BANK OF THAILAND

Payment Systems Report

2017

BANK OF THAILAND

Payment Systems Report 2017

Executive Summary

In 2017, a number of crucial developments took place in the Thai payment systems. Particularly, in terms of payment systems infrastructure, its enhancement has broadened public access to financial services and has been a key contributor to a 30 percent growth in e-Payment transactions in 2017 compared to the previous year. These infrastructure developments include:

- PromptPay, initially launched in late 2016 for government welfare disbursements and gradually extended to facilitate funds transfer services between individuals and juristic persons and other overlay services in 2017, have enabled faster and more convenient funds transfer among individuals and businesses by using easier-to-remember numerical IDs such as Citizen ID numbers or mobile phone numbers as proxy of traditional bank account numbers.
- The development and promotion of Thai QR Code standard for payments and funds transfer, known as QR Code Payment, have allowed merchants to accept payments directly into to their bank accounts without having to invest in an EDC. The QR Code Payment, which is convenient for retailers such as restaurants, small market vendors, and public transportation services including taxis and motorcycle taxis, has helped expand coverage of the e-Payment points of sale.

In addition to the infrastructure enhancement to broaden financial access, the Bank of Thailand (BOT) has continued to emphasize on overseeing systems security and financial consumer protection. In 2017, the BOT in collaboration with the Ministry of Finance enacted the Payment Systems Act 2017 (B.E. 2560). The new Act helps promote the congruity of payment legislation, reduce redundancy of existing laws and regulations, and provide an ecosystem in support of innovative services and consumer protection.

With regard to cyber risk, the BOT conducted an assessment on cybersecurity readiness on Thai commercial banks, specialized financial institutions (SFIs) and payment service providers, following the international standards, to identify further improvements required in the cybersecurity management. Moreover, the BOT organized a cybersecurity collaborative forum for the financial sector, and advocated the establishment of the Thailand Banking Sector Computer Emergency Response Team (TB-CERT).

The abovementioned developments have laid a strong foundation for efficient and secured Thai payment systems, which will be one of the keys to sustainable development of the Thai economy.

Payment Systems Committee (PSC)

Payment Systems Committee (PSC) is one of the main committees of the Bank of Thailand and is responsible for setting policy of payment systems for the Bank of Thailand which consistency with business development and technological advancement.

Payment Systems Committee

Chairman
Mr. Veerathai Santiprabhop
Governor

Vice Chairman
Mrs. Ruchukorn Siriyodhin
Deputy Governor Financial Institutions Stability

Committee member
Mr. Paiboon Kittisrikangwan
Deputy Governor
Corporate Support Services
and Banknote Management

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

Committee member
Mr. Rom Hiranpruk
Expert in Information Technology

Committee member
Mr. Kriengkrai Thiennukul
Vice Chairman,
the Federation of Thai Industries

Committee member
Miss Oranuch Vainusit
Deputy Director of the Comptroller General's Department

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

As of 31 December 2017

Key payment statistics in 2016 – 2017

	2016	2017	
Total population	65.9	66.2	Million
Nominal Gross Domestic Product (GDP)	14,931.5	15,691.7	Billion Baht
Technological infrastructure			
Number of fixed-line telephone number	7.1	4.0	Numbers per 100 persons
Number of mobile phone subscribers	179.5	183.6	Numbers per 100 persons
Payment statistics			
Number of Thai commercial bank branches	6,998	6,766	Branches
Number of Foreign commercial bank branches	18	18	Branches
Number of 6 Specialized Financial Institutions branches	2,468	2,471	Branches
Number of Automated machines (ATMs/CDMs) [1]	64,115	66,944	Terminals
Number of EFTPOS terminals [2]	474,363	711,221	Terminals
Number of ATM cards	19,638,033	18,380,892	Cards
Number of Debit cards	54,152,675	57,773,793	Cards
Number of Credit cards	20,136,341	20,571,634	Cards
Currency in circulation per capita	20,263.00	21,719.15	Baht per person
Average cheque usage per capita	1.8	1.7	Cheques per person per year
Monthly average value of credit card payments [3]	5,767	5,959	Baht per card
Monthly average value of cash withdrawals via ATM card	8,209	7,056	Baht per card
Monthly average value of debit card payments [4]	265	292	Baht per card
Monthly average value of cash withdrawals via debit card	11,123	11,239	Baht per card

[1] Includes both Automated Teller Machines (ATMs) and Cash Deposit Machines (CDMs)
[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 collect and send information on payment transactions made through debit and credit cards
[3] Refers only to payments for goods and services through EFTPOS within and outside Thailand using domestically issued credit cards
[4] Refers only to payments for goods and services through EFTPOS within and outside Thailand using domestically issued debit cards

PAYMENT in Thailand (2017)

Data as of 2017

18.3 million cards
No. of ATM cards

711,221
No. of EDCs

57.8 million cards
No. of Debit cards

Increased by **50%** from the previous year

9,255
No. of bank branches

20.6 million cards
No. of Credit cards

Volume of Debit Card Payments at the Point of sale

2012	2013	2014	2015	2016	2017
30.7 million transactions	36.7 million transactions	43.4 million transactions	51.3 million transactions	66.0 million transactions	83.5 million transactions

Mobile Banking

No. of accounts (Million accounts)		Total volume (Million transactions)	
2016	2017	2016	2017
20.9	31.6	585.0	1,228.3
Growth rate	51.3%	Growth rate	110.0%

Total value of (Billion Baht)		
2016	2017	
5,363.9	8,997.1	Growth rate 67.7%

PromptPay (As of 31 March 2018)

No. of PromptPay registrations

40.4 million IDs

Registered with Citizen ID

27.1 million IDs

Registered with Mobile phone number

13.3 million IDs

Growth rate (Volume) of e-Payment by channels 2012–2017

102% Mobile banking

28% Debit card

20% e-Money	**11%** Bulk payment	**8%** BAHTNET (3rd Party)	**4%** Direct credit
15% Internet banking	**8%** Credit card	**7%** Direct debit	**1%** Fund transfer & Bill payment at ATM

Contents

II Payment Systems Oversight

III Payment Systems Trends

IV Appendix

List of Boxes

List of Figures

List of Tables

I

Major Payment Systems Developments in 2017

1. Policy and Developments in Payment Systems Infrastructure

1.1 The Fourth Payment Systems Roadmap

The Bank of Thailand (BOT) continues to focus on improving efficiency, stability, and security of Thai payment systems. With this regard, the BOT has formulated Payment Systems Roadmaps providing frameworks for developments of the country's payment systems, and concluded the implementation of the Third Payment Systems Roadmap (2012 – 2016). At the end of this Roadmap, technology advancement and financial innovation have made possible the development of payment systems which are convenient, fast and accessible at lower costs. The advancement, however, has brought about new types of risks such as cyber threats, posting a new challenge on oversight of payment systems stability in the future.

In 2017, the BOT was in the process of formulating the Fourth Payment Systems Roadmap setting out development directions to align the future payment systems with new environments, innovative payment development trends, and the national strategies pertaining to digital economy and social development. The BOT assessed the Thai payment system environments by conducting a survey on consumer payment behaviors and by gathering stakeholders' inputs from both the public and private sectors. The findings indicated that the adoption of digital payments in Thailand has grown continually as people are increasingly acquainted with technologies, and as the government policies and initiatives promote access and adoption of digital payment. Nonetheless, at present, cash still remains the preferred medium of payment in most individuals' day-to-day activities, while cheque and cash are predominant among businesses especially small and medium enterprises (SMEs).

The main objective of the Fourth Payment Systems Roadmap is to foster an enabling environment for greater adoption of digital payment in activities of all sectors. The goal is for every sector to be able to reap maximum benefits from digital payment. The general public is able to make convenient and safe payments both online and offline. Businesses and government agencies are able to enhance their operational efficiencies and transparency and to reduce their operating costs. The economy is fueled for expansion, and national competitiveness in the digital era is elevated. In this regard, the BOT will discuss with relevant stakeholders in order to formulate the Payment Systems Roadmap along with implementation plans associated.

Box 1: "Understanding Accessibility"— The Survey of Public Understandings and Behaviors towards e-Payments.

In 2017, the BOT launched a survey to learn more about the general public's understanding and behaviors towards electronic payment (e-Payment) services. The survey aimed to assess individuals' knowledge and understanding of various e-Payment services and to identify factors influencing individual payment behaviors in order to serve as inputs for the formulation of the Fourth Payment Systems Roadmap. The BOT in collaboration with the Institute for Population and Social Research, Mahidol University, collected data from 10,805 samples, representing individuals from all provinces covering both urban and rural areas and whose ages were between 18 and 89 years old.

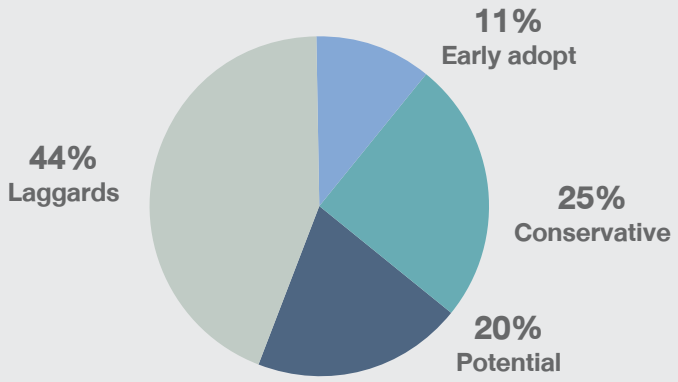
The survey revealed that a majority of the samples had relatively limited knowledge and understandings of e-Payment. While 84 percent of the samples knew ATM cards, less than 50 percent knew other payment instruments, e.g., debit card, mobile banking, and internet banking. Further, these samples could not distinguish between ATM cards and debit cards, which could be the main reason why debit cards were mainly used for cash withdrawals rather than payments for goods at stores.

Moreover, although 68 percent of the samples owned at least one medium of e-Payment, a majority of the samples still preferred cash for small-value day-to-day transactions. Nonetheless, for high-value transactions such as high-value funds transfers and bill payments, e-Payment was preferable as consumers perceived it to be safe and be able to verify past transactions.

In addition, there were four key factors influencing consumer e-Payment behaviors, i.e., income, a necessity of spending, generation[1] , and understanding of payment instruments. Income directly affected individuals' purchasing power, while the necessity of spending increased opportunities for spending. Individuals with high income and high necessity of spending were more likely to adopt e-Payment. Still, individual payment behaviors depended on his/her familiarity with technologies. As can be observed from consumers in Generation Y who grew up with financial technology advancement, their e-Payment adoption was higher, compared to other generations. Knowledge of payment instruments also influenced e-Payment behaviors as it created confidence in the system. Consumers with better understandings of payment instruments were more likely to migrate to e-Payment.

[1] Generation refers to demographic classifications by age groups exhibiting different environments, behaviors, and ideas. In the analysis, samples were classified into 5 groups: (1) Generation Z – born after 1997 (2) Generation Y – born between 1980 and 1997 (3) Generation X –born between 1965 and 1979 (4) Baby Boomers – born between 1946 and 1964 and (5) Silent Generation –born between 1925 and 1945.

E-Payment Target Groups



Based on the analysis above, e-Payment adopters can be categorized into 4 groups: (1) Early adopters[2] who are technology savvy with high purchasing power and are current mobile banking and electronic cards users; (2) Conservatives[3] who possess high purchasing power but have relatively low e-Payment usage. The policy for these two groups should focus on offering additional e-Payment services that create pleasant experiences to induce repetitive uses and on dispersing service points extensively; (3) Potentials[4] , mostly Generation Z, who are high-school and college students already acquainted with technology. Given their high potential for e-Payment adoption, the policy for this group should emphasize on building an ecosystem conducive to daily e-Payment usage, such as issuing a student ID card that can also be used as a debit card, or encouraging university shops and vendors to accept Quick Response Code (QR Code) payment; (4) Laggards[5] who have low purchasing power and lack of both understanding of and access to e-payment services due to their remote residency. The Thai Government's welfare smart card project, in particular, is crucial for fostering e-Payment adoption in this group. The policy therefore should focus on providing e-Payment education and on spreading local service points to broaden their access to e-Payment services.

In summary, promoting consumer e-Payment adoption requires the BOT to improve payment infrastructure to broaden access to e-Payment, e.g., extending PromptPay services, expanding cards and QR Code terminals, and raising public awareness and understanding of e-Payment. Still, migrating consumers from cash to e-Payment requires environments conducive to adoption. All relevant parties, e.g., public sector, business sector, and e-Payment service providers, need to collaborate in advocating e-Payment services to general public by promoting tryouts and creating pleasant e-Payment user experiences in order to initiate wider behavioral changes.

[2] Early adopters refers to those who earn more than 10,000 baht/month and use e-Payment more than 6 times/month.
[3] Conservative refers to those who earn more than 10,000 baht/month and use e-Payment less than 6 times/month
[4] Potential refers to those who earn less than 10,000 baht/month, aged below 21 years old, and use e-Payment less than 6 times/month
[5] Laggards refers to those who earn less than 10,000 baht/month, aged above 21 years old, and use e-Payment less than 6 times/month

1.2 Development of Payment Systems Infrastructure According to the National e-Payment Master Plan

Since 2017, the BOT has pushed forward the enhancement of e-Payment systems infrastructure and closely monitored the progress of the PromptPay and the Card Usage Expansion Projects, which were part of the National e-Payment Master Plan to encourage e-payment adoption in all sectors. The details of each project are as follows:

1) PromptPay Project: Launched in late 2016, PromptPay infrastructure was designed to accommodate multiple payment applications, thereby allowing businesses and other non-bank service providers to operate with PromptPay. In 2017, the BOT has pushed for various extended PromptPay services, for example,

• **e-Wallet PromptPay:** Launched on 15 September 2017, the service allows consumers to link their e-Wallet ID[6] to their bank accounts to transfer funds or top-up e-Wallet[7] operated by 4 non-banks. The service provides a more convenient and quicker alternative payment for everyday spending, at a lower fee.

Figure 1: Types of ID that can be linked with PromptPay

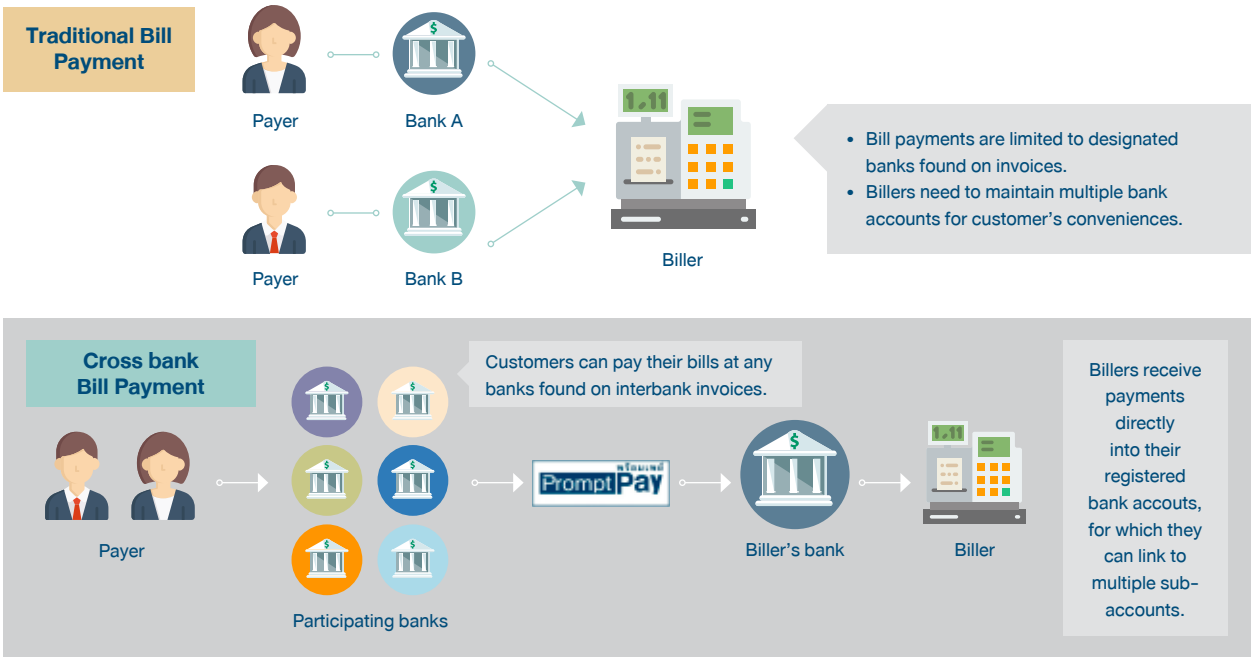
Source: Bank of Thailand

[6] e-Wallet ID refers to the 15-digit electronic wallet identification number that applicants receive from non-bank providers, once completed the Know Your Client (KYC) process.

[7] e-Wallet refers to electronic wallet, whose values are recorded on cards or computer network.

• **Cross-bank Bill Payment:** The service broadens numbers of banks for which consumers can use to pay bills, instead of being limited to a list of designated banks found on invoices. Similarly, businesses no longer need to maintain multiple bank accounts to accept payments from their customers, thus helping increase their flexibility in accounting reconciliation and reduce accounting errors. E-Payment fees are also decreased to no more than 5 baht per transaction. The service has been available since November 2017; businesses who are interested to use the service can contact their banks for more information.

Figure 2 : Cross-bank Bill Payment

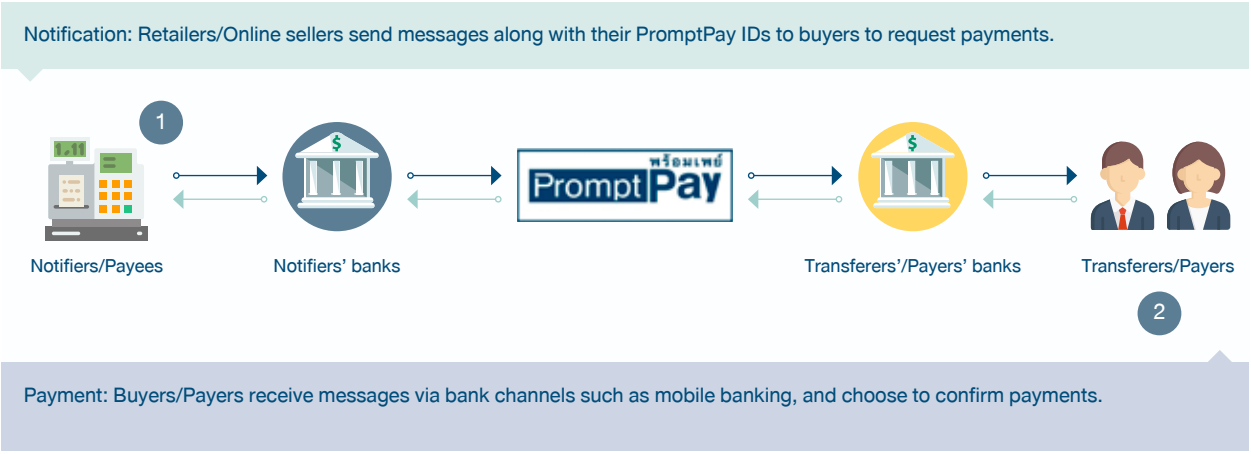


Source: Bank of Thailand

• **PayAlert:** The service allows vendors and businesses to send notifications to consumers to request payments, thus adding another convenient and quick payment channel for business owners, retailers, and online sellers, while increasing consumers' convenience with additional e-Payment channels.

The PayAlert service consists of two steps, i.e., (1) Notification: sellers or service providers, such as stores or online sellers, send notification messages including their PromptPay IDs to buyers to request payments; (2) Payment: buyers receive the messages through channels provided by their banks, such as mobile banking applications, and confirm the payments. The PayAlert service has been available since March 2018.

Figure 3: PayAlert



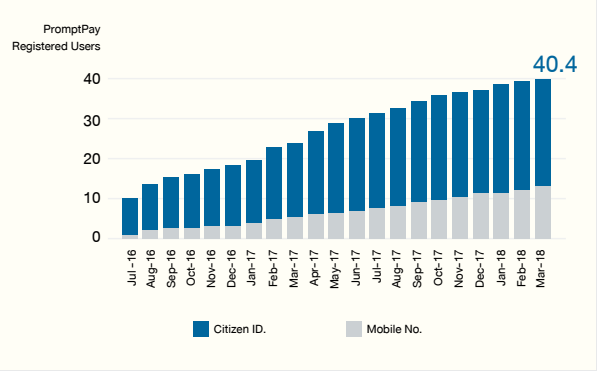
Source: Bank of Thailand

2) Card Expansion Project: Throughout 2017, participating commercial banks completed installation of EDC[8] terminals in both public and private organizations on target. At the end of 2017, more than 575,000 EDC terminals was installed throughout the country resulting in the proportion of one EDC per 1,000 inhabitants, rising from 6.3 in 2015 to 10.8, thereby providing consumers with easier and more convenient access to payment channels.

In addition, to encourage consumers to shift their payment preference from cash to e-payment as well as to increase public awareness and usage of debit cards, the Ministry of Finance launched the Debit Card Lucky Draw Campaign, offering monthly prizes to winning debit card users and participating merchants with EDC terminals for eligible transactions ended in April 2018. In this regard, the volume of debit card transactions in 2017 showed a growth of 32 percent, compared to that of 2016, equivalent to an increase of more than 17,000 million baht in value. Note that, consumer payments via debit cards increased by 35 percent during the campaign period of April – December 2017.

[8] EDC stands for Electronic Data Capture, also known as EFTPOS, referring to an equipment used to accept e-payment or a card swipe terminal.

BOX 2: Four PromptPay Highlights



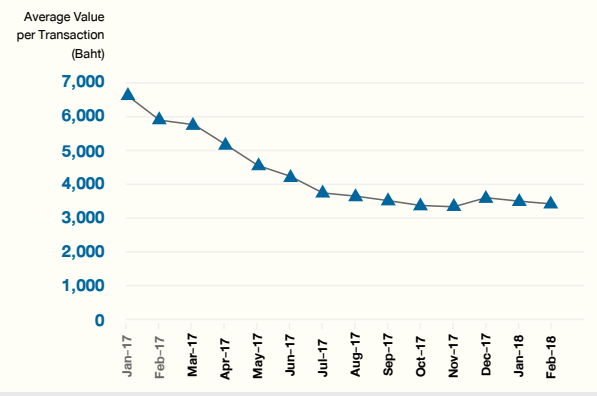
1. PromptPay Growth

Since its first operation in January 2017, the number of PromptPay registered users has grown continually.

As of 31 March 2018, there were 40.4 million PromptPay registered numbers, consisting of 27.1 million Citizen ID registered users and 13.3 million mobile number registered users. In short, one-third of the Thais are PromptPay users.

Although the number of Citizen ID registered numbers was slightly higher, most transfers made were to mobile phone numbers. This is because most Citizen ID registered numbers adopted PromptPay for government welfare payment, government transfers, and tax refund, for which transactions have occurred less frequently. On the other hand, mobile phone number registered users are current mobile banking or internet banking users, who regularly send and receive funds transfers, and switch to PromptPay simply because of its convenience and lower fees.

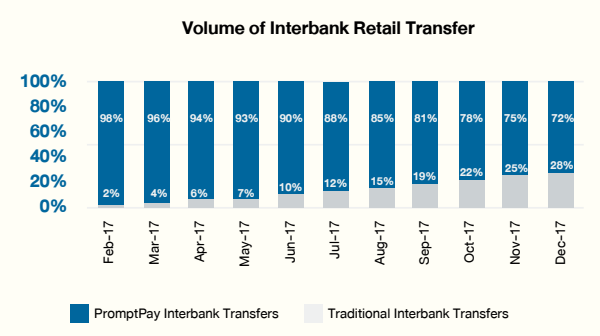
During the past year, accumulated PromptPay transactions totaled 136 million transactions, representing 490 billion baht in value. The average transaction growth of 28.8 percent per month was relatively high compared to that of similar retail transfer services in other countries.



2. PromptPay's Consumer Behaviors

Since its introduction, the average PromptPay transaction value has continually declined, suggesting that most consumers use PromptPay for daily low-value funds transfers and payments. This is due to convenience of funds transfer, where fee is exempted for the transfer of 5,000 Baht or less, and where numbers of transfers allowed per day are unlimited. As a result, transfers of 5,000 baht or less accounted for 87 percent of total PromptPay transactions.

Pertaining to usage channels, most consumers preferred to use PromptPay via mobile banking and internet banking, which accounted for 94.4 percent of total transaction values and grew on average at 26.3 percent per month. Various factors contributed to this growing preference such as increasing popularity of mobile banking and internet banking, more user-friendly and safer retail payment services, and continuing promotion of the service.



3. PromptPay vs Traditional Fund Transfers

Considering volume of interbank retail transfers, PromptPay interbank transfers have gradually increased since its introduction. As of 2017, interbank transfers through PromptPay accounted for 28 percent of total volume of interbank retail transfers. The traditional interbank retail transfers using bank account number, in contrast, declined steadily, indicating that PromptPay is becoming one of the preferred funds transfer channels.

4. PromptPay vs Similar Payment Services Aboard

PromptPay offers services similar to Fast Payment services available in many countries, e.g., Paym of United Kingdom, PayNow of Singapore, and OSKO of Australia. Many countries opt for more easily remembered Citizen ID or mobile numbers in substitution of bank account numbers to increase convenience of funds transfer and to reduce costs and transaction times. These benefits of Fast Payment, in turn, help foster widely e-Payment adoption.

Comparison of Fast Payment in Selected Countries (As of March 2018)

	Thailand	United Kingdom	Singapore	Australia
Fast Payment	PromptPay	Paym	PayNow	OSKO payment
Proxy ID	- Mobile phone number - Citizen ID - Juristic Persons ID - e-Wallet ID	- Mobile phone number - Citizen ID	- Mobile phone number	- Mobile phone number - Juristic Persons ID - e-mail address
No. of bank participants	23	15	9	53
Payment Channels	- Internet/Mobile device - ATM - Bank counter (selected banks)	- Internet/Mobile device - Bank counter (selected banks)	- Internet/Mobile device - As specified by the Bank	As specified by the Bank
Fee	Free – 10 baht	Free	Free	Free
Transfer limit (per transaction)	As specified by the Bank e.g., 2 million baht	£250 (11,150 baht)	SGD 200,000 (4.8 million baht)	AUD 2,000 (50,000 baht)

2. Developments in Legal and Regulatory Infrastructure

The BOT together with the Ministry of Finance proposed the enactment of the Payment Systems Act B.E. 2560 (2017) (PSA) to unify related payment laws, reduce redundancy founded in existing laws, and enhance oversight of Thai payment systems to be in compliance with international standards. The Act was published in the Government Gazette on 18 October 2017. The PSA was in effect since 16 April 2018. In this regard, three existing laws were annulled, namely, (1) the Ministerial Notification of Ministry of Finance: Business for which permissions must be obtained according to Section 5 of the Notification of the Revolution Council No. 58 (e-Money businesses) dated 4 October 2004; (2) the Royal Decree on Regulating Electronic Payment Service Business, B.E. 2551 (2008); and (3) the Royal Decree on Regulating Electronic Payment Services of Specialized Financial Institutions, B.E. 2559 (2016). Existing payment service providers who wish to continue their operations must apply for licenses or register with the BOT within 120 days as from the date of the Minister's Notification (14 August 2018). Once obtaining the new license or registering with the BOT, the service providers can operate until the Ministry of Finance or the BOT indicates otherwise.

In 2017, the Ministry of Finance issued the Notification on stipulating Designated Payment Systems. Correspondingly, the BOT later issued notifications prescribing regulations on supervision of the payment systems encompassing 5 aspects: Risk Management and Security, Financial Stability, Governance, Consumer Protection, and Efficiency and Competitiveness.

The PSA and related notifications can be found on the BOT Website (https://www.bot.or.th) under "Payment Systems" > "Payment Systems Act 2017"

Box 3: "Payment Systems Act" The Must-Know Legislation

Introduction to Payment Systems Act

The PSA is the legislation related to oversight and supervision of payment systems and payment services. The Act aims to ensure national payment systems' stability, security, agility, operational continuity, and conduciveness to e-payment services and future payment innovation.

The PSA brings previously fragmented payment laws into a single cohesive law, which helps reduce businesses' difficulties to comply with multiple laws, and enhance payment supervision to be in accordance with international standards. The PSA is also consistent with the payment systems laws in other countries, such as Hong Kong, Malaysia, Singapore, and Australia. Further, the PSA facilitates both banks and non-banks with innovative services to operate under appropriately regulated environments and well-defined consumer protection schemes.

Supervisory Framework under the Payment Systems Act

The PSA empowers the Ministry of Finance to issue notifications specifying types of businesses that need to apply for licenses or registration, and to grant such licenses. Further, the Act designates the BOT as the payment systems regulator with responsibilities to establish a supervisory framework to oversee payment systems businesses and payment systems services under supervision, to examine, and to order rectification in case of insolvency or financial trouble. The Supervisory Framework can be summarized as follows:

1) Risk management and Security: Ensures proper management of risks such as systemic risk, settlement risk, and operational risk associated with payment systems businesses and payment services; and prescribes of the principle of payment finality and IT security framework.

2) Financial Viability: Ensures that operators/service providers are financially sound to support continuity of their operations, such as setting minimum initial paid-up capital for payment systems businesses and payment services.

3) Governance: Focuses on business management and organizational structure that allows for check and balance, including fit and proper qualification of the board members and executives.

4) Consumer Protection: Ensures consumers are treated fairly. Key principles are provided for protection of users' money received in advance, ensuring adequate and accurate disclosure of information to customers, arranging for proper complaint handling, and defining fee structures charged to users.

5) Efficiency and competitiveness: Emphasizes on fair regulatory treatments and promotion of competitions and innovations to enhance efficiency and performance of Thai payments.

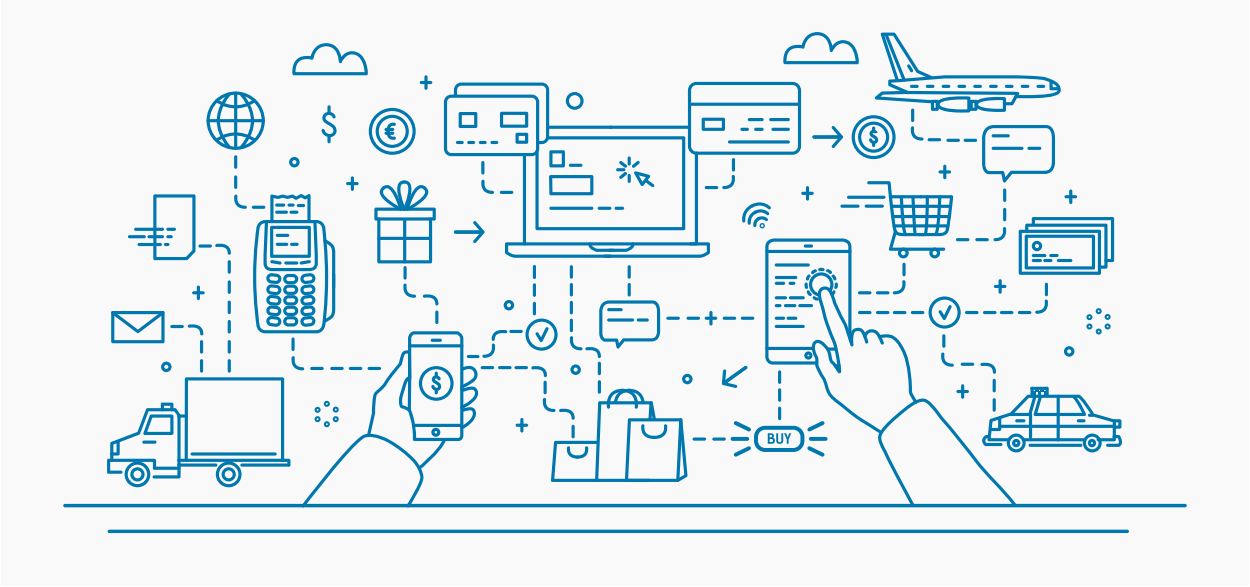
Benefits of Payment Systems Act

The PSA intends to elevate Thai payment systems' stability and to create flexible regulatory environments conducive to new technology and innovations, which will benefit individual consumers, service providers, and the economy. These benefits are summarized below:

Benefits to individual consumers The PSA includes legal provisions regarding fair treatments and protection of consumers. Besides providing safe and trustworthy services and safeguarding customer information, payment service providers are expected to establish good customer handling procedures and to make available complete and sufficient information for consumers to make informed decisions. The PSA also adds protection of prepaid funds received in advance by e-Money and fund transfers operators such that these prepaid funds will be sheltered and paid back to customers in case the operators are under bankruptcy proceedings or are granted the receivership orders.

Benefits to service providers The PSA integrates related payment laws into a single regulation, thus increasing service providers' ease of doing business and reducing their burdens in compliance with multiple laws and regulatory requirements. The PSA also includes legal provisions essential to introduction of new technology and innovation into the payment landscape, thereby encouraging new players and new efficient services.

Benefits to the Economy The PSA enhances oversight of Thai Payment systems to be in line with international standards, ensuring systems stability and proper management of systemic risk thereby raising public confidence in the country's payment systems. The PSA also contains a legal provision regarding payment finality, which protects transactions completed through Systemically Important Payment Systems from being revoked in case a member of such systems undergone bankruptcy proceedings. In addition, the oversight is proportionate to risks associated with each service. Some services may be required lower paid up capital. This helps ease barrier to entry to the payment landscape and promote competition to spur the provision of efficient services, which, in turn, will create greater flexibility for payments in the financial system.



3. Building Public Confidence in e-Payment

3.1 Cybersecurity Enhancement

At present, technology has been extensively applied to financial and payment transactions by both bank and non-bank service providers, enabling convenient, fast and cost-effective services that are more easily accessible anywhere anytime any device. However, the use of technology has also brought about cyber-attacks, which are growing in numbers and sophistications, and can cause quick and widespread impacts to customers and financial institutions. Cybersecurity is therefore vital along with the use of technology. The BOT has laid out 3-year strategic plan (2017-2019) to drive cybersecurity improvements in the payment systems and increase financial institutions' cybersecurity readiness. Key initiatives in 2017 are as follows:

3.1.1 Enhancing Financial Institutions' Cyber Resilience Readiness

The BOT arranged for an assessment of cyber resilience readiness on financial institutions to identify gaps and improvements following the international standards. In 2017, the BOT conducted the assessment on 22 Thai commercial banks and SFIs, all of which were undergoing improvements to enhance security levels. In 2018, the BOT will issue the Cyber Resilience Assessment Framework as guidelines for financial institutions to assess cyber risks and put in place proper controls and risk management measures.

3.1.2 Establishing Financial Sector Collaboration in Cybersecurity

The BOT promoted concrete collaborations on cyber risk responses in the financial

sector by bringing together financial institutions, regulators, educators, cybersecurity experts, and relevant domestic and international organizations. Key actions are as follows:

1) Promoting and monitoring alignment of supervisory frameworks on IT Risk Governance and Cyber Resilience among financial sector regulators, namely the BOT, the Office of the Securities and Exchange Commission (SEC), and the Office of Insurance Commission (OIC).

2) Putting forth the coordination centers for cybersecurity within financial sector. The BOT pushed for the establishment of Thailand Banking Sector Computer Emergency Response Team (TB-CERT), while the SEC and the OIC insisted on establishment of Thai Capital Market CERT (TCM-CERT) and Thailand Insurance CERT (TI-CERT), respectively. These centers were designed to promote information sharing on cyber threats, impacts, corrective and response measures, and cybersecurity standards, in a concrete, continuous, efficient, and practical manner.

3) Promoting human resources development, capability buildings, and cybersecurity awareness of all personnel in financial sector including board members, senior executives, and employees. Throughout the year, the BOT promoted cybersecurity awareness among financial institutions' board members through seminars on Cyber Resilience Leadership. The aforementioned cooperation groups (TB-CERT, TCM-CERT, and TI-CERT) jointly with the Thai Institute of Directors Association (IOD) constantly provided IT Governance and Cyber Resilience programs. In addition, the BOT in partnership with academic sector organized networking activities to facilitate recruitment of cybersecurity personnel for financial sector.

4) Promoting public awareness of financial technology through various media channels, e.g., websites and social media, and educational sessions in related events, e.g., Money Expo 2017 and Digital Thailand Big Bang 2017.

Box 4: Cyber Risk Management in accordance with International Standards

Cyber risk management for cyber resilience comprises of 6 aspects summarized below.

1) **Governance:** It is the roles and responsibilities of the organization's Board of Directors and senior executives to establish risk appetite and clear risk management policies and strategies and to ensure proper organizational structure and resource allocation in terms of people and tools.

2) **Risk Identification:** Organizations should be able to identify cyber risks by establishing IT assets and data management procedures to facilitate proper and comprehensive risk detection.

3) **Protection:** There should be preventive structure and control measures including regular penetration tests.

4) **Detection:** There should be procedures and tools to promptly detect cyber threats, supported by threat intelligence services and capable personnel who can quickly and comprehensively analyze cyber threats.

5) **Response and Recovery:** There should be a cybersecurity incident response plan that aligns with the organization's business continuity plans and is tested regularly.

6) **Third parties Risk Management:** Organizations should assess cyber risks borne by external agencies and put in place procedures to prevent and detect these risks including evaluation of cybersecurity incident response plans of those connected to the organization's system.

3.2 Consumer Protection

The BOT in cooperation with the Thai Bankers' Association developed the Service Level Agreement for Banking Industry (Industry SLA) to enhance service standards, promote competition in terms of quality of services, and ensure faster and more convenient financial services for consumers. Two SLAs were agreed upon, namely the SLA for the PromptPay and the SLA for the Debit Card Payment, the details of which are summarized below.

1) SLA for the PromptPay Service: In the event that a transaction of funds transferred to bank accounts or e-Wallet accounts through PromptPay failed to complete due to a system disruption, causing the funds not being credited to the customer's account, banks must complete an investigation, report the results, and make adjustments within 1 day.

2) SLA for the Debit Card Payment: In the event that a debit card transaction for domestic payments via an EDC failed to complete due to the EDC terminal or the Network being inoperable; and fund was debited from the customer's account without the receipt of transaction confirmation on the merchant part, banks must conduct investigation and refund to the customers as follows:

2.1) In the event that the transaction occurred during normal business hours:

- In the event of a failed transaction which the card-issuer bank was notified of the cancellation by the merchants by 12.00 p.m., banks will refund the customer within the same day of the transaction date.

- In the event of a failed transaction which the card-issuer bank was notified of the cancellation by the merchants after 12.00 p.m., banks will refund the customer within the next business day.

2.2) In the event that the transaction occurred outside business hours, banks will refund the customer within the next business day.

4. Promotion of Financial Technology Innovation

4.1 The Development and Promotion of Quick Response Code (QR Code) Standard for Payment and Funds Transfer

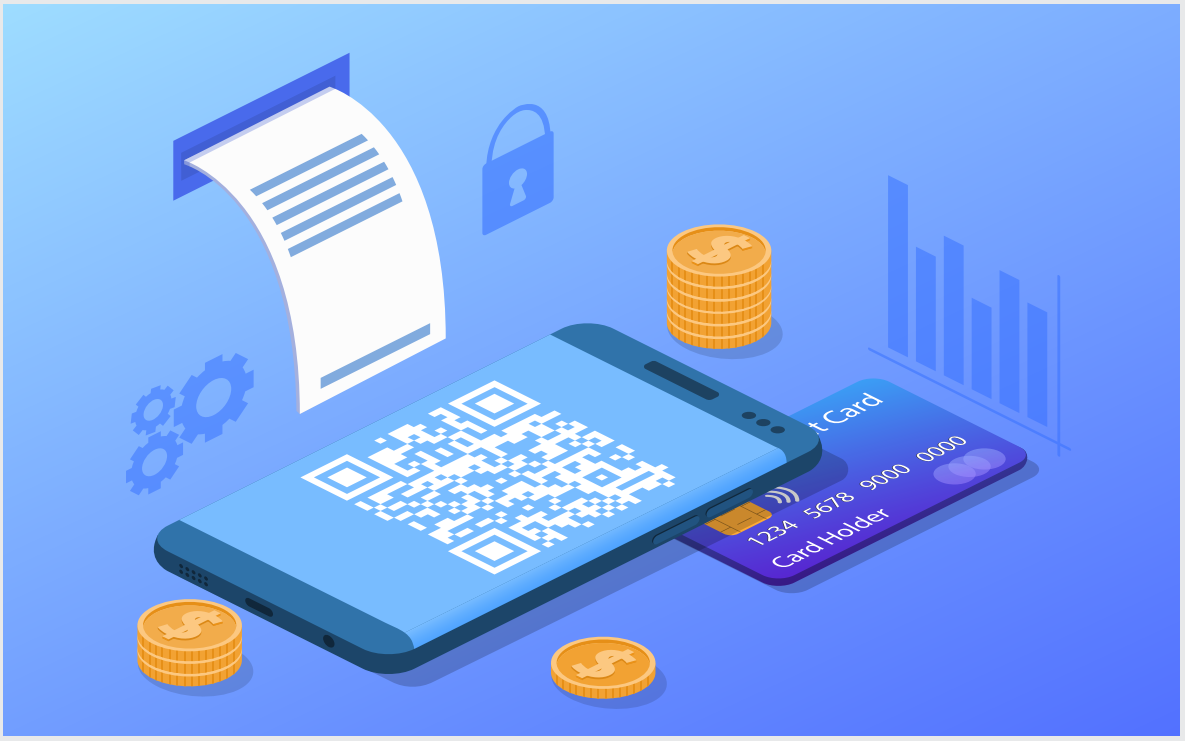
It is the BOT policy to promote open and interoperability infrastructure in the financial system in order to increase efficiency, connectivity, and financial inclusion, as well as to provide a strong foundation for future financial technology innovations. Previously, the BOT encouraged collaboration among international card networks (i.e., American Express, JCB, MasterCard, UnionPay International, and Visa) together with financial institutions and local card networks and operators, in developing and promoting Thai QR Code Payment standard in accordance with the international standard (EMVCo) for payments and funds transfers in Thailand. The standardized QR Code also supported various payment channels, e.g., bank deposit accounts, credit cards, debit cards, and e-Money accounts. The BOT allowed banks and non-bank service providers to participate in testing the standardized QR Code on payments performed via mobile applications in the Regulatory Sandbox. In

addition, the BOT also encouraged collaboration on development of Business Rules, customer complaint handling arrangement, and the Thai QR Code Logo Guideline. In 2017, there were 12 payment institutions participated in the QR Code for PromptPay Project, consisting of 9 banks and 3 non-bank payment service providers. The BOT subsequently granted permissions for 8 participants who demonstrated readiness in meeting the exit criteria of the Regulatory Sandbox. Consumers are now able to use mobile applications offered by these authorized banks to scan the standardized QR Code for payments. The service is ideal for basic payments such as purchases of goods and services at restaurants, small and medium stores, local markets, taxis, and motorcycle taxis. Later, these banks and non-bank payment service providers will participate in testing additional services on other payment channels, such as local and foreign credit cards and debit cards.

4.2 QR Code Guideline on Invoice Payment

The BOT together with representatives from financial institutions, non-bank payment service providers, and large corporates issuing a high volume of invoices, developed the QR Code Guidelines for Invoice Payments in compliance with ISO/IEC 18004. The Guideline was announced in the first quarter of 2017. With businesses and payment service providers using a common QR Code, individuals and businesses can quickly and conveniently make bill payments through any service providers. Moreover, by embedding additional information into the QR Code, businesses and payment service providers can further enhance their operational efficiency; for instance, making transaction reconciliation and offering additional point-of-sale services such as printing receipts and full tax invoices. The latter helps reduce burden of sending a full receipt and tax invoice to customers by mail, and support issuance of tax invoices and receipts and administration of withholding tax according to the Revenue Department's criteria. Additionally, payment service providers offering services via mobile phone application can use the QR Code to enhance their services, providing greater convenience for consumers.

BOX 5: QR Code for Payments



QR Code is a type of coding generated to store data, sometimes referred to as a Two-dimensional barcode (2D barcode) due to its functionality similar to that of the barcode. However, because the QR Code is relatively easier to use, is smaller in size, and provides greater storage capacity, it can be applied to many applications, e.g., stored website URL, SMS message, and mobile phone number. QR Code can be read by using QR Code scanner applications installed on smartphones to decode hidden information back into a message format.

Currently, QR Code has been developed to support bill payments, funds transfer, and payments for goods and services at stores or via online channels. The payments can be made at stores through funds transfer or direct payments from customers' bank accounts, credit cards, debit cards, and e-Money accounts to merchants' accounts in two approaches:

1) Push Payments: Merchants or stores display their QR Code for customers to scan and confirm payments. In India, most QR Code payments are conducted this way so that the stores will not be able to access customers' card information, preventing fraud risks that could be performed by the stores.

2) Pull Payments: Customers generate their own QR Code, stored on their mobile phones, and showed it to merchants when they need to pay for goods and services. Once the QR Code was scanned, customers will receive payment information for confirming execution of the transactions. In China, a majority of QR Code employs both push and pull payments.

Examples of QR Code Payments in Selected Countries

Countries	QR Code Services	Initiatives
India 	Bharat QR (Push Payments) BHARATQR	The Indian Government established Bharat QR in compliance with standardized QR Code for Card Payment using by payment networks such as MasterCard, American Express, and Visa. By scanning the QR Code via mobile phones, a customer can transfer money directly from his/her bank account to the merchant's account.
	mVisa and Masterpass QR (Push Payments) VISA	Together with associated banks, Visa introduced mVisa, and MasterCard introduced Masterpass QR, for payments via Smartphone using QR Code scanning in India in 2015. Consumers are able to make payments for goods and services, transportation fees, as well as pay bills at the point of sale terminals with mVisa/Masterpass QR Logo.
	Paytm Wallet (Push Payments) Paytm	Paytm adopted QR Code technology allowing consumers to pay bills and make payments through Paytm Wallet by scanning merchant's standard QR Code issued by Paytm
China 	Alipay and WeChat Pay (Push&Pull Payments)	Alipay and WeChat Pay offer their own QR code for both push and pull payments. Consumers are required to conduct their transactions through Alipay or WeChat Pay application installed on mobile phones by choosing scan menu to scan merchant's QR Code for payments (Push Payments), or choosing Pay menu to create a QR code and showing it to merchants to approve transactions (Pull Payments)
	UnionPay UnionPay	UnionPay issued a notification on standard payments using QR Code on 12 December 2016, and planned to promote it extensively.
Thailand 	Thai QR Code Payment Standard (Push Payments) THAI QR PAYMENT	The BOT advocated for collaboration among card payment service providers, i.e., American Express, JCB, MasterCard, UnionPay International, and Visa; as well as financial institutions, card network providers, and payment service providers in Thailand to develop and promote Thai QR Code Payment standard in compliance with international standards (EMVCo) for various payment channels in Thailand. For example, the QR code can be used with bank deposit accounts, credit cards, debit cards, and e-money accounts. The aims are to create open and interoperability infrastructure such that customers can use banks' mobile applications to scan the standardized QR code in all shops having the Thai QR Code Logo to make payments.

5. Payment Systems Connection in ASEAN

5.1 The Operations through the Working Committee on Payment and Settlement Systems (WC-PSS) under AEC 2025 Framework

The BOT promoted interconnectedness of cross-border payment systems via both banks and non-bank service providers by working with the Working Committee on Payment and Settlement Systems (WC-PSS) and ASEAN central banks to push forward regulations conducive to cross-border payments and formulate policy to encourage consistencies among member countries' supervisory framework on payment systems, in order to provide consumers with a secured and accessible payment channels at proper costs.

Previously, the BOT conducted a survey on AEC members' remittance services and fees, based on the General Principles for international remittance services of the World Bank. The survey helped member countries assess their readiness, provide overview of their policies and oversight activities on remittance services, and identify directions to improve policies and regulations to be in compliance with international standards. The survey also helped initiate disclosure of remittance fees for money transfers among member countries to allow consumers to compare and choose applicable services and to spur competitiveness among service providers.

With regard to connecting payment systems with those of other countries, the BOT and commercial banks are exploring business, technical and legal feasibilities in connecting cross-border Real-Time Retail Payment System (RT-RPS), and discussing with other member central banks, such as in Singapore, that expressed interests in connecting with Thai retail payment systems.

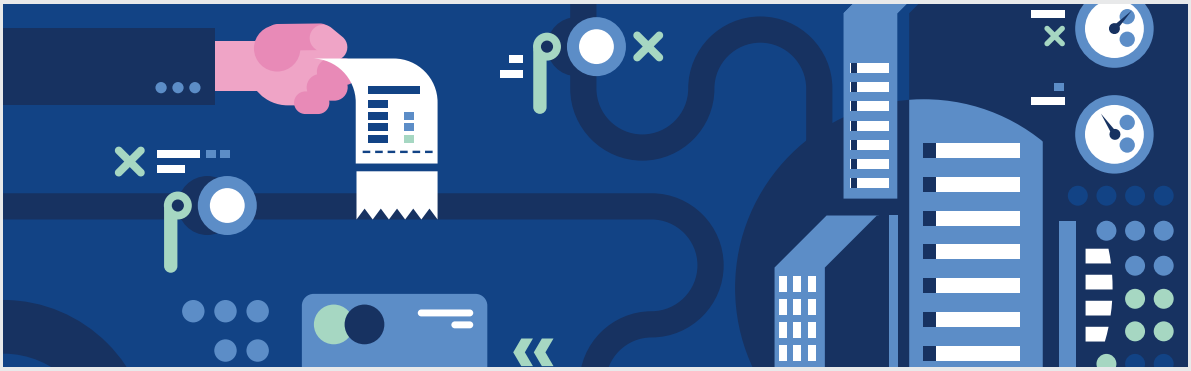
5.2 Progress of the Asian Payment Network Hub (APN Hub) Project

Asian Payment Network (APN)[9] planned to establish the APN Hub to connect payment systems of 11 APN members (i.e., Thailand, Singapore, Malaysia, Indonesia, Philippines, Vietnam, China, Japan, South Korea, Australia, and New Zealand) to a central hub. This is to improve operational efficiency and risk management as well as to reduce costs and difficulties in connecting members' payment systems, which presently are under bilateral arrangements.

The National ITMX Co. Ltd. (NITMX) was chosen as developer and operator of the APN Hub in June 2017. The APN Hub will operate as a switching for withdrawals, balance inquiries, ATM transfers, and cross-border debit card payments for 11 APN countries members. The APN development plans also include linking all APN members' national payment systems to the APN hub and broadening its scope to support cross-border transfers and payments.

[9] Asian Payment Network (APN) is a collaborative effort to expand ATM networks within the region for cross-border withdrawals, transfers, and payments. Currently, APN has 14 members from 11 countries.

Box 6: Noteworthy Developments of Real-Time Retail Payment System in ASEAN



Singapore

Singapore operated a 24-hour real-time retail payment system via mobile phone, using mobile numbers or citizen ID numbers to identify transferees in lieu of bank account numbers. The system, namely PayNow, was launched on 10 July 2017. With no transaction fee, Paynow limits a maximum fund transfer of SGD 50,000. At present, the system facilitates both Consumer- to-Consumer (C2C) and Consumer-to-Business (C2B) transactions, and will be extended to include Business-to-Consumer (B2C) transactions and connected to other countries' payment systems including Thailand's.

Malaysia

Malaysia is in the process of developing a Real-time Retail Payment Platform (RPP) to facilitate 24-hour retail transfers. The system will support transfers using mobile numbers and Citizen ID numbers in addition to bank account numbers in 2018. Later, the Platform will be connected to other foreign payment systems.

Cambodia

In October 2017, Cambodia developed the Shared Switch System to facilitate ATM usage and interbank POS transactions. In addition, Cambodia established a real-time over the counter interbank retail payment system called Fast Payment, which was introduced in July 2016. There is also a plan to upgrade the system to support internet banking and mobile banking as well as to connect with other foreign payment systems in the future.

II

Payment Systems Oversight

1. Payment Systems Stability

The BOT oversees the Systemically Important Payment System (SIPS), namely the Bank of Thailand Automated High-value Transfer Network (BAHTNET). The BOT operates infrastructure for large value transfers and interbank settlement. By applying international standards on Principles for Financial Market Infrastructures (PFMI) of Bank for International Settlements (BIS), the BOT aims to ensure that the BAHTNET is efficient, reliable, secured, having adequate risk management, and that systemic risk is reduced, leading to payment systems stability and financial stability.

Furthermore, the BOT applies the PFMI in overseeing the Prominently Important Retail Payment Systems (PIRPS), namely the Imaged Cheque Clearing and Archive System (ICAS), operated by the BOT and the Interbank Transaction Management and Exchange (ITMX), operated by the NITMX.

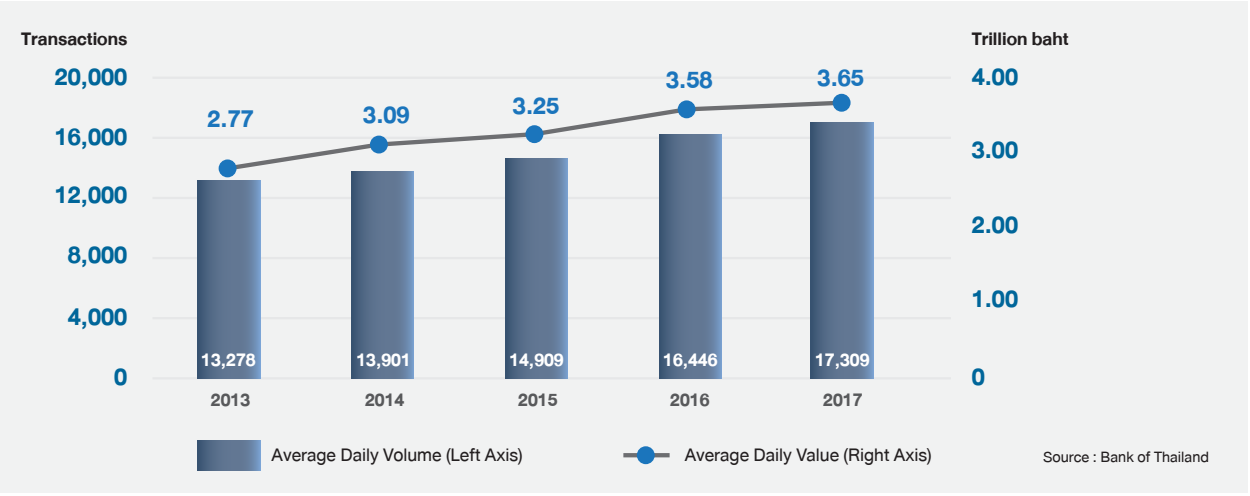
In 2017, the overall payments in Thailand continued to grow. Both high-value funds transfer via BAHTNET and interbank retail funds transfer exhibited an increasing trend, due to growing electronic funds transfer transactions. Meanwhile, the volume and value of cheque transactions continued to decline. Key trends and risk management of the payment systems operated by the BOT can be summarized as follows:

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

1.1 Key Trends

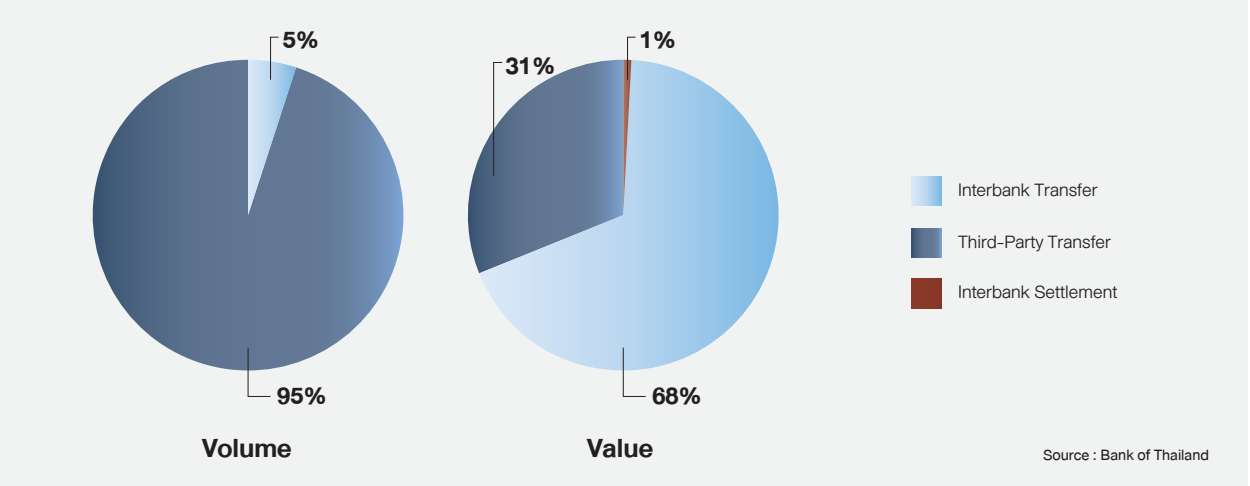
BAHTNET is a real-time gross settlement system that facilitates large value funds transfers between financial institutions. The volume and value of funds transfer through BAHTNET have increased steadily since 2013 consistent with the country's economic expansion. In 2017, funds transfers via BAHTNET totalled 890 trillion baht or 57.6 times of Thailand's gross domestic product (GDP). The volume of funds transfers through BAHTNET averaged at 17,309 transactions per day, increasing by 5.25 percent from 2016. The average daily funds transfer was 3.65 trillion baht in value, increasing by 1.83 percent from 2016.

Figure 4: Volume and Value of Transfers via BAHTNET



Comparison of transfers volume by transaction types indicated that a majority (95 percent) of funds transfers via BAHTNET was third-party funds transfer (e.g., businesses, individuals, and non-residents), of which the average transaction value recorded at 67.28 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 53 percent of total transactions. The main contributor to such growth was the increasing volume of non-resident funds transfers. In terms of transfer value, most BAHTNET transactions were interbank funds transfers, which accounted for 68 percent of total transfers and valued on average at 3,159.13 million baht per transaction.

Figure 5: BAHTNET Transfers by Transaction Types

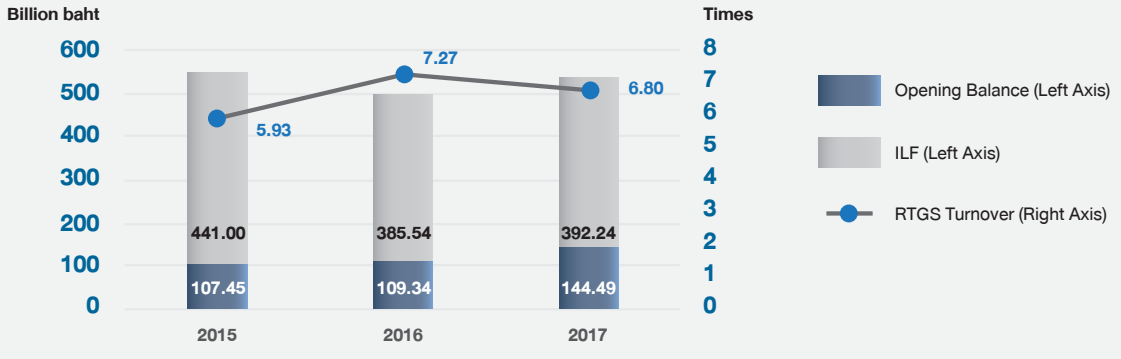


1.2 Management of Material Risks

BAHTNET facilitates high-value interbank transfers and settlement of interbank payment transactions occurred through retail payment systems such as ICAS and ITMX. Each day, these retail payment systems send out members' net settlement positions to be settled in BAHTNET. Liquidity risk and settlement risk, therefore, are crucial. All BAHTNET members are required to have sufficient liquidity for uninterrupted fund transfers and settlement as insufficient liquidity of a member can lead to systemic risk.

In 2017, members' intraday liquidity as provided in the Current Account (C/A) and Intraday Liquidity Facility (ILF) averaged at 144.49 billion baht per day and 392.24 billion baht per day, respectively. The liquidity were sufficient for BAHTNET real-time funds transfer without incurring settlement risk. Queuing transactions, which were usually resolved in less than 5 minutes, accounted for 7 percent of total transactions. The RTGS Turnover, derived from the ratio of average transfer value per day to members' intraday liquidity per day, decreased from 7.27 times in 2016 to 6.80 times in 2017, due to a higher level of C/A and ILF balances maintained by BAHTNET members, thus resulting in lower liquidity turnover in the system.

Figure 6: Intraday Liquidity and RTGS Turnover



Source : Bank of Thailand

Throughout 2017, the BOT undertook several measures to strengthen risk management of the BAHTNET e.g., revising ILF collateral haircut, enacting the Payment Systems Act B.E. 2560 (2017) that includes payment finality of funds transfer or settlement transactions to be deemed completed, and establishing default management procedures in case a member is bankrupt or is under receivership. Further, the BOT improved regulations and guidelines in connection with securities settlement of the Thailand Securities Depository Co., Ltd. (TSD) by laying out default management procedures in case a member is bankrupt or is under receivership in order to prevent systemic risk.

In addition, operational risk is another important risk in the BAHTNET. Business continuity arrangement is therefore vital in supporting smooth functioning of the system. As the operator and the regulator of BAHTNET, the BOT established targeted system availability of 99.8% in 2017. At the end of 2017, 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. Moreover, in 2017, the BOT also conducted a performance stress test on the BAHTNET. The results were satisfactory in all requirements to support future operations.

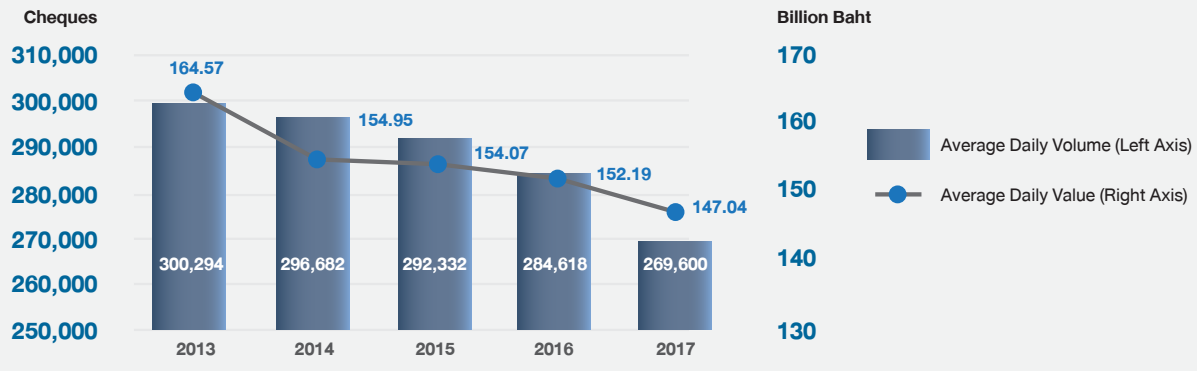
2. Imaged Cheque Clearing and Archive System: ICAS

2.1 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 2017, cheque transactions made up the highest proportion of total retail payment transactions[10] , amounting to 106.11 trillion baht or 81 percent of total transactions of 131 trillion baht. However, daily average volume and value of cheques transactions (both same-bank and interbank cheques) declined by 5.28 percent and 3.38 percent, respectively, compared to 2016. This is driven by growing popularity of electronic funds transfer and use of PromptPay for tax refunds instead of cheques. In 2017, volume of interbank cheques averaged at 269,600 cheques per day, equivalent to an average value of 147.04 billion baht per day.

[10] Retail Payment consists of cheque payment and interbank funds transfers.

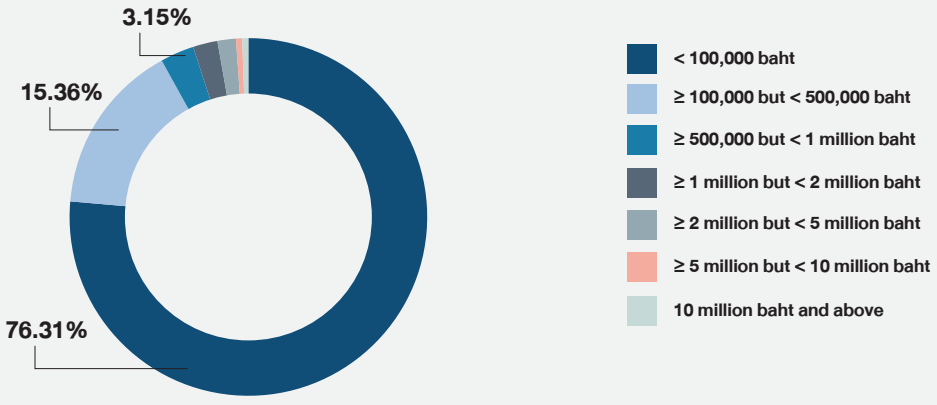
Figure 7: Volume and Value of Nationwide Interbank Cheques



Source : Bank of Thailand

Considering value of interbank cheques per transaction in 2017, a majority of interbank cheques were less than 100,000 baht in value, representing 76.31 percent of total interbank cheques. This was followed by interbank cheques of between 100,000 – 500,000 baht, equivalent to 15.36 percent of total interbank cheques. Interbank cheques of greater than 10 million baht merely accounted for 0.69 percent of total interbank cheques. Note that, the declining trends in interbank cheques were noticeable among two categories, i.e., interbank cheques of less than 100,000 baht, whose volume decreased by 3.19 million cheques, and interbank cheques of between 100,000 – 500,000 baht, whose volume decreased roughly by 0.5 million cheques. These downward trends were attributed to increasing electronic funds transfer.

Figure 8: Proportion of Interbank Cheques by Values



Source : Bank of Thailand

2.2 Management of Material Risks

The BOT continuously manages operational risks and business continuity of ICAS, where the targeted system availability in 2017 was set at 99.8 percent. At the end of 2017, ICAS achieved system availability higher than the target. The BOT continually monitors ICAS system availability and reports results to concerned management and the PSC regularly.

2. Preparation for the Financial Sector Assessment Program (FSAP)

The BOT as a regulator of Systemically Important Payment Systems (SIPS) previously participated in the Financial Sector Assessment Program (FSAP)[11] conducted by the International Monetary Fund (IMF) and the World Bank in 2007. The assessment was based on the former international standards of Core Principles for Systemically Important Payment Systems (CPSIPS). The results indicated that the BAHTNET operated efficiently with adequate risk management measures. Nonetheless, the assessors pinpointed required improvements on legal foundation, and suggested a legislative amendment to reduce the risks that completed funds transfers or settlement transactions were subject to cancellation or revocation in case that a member is bankrupted or is subject to a court-ordered administration. In this regard, the BOT has continued to work on these improvements accordingly.

Later, in 2012, the Committee on Payment and Settlement Systems (CPSS), under the umbrella of the Bank for International Settlement (BIS), which is responsible for formulating international standards on oversight of efficiency and stability of payment systems, together with the Technical Committee of the International Organization of Securities Commissions (IOSCO), which is responsible for formulating international standards on oversight of efficiency and stability of securities-related systems, combined related standards into a single international standard on oversight of efficiency and stability of financial market infrastructure payment, namely Principles for Financial Market Infrastructures (PFMI). During 2013 – 2017, the BOT conducted self-assessments in accordance with the PFMI on the BAHTNET, and continued to improve the BAHTNET to be in compliance with the international standards.

In 2017, the BOT improved the BAHTNET in terms of system operations and risk management (Principles for FMI) and the BOT's responsibilities as a regulator (Responsibilities of Authority) by using the 2016 BAHTNET assessment results as inputs to formulate improvement plans to be in accordance with the PFMI. The BOT constantly improved BAHTNET in various aspects. For instance, the BOT pushed enactment

[11] Financial Sector Assessment Program (FSAP) is the collaborative efforts of the International Monetary Fund (MF) and the World Bank in conducting assessments on a country's financial stability and levels of financial development. The FSAP assessment consists of 2 parts: (1) Financial Stability Assessment, a mandatory assessment encompassing 3 aspects, i.e., Vulnerabilities and Financial System, Financial Stability Policy Framework, and Financial Safety Net; and (2) Financial Development Assessment.

of the Payment Systems Act B.E. 2560 (2017) that includes payment finality of completed funds transfer or settlement transactions from being revoked once it has been completed; established the Payment Systems risk management framework; set qualification guidelines for BAHTNET participants; and reviewed BAHTNET service costs and fee structure. Further, the BOT also enhanced supervisory efforts pertaining to payment systems, e.g., signing an Memorandum of Understanding (MOU) with the SEC on co-operative oversights of interdependent FMIs, revising supervisory procedures for highly important payment systems operated by the BOT, and issuing notifications on the stipulation of designated payment systems required supervisions under the international standard PFMI.

Moreover, the BOT and related authorities plan to participate in the Financial Sector Assessment Program (FSAP) in the fourth quarter of 2018, during which the payment systems would be assessed against the Principles for Financial Market Infrastructures (PFMI).

3. Payment Systems Co-operative Oversight

The BOT as the regulator of the BAHTNET and the SEC as the regulator of the Central Securities Depositories (CSD), Securities Settlement Systems (SSS), and Central Counterparties (CCP), share responsibilities for the oversight of interconnected FMIs to ensure safety, security, efficiency, sound risk management, and alignment with the international standards of Principles for Financial Market Infrastructures (PFMI) in order to properly prevent systemic risk in the payment systems.

In 2017, the BOT and the SEC have entered into MOU on co-operative oversights of interconnected FMIs to strengthen cooperation between both parties in ensuring safety, security, adequate risk management, and alignment with the international standards of the interdependent FMIs, and to efficiently support transactions in both money and capital markets. Scope for the co-operative oversight included formulation of policies and development plans for interconnected FMIs, management of key risks, and formulation of response and recovery plans for potential disruptions that could impact the linked FMIs. In addition, the scope also involved arrangements for information and knowledge sharing, governance of confidential information, and designation of coordinators in both normal and emergency situations. The cooperation is in line with the international standards of PFMI with respect to the Responsibility E: Cooperation with other authorities, which emphasizes formal co-operative oversight among regulators of the interdependent FMIs.

4. The Oversight and Supervision of e-Payment Service Providers

The BOT oversees and supervises e-payment service providers to ensure proper risk management, trustworthiness, and security of e-Payment services. In 2017, the main oversight activities are as follows:

1. The supervision activities under the Ministerial Notification of Ministry of Finance: Business for which permissions must be obtained according to Section 5 of the Notification of the Revolution Council No. 58 (e-Money business)

The BOT supervised non-bank e-Money service providers that have been granted licenses under the Ministerial Notification of Ministry of Finance: Business for which permissions must be obtained according to Section 5 of the Notification of the Revolution Council No. 58 (e-Money business) dated 4 October 2004. At the end of 2017, there were 15 non-bank e-Money service providers, one of which was granted the license this year.

2. The supervision activities under the Royal Decree on Regulating Electronic Payment Service Business, B.E. 2551 (2008) (the e-Payment Royal Decree) and the Royal Decree on Regulating Electronic Payment Services of Specialized Financial Institutions, B.E. 2559 (2016) (the e-Payment SFIs Royal Decree)

The BOT supervised e-payment service providers by virtue of the Royal Decree on Regulating Electronic Payment Service Business, B.E. 2551 (2008) and the Royal Decree on Regulating Electronic Payment Services of Specialized Financial Institutions, B.E. 2559 (2016), both of which were issued under the Electronic Transaction Act, B.E. 2544 (2001). The regulated e-payment service providers under both laws are categorized into three levels: List A for businesses required to notify to the BOT prior to providing services, List B for businesses required to register with the BOT prior to providing services, and List C for businesses required to acquire

a license, prior to providing services. In 2017, the BOT oversight activities under both laws are as follows:

1) The BOT acknowledged the applications from List A and List B applicants, and proposed recommendations for List C applicants to the Electronic Transactions Commission (ETC). As of end-2017, there were one List A non-bank service provider, 10 List B non-bank service providers, and 104 List C service providers, comprising of 30 commercial banks, 6 specialized financial institutions, and 68 non-banks. In total, there were 185 licenses, given that 9 List C service providers repealed their licenses in 2017.

2) The BOT supervised and oversaw all e-payment service providers to ensure their compliance with the Royal Decrees and related Notifications, as well as reported supervisory results and findings of non-compliance to the ETC on a regular basis. In parallel, the BOT notified, enforced, and monitored all corrective actions of non-compliance service providers.

Further, the BOT in collaboration with the Ministry of Finance pushed for enactment of the new Payment Systems legislation. The meeting of National Legislative Assembly (NLA) approved the proposal of enacting the Payment Systems Act. The Secretariat of the Cabinet published and announced the Act in the Royal Thai Government Gazette on 18 October 2017. The Act came into effect on 16 April 2018.

All regulated payment service providers under the 3 existing laws who wished to continue their services under the Payment Systems Act B.E. 2560 (2016) would have to apply for licenses from the Ministry of Finance, or register with the BOT within 120 days as from the date of Minister's Notification. In this regard, the BOT had arranged a number of meetings to clarify and facilitate the service providers' preparations to comply with the new regulations. BOT also conducted public hearings among related stakeholders to solicit their viewpoints when drafting the notifications.

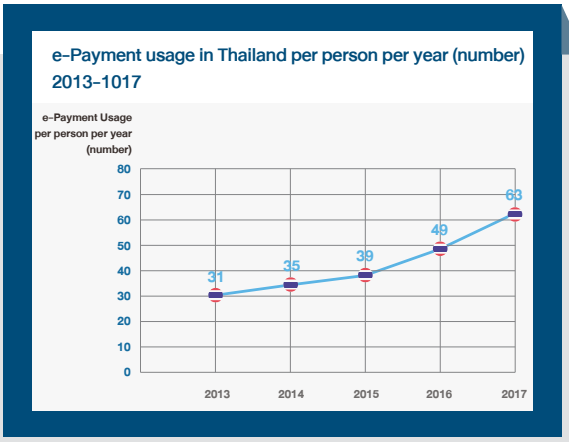
III

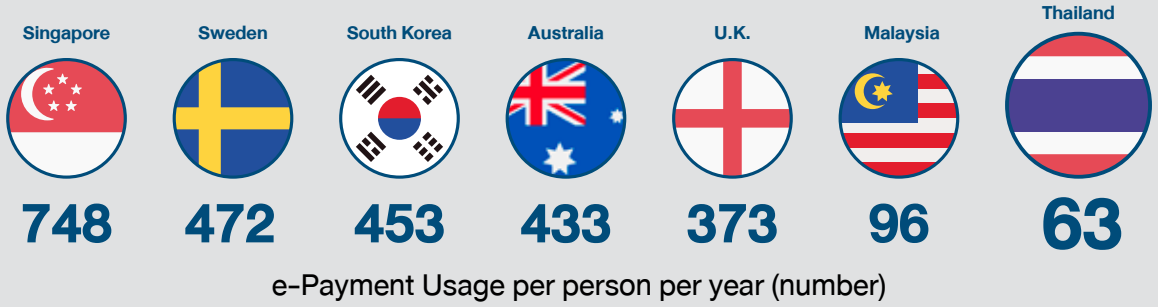
Key Trends in Payment Services

1. Overview of Payment Services in 2017

In 2017, the BOT in partnership with government agencies and commercial banks put forth several key developments in payment services infrastructure, namely the PromptPay and the expansion of the EDC installations initiatives. These developments were among factors contributing to changes in commercial bank service models and consumer payment behaviors. Commercial banks have widely distributed EDCs to stores and promoted e-payment services via mobile banking and internet banking to their customers. Correspondingly, consumers have adapted to these changes, which can be witnessed by a continued growth of mobile banking and a notable increase in popularity of debit card payments at the point of sale and online channels, in contrast to a declining trend of cash withdrawals at bank branches.

Figure 9: Comparison of e-Payment Usage in Thailand and other countries*





* End of 2016 data for other countries; End of 2017 data for Thailand
Source: BIS (2017) Statistics on payment, clearing and settlement systems in the CPMI countries, Bank of Negara Malaysia and Bank of Thailand

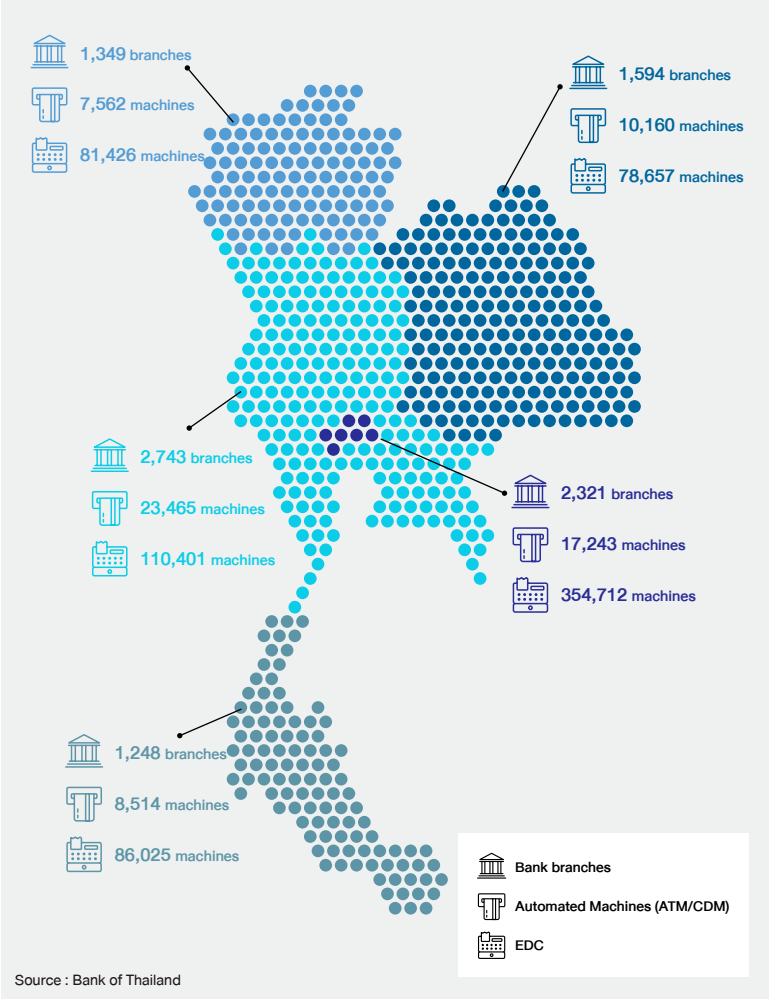
The results of payment services infrastructure developments and changes in consumer payment behaviors led to a total of 4,167.7 million e-payment transactions in 2017, equivalent to a 30.1 percent growth compared to last year. In particular, interbank transfers via internet banking and mobile banking grew at 124.0 percent in volume and 90.1 percent in value. As of 2017, Thais' e-payment transactions per capita rose from 49 times per capita per year in 2016 to 63 times per capita per year.

2. Payment Services Infrastructure

Advanced technologies related to payments have reduced the necessity of transactions occurring at bank branches. Over the years, commercial banks have adapted to the changing environments by reducing costly bank branches. As of 2017, overall financial institution branches decreased by 229 branches, resulting in a total of 9,255 remaining branches. Note that, Thai commercial banks' branches reduced by 232 branches and those of specialized financial institutions increased by 3 branches.

Advanced technology has contributed to substantial decline in the number of bank branches in 2017. Meanwhile, a wide distribution of the EDCs increased access to consumers

Figure 10: Payment Service Infrastructure in 2017

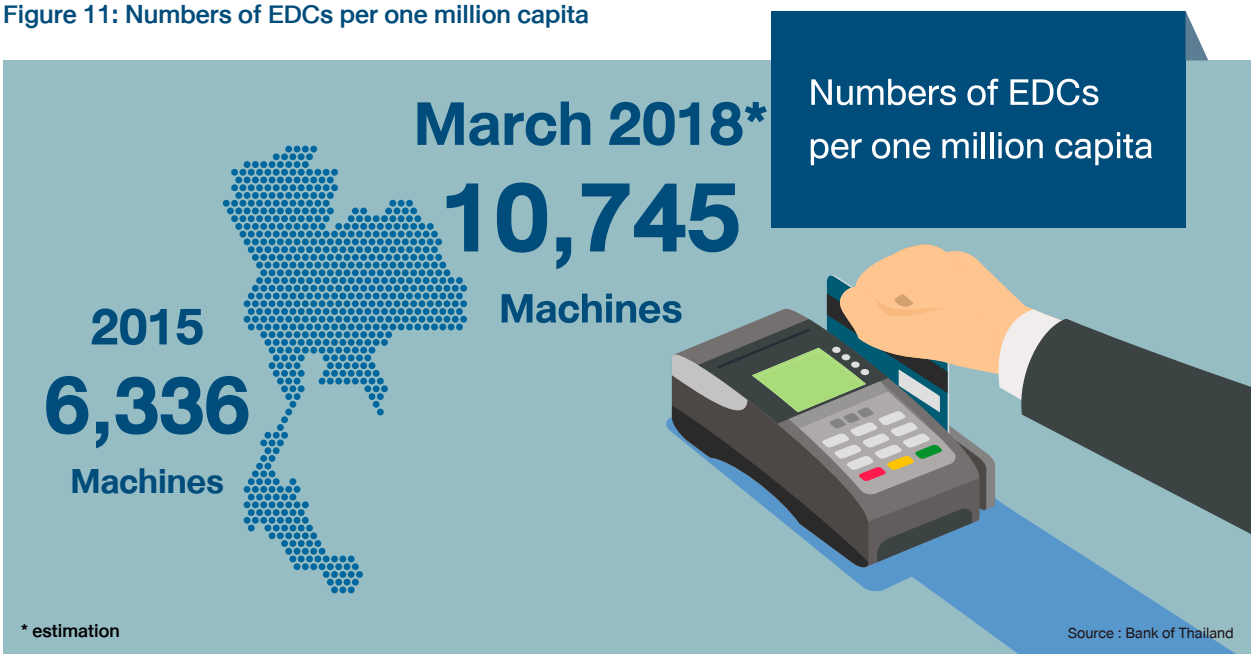


Source : Bank of Thailand

As for the automated machine (ATM/CDM), the number of ATM/CDM continued to increase. As of 2017, ATM/CDM totaled 66,944 machines, indicating an increase of 2,829 machines or a 4.4 percent growth, compared to last year. The adequacy of ATM/CDM in Thailand was 1,011 machines per million inhabitants, which was relatively high compared to those of other countries; for instance, 489 machines per million inhabitants in Singapore, 285 machines per million inhabitants in Sweden and 1,067 machines per million inhabitants in the United Kingdom.

At the end of 2017, the number of the EDCs stood at 711,211 machines, increased by 236,858 machines or a growth of 50 percent from last year. This resulted from the push for nationwide EDC installations according to the Card Usage Expansion Project under the National e-Payment strategies. The North Eastern region had the highest increase in the number of EDCs installed of 85 percent, followed by the the increase in Southern region of 79.8 percent. Meanwhile, Bangkok had the least increase of 33.5 percent, due to its relatively large number of existing EDCs.

Figure 11: Numbers of EDCs per one million capita



Compared to other countries, in 2017, Thailand had 10,745 EDCs per one million inhabitants, representing an increase of 3,550 EDCs per one million inhabitants from 2016. This was greater than that of Malaysia which stood at 10,324 EDCs per one million inhabitants. However, the number of EDCs per one million capita in Thailand was still lower than that of developed countries such as Australia, UK, Sweden, and Singapore; of which the number of EDCs per one million inhabitants was 39,337, 32,858, 25,800, and 33,219, respectively.

Table 1: Numbers of ATM/CDM and EDC in Various Countries

	Thailand	Malaysia	Singapore	Australia	U.K.	Sweden
No. of ATM/CDM*	1,011	N/A	489	1,355	1,067	285
No. of EDC*	10,745	10,324	33,219	39,337	32,858	25,800

Unit: Machines per one million inhabitants

Source: Statistics on payment, clearing and settlement systems in the CPMI countries – Figures for 2016, Malaysia's Payment Statistics: BNM, Bank of Thailand
* End of 2016 data for other countries; End of 2017 data for Thailand and Malaysia

3. Payment Behaviors

3.1 General Public, Businesses, and Government Payments

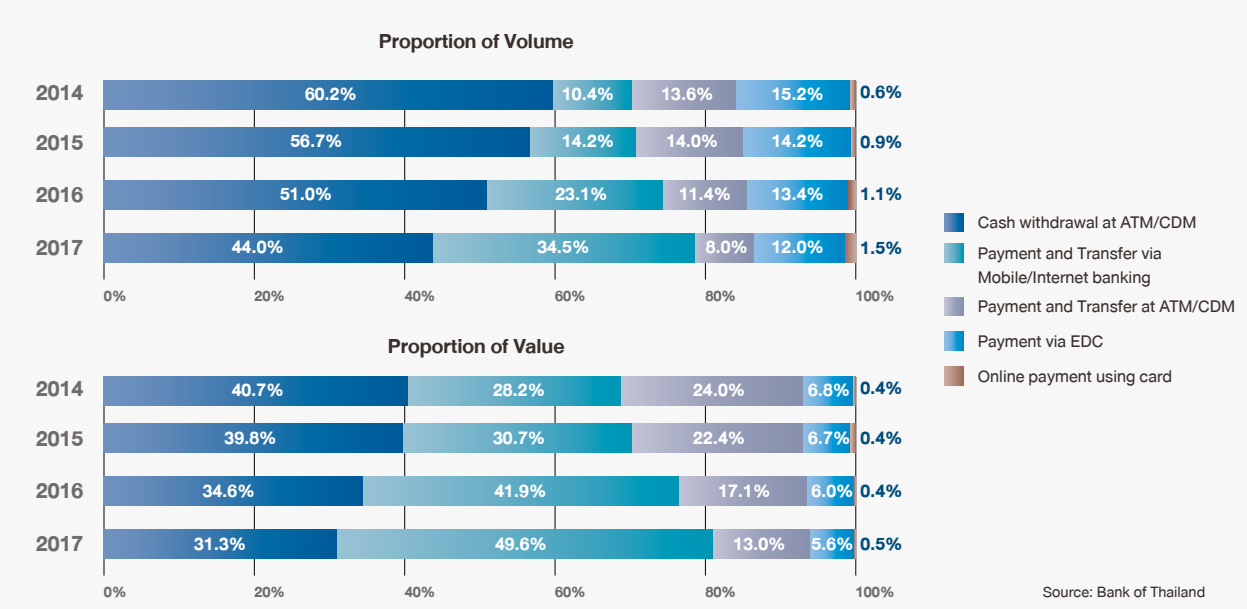
General Public

In 2017, general public payments continued to grow steadily. Classified transactions by payment channels revealed that spending via mobile banking/internet banking continued to grow at a faster rate similar to the year before, owing to the increasing popularity of mobile banking and the promotion of the QR Code for payments. The volume and value of mobile banking/internet banking transactions grew at 82.2 percent and 33.2 percent, respectively. Meanwhile, payments and transfers via ATM/CDM using electronic cards continued to shrink from the previous year. The contraction was about 15.0 percent in both volume and value, indicating that individuals have switched to a more convenient mobile banking/internet banking that allow them to transact anywhere anytime.

During the past 4 years, payments and transfers via mobile banking/internet banking have grown considerably, while cash withdrawals at ATM/CDM have gradually declined, providing a positive sign that the public is migrating towards e-payments.

The Volume of transactions totaled 4.1 billion (+22.0% YoY); The Value of transactions totaled 25.0 trillion baht (+12.5% YoY)

Figure 12: Proportions of Payments during 2014 – 2017 (General Public)



The Volume of transactions totaled 571.0 million (+5.8% YoY); The Value of transactions totaled 105.7 trillion baht (+1.0% YoY)

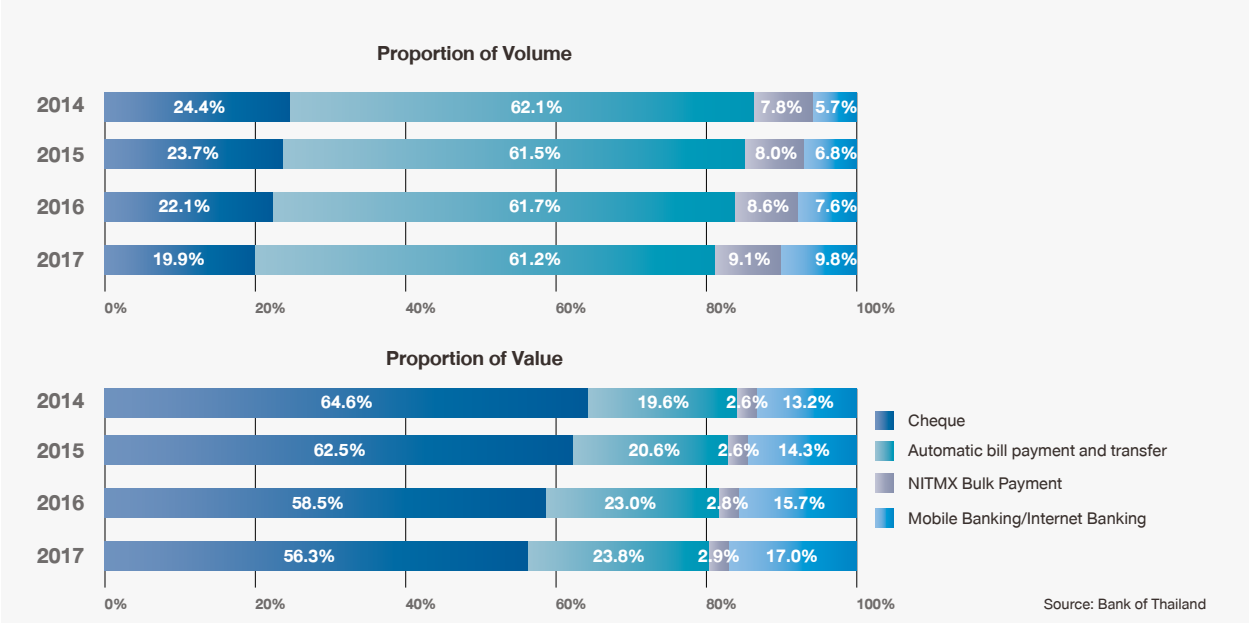
The Business Sector and the Government Sector

In 2017, payments in the business and the government sectors grew slightly. Transactions via mobile banking/internet banking had the highest growth rate compared to other payment channels. One reason was that many commercial banks focused on marketing the use of mobile banking/internet banking to SMEs, resulting in a growth of mobile banking/internet banking usage in the business and the government sectors of 36.7 percent in terms of volume and 9.2 percent in terms of value.

In addition, in 2017 cheque usage fell from last year by 4.4 percent in volume and 2.8 percent in value. This was because more businesses turned to e-payment, and the government issued tax refunds via PromptPay in lieu of cheque returns. In 2017, the Revenue Department refunded over 2.2 million taxpayers out of the approximate total of 3.7 million taxpayers entitled to receive tax refunds, through PromptPay.

During the past 4 years, both e-payment transactions in the business sector and the government sector exhibited an upward trend, similar to that of the public sector. However, annual growths were relatively low as businesses still need to use cheque in such circumstances as cheque collateral for loans or as evidence in court.

Figure 13: Proportions of Payments during 2014 - 2017 (Business and Government Sectors)



3.2 Cash Withdrawals and Deposits

The Thais'cash usage in 2017 still grew at a slightly decreasing rate due primarily to their habit of withdrawing cash for daily spending. Cash withdrawals in 2017 increased by 3.2 percent from the previous year.The main channel for cash withdrawals was the ATM/CDM, which comprises cash withdrawal via in-house machines, cash withdrawal via machines abroad, and cash advance via automated machines.

In 2017, Thais withdrew cash via ATM/CDM on average 28 times per year per person, accounting for 90.7 percent of total cash withdrawals through various channels (1,892.5 million transactions). The remaining 9.3 percent were over the counter withdrawals. Compared to volume of cash withdrawal in the year earlier, growth of cash withdrawals via ATM/CDM trended downward from 5.8 percent in 2016 to 4.3 percent in 2017, while over-the-counter cash withdrawals slightly shrunk by 0.2 percent in 2017. The declines were consistent with the decreasing trends of commercial bank branches and transfers and payments via ATM/CDM since most people have switched to online channels.

Figure 14: Growth of Cash Withdrawals via ATM/CDM

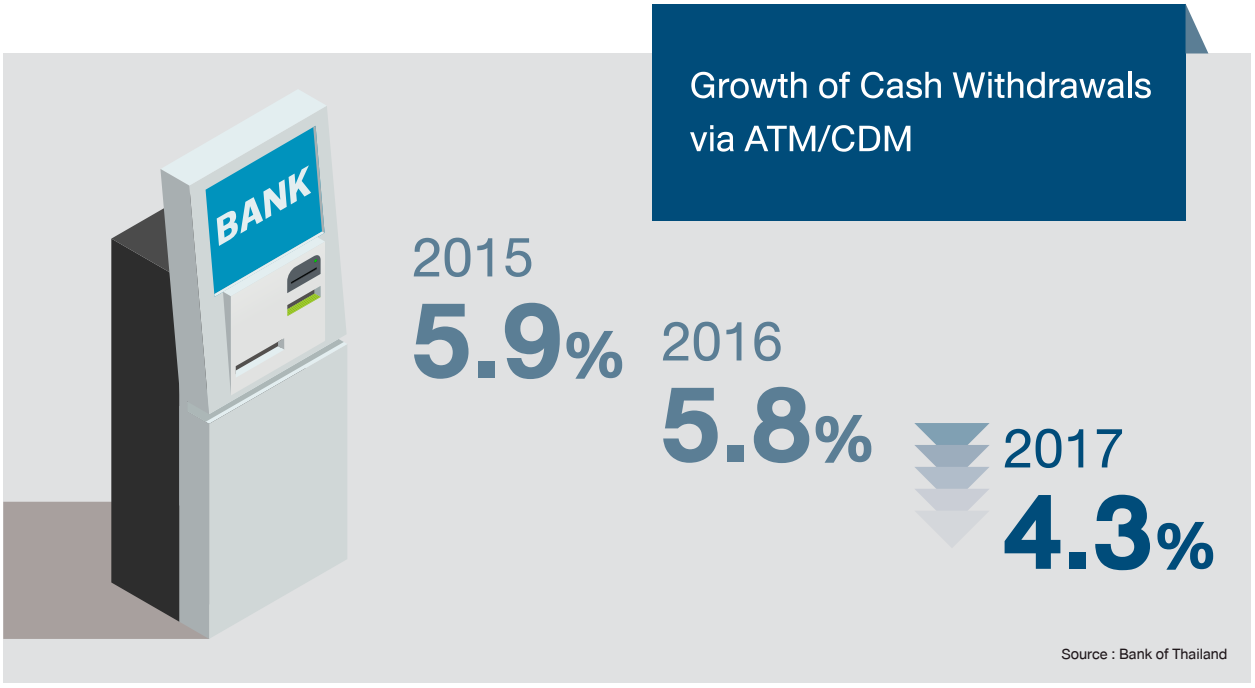
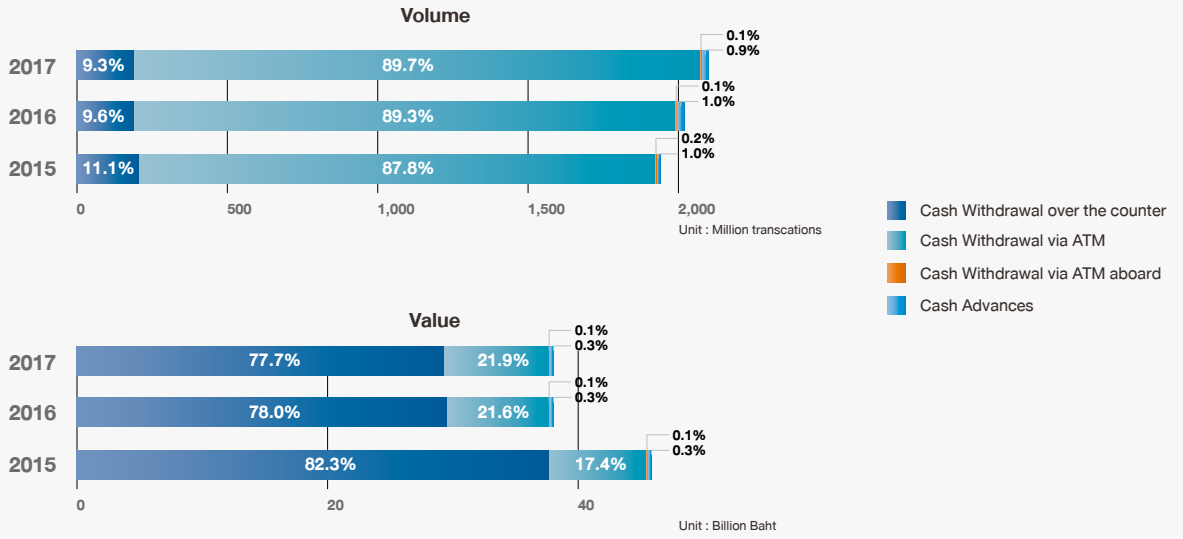


Figure 15: Volume and Value of Cash Withdrawals in 2015–2017

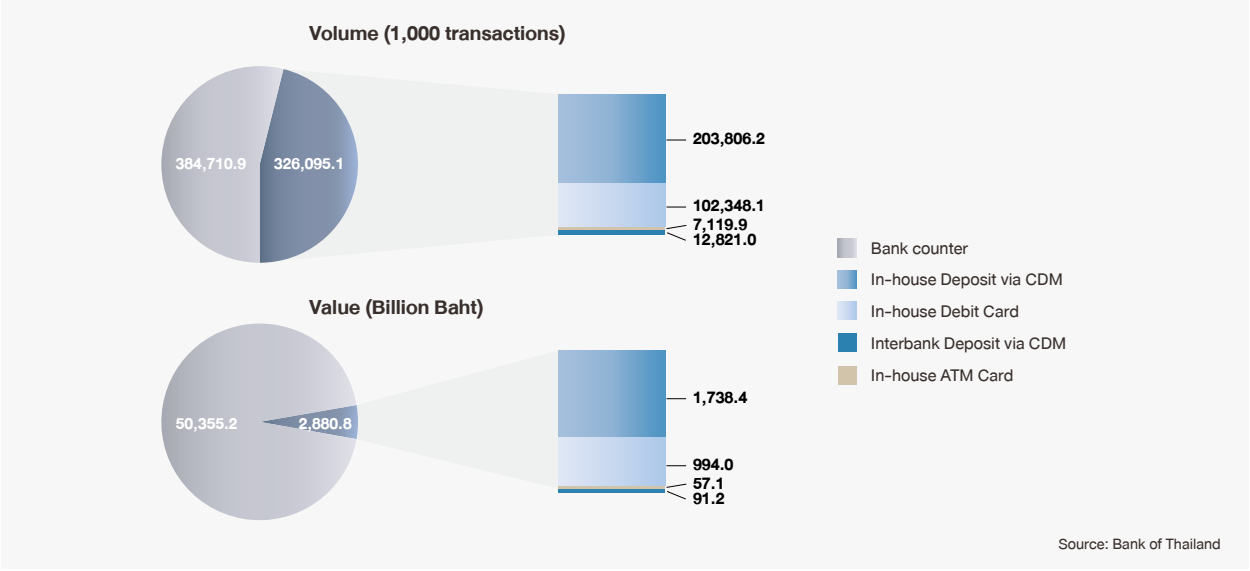


In terms of transaction value, most withdrawals in 2017 occurred over the counter, which accounted for 77.7 percent of total value of cash withdrawals or valued at 29,161.9 billion baht. Further, the value of cash withdrawal over-the-counter was 3.5 times higher than the value of cash withdrawals via ATM/CDM. This could be attributed to an ATM/CDM withdrawal limit of 20,000-30,000 baht per transaction and a maximum daily withdrawal limit imposed variably by banks as preventive risk measures for both customers and the banks. Thus, in case of a large withdrawal, customers preferred to conduct the transaction over the counter. Consequently, the average value of cash withdrawals over the counter stood at 149,844.9 baht per transaction, while the average value of cash withdrawals via ATM/CDM was at 4,401.8 baht per transaction.

Cash deposits in 2017 slightly expanded from last year and registered a growth of 2.9 percent. The average number of transactions for the over-the-counter deposits and CDM deposits were about 5.8 and 4.9 times per person per year, respectively. However, in terms of value, Thais preferred to make large deposits over the counter because the CDM deposits imposed a maximum limit of 100,000 baht per transaction, and consumers are more confident in the in-person service than are the CDM. This preference was evident with the average value of the counter deposits, in 2017, of 130,891 baht per transaction, compared to the average CDM deposits of 8,834.1 baht per transaction.

"Cash withdrawals and deposits, in general, were similar to the previous year, although cash withdrawals at bank branches exhibited a declining trend."

Figure 16: Volume and Value of Cash Deposits in 2017



Source: Bank of Thailand

3.3 Electronic Card Usage

In 2017, the total number of electronic cards was increased by the number of debit cards, having the highest increase in number and in growth, followed by credit cards. ATM cards, on the contrary, declined in number. One explanation was that most commercial banks increasingly focused on publicizing the use of debit cards, thereby promoting their applications for payments at the point of sale and online in addition to its ATM-like features. As for credit cards, commercial banks have continuously promoted credit card spending, which resulted in a steady growth in the number of credit cards. At the end of 2017, the number of debit and credit cards totaled 57.8 million cards and 20.6 million cards, representing a 6.7 percent and a 1.7 percent growth, respectively. Meanwhile, the number of ATM cards recorded at 18.4 million cards, decreased considerably from the previous year by 6.4 percent.

Table 2: Numbers and Proportions of Electronic Cards at the end of 2017, and the growth/decline rates in 2017 (compared to previous year)

2017 Number (Million cards)	2017 Proportion (%)	Growth (%) (Compared 2016 to 2017)
ATM Card	ATM Card	ATM Card
18.4	19.0	-6.4
Debit Card	Debit Card	Debit Card
57.8	59.7	+6.7
Credit Card	Credit Card	Credit Card
20.6	21.3	+1.7
Total	Total	Total
96.7	100.0	+2.9

Source : Bank of Thailand

"The use of cards for transfers/payments at ATM/CDM declined as more people switched to mobile banking/internet banking, which fits their needs for anywhere, anytime banking.

The use of electronic cards for funds transfers and payments via ATM/CDM declined in volume from the previous year. The volume of fund transfers using ATM cards and debit cards at the ATM/CDM dropped by 12.9 percent. Similarly, the use of ATM cards and debit cards for payments via ATM/CDM such as bill payments substantially declined by 28.8 percent. Such declines resulted from changing Thai customers' preferences towards a more convenient mobile banking/internet banking for transfers and bill payments.

Further, payments for goods and services with debit and credit cards through online channels also increased remarkably by 81.4 percent, reaffirming changes in consumer behaviors towards online channels.

In parallel, the volume of debit card and credit card payments at the point of sale increased by 9.3 percent. Credit cards were the main payment instrument used at the point of sale while ATM cards and debit cards were mainly used by most consumers for cash withdrawals via ATM/CDM.

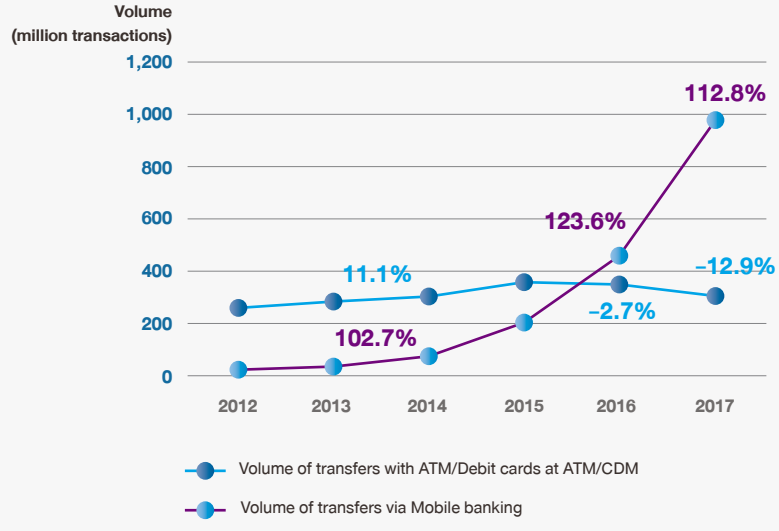
Table 3: Volume and Value of Electronic Cards in 2017

Transaction Types	Volume (Million Transactions)		Value (billion Baht)	
	ATM/ Debit	Credit	ATM/ Debit	Credit
Money Withdrawal*	1,885.6	19.4	8,256.5	129.0
	(4.3%)	(0.7%)	(0.9%)	(1.6%)
Money Transfers	304.1	n/a	3,214.3	n/a
	(-12.9%)	(n/a)	(-13.8%)	(n/a)
Payments for goods and services**	134.3	451.3	311.9	1,371.8
	(14.2%)	(9.4%)	(-6.4%)	(5.7%)
Money Deposits	110.2	n/a	1,056.1	n/a
	(4.4%)	(n/a)	(0.8%)	(n/a)

( ) represents growth rates in 2017 compared to 2016
* refers to cash withdrawals or cash advances from ATM/CDM
** refers to electronic payments for goods and services at the point of sale or bill payments at ATM/CDM

Source : Bank of Thailand

Figure 17: Volume of Funds Transfer via ATM cards and Debit cards at ATM/CDM and Mobile banking

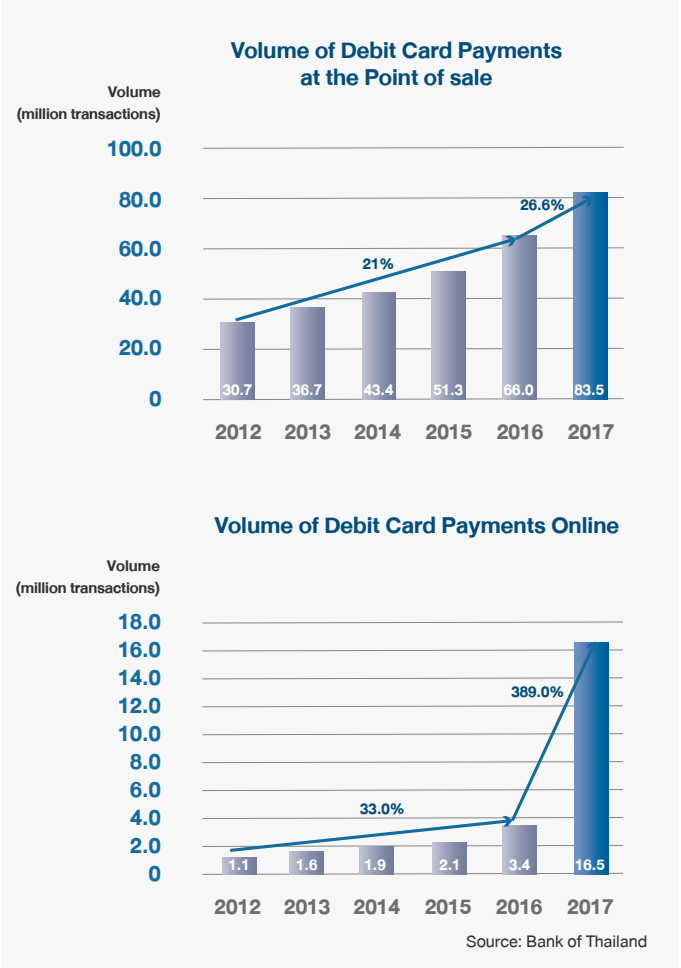


Source: Bank of Thailand

"The PromptPay and the Card Expansion Projects were among factors contributing to the noticeable changes in card usage behaviors. Funds transfer via ATM cards and debit cards at ATM/CDM declined while payments via debit cards at the point of sale increased"

In 2017, the use of ATM cards and debit cards for funds transfer at ATM/CDM showed a clear downward trend. Compared to last year, the volume of transfers performed via ATM/CDM in 2017 declined by 12.9 percent, in contrast to those during 2012-2015, which grew at an average of 11.1 percent per year. One contributing factor to such decline was the policy promoting e-Payment under the National e-Payment Project which aims at creating e-Payment systems on par with standards. In particular, PromptPay, which was available for individual funds transfer since the beginning of 2017, became a new alternative for receiving and transferring funds via electronic channels at a lower fee. As shown by the mobile banking data, Thais increasingly switched to transfer funds via mobile banking as it is convenient and allows customers to transfer funds anywhere anytime. In 2017, the volume of transfers via mobile banking grew considerably from the previous year by 112.8 percent.

Figure 18: Volume of Debit Card Payments at the Point of sale and Online



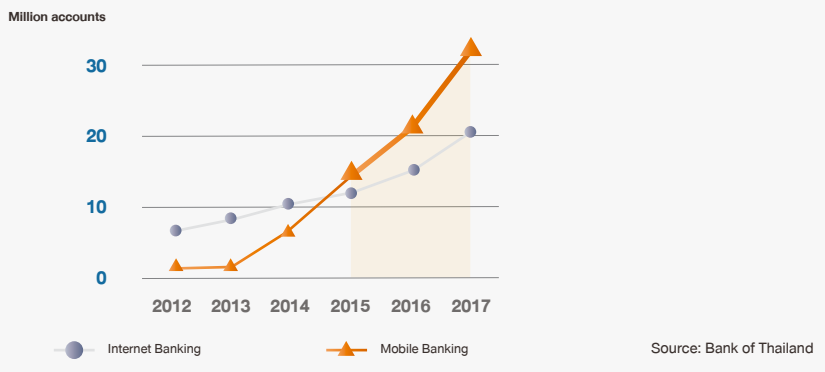
In addition, the BOT in cooperation with the Ministry of Finance encouraged consumers to adopt e-payment by broadening the electronic card usage with the nationwide EDC installations and the Lucky Draw campaign for those used debit cards for payments at the point of sale during May 2017 – April 2018. As a result, in 2017, the volume of debit card payments at the point of sale and via online channels significantly expanded from last year by 26.6 percent and 389.0 percent, respectively. By contrast, the average annual growth of debit card payments at the point of sale and via online channels between 2012 and 2016 was at 21.0 percent and 33.0 percent, respectively.

3.4 Mobile banking/Internet banking

At the end of 2017, the number of mobile banking accounts grew from 20.9 million accounts in 2016 to 31.6 million accounts, equivalent to a 51 percent growth compared to the previous year. The volume and value of mobile banking transactions in 2017 expanded considerably from the previous year by 110.0 percent and 67.7 percent, respectively. This is consistent with increasing number of mobile banking users, which is driven by recent mobile banking applications that are easy to use and accommodate a variety of services. Further, banks have adopted aggressive marketing campaigns offering special promotions to stimulate mobile banking usage such as reward programs and discounts, leading more people to switch to mobile banking.

At the same time, the number of internet banking accounts in 2017 grew by 35.1 percent and registered at 20.4 million accounts. At the end of 2017, internet banking transactions expanded by 5.7 percent in volume but contracted by 11.8 percent in value, compared to those of 2016. This too is driven by the increasing trend of mobile banking adoptions.

Figure 19: Number of Internet Banking and Mobile Banking Accounts



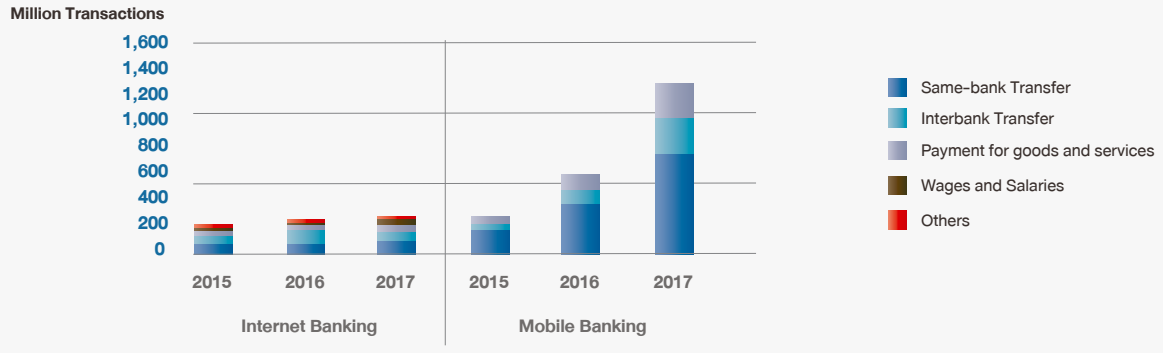
"In the past 3 years, the popularity of mobile banking has grown exponentially; consumers preferred mobile banking to internet banking since 2015."

At the end of 2017, the number of mobile banking accounts grew from 20.9 million accounts in 2016 to 31.6 million accounts, equivalent to a 51 percent growth compared to the previous year. The volume and value of mobile banking transactions in 2017 expanded considerably from the previous year by 110.0 percent and 67.7 percent, respectively. This is consistent with increasing number of mobile banking users, which is driven by recent mobile banking applications that are easy to use and accommodate a variety of services. Further, banks have adopted aggressive marketing campaigns offering special promotions to stimulate mobile banking usage such as reward programs and discounts, leading more people to switch to mobile banking.

At the same time, the number of internet banking accounts in 2017 grew by 35.1 percent and registered at 20.4 million accounts. At the end of 2017, internet banking transactions expanded by 5.7 percent in volume but contracted by 11.8 percent in value, compared to those of 2016. This too is driven by the increasing trend of mobile banking adoptions.

The increasing volume of mobile banking transactions in 2017 partly came from PromptPay which has been operational since the beginning of 2017. During the past year, the number of registered PromptPay users were more than 40.4 million, and the volume of the PromptPay transactions via mobile banking/ internet banking grew at an average of 26.3 percent per month, suggesting that PromptPay has become a preferred choice for low-value retail funds transfers.

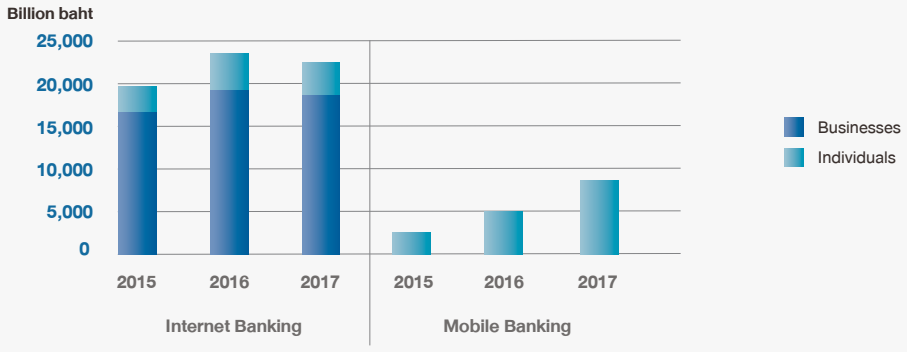
Figure 20: Volume of Internet banking and Mobile Banking Transactions



Source: Bank of Thailand

"The value of internet banking transactions is largely higher than that of mobile banking because most internet banking users were businesses while mobile banking focused on retail customers."

Figure 21: Value of Internet banking and Mobile banking Transactions



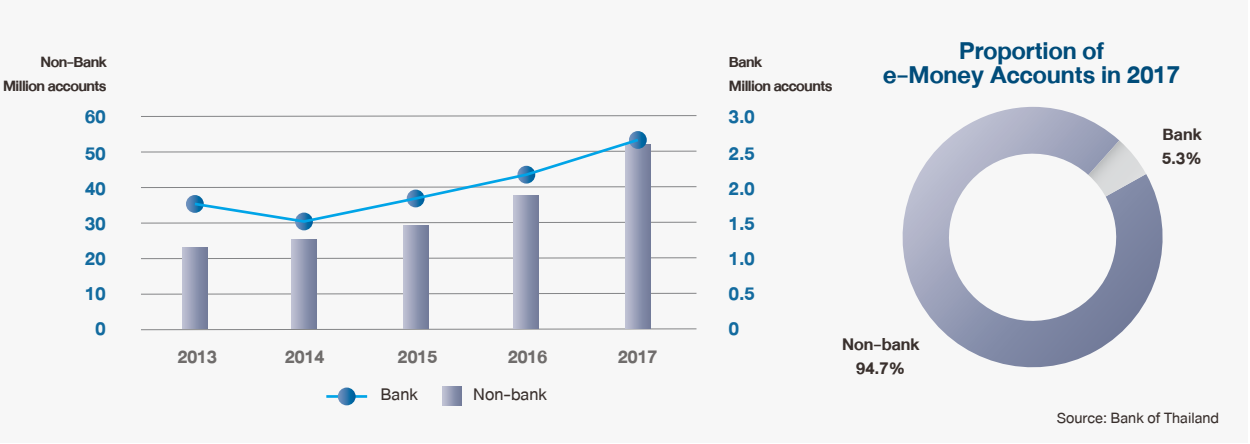
Source: Bank of Thailand

Further, a comparison of transaction values in 2017 revealed that the value of internet banking transactions was significantly higher than that of mobile banking. This was because most internet banking transactions were for business purposes, which encompassed funds transfer for trade settlement, payments for goods and services, and salary and wage payments. Because businesses can transfer funds via internet banking up to 10 million baht per transaction as opposed to a transfer limit of 500,000 baht per transaction via mobile banking, most businesses, therefore, preferred internet banking. Consequently, the total internet banking transactions recorded at 23.5 trillion baht in value. In contrast, most transactions conducted via mobile banking were individual and retail funds transfer for low-value daily expenses. As a result, the total value of mobile banking transactions recorded only at 8.9 trillion baht, and it is likely that the value per transaction will gradually decrease every year. This reflected that consumers are getting used to payments and transfers via internet banking and mobile banking in their daily lives.

3.5 e-Money

At the end of 2017, there were 30 e-Money service providers. The number of non-bank e-Money service providers totaled 23 providers, while bank e-Money service providers stood at 7 providers, down by one bank that ceased its e-Money Service.

Figure 22: Number of e-Money accounts (Bank and Non-bank)



Source: Bank of Thailand

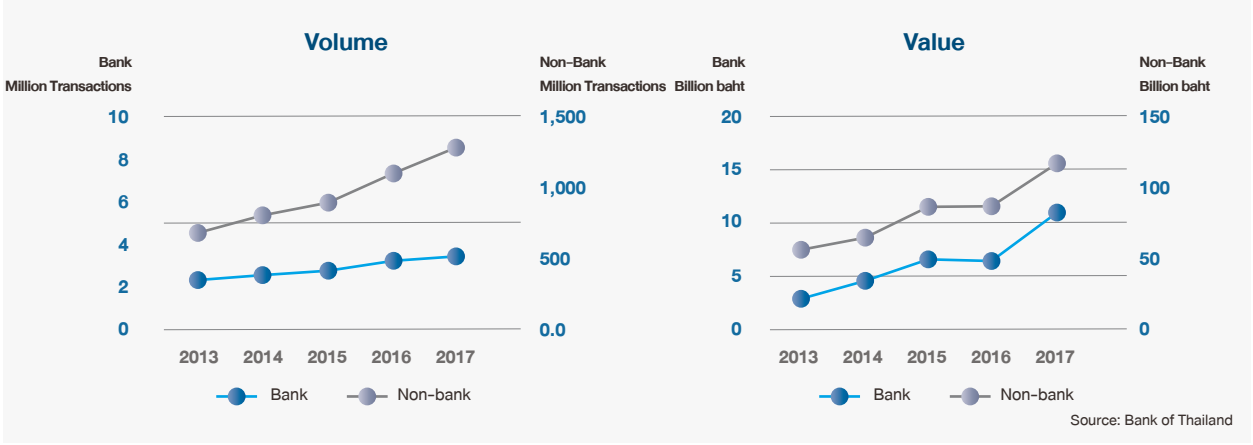
"Most e-Money operators are non-banks that continued to provide solutions fitting for everyday spending and offered marketing promotions aiming to broaden their customer base for the future."

The number of e-Money accounts[12] has grown over the years. These increases were consistent with the e-Money providers' marketing campaigns offering promotions for everyday expenditures, such as top-up prepaid cards for transit payments, buying movie tickets at discount or giving discounts for online shopping via applications. At the end of 2017, there were 53.2 million e-Money accounts, increased by 14 million accounts from the previous year, equivalent to a growth rate of 35.7 percent. Of the total e-Money accounts, 95.2 percent were issued by non-bank providers.

The volume and value of e-Money transactions in 2017 also continued to grow, recording an increase by 18.2 percent and 38.7 percent from 2016 respectively, representing a total of 1,272.2 million transactions in volume and 126.2 billion baht in value.

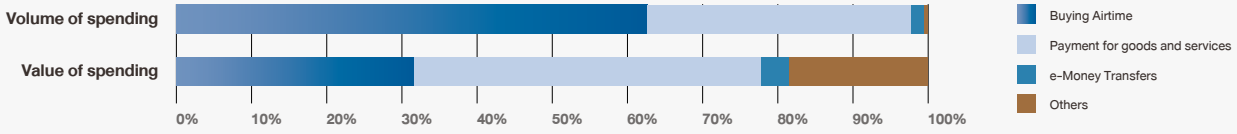
[12] e-Money accounts include both card-based and network-based e-Money accounts.

Figure 23: Volume and Value of e-Money



Source: Bank of Thailand

Figure 24: e-Money Transaction by Types in 2017



	Buying Airtime	Payments for goods and services	e-Money Transfers	Others
Value (Million Baht)	39,999.5	58,679.6	4,452.2	23,040.7
Volume (Million Transactions)	802.5	444.9	17.8	7.1
Average Value (Baht per Transaction)	49.9	131.9	250.1	3,246.7

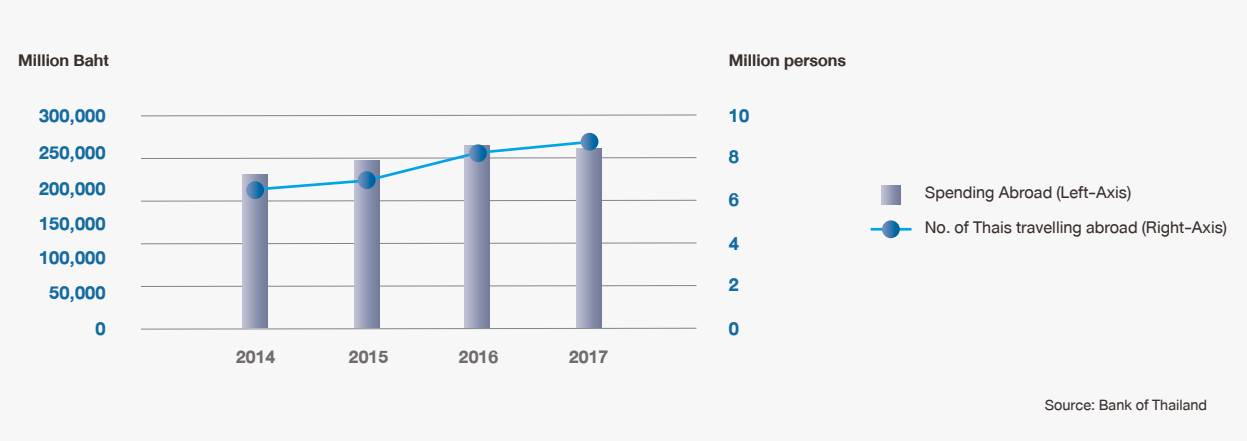
Source : Bank of Thailand

Overall, e-Money services provided by both banks and non-banks still showed noticeably upward trends. More than 90 percent of e-Money transactions were made through non-bank operators and for low-value payments with an average value of 91.0 baht per transaction. This suggested that e-Money services were mostly used in everyday expenditures such as payments for goods and services, mobile phone top-up (buying airtime), and transfers between e-Money accounts.Meanwhile, transactions through bank e-Money service providers were mostly made via cash cards and used for payments of goods and services, fee payments, transfers between e-Money accounts, with an average of 3,237.0 baht per transaction, higher than that of non-banks.

3.6 Payment Abroad

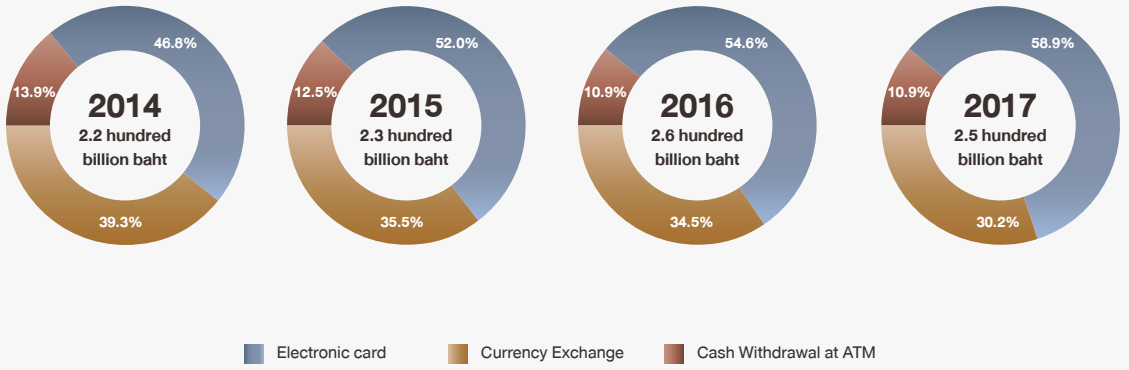
During the past years, payment abroad showed an upward trend in line with increasing number of Thais travelling overseas. Payment abroad can be classified into 3 approaches, namely electronic card payments at the point of sale abroad, foreign currency exchanges, and cash withdrawals at ATM/CDM. In the past years, electronic card payment abroad has continually increased. This was partly because commercial banks increasingly promoted the use of electronic cards abroad, as well as introduced privileges and discounts. Meanwhile, foreign currency exchanges and cash withdrawals at automated machines abroad have declined, compared to total spending abroad.

Figure 25: Payment abroad and Number of Thai people travelling abroad



Source: Bank of Thailand

Figure 26: Payment Abroad by Approaches during 2014 – 2017



Source: Bank of Thailand

In categorizing by different electronic card types, i.e., credit cards and debit cards, credit cards remained preferable to debit cards for payment abroad, and accounted for 83.1 percent of total electronic card transactions overseas. Nonetheless, more Thais turned to debit cards for payments for goods and services aboard owing to commercial banks' promotions encouraging customers to switch to debit cards when spending overseas. This was evident with the growing proportion of debit card transactions, rising from 10.9 percent of total electronic card transactions aboard in 2014 to 16.9 percent in 2017.

"Using electronic cards at the point of sale abroad gained increasing popularity; still, credit cards remained preferable to debit cards"

IV

Appendix

Glossary and abbreviation

ATM	Automated Teller Machine
BAHTNET	Bank of Thailand Automated High-Value Transfer Network
BIS	Bank for International Settlements
BOT	Bank of Thailand
CDM	Cash Deposit Machine
e-Commerce	Electronic Commerce
e-Money	Electronic Money
e-Payment	Electronic Payment
e-Wallet	Electronic Wallet
EDC	Electronic Data Capture
EFTPOS	Electronic Funds Transfer at Point Of Sale
ETC	Electronic Transactions Commission
FSAP	Financial Sector Assessment Program
ICAS	Imaged Cheque Clearing and Archive System
ISO	International Organization for Standardization
m-Commerce	Mobile Commerce
NITMX	National ITMX
Non-bank	Non-bank financial institution
ORFT	Online Retail Funds Transfer
PFMIs	Principles for Financial Market Infrastructures
PIRPS	Prominently Important Retail Payment Systems
PSC	Payment Systems Committee
QR code	Quick Response Code
SEC	The Securities and Exchange Commission, Thailand
SFIs	Specialized Financial Institutions
SIPS	Systemically Important Payment Systems
WC-PSS	Working Committee on Payment and Settlement Systems

Statistical tables

Table 1: Basic statistical data

	2012	2013	2014	2015	2016	2017
Population (millions)	64.46	64.79	65.12	65.73	65.93	66.19
GDP current price (billion Baht)	12,155.4	12,771.3	13,230.8	14,013.5	14,931.5	15,691.7
GDP per capita (Baht)	188,573	197,119	203,176	213,198	226,475	237,071
Exchange rate vis-à-vis US$ (at year-end)	30.63	32.82	32.96	36.08	35.82	32.66

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

Table 2: Technological infrastructure[1]

	2012	2013	2014	2015	2016	2017
Total fixed network telephone subscribers (millions)	**6.36**	**6.04**	**5.69**	**5.31**	**4.71**	**2.65**
Total mobile telephone subscribers (millions)[2]	**85.01**	**92.94**	**97.09**	**102.94**	**118.35**	**121.53**
Postpaid	9.78	11.28	12.85	17.78	22.74	26.53
Prepaid	75.23	81.66	84.24	85.16	95.61	95.00
Total Internet users (millions)	**23.06**	**26.14**	**27.65**	**39.47**	**43.87**	**45.19**
Penetration rates						
Fixed network telephone (%)	9.87	9.33	8.74	8.08	7.14	4.00
Mobile telephone (%)	131.88	143.45	149.08	156.61	179.50	183.61

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

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

[2] Data as of November 2016

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

	2012	2013	2014	2015	2016	2017
Narrow money (1+2)	**1,598,262**	**1,661,303**	**1,682,470**	**1,778,050**	**1,864,165**	**2,038,860**
1. Currency outside Depository Corp.& Central Gov.	1,136,303	1,188,888	1,200,331	1,250,926	1,335,952	1,437,558
Banknotes in circulation	1,350,932	1,425,282	1,503,679	1,539,848	1,627,997	1,734,078
Coins in circulation	50,864	54,322	56,622	59,888	63,986	68,755
Less: currency held by Central Gov.	854	1,115	1,247	1,094	1,115	830
Less: currency held by Depository Corp.	264,639	289,601	358,723	347,716	354,916	364,445
Held by commercial banks	210,596	238,668	299,916	290,772	301,309	306,968
Held by finance companies	0	0	0	0	0	0
Held by Specialized Financial Institutions	53,602	50,538	58,385	56,544	53,211	57,240
Held by savings cooperatives	441	395	422	400	396	237
Held by money market mutual funds	0	0	0	0	0	0
2. Transferable deposits at Depository Corp.	461,959	472,415	482,139	527,124	528,213	601,302
Transferable deposits at Bank of Thailand	4,554	3,225	2,708	2,697	5,050	4,974
Transferable deposits at commercial banks	451,295	464,220	475,561	519,296	518,085	590,676
Transferable deposit at SFIs	6,110	4,970	3,870	5,131	5,078	5,652

Source: Bank of Thailand

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

	2012	2013	2014	2015	2016	2017
Currency outside Depository Corp. & Central	1,136	1,189	1,200	1,251	1,336	1,438
Transferable deposits at Depository Corp.	462	472	482	527	528	601
Narrow money	1,598	1,661	1,682	1,778	1,864	2,039
Broad money [2]	14,967	16,062	16,808	17,552	18,289	19,206

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)

	2012	2013	2014	2015	2016	2017
Balances held at central bank	88.7	89.8	95.6	98.7	113.7	126.9
Stock of high-quality liquid assets[1]	-	-	-	-	3,491.3	3,783.3
Required reserves	655.6	668.2	733.5	759.3	-	-
Free reserves	2,489.4	2,575.2	2,529.8	2,362.4	-	-
Transferable deposits at other banks	6.5	3.7	4.5	2.8	3.2	3.4
Memorandum item:						
Institutions borrowing from central bank	124.7	119.4	98.9	78.8	61.7	7.0

Source: Bank of Thailand

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

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

	2012	2013	2014	2015	2016	2017
Paper-based:	**122,875**	**118,365**	**118,791**	**120,455**	**118,754**	**113,783**
In-house cheque[1]	48,145	44,793	46,103	49,418	49,309	48,001
Interbank cheque	74,730	73,572	72,687	71,037	69,446	65,782
Electronic payment cards:	**2,827,638**	**3,182,137**	**3,370,883**	**3,636,343**	**3,978,781**	**4,290,850**
ATM card	539,056	535,350	502,026	487,986	411,509	301,800
for cash withdrawal via ATM	424,354	415,872	395,880	377,369	318,690	239,286
for other purposes[2]	114,702	119,478	106,146	110,617	92,819	62,514
Debit card[3]	1,406,350	1,576,484	1,655,143	1,808,115	1,990,901	2,173,372
for cash withdrawal via ATM	1,059,075	1,165,118	1,206,078	1,332,160	1,489,565	1,646,290
for purchasing purpose via EFTPOS	30,748	37,221	43,375	51,347	65,956	83,487
for other purposes[4]	316,527	374,144	405,690	424,608	435,380	443,595
Credit card[5]	369,920	401,093	425,781	456,889	500,073	542,710
for purchasing purpose	343,346	373,046	397,697	421,448	465,731	510,896
for other purposes[6]	26,574	28,047	28,083	35,442	34,343	31,813
e-Money[7]	512,311	669,210	787,932	883,352	1,076,298	1,272,968
Automated:	**332,324**	**346,410**	**349,034**	**369,644**	**392,645**	**408,498**
Direct credit[8]	204,829	214,657	211,479	224,222	234,202	238,709
Direct debit[9]	93,531	93,636	96,205	100,568	107,630	113,920
ITMX Bulk Payment	31,018	34,864	37,944	41,231	46,801	51,646
BAHTNET[10]	2,946	3,253	3,406	3,623	4,013	4,224

Source: Bank of Thailand

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

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

[3] Domestic and oversea spending of Thai debit cards.

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

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

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

[7] Data exclude top-up cards.

[8] Intra-bank pre-authorized direct credit.

[9] Intra-bank pre-authorized direct debit.

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

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

	2012	2013	2014	2015	2016	2017
Paper-based:	**64,832**	**64,581**	**61,595**	**61,583**	**60,895**	**59,530**
In-house cheque[1]	25,989	24,262	23,632	24,142	23,762	23,651
Interbank cheque	38,843	40,319	37,963	37,441	37,133	35,879
Electronic payment cards:	**13,350**	**14,498**	**14,922**	**15,279**	**15,221**	**14,894**
ATM card	2,437	2,451	2,419	2,352	1,951	1,476
for cash withdrawal via ATM	1,852	1,846	1,761	1,664	1,403	1,076
for other purposes[2]	584	606	658	688	548	400
Debit card[3]	9,489	10,475	10,820	11,136	11,354	11,380
for cash withdrawal via ATM	5,136	5,743	5,905	6,320	6,778	7,181
for purchasing purpose via EFTPOS	94	100	106	111	135	153
for other purposes[4]	4,259	4,633	4,810	4,705	4,441	4,046
Credit card[5]	1,389	1,524	1,626	1,722	1,825	1,912
for purchasing purpose	1,157	1,282	1,384	1,465	1,574	1,672
for other purposes[6]	232	241	242	257	251	240
e-Money[7]	35.4	48.0	56.2	67.6	91.0	126.0
Automated:	**667,134**	**699,527**	**778,999**	**814,821**	**901,257**	**918,334**
Direct credit[8]	12,495	13,500	14,065	15,199	16,623	17,662
Direct debit[9]	3,749	4,117	4,467	6,250	7,588	7,551
ITMX Bulk Payment	1,771	2,187	2,469	2,538	2,941	3,060
BAHTNET[10]	649,119	679,723	757,998	790,834	874,106	890,060

Source: Bank of Thailand

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

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

[3] Domestic and oversea spending of Thai debit cards.

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

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

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

[7] Data exclude top-up cards.

[8] Intra-bank pre-authorized direct credit.

[9] Intra-bank pre-authorized direct debit.

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

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

	2012	2013	2014	2015	2016	2017
Credit card[1]	4,598	4,871	5,325	5,861	5,767	5,959
Debit card[2]	191	194	196	237	265	292

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)

	2012	2013	2014	2015	2016	2017
ATM card	8,265	8,381	8,229	8,049	8,209	7,056
Debit card[1]	9,956	10,579	10,979	11,140	11,123	11,239

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)

	2012	2013	2014	2015	2016	2017
Notes and coins	**1,401,796**	**1,479,604**	**1,560,301**	**1,719,372**	**1,773,469**	**1,878,237**
Notes:	**1,350,932**	**1,425,282**	**1,503,679**	**1,659,484**	**1,709,483**	**1,809,482**
500000 Baht	118	118	118	134	152	157
1000 Baht	1,102,770	1,202,441	1,282,400	1,318,903	1,317,006	1,402,484
500 Baht	128,217	138,695	124,976	140,933	173,682	184,638
100 Baht	121,358	129,095	141,047	140,768	155,103	152,363
80 Baht	149	150	151	152	152	152
70 Baht	0	0	0	0	1,393	1,393
60 Baht	1,175	1,178	1,181	1,187	1,247	1,247
50 Baht	13,194	13,347	19,070	18,379	19,208	22,941
20 Baht	28,840	30,801	36,884	35,372	37,885	40,453
10 Baht	3,336	3,334	3,332	3,330	3,329	3,328
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:	**50,864**	**54,322**	**56,622**	**59,888**	**63,986**	**68,755**

Source: Bank of Thailand

Table 11: Institutional infrastructure

	2012	2013	2014	2015	2016	2017
Central Bank						
Number of Institutions	1	1	1	1	1	1
Number of Branches	3	3	3	3	3	3
Number of Accounts[1]	241	182	182	181	173	173
Value of Accounts (million Baht)[1]	381,223	439,175	310,132	533,250	265,949	352,563
Thai Commercial Banks						
Number of Institutions	16	16	17	19	19	19
Number of Branches	6,421	6,696	6,986	7,040	6,998	6,766
Number of Accounts	81,344,121	84,433,032	86,582,576	88,529,904	90,648,406	94,846,533
Value of Accounts (million Baht)	9,540,114	10,350,543	11,065,024	11,347,475	12,433,454	13,062,173
Specialized Financial Institutions						
Number of Institutions	6	6	6	6	6	6
Number of Branches	2,348	2,549	2,445	2,445	2,468	2,471
Number of Accounts	48,233,488	54,377,970	59,539,994	63,243,722	68,569,387	74,242,903
Value of Accounts (million Baht)	3,199,296	3,604,591	3,901,266	4,214,675	4,450,107	4,686,137
Foreign Bank Branches						
Number of Institutions	15	14	14	12	11	11
Number of Branches	19	19	19	19	18	18
Number of Accounts	86,556	89,617	79,641	72,132	68,580	68,819
Value of Accounts (million Baht)	679,790	700,469	789,461	798,701	908,302	814,701

Sources: Bank of Thailand

[1] Data exclude regional office.

Table 12: Payment instructions handled by selected interbank settlement systems

Volume of transactions (in thousands)

	2012	2013	2014	2015	2016	2017
Paper-based:	**74,705**	**73,572**	**72,687**	**71,036**	**69,446**	**65,782**
Intra-provincial Cheque in Bangkok and vicinity[1]	53,137	52,051	50,215	48,701	47,322	44,664
Intra-provincial Cheque in Regional Area[2]	14,800	13,312	11,455	11,053	10,775	10,421
Inter-provincial Cheque[3]	6,768	8,209	11,017	11,283	11,350	10,698
Automated:	**150,962**	**170,153**	**184,270**	**192,769**	**192,450**	**178,705**
BAHTNET[4]	2,946	3,253	3,406	3,623	4,013	4,224
ITMX Bulk Payment	31,018	34,864	37,944	41,231	46,789	51,646
ORFT-ATM	116,997	132,035	142,920	147,916	141,648	122,836

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

Volume of transactions (billion Baht)

	2012	2013	2014	2015	2016	2017
Paper-based:	**38,740**	**40,319**	**37,963**	**37,440**	**37,133**	**35,879**
Intra-provincial Cheque in Bangkok and vicinity[1]	34,445	35,980	33,530	33,063	32,852	31,642
Intra-provincial Cheque in Regional Area[2]	3,811	3,684	3,500	3,368	3,245	3,189
Inter-provincial Cheque[3]	484	655	933	1,008	1,036	1,048
Automated:	**651,660**	**682,762**	**761,411**	**794,347**	**877,955**	**893,921**
BAHTNET[4]	649,119	679,723	757,998	790,834	874,106	890,060
ITMX Bulk Payment	1,771	2,187	2,469	2,538	2,939	3,060
ORFT-ATM (Online Retail Funds Transfer)	771	852	944	975	910	801

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

	2012	2013	2014	2015	2016	2017
Bond registry system:						
Government securities	7,979	4,222	2,009	1,372	511	414
Book-entry system:						
Equity securities (in millions)	3.09	3.72	4.09	4.72	5.47	5.95
Government securities (in millions)	0.18	0.19	0.20	0.20	0.21	0.23

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

Table 15: Securities transfer instructions handled by securities settlement systems

Volume of transactions (billion Baht)

	2012	2013	2014	2015	2016	2017
Bond registry system:						
Government securities	28.05	50.00	22.75	49.52	94.44	82.65
Book-entry system:						
Equity securities	839.00	1,220.00	1,027.83	1,081.33	1,209.11	1,055.41
Government securities	82,954.00	81,839.00	87,274.82	86,804.54	116,869.57	124,323.13

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

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

	2012	2013	2014	2015	2016	2017
BAHTNET[1]	65	64	64	65	66	64
Intra-provincial Cheque in Bangkok and vicinity[2]	36	36	36	37	38	36
Intra-provincial Cheque in Regional Area[3]	21	23	36	23	23	23
Inter-provincial Cheque[4]	35	36	36	37	35	36
ITMX Bulk Payment	32	31	30	33	32	33
Bond registry system:						
Government securities	283,597	211,631	113,842	460,436	461,723	462,309
Book-entry system:						
Equity securities and Government securities	86	86	38	39	39	39

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 machines[1] and EFTPOS terminals[2]

	2012	2013	2014	2015	2016	2017
Total of Automated machines	**52,242**	**56,851**	**61,614**	**63,432**	**64,115**	**66,944**
Bangkok	15,802	16,304	16,727	16,790	16,658	17,243
Central	18,036	19,640	21,288	21,894	22,125	23,465
Northeast	7,128	7,270	9,255	9,699	7,926	10,160
North	5,474	6,110	6,853	7,142	8,588	7,562
South	5,802	7,527	7,491	7,907	8,818	8,514
Total of EFTPOS terminals	**264,004**	**311,356**	**388,673**	**416,843**	**474,363**	**711,221**
Bangkok	129,680	146,012	186,273	176,158	195,851	354,712
Central	61,824	76,939	93,386	111,471	128,523	110,401
Northeast	18,897	24,004	29,621	36,432	42,371	78,657
North	29,184	34,105	42,846	50,905	59,773	81,426
South	24,419	30,296	36,547	41,877	47,845	86,025

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

	2012	2013	2014	2015	2016	2017
Total	**83,966,632**	**87,970,298**	**93,491,615**	**93,919,633**	**93,877,836**	**96,726,319**
Credit card[1]	16,870,025	18,626,864	20,303,751	18,974,195	20,136,341	20,571,634
ATM card	24,108,467	24,101,957	25,066,799	21,743,686	19,638,033	18,380,892
Debit card	42,988,140	45,241,477	48,121,065	50,413,672	54,103,462	57,773,793

Source: Bank of Thailand

[1] Data include non-bank.

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

	2012	2013	2014	2015	2016	2017
Total	**65,571**	**71,680**	**76,257**	**81,715**	**87,648**	**92,197**
Credit card	24,049	27,419	29,501	31,347	33,210	34,009
ATM/Debit card and e-banking	22,475	25,194	26,851	29,275	31,575	33,350
Money transfer and collection	16,875	16,944	17,896	19,178	21,051	23,227
Cheque-related fee	2,172	2,123	2,009	1,915	1,812	1,611

Source: Bank of Thailand

[1] From 2013, data exclude securities custodian and letter of credit

Table 20: Sources of payment revenues of foreign bank branches (million Baht)[1]

	2012	2013	2014	2015	2016	2017
Total	**3,991**	**4,428**	**4,323**	**3,964**	**4,153**	**4,289**
Credit card	2,653	3,011	2,844	2,758	2,903	2,935
ATM/Debit card and e-banking	50	50	48	41	42	45
Money transfer and collection	1,162	1,234	1,310	1,063	1,109	1,216
Cheque-related fee	126	133	121	102	99	93

Source: Bank of Thailand

[1] From 2013, data exclude securities custodian and letter of credit

Table 21: Daily averages of BOT payment services - Volume of transactions

	2012	2013	2014	2015	2016	2017
BAHTNET[1]	12,025	13,278	13,901	14,909	16,446	17,310
Intra-provincial Cheque in Bangkok and vicinity[2]	216,886	212,453	204,961	200,415	193,941	183,047
Intra-provincial Cheque in Regional Area[3]	60,407	54,336	46,756	45,484	44,160	42,708
Inter-provincial Cheque[4]	27,625	33,505	44,966	46,431	46,516	43,845
ITMX Bulk Payment	126,606	142,304	154,874	169,674	191,758	211,663

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)

	2012	2013	2014	2015	2016	2017
BAHTNET[1]	2,649	2,774	3,094	3,254	3,582	3,648
Intra-provincial Cheque in Bangkok and vicinity[2]	141	147	137	136	135	130
Intra-provincial Cheque in Regional Area[3]	15.6	15.0	14.3	13.9	13.3	13.1
Inter-provincial Cheque[4]	2.0	2.7	3.8	4.1	4.2	4.3
ITMX Bulk Payment	7.2	8.9	10.1	10.4	12.0	12.5

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

	2012	2013	2014	2015	2016	2017
BAHTNET[1]	19,303	22,190	21,820	29,033	28,827	28,077
Intra-provincial Cheque in Bangkok and vicinity[2]	477,396	547,406	417,618	484,821	445,684	429,714
Intra-provincial Cheque in Regional Area[3]	125,127	114,492	90,005	97,533	83,358	79,595
Inter-provincial Cheque[4]	125,189	172,463	184,197	188,315	190,831	186,206
ITMX Bulk Payment	417,015	508,748	473,040	574,555	615,266	744,926

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)

	2012	2013	2014	2015	2016	2017
BAHTNET[1]	3,597.3	8,384.9	3,877.3	4,776.2	4,610.3	4,845.0
Intra-provincial Cheque in Bangkok and vicinity[2]	268.2	283.4	266.0	297.5	248.6	212.6
Intra-provincial Cheque in Regional Area[3]	25.7	26.8	25.6	25.1	22.4	22.3
Inter-provincial Cheque[4]	6.8	11.0	12.4	12.6	13.7	13.4
ITMX Bulk Payment	28.8	44.3	77.8	46.4	83.1	47.7

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

	2012	2013	2014	2015	2016	2017
No. of agreements	864,312	1,164,796	6,229,960	13,918,815	20,883,147	31,641,487
Volume of transactions	36,285,076	57,198,604	109,349,726	263,922,502	584,983,180	1,228,270,303
Value of transactions (million Baht)	439,960	751,558	1,364,022	2,800,299	5,360,605	8,997,136

Source: Bank of Thailand

Table 26: Use of internet banking

	2012	2013	2014	2015	2016	2017
No. of agreements	6,645,161	8,033,061	10,159,971	11,901,117	15,095,696	20,480,268
Volume of transactions[1]	125,276,726	161,784,249	188,408,939	186,236,816	240,461,111	248,478,233
Value of transactions (billion Baht)	14,112.1	19,548.0	20,500.4	23,629.7	29,706.3	23,513.0

Source: Bank of Thailand

[1] Enquiry transactions were excluded.

Table 27: Use of ORFT (Online Retail Funds Transfer) - Volume of transactions (in thousands)

	2012	2013	2014	2015	2016	2017
Total	**150,440**	**173,909**	**199,633**	**235,636**	**298,975**	**462,704**
ATM	116,997	132,035	142,920	147,916	141,648	122,836
Counter	10,273	9,160	9,146	9,791	9,702	8,768
Internet banking	23,169	32,714	47,567	77,928	147,624	331,101

Source: Bank of Thailand

Table 28: Use of ORFT (Online Retail Funds Transfer) - Value of transactions (billion Baht)

	2012	2013	2014	2015	2016	2017
Total	**1,250**	**1,399**	**1,588**	**1,819**	**2,184**	**3,060**
ATM	771	852	944	975	910	801
Counter	227	201	191	189	183	170
Internet banking	252	347	453	656	1,091	2,089

Source: Bank of Thailand

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

	2012	2013	2014	2015	2016	2017
Total	**323,168**	**359,423**	**397,260**	**429,287**	**479,106**	**510,820**
Total bill payment at bank counters	**87,425**	**87,992**	**101,736**	**107,262**	**113,367**	**120,891**
Cash	83,320	84,297	97,018	101,594	104,354	107,590
Cheque	1,663	1,560	1,911	2,321	3,007	3,624
Others	2,442	2,135	2,807	3,348	6,006	9,677
Total bill payment at non-bank counters	**235,742**	**271,431**	**295,524**	**322,025**	**365,739**	**389,929**
Cash	231,446	266,825	291,486	318,340	362,038	385,640
Cheque	351	346	333	361	358	362
Others	3,946	4,260	3,705	3,324	3,342	3,927

Source: Bank of Thailand

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

	2012	2013	2014	2015	2016	2017
Total	**6,461**	**5,985**	**7,048**	**7,704**	**7,461**	**7,906**
Total bill payment at bank counters	**5,855**	**5,278**	**6,272**	**6,886**	**6,608**	**7,010**
Cash	2,133	1,933	2,431	2,696	2,802	3,077
Cheque	2,613	2,506	2,361	2,629	2,705	2,970
Others	1,109	838	1,481	1,561	1,102	963
Total bill payment at non-bank counters	**606**	**708**	**776**	**818**	**853**	**896**
Cash	600	700	768	810	845	887
Cheque	2	3	3	3	4	4
Others	4	5	5	4	4	5

Source: Bank of Thailand

Table 31: Use of e-Money[1]

	2012	2013	2014	2015	2016	2017
No. of cards/accounts	20,220,438	24,286,746	26,852,975	31,070,380	39,181,287	53,171,877
Volume of transactions	512,331,773	669,210,802	787,932,371	883,352,315	1,076,300,313	1,272,235,125
Value of transactions (million Baht)	35,375.8	48,031.9	55,801.7	67,616.6	90,945.7	126,171.9

Source: Bank of Thailand

[1] Data exclude top-up cards.

Table 32: Fraud through specific payment channels and payment instruments[1] (million Baht)

	2012	2013	2014	2015	2016	2017
Total fraud	**179**	**204**	**426**	**2,321**	**593**	**753**
Payment channels[2]	51	79	91	2,018	224	377
Payment instruments[3]	128	125	335	303	369	376

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 comments expressed in this report. Due acknowledgement is appreciated for the use of text or figures in any topic or section of the report, in other publications.

Enquiries can be addressed to:
Payment Systems Analysis Team, Payment Systems Policy Department, Bank of Thailand
Telephone: 0 2356 7067-8, 0 2356 7782-3 or
Facsimile: 0 2282 7717
e-mail: PSAnalysis@bot.or.th

Pursuing Sustainable Economic Well-Being

BANK OF THAILAND

BANK OF THAILAND

Pursuing Sustainable
Economic Well-Being

Bank of Thailand
273 Samsen Road, Watsamphraya, Phra Nakhon District, Bangkok 10200
Tel. +66 2283-5353 www.bot.or.th