BILLION BAHT)	121.9	38.7	60.3	56.7	1.6
VALUE PER TRANSACTION (BAHT)	140.4	51.2	445.5	284.4	258.3

Source : Bank of Thailand

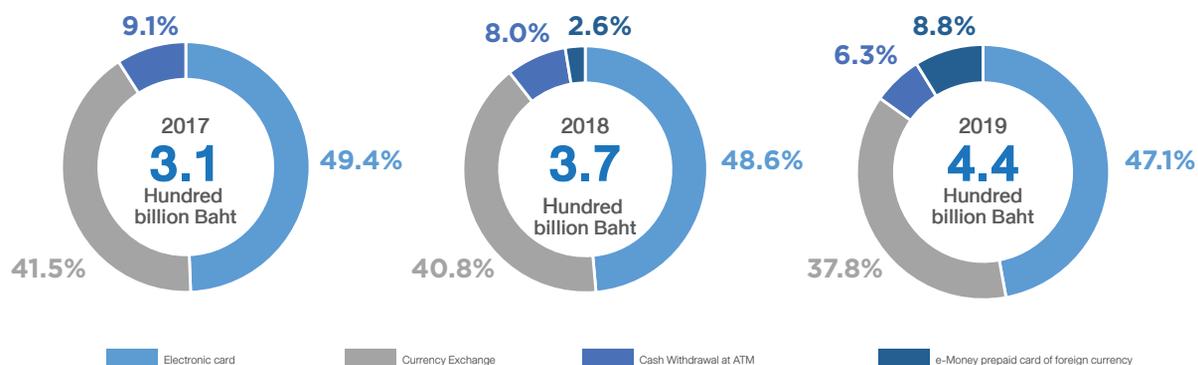


6) Payment Abroad

In 2019, payment abroad exhibited an upward trend in line with the increasing number of Thais traveling overseas of more than 10.6 million people, representing a growth rate of 6.4 percent from the previous year. The Thais preferred to use electronic cards for payment abroad, which accounted for 47.1 percent of total transactions. Such preference arose because of the convenience and the privileges for using electronic cards overseas. Next, Thais travelers preferred to make payments abroad using foreign currency exchanges from commercial

banks or money changers, which accounted for 37.8 percent of total transactions, representing a value of approximately 1.6 hundred billion baht. This is followed by cash withdrawals at ATMs / CDMs abroad, which accounted for 6.3 percent and valued at 27.7 billion baht. The remaining were e-money prepaid cards of foreign currency e.g. travel card issued by commercial banks, which had grown exponentially due to their convenience for making payments without carrying cash.

Figure 22: Payment abroad by payment instruments during 2017 – 2019



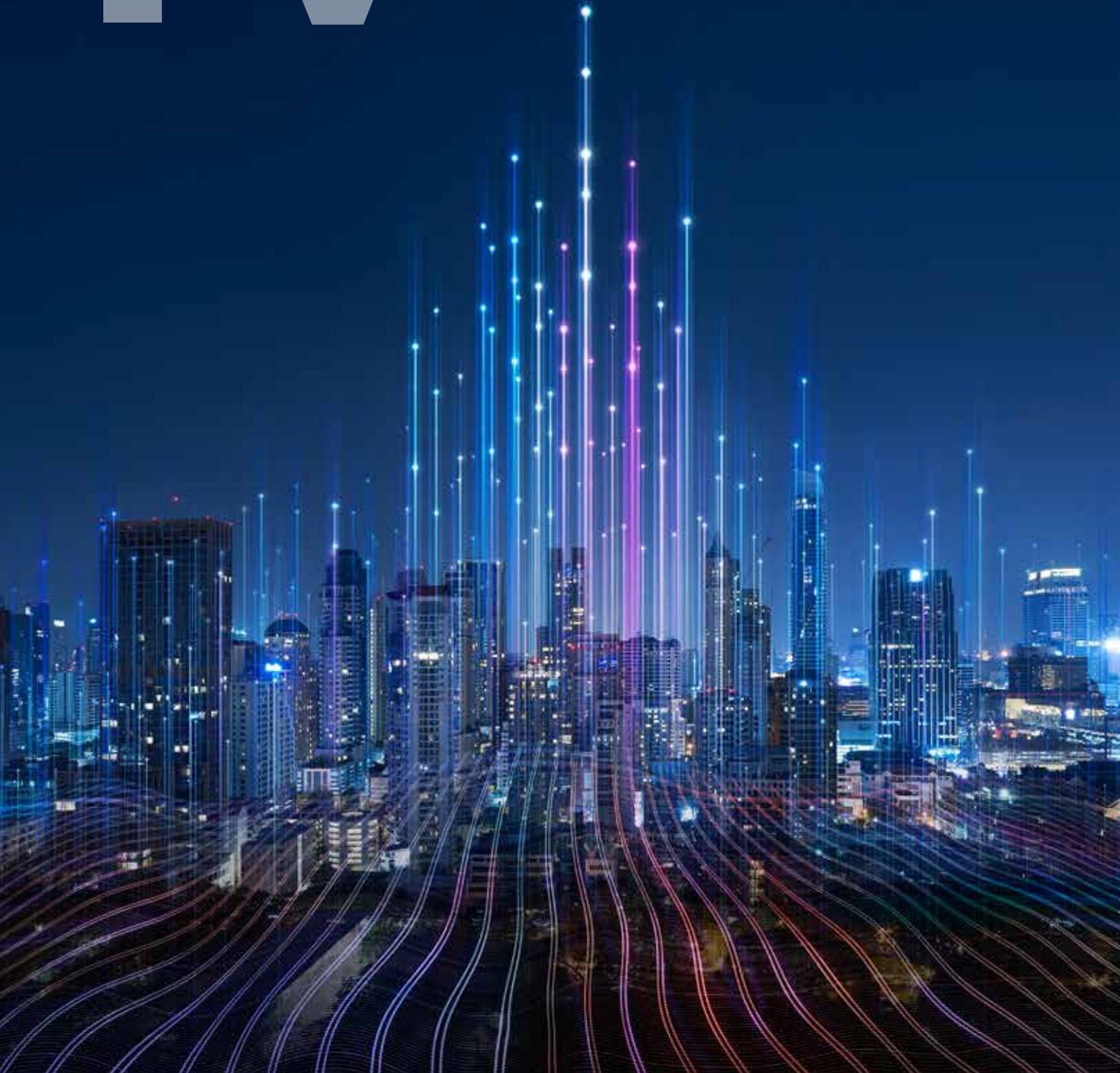
Source : Bank of Thailand

Nonetheless, apart from the aforementioned payment channels, the BOT collaborated with other central banks and domestic and international payment service providers to promote payment

connectivity through QR payment as another payment alternative. The service has been rolled out since 2019 in anticipation of increasing international transactions.

IV

Appendix





Glossary and abbreviation

ATM	Automated Teller Machine
ASEAN	Association of South East Asian Nations
BAHTNET	Bank of Thailand Automated High-Value Transfer Network
BHIM	Bharat Interface for Money
BIS	Bank for International Settlements
BOT	Bank of Thailand
CDM	Cash Deposit Machine
CPMI	Committee on Payments and Market Infrastructures
e-LG	Electronic Letter of Guarantee
e-Money	Electronic Money
e-Wallet	Electronic Wallet
EDC	Electronic Data Capture
EFTPOS	Electronic Funds Transfer at Point Of Sale
ETDA	Electronic Transactions Development Agency
GDPR	General Data Protection Regulation
ICAS	Imaged Cheque Clearing and Archive System
ILF	Intraday Liquidity Facilities
IOSCO	the International Organization of Securities Commissions
ISO	International Organization for Standardization
KYC	Know Your Customer
NDID	National Digital Identity
NFC	Near Field Communication
NITMX	National ITMX
Non-bank	Non-bank financial institution
NPA	New Payment Architecture
NPCI	National Payments Corporation of India
OIC	Office of Insurance Commission
ORFT	Online Retail Funds Transfer
PDPA	Personal Data Protection Act
PFMI	Principles for Financial Market Infrastructures



PIRPS	Prominently Important Retail Payment Systems
PCS	Payment Systems Committee
QR Code	Quick Response Code
RIA	Regulatory Impact Assessment
RTGS	Real Time Gross Settlement
SEC	The Securities and Exchange Commission, Thailand
SFIs	Specialized Financial Institutions
SIPS	Systemically Important Payment Systems
UPI	Unified Payment Interface

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Table 1: Basic statistical data

	2014	2015	2016	2017	2018	2019
Population (millions)	65.12	65.73	65.93	66.19	66.41	66.56
GDP current price (billion Baht)	13,230.8	14,020.4	14,911.6	15,724.9	16,365.6	16,879.0
GDP per capita (Baht)	203,176	213,302	226,173	237,572	246,432	253,595
Exchange rate vis-à-vis US\$ (at year-end)	32.96	36.08	35.82	32.66	32.42	32.36

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

Table 2: Technological infrastructure¹

	2014	2015	2016	2017	2018	2019
Total fixed network telephone subscribers (millions)	5.69	5.31	4.71	3.47	2.93	2.61
Total mobile telephone subscribers (millions)²	97.09	102.94	118.35	121.53	125.10	129.61
Postpaid	12.85	17.78	22.74	26.53	29.40	32.57
Prepaid	84.24	85.16	95.61	95.00	95.70	97.04
Total Internet users (millions)	27.65	39.47	43.87	45.19	47.45	50.10
Penetration rates						
Fixed network telephone (%)	8.74	8.08	7.14	4.00	4.41	3.92
Mobile telephone (%)	149.08	156.61	179.50	183.61	188.36	194.74

Sources: Division of Telecommunication Economics Research and Information Center Telecommunication Policy and Resource Management Bureau Office of National Broadcasting and Telecommunications Commission (NBTC)

¹Data source was changed since 2016 and all data was reviewed.

²Data as of November 2016

Table 3: Narrow money (at year-end , million Baht)

	2014	2015	2016	2017	2018	2019
Narrow money (1+2)	1,682,470	1,778,050	1,864,165	2,038,860	2,095,155	2,214,391
1. Currency outside Depository Corp. & Central Gov.	1,200,331	1,250,926	1,335,952	1,437,558	1,504,449	1,590,842
Banknotes in circulation	1,503,679	1,539,848	1,627,997	1,734,078	1,784,153	1,859,539
Coins in circulation	56,622	59,888	63,986	68,755	73,599	77,344
Less: currency held by Central Gov.	1,247	1,094	1,115	830	875	1,424
Less: currency held by Depository Corp.	358,723	347,716	354,916	364,445	352,428	344,617
Held by commercial banks	299,916	290,772	301,309	306,968	297,832	287,914
Held by finance companies	0	0	0	0	0	0
Held by Specialized Financial Institutions	58,385	56,544	53,211	57,240	54,341	56,360
Held by savings cooperatives	422	400	396	237	255	342
Held by money market mutual funds	0	0	0	0	0	0
2. Transferable deposits at Depository Corp.	482,139	527,124	528,213	601,302	590,706	623,549
Transferable deposits at Bank of Thailand	2,708	2,697	5,050	4,974	1,907	801
Transferable deposits at commercial banks	475,561	519,296	518,085	590,676	585,207	617,318
Transferable deposit at SFIs	3,870	5,131	5,078	5,652	3,592	5,430

Source: Bank of Thailand

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

	2014	2015	2016	2017	2018	2019
Currency outside Depository Corp. & Central Gov. ¹	1,200	1,251	1,336	1,438	1,504	1,591
Transferable deposits at Depository Corp.	482	527	528	601	591	624
Narrow money	1,682	1,778	1,864	2,039	2,095	2,214
Broad money ²	16,808	17,552	18,289	19,206	20,110	20,841

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)**

	2014	2015	2016	2017	2018	2019
Balances held at central bank	107.5	121.9	110.1	123.0	135.3	127.9
Stock of high-quality liquid assets ¹	-	-	3,585.6	3,627.0	3,860.8	4,049.7
Required reserves	713.8	749.0	-	-	-	-
Free reserves	2,354.4	2,445.5	-	-	-	-
Transferable deposits at other banks	5.3	3.5	4.1	5.2	4.5	6.2
Memorandum item:	108.1	88.2	69.5	33.9	3.4	0.0
Institutions borrowing from central bank						

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)

	2014	2015	2016	2017	2018	2019
Paper-based:	118,791	120,455	118,754	113,783	109,964	99,769
In-house cheque ¹	46,103	49,418	49,309	48,001	46,684	42,299
Interbank cheque	72,687	71,037	69,446	65,782	63,280	57,469
Electronic payment cards:	3,370,883	3,636,343	3,978,784	4,326,023	4,671,481	5,137,506
ATM card	502,026	487,986	411,513	301,822	237,597	182,047
for cash withdrawal via ATM	395,880	377,369	318,681	239,280	200,285	163,155
for other purposes ²	106,146	110,617	92,832	62,542	37,312	18,892
Debit card ³	1,655,143	1,833,615	2,015,466	2,231,425	2,352,871	2,271,979
for cash withdrawal via ATM	1,206,078	1,349,557	1,505,916	1,690,437	1,847,291	1,837,496
for purchasing purpose via EFTPOS	43,375	55,751	71,008	91,656	123,239	136,923
for other purposes ⁴	405,690	424,608	435,380	448,314	381,168	297,560
Credit card ⁵	425,781	456,889	500,072	542,579	599,664	717,783
for purchasing purpose	397,697	421,448	465,730	510,763	565,803	679,089
for other purposes ⁶	28,083	35,442	34,343	31,816	33,861	38,695
e-Money ⁷	787,932	883,352	1,076,298	1,272,968	1,510,836	1,965,696
Automated:	349,034	369,644	392,645	415,546	460,813	524,874
Direct credit ⁸	211,479	224,222	234,202	244,733	276,667	327,169
Direct debit ⁹	96,205	100,568	107,630	114,944	123,636	132,571
ITMX Bulk Payment	37,944	41,231	46,801	51,646	56,054	60,484
BAHTNET ¹⁰	3,406	3,623	4,013	4,224	4,456	4,651

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.

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)

	2014	2015	2016	2017	2018	2019
Paper-based:	61,595	61,583	60,895	59,530	56,812	52,247
In-house cheque ¹	23,632	24,142	23,762	23,651	21,780	18,344
Interbank cheque	37,963	37,441	37,133	35,879	35,031	33,904
Electronic payment cards:	14,922	15,279	15,221	15,044	14,348	12,725
ATM card	2,419	2,352	1,951	1,476	1,168	837
for cash withdrawal via ATM	1,761	1,664	1,403	1,076	888	668
for other purposes ²	658	688	548	400	280	169
Debit card ³	10,820	11,285	11,500	11,662	11,113	9,377
for cash withdrawal via ATM	5,905	6,420	6,876	7,389	7,471	6,782
for purchasing purpose via EFTPOS	106	134	161	187	225	233
for other purposes ⁴	4,810	4,705	4,441	4,076	3,409	2,362
Credit card ⁵	1,626	1,722	1,825	1,912	2,010	2,232
for purchasing purpose	1,384	1,465	1,574	1,672	1,758	1,964
for other purposes ⁶	242	257	251	240	252	268
e-Money ⁷	56.2	67.6	91.0	126.0	209.0	279.3
Automated:	778,999	814,821	901,257	918,687	882,366	852,770
Direct credit ⁸	14,065	15,199	16,623	18,000	19,827	20,825
Direct debit ⁹	4,467	6,250	7,588	7,567	7,727	7,096
ITMX Bulk Payment	2,469	2,538	2,941	3,060	3,436	3,924
BAHTNET ¹⁰	757,998	790,834	874,106	890,060	851,375	820,925

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.

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

	2014	2015	2016	2017	2018	2019
Credit card ¹	4,814	4,673	4,988	5,081	4,955	5,126
Debit card ²	182	182	196	224	241	303

Source: Bank of Thailand

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

² Domestic and oversea spending of Thai debit cards via EFTPOS.

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

	2014	2015	2016	2017	2018	2019
ATM card	6,755	6,501	5,658	4,764	4,154	3,380
Debit card ¹	11,238	11,264	10,885	10,679	9,798	8,820

Source: Bank of Thailand

¹ Domestic and oversea cash withdrawal of Thai debit cards via ATM.

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

	2014	2015	2016	2017	2018	2019
Notes and coins	1,560,301	1,719,372	1,773,469	1,878,237	1,933,082	1,986,827
Notes:	1,503,679	1,659,484	1,709,483	1,809,482	1,859,483	1,909,483
500000 Baht	118	134	152	157	160	160
1000 Baht	1,282,400	1,318,903	1,317,006	1,402,484	1,460,469	1,506,320
500 Baht	124,976	140,933	173,682	184,638	164,088	162,662
100 Baht	141,047	140,768	155,103	152,363	159,570	162,991
80 Baht	151	152	152	152	152	152
70 Baht	0	0	1,393	1,393	1,393	1,393
60 Baht	1,181	1,187	1,247	1,247	1,247	1,247
50 Baht	19,070	18,379	19,208	22,941	25,728	26,514
20 Baht	36,884	35,372	37,885	40,453	43,022	44,391
10 Baht	3,332	3,330	3,329	3,328	3,328	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:	56,622	59,888	63,986	68,755	73,599	77,344

Source: Bank of Thailand



Table 11: Institutional infrastructure

	2014	2015	2016	2017	2018	2019
Central Bank						
Number of Institutions	1	1	1	1	1	1
Number of Branches	3	3	3	3	3	3
Number of Accounts ¹	194	193	186	184	184	181
Value of Accounts (million Baht)	310,154	533,275	265,970	352,586	546,015	482,091
Thai Commercial Banks						
Number of Institutions	17	19	19	19	19	19
Number of Branches	6,986	7,040	6,998	6,766	6,717	6,491
Number of Accounts	86,582,576	88,529,904	90,648,406	94,846,533	99,882,718	101,635,499
Value of Accounts (million Baht)	11,065,024	11,347,475	12,433,454	13,062,173	13,591,551	13,272,010
Specialized Financial Institutions						
Number of Institutions	6	6	6	6	6	6
Number of Branches	2,445	2,445	2,468	2,471	2,475	2,477
Number of Accounts	59,539,994	63,243,722	68,569,387	74,242,903	72,594,911	76,547,332
Value of Accounts (million Baht)	3,901,266	4,214,675	4,450,107	4,686,137	4,940,815	5,095,488
Foreign Bank Branches						
Number of Institutions	14	12	11	11	11	11
Number of Branches	19	19	18	18	18	17
Number of Accounts	79,641	72,132	68,580	68,819	71,202	80,680
Value of Accounts (million Baht)	789,461	798,701	908,302	814,701	812,854	872,996

Sources: Bank of Thailand

¹ Data exclude regional office.

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

	2014	2015	2016	2017	2018	2019
Paper-based:	72,687	71,036	69,446	65,782	63,280	57,469
Intra-provincial Cheque in Bangkok and vicinity ¹	50,215	48,701	47,322	44,664	42,663	38,629
Intra-provincial Cheque in Regional Area ²	11,455	11,053	10,775	10,421	10,212	9,418
Inter-provincial Cheque ³	11,017	11,283	11,350	10,698	10,404	9,423
Automated:	184,270	192,769	192,450	178,878	152,675	125,967
BAHTNET ⁴	3,406	3,623	4,013	4,224	4,456	4,651
ITMX Bulk Payment	37,944	41,231	46,789	51,646	56,054	60,484
ORFT-ATM	142,920	147,916	141,648	123,009	92,165	60,832

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)

	2014	2015	2016	2017	2018	2019
Paper-based:	37,963	37,440	37,133	35,879	35,031	33,904
Intra-provincial Cheque in Bangkok and vicinity ¹	33,530	33,063	32,852	31,642	30,796	29,964
Intra-provincial Cheque in Regional Area ²	3,500	3,368	3,245	3,189	3,189	3,011
Inter-provincial Cheque ³	933	1,008	1,036	1,048	1,046	929
Automated:	761,411	794,347	877,955	893,909	855,420	825,262
BAHTNET ⁴	757,998	790,834	874,106	890,060	851,375	820,925
ITMX Bulk Payment	2,469	2,538	2,939	3,060	3,436	3,924
ORFT-ATM (Online Retail Funds Transfer)	944	975	910	789	609	413

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

	2014	2015	2016	2017	2018	2019
Bond registry system:						
Government securities	2,009	1,372	511	414	429	736
Book-entry system:						
Equity securities (in millions)	4.09	4.72	5.47	5.95	6.10	5.78
Government securities (in millions)	0.20	0.20	0.21	0.23	0.24	0.14

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)

	2014	2015	2016	2017	2018	2019
Bond registry system:						
Government securities	22.75	49.52	94.44	82.65	62.83	64.58
Book-entry system:						
Equity securities	1,027.83	1,081.33	1,209.11	1,055.41	1,406.66	1,228.04
Government securities	87,274.82	86,804.54	116,869.57	124,323.13	125,642.17	96,270.00

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



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

	2014	2015	2016	2017	2018	2019
BAHTNET ¹	64	65	66	64	67	66
Intra-provincial Cheque in Bangkok and vicinity ²	36	37	38	36	36	36
Intra-provincial Cheque in Regional Area ³	36	23	23	23	22	22
Inter-provincial Cheque ⁴	36	37	35	36	36	36
ITMX Bulk Payment	30	33	32	33	32	32
Bond registry system:						
Government securities	113,842	460,436	461,723	462,309	579,429	661,064
Book-entry system:						
Equity securities and Government securities	38	39	39	39	39	40

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

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

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

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

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

Table 17: Number of Automated machines¹ and EFTPOS terminals²

	2014	2015	2016	2017	2018	2019
Total of Automated machines	63,918	66,155	66,812	67,376	67,641	66,652
Bangkok	17,629	17,625	17,547	17,367	16,968	16,455
Central	22,002	22,821	23,027	23,649	23,900	23,862
Northeast	9,627	10,140	10,257	10,267	10,390	10,294
North	7,128	7,533	7,630	7,634	7,772	7,722
South	7,532	8,036	8,351	8,459	8,611	8,319
Total of EFTPOS terminals	361,871	411,755	470,835	708,976	870,454	876,149
Bangkok	172,485	173,693	194,002	260,677	338,831	352,943
Central	86,671	110,407	127,983	203,030	252,439	254,177
Northeast	28,131	36,056	42,102	78,439	90,311	87,701
North	34,339	41,428	47,571	81,204	92,405	86,533
South	40,245	50,171	59,177	85,626	96,468	94,795

Source: Bank of Thailand

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

² Data include commercial banks and some credit card companies.

Table 18: Number of electronic payment cards

	2014	2015	2016	2017	2018	2019
Total	93,491,615	91,131,751	94,020,965	97,984,264	101,532,986	104,089,905
Credit card ¹	20,303,751	18,974,393	20,230,257	20,571,634	22,074,802	23,998,653
ATM card	25,066,799	21,743,686	19,638,033	18,380,892	17,390,984	15,318,234
Debit card	48,121,065	50,413,672	54,152,675	59,031,738	62,067,200	64,773,018

Source: Bank of Thailand

¹ Data include non-bank.



Table 19: Sources of payment revenues of Thai commercial banks (million Baht)¹

	2014	2015	2016	2017	2018	2019
Total	76,257	81,715	87,648	92,197	92,918	92,859
Credit card	29,501	31,347	33,210	34,009	36,364	38,393
ATM/Debit card and e-banking	26,851	29,275	31,575	33,350	33,354	33,255
Money transfer and collection	17,896	19,178	21,051	23,227	21,682	19,742
Cheque-related fee	2,009	1,915	1,812	1,611	1,518	1,469

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

	2014	2015	2016	2017	2018	2019
Total	4,323	3,964	4,153	4,289	4,573	4,955
Credit card	2,844	2,758	2,903	2,935	3,291	3,713
ATM/Debit card and e-banking	48	41	42	45	44	44
Money transfer and collection	1,310	1,063	1,109	1,216	1,154	1,118
Cheque-related fee	121	102	99	93	84	80

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

	2014	2015	2016	2017	2018	2019
BAHTNET ¹	13,901	14,909	16,446	17,310	18,188	19,061
Intra-provincial Cheque in Bangkok and vicinity ²	204,961	200,415	193,941	183,047	174,136	158,317
Intra-provincial Cheque in Regional Area ³	46,756	45,484	44,160	42,708	41,682	38,597
Inter-provincial Cheque ⁴	44,966	46,431	46,516	43,845	42,467	38,617
ITMX Bulk Payment	154,874	169,674	191,758	211,663	228,792	247,884

Source: Bank of Thailand

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

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

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

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

Table 22: Daily averages of BOT payment services - Value of transactions (billion Baht)

	2014	2015	2016	2017	2018	2019
BAHTNET ¹	3,094	3,254	3,582	3,648	3,475	3,364
Intra-provincial Cheque in Bangkok and vicinity ²	137	136	135	130	126	123
Intra-provincial Cheque in Regional Area ³	14.3	13.9	13.3	13.1	13.0	12.3
Inter-provincial Cheque ⁴	3.8	4.1	4.2	4.3	4.3	3.8
ITMX Bulk Payment	10.1	10.4	12.0	12.5	14.0	16.1

Source: Bank of Thailand

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

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

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

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

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

	2014	2015	2016	2017	2018	2019
BAHTNET ¹	21,820	29,033	28,827	28,077	36,044	30,433
Intra-provincial Cheque in Bangkok and vicinity ²	417,618	484,821	445,684	429,714	386,101	313,828
Intra-provincial Cheque in Regional Area ³	90,005	97,533	83,358	79,595	83,420	69,958
Inter-provincial Cheque ⁴	184,197	188,315	190,831	186,206	187,085	146,742
ITMX Bulk Payment	473,040	574,555	615,266	744,926	790,750	705,591

Source: Bank of Thailand

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

	2014	2015	2016	2017	2018	2019
BAHTNET ¹	3,877.3	4,776.2	4,610.3	4,845.0	4,684.5	4,875.3
Intra-provincial Cheque in Bangkok and vicinity ²	266.0	297.5	248.6	212.6	248.9	218.0
Intra-provincial Cheque in Regional Area ³	25.6	25.1	22.4	22.3	22.2	21.4
Inter-provincial Cheque ⁴	12.4	12.6	13.7	13.4	15.8	10.7
ITMX Bulk Payment	77.8	46.4	83.1	47.7	63.4	52.1

Source: Bank of Thailand

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

	2014	2015	2016	2017	2018	2019
No. of agreements	6,229,960	13,918,815	20,883,147	31,779,042	46,004,931	60,084,598
Volume of transactions	109,349,726	263,922,502	584,983,180	1,228,270,303	2,727,906,573	4,635,781,425
Value of transactions (million Baht)	1,364,022	2,800,299	5,360,605	8,997,136	16,827,632	23,190,743

Source: Bank of Thailand

Table 26: Use of internet banking

	2014	2015	2016	2017	2018	2019
No. of agreements	10,159,971	11,901,117	15,095,696	19,899,583	23,861,834	29,404,921
Volume of transactions ¹	188,408,939	186,236,816	240,461,111	248,478,233	418,783,675	973,946,373
Value of transactions (billion Baht)	20,500.4	23,629.7	29,706.3	23,513.0	27,177.4	31,078.3

Source: Bank of Thailand

¹ Enquiry transactions were excluded.



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

	2014	2015	2016	2017	2018	2019
Total	199,633	235,636	298,975	463,248	1,177,194	2,502,335
ATM	142,920	147,916	141,648	123,009	92,165	60,832
Counter	9,146	9,791	9,702	8,781	6,802	5,296
Internet banking and mobile banking	47,567	77,928	147,624	331,458	1,078,227	2,436,207

Source: Bank of Thailand

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

	2014	2015	2016	2017	2018	2019
Total	1,588	1,819	2,184	3,042	6,870	13,394
ATM	944	975	910	789	609	413
Counter	191	189	183	171	145	125
Internet banking and mobile banking	453	656	1,091	2,082	6,116	12,856

Source: Bank of Thailand

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

	2014	2015	2016	2017	2018	2019
Total	397,260	429,287	479,106	510,820	487,491	428,449
Total bill payment at bank counters	101,736	107,262	113,367	120,891	116,238	113,458
Cash	97,018	101,594	104,354	107,590	100,159	106,103
Cheque	1,911	2,321	3,007	3,624	3,857	4,227
Others	2,807	3,348	6,006	9,677	12,223	3,127
Total bill payment at non-bank counters	295,524	322,025	365,739	389,929	371,252	314,991
Cash	291,486	318,340	362,038	385,640	368,128	312,458
Cheque	333	361	358	362	378	376
Others	3,705	3,324	3,342	3,927	2,746	2,158

Source: Bank of Thailand

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

	2014	2015	2016	2017	2018	2019
Total	7,048	7,704	7,461	7,906	7,558	7,744
Total bill payment at bank counters	6,272	6,886	6,608	7,010	6,684	6,911
Cash	2,431	2,696	2,802	3,077	3,010	2,774
Cheque	2,361	2,629	2,705	2,970	2,414	1,915
Others	1,481	1,561	1,102	963	1,259	2,223
Total bill payment at non-bank counters	776	818	853	896	874	833
Cash	768	810	845	887	866	825
Cheque	3	3	4	4	5	5
Others	5	4	4	5	4	3

Source: Bank of Thailand

**Table 31: Use of e-Money¹**

	2014	2015	2016	2017	2018	2019
No. of cards/accounts	26,852,975	31,070,380	39,181,287	53,171,877	91,747,747	89,340,646
Volume of transactions	787,932,371	883,352,315	1,076,300,313	1,272,235,125	1,511,010,671	1,965,696,357
Value of transactions (million Baht)	55,801.7	67,616.6	90,945.7	126,171.9	204,038.4	279,305.1

Source: Bank of Thailand

¹ Data exclude top-up cards.**Table 32: Fraud through specific payment channels and payment instruments¹ (million Baht)**

	2014	2015	2016	2017	2018	2019
Total fraud	426	2,321	593	753	896	1,204
Payment channels ²	91	2,018	224	377	519	674
Payment instruments ³	335	303	369	376	377	530

Source: Bank of Thailand

¹ Data collect from banks, some special financial institutions and some credit card companies.² Fraud through specific payment channels include phone banking, mobile banking, internet banking, pass book and other channels.³ Fraud via specific payment instruments include cheque, 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

Payment Systems Report Published annually

This Payment Systems Report is available on the Bank of Thailand's website (<http://www.bot.or.th>).

The Payment Systems Policy and Financial Technology Group of the Bank of Thailand is responsible for the explanations and viewpoints expressed in this report. Due acknowledgment is appreciated for the use of texts or figures in any topic or section of this report, in other publications.

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BANK OF THAILAND

Payment Systems Report

2019



The First Step of
the Payment Systems
Roadmap No.4



BANK OF THAILAND

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BOT Payment
Annual Report
2562/2019