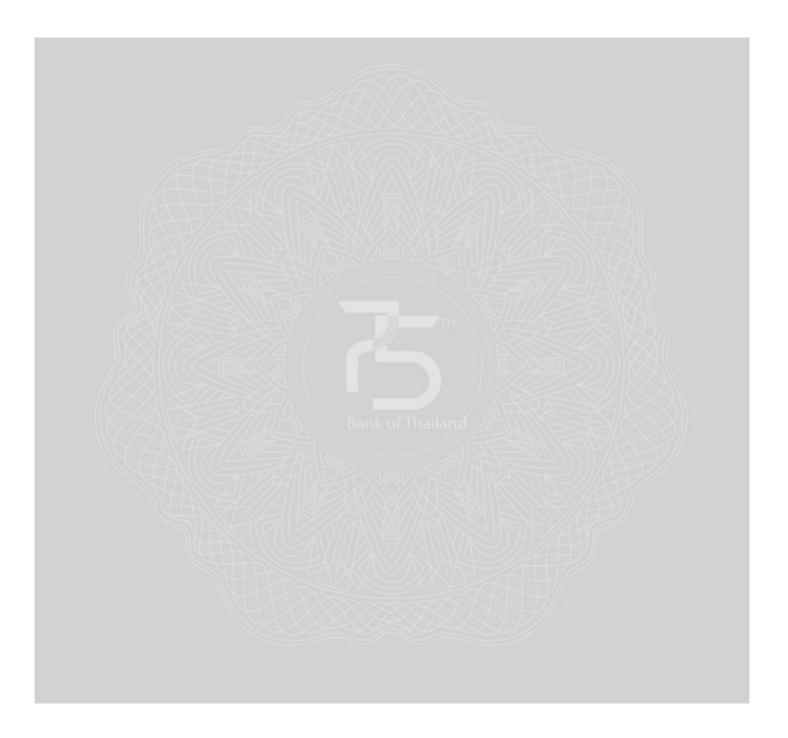


# Payment Systems Report 2016

Bank of Thailand (1942-2017)

# 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 (PSC)



Chairman
Mr. Veerathai Santiprabhop
Governor

Vice Chairman Mrs. Ruchukorn Siriyodhin Deputy Governor Financial Institutions Stability



Committee Members



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



Mr.Predee Daochai
Chairman, the Thai Bankers'
Association



Mr. Rom Hiranpruk

Expert in Information Technology



Mr. Kriengkrai Thiennukul

Vice Chairman,
the Federation of Thai Industries



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

31 December 2016

# Key payment statistics in 2015 - 2016

	2015	2016	
Total population	65.7	65.9	Million
Nominal Gross Domestic Product (GDP)	13,672.9	14,360.6	Billion Baht
Technological infrastructure			
Number of fixed-line telephone number	8.1	7.1	Numbers per
Number of mobile phone subscribers	156.6	179.5	100 persons Numbers per 100 persons
Payment statistics			
Number of Thai commercial bank branches	7,040	6,998	Branches
Number of Foreign commercial bank branches	19	18	Branches
Number of 6 Specialized Financial Institutions branches	2,445	2,468	Branches
Number of Automated machines (ATMs/CDMs) <sup>1</sup>	63,432	64,115	Terminals
Number of EFTPOS terminals <sup>2</sup>	416,843	474,363	Terminals
Number of ATM cards	21,743,686	19,638,033	Cards
Number of Debit cards	50,413,672	54,152,675	Cards
Number of Credit cards	18,974,195	20,136,341	Cards
Currency in circulation per capita	19,031.26	20,263.00	Baht per person
Average cheque usage per capita	1.8	1.8	Cheques per
			person per year
Monthly average value of credit card payments <sup>3</sup>	5,477	5,767	Baht per card
Monthly average value of cash withdrawals via ATM card	7,586	8,209	Baht per card
Monthly average value of debit card payments <sup>4</sup>	248	265	Baht per card
Monthly average value of cash withdrawals via debit card	11,678	11,123	Baht per card

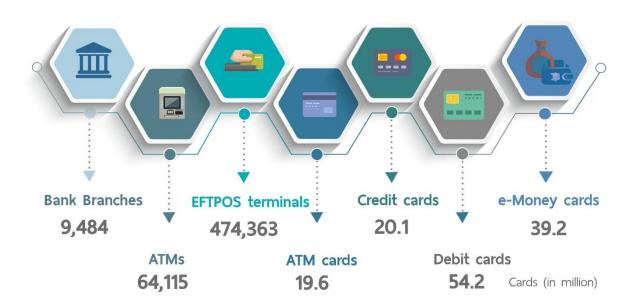
 $^{\mathrm{1}}$  Includes both Automated Teller Machines (ATMs) and Cash Deposit Machines (CDMs)

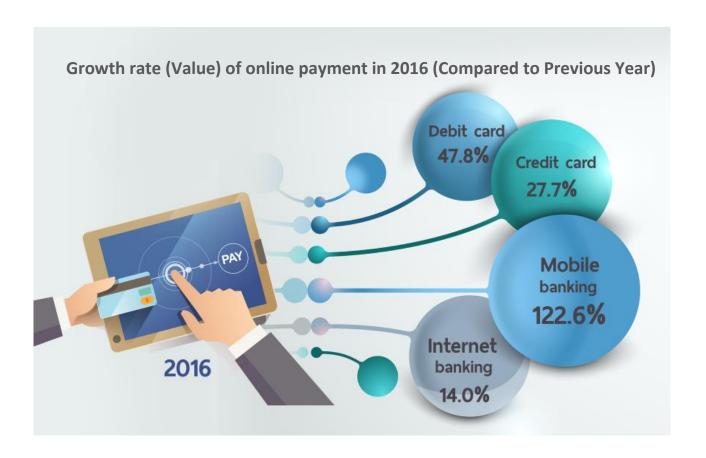
<sup>&</sup>lt;sup>2</sup> EFTPOS (Electronic Funds Transfer at Point Of Sale) or EDC (Electronic Data Capture) terminals are machines that banks or service providers install at retailers to collect and send information on payment transactions made through debit and credit cards

 $<sup>^3</sup>$  Refers only to payments for goods and services through EFTPOS within and outside Thailand using domestically issued credit cards

<sup>&</sup>lt;sup>4</sup> Refers only to payments for goods and services through EFTPOS within and outside Thailand using domestically issued debit cards

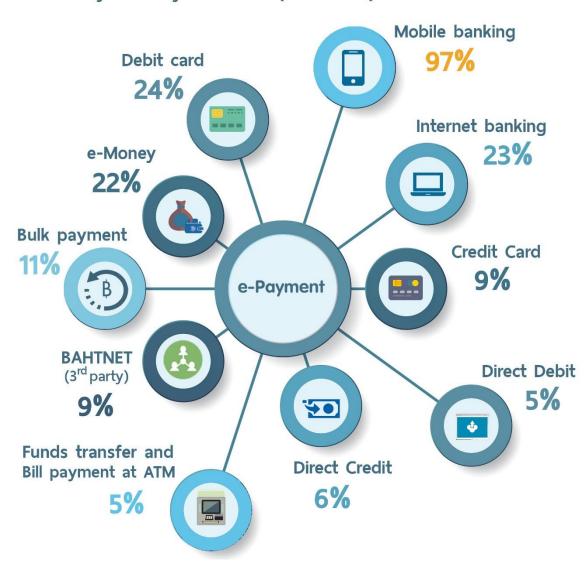
# **PAYMENT IN THAILAND (2016)**







Growth rate (Volume) of e-Payment by Channels (2012-2016)



# Payment Systems Report 2016

# Payment Systems Committee

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# Payment Systems Policy and Supervision

1.	Promotion and Development of Electronic Payments	12
	1.1 Development of Payment Services According to the National	12
	e-Payment Master Plan	
	BOX 1: "PromptPay" for Payments in the Digital Age	
	BOX 2: EDC $-$ A Payment Channel that the Business Sector	
	should not overlook	
	1.2 Creating Confidence in e-Payment Usage	19
	BOX 3: Get to Know the Local Card Brand	
	1.3 FinTech Development	23
	BOX 4: BOT's Regulatory Sandbox	
	1.4 Actions to Support Payment Systems Linkage with ASEAN	27
	Countries	
	BOX 5: General Principles for International Remittance Services	
2.	Improvement in Legal Framework	30
	2.1 Royal Decree on Regulating Electronic Payment Services of	30
	Specialized Financial Institutions B.E. 2559 (2016) (Royal	
	Decree on SFIs e-Payment)	
	2.2 Revision of Laws and Notifications on the Supervision of	30
	e-Payment Service Providers	
	2.3 Payment Systems Act B.E. 2560 (2017)	31
	BOX 6: Structure of the Payment Systems Act B.E. 2560 (2017)	
3.	Payment Systems Oversight	34
	3.1 Payment Systems Stability	34
	3.2 Preparation for the Financial Sector Assessment Program (FSAP)	38
	BOX 7: Getting to Know FSAP and Benefits from Program	
	Participation	
	3.3 Co-operative Oversight	40
	3.4 Supervision of e-Payment Service Providers	40

	Payment Systems Trends	
1.	Overall Payment Systems Usage in 2016	44
	1.1 General public and business sector's spending	45
	1.2 Cash withdrawals and deposits	48
	1.3 Payment at Point Of Sales	50
	1.4 Online payment	52
	1.5 Payment abroad	54
	1.6 Funds transfer	55
2.	Major Channels and Payment Instruments	
	2.1 Payment Service Infrastructure	57
	2.2 Cash	59
	2.3 Internet Banking and Mobile Banking	60
	2.4 Card Payments	63
	2.5 e-Money	65
	Appendix	
	Glossary and Abbreviation	69
	Statistical Tables	70
	Bibliography	86

### List of Boxes

- Box 1: "PromptPay" for Payments in the Digital Age
- Box 2: EDC A Payment Channel that the Business Sector should not overlook
- Box 3: Get to Know the Local Card Brand
- Box 4: BOT's Regulatory Sandbox
- Box 5: General Principles for International Remittance Services
- Box 6: Structure of the Payment Systems Act B.E. 2560 (2017)
- Box 7: Getting to Know FSAP and Benefits from Program Participation

### List of Figures

- Figure 1: Volume and Value of Funds Transfer through BAHTNET
- Figure 2: Proportion of Funds Transfer through BAHTNET Categorized by Transaction Types
- Figure 3: Daily Average of BAHTNET Intraday Liquidity
- Figure 4: Volume and Value of Interbank Cheques Nationwide
- Figure 5: Volume of Interbank Cheques Classified by Value in 2016
- Figure 6: e-Payment Service Providers
- Figure 7: e-Payment usage in Thailand compared to various countries
- Figure 8: Proportions of Thais' Spending during 2013 2016 (General Public)
- Figure 9: Proportions of Thais' Spending during 2013 2016 (Business Sector)
- Figure 10: Proportion of volume of Cash Withdrawals in 2016
- Figure 11: Proportion of volume of Cash Deposits in 2016
- Figure 12: Proportion of value of Payments at Points of Sale in 2016
- Figure 13: Volume and Value Growth in Payments at Points of Sale in 2016 (Compared to Previous Year)
- Figure 14: Value and Volume of Online Payment by Various Services in 2012 2016
- Figure 15: Volume of Online Payment in 2016
- Figure 16: Growth in Volume and Value of Online Payment in 2016 (Compared to Previous Year)
- Figure 17: Payments Abroad by Categories in 2014 2016
- Figure 18: Proportions of Volume of Funds Transfer via Various Channels 2015 2016

- Figure 19: Growth in value of Funds Transfer via Various Channels in 2016 (Compared to Previous Year)
- Figure 20: Payment Service Infrastructure in 2016
- Figure 21: Currency in Circulation to GDP
- Figure 22: Compositions of Cash at Main Institutions
- Figure 23: Internet Banking and Mobile Banking accounts
- Figure 24: Volume and Value of Internet Banking and Mobile Banking
- Figure 25: Volume of Internet Banking and Mobile Banking (Businesses and Individuals)
- Figure 26: Proportion of Electronics Card at the end of 2016 and Growth/Decline Rate in 2016 (Compared to Previous Year)
- Figure 27: Number of e-Money Cards/Accounts (Banks and Non-banks)
- Figure 28: Volume and Value of e-Money
- Figure 29: e-Money Transactions, classified by type in 2016

### List of Tables

- Table 1: Number of ATM/CDM and EDC of Various Countries
- Table 2: Volume and Value of Electronic Cards in 2016

# I. Payment Systems Policy and Supervision

# 1

### Promotion and Development of Electronic Payments

# 1.1 Development of Payment Services According to the National e-Payment Master Plan

In 2016, the Bank of Thailand (BOT) took part in pushing forward the development of electronic payment systems infrastructure as part of the National e-Payment Master Plan which aimed at promoting the use of e-Payment in all sectors. The BOT had a main role in pushing forward two projects, namely 1) PromptPay Project — infrastructure that assists the public sector, the business sector and the general public to transfer funds conveniently and quickly with lower costs, and supports e-Commerce; and 2) Card Usage Expansion Project – to expand Electronic Data Capture (EDC) distribution and promote the use of debit cards instead of cash. These projects will increase convenience for the general public and retail shops. Moreover, they will help to reduce costs associated with cash management for the business sector and country as a whole.

1) PromptPay Project: The BOT pushed forward the development of PromptPay continuously in the part of the central system provider, namely the National ITMX Co. Ltd. (NITMX), and in the part of commercial banks to develop systems to support funds transfer between the general public, the public sector and the business sector. PromptPay services were gradually activated as follows.

Government
Transfer Service

Government transfer service was activated on 25 November 2016 with the Comptroller General's Department's child support payment being the first welfare payment to be transferred via PromptPay on 8 December 2016. For other welfare payments, the Comptroller General's Department has been gradually proceeding with payments via PromptPay. In addition, the Revenue Department has been transferring tax refunds to individuals via PromptPay since 4 January 2017, allowing the general public to receive their refunds promptly.

Transfer Service between Individuals and Juristic Persons Banks activated their PromptPay transfer services together on 27 January 2017 whereby transfers could be performed via various channels such as mobile banking, internet banking and ATM. Since the launch, there was an increase in the number of registered users and sequentially, an increasing growth rate of PromptPay usage could be observed. As for transfer service for juristic persons, the service had already opened for registration via the 1 3 - digit corporate identification number (or taxpayer identification number). In this connection, transfer service via the 13-digit number for juristic persons was commenced on 1 March 2017.

Services on the top of Promptpay

In 2017, PromptPay will gradually offer additional services such as linking e-Wallet to PromptPay, which has been activated since 15 September 2017. As for crossbank bill payment, the service has been available since November 2017.

### Box 1: "PromptPay" for Payments in the Digital Age

### What is PromptPay?

PromptPay is a new alternative payment service that the Thai Bankers Association and commercial banks jointly developed to increase convenience in receiving and transferring funds. The transferrer only needs to specify the national ID card number, corporate tax ID number, or mobile phone number of the transferee instead of the bank account number to carry out transfers conveniently. This is an additional alternative for payment transactions for the general public, businesses, and small merchants, with much lower service fees than traditional transfer services.

Transfor	conico	foor	hotwoon	individuals
Transfer	service	rees	between	individuats

Amount/Transaction	Service Fee/Transaction
5,000 baht or less	Free
>5,000-30,000 baht	2 baht or less
>30,000-100,000 baht	5 baht or less
Over 100,000 baht*	10 baht or less

### Transfer service fees between juristic persons

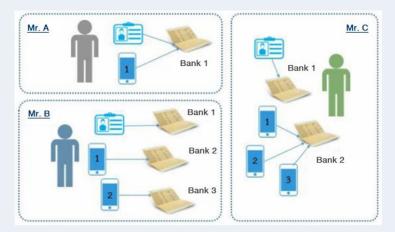
Amount/Transaction	Service Fee/Transaction
100,000 baht or less	10 baht or less
Over 100,000 baht*	15 baht or less

<sup>\*</sup>Maximum limit determined by each bank

### How to use PromptPay?

The transferees must register to link their bank accounts with their national ID card numbers, corporate tax ID numbers, or mobile phone numbers first in order to use PromptPay service to receive funds transfer.

For the transferrers, they can transfer funds via PromptPay without registration by using various channels offered by the bank such as mobile banking, internet banking and ATMs. The transferrer only needs to select the PromptPay service and specify the destination number by using the transferee's national ID card number or mobile phone number that has already been linked to his/her PromptPay account. Then, transfers can be made easily and conveniently with lower service fees.



### Is PromptPay secure?

PromptPay was developed from the existing funds transfer system which complied with the international information security standards. The BOT closely monitored the development and participated in testing, as well as performed oversight of services to ensure that security was in accordance with the law. Such oversight activities covered areas such as system security, monitoring of issue resolution/rectification, user protection and personal data privacy. As for users, they can be assured because registration steps and funds transfer require rigorous authentication each time. For every log-in, the user must provide their personal code. However, the transferrer should take care in his/her relevant parts such as setting a secret password that is difficult to guess as well as keeping equipment secure, such as mobile devices used to connect the transaction, so that others cannot use them. In addition, the transferrer should check the name of the transferee before confirming the transfer every time and not fall for scams by criminals.

### What are the benefits of PromptPay?

Users of PromptPay will benefit from the lower transfer service fee, and the simpler way of receiving and transferring funds in their daily activities. In addition, PromptPay creates benefit for the country in many aspects; it reduces costs in trading and in managing and printing banknotes, strengthens governance for the public sector in receiving and transferring funds via a verified electronic channel, reduces risks in illegal activities, reduces the use of cash for undesirable activities, and increases opportunities for the business sector to expand trade channels and online payments. PromptPay also enhances competitiveness of businesses within the country.

**2) Card Usage Expansion Project:** The BOT supported the government's policy in promoting amongst the general public electronic card usage, especially debit cards, in place of cash which will reduce cash management burden for all sectors and increase payment convenience for individuals. There were a total of 54 million debit cards in Thailand at the end of 2016 but the majority of the general public used debit cards mainly for cash withdrawals.

To make debit card usage more widespread and convenient, the government foresaw the needs to increase the number of service points by encouraging retail shops and government agencies all over the country by installing EDC¹ at points of sales. This also included pushing for debit card service fees to be lower to attract more merchants and government agencies to install EDC to accept cards. Focus was also placed on disseminating information and creating familiarity and convenience for the general public in using electronic cards which will in turn, create benefit for the general public, the business sector and the public sector. In addition, the project represented an infrastructure development to support the development of financial technology which was an important part in moving towards Thailand 4.0.

Recently, the Subcommittee on Selection and Oversight of EDC Installers selected service providers to install EDC in various regions throughout the country. The service providers who passed the selection have been installed EDC for merchants and government agencies since 13 March 2017. With our plan for EDC installation, government agencies need to install and receive payments within December 2017. For juristic persons and individuals who registered for VAT, the installation should be completed by March 2018.



<sup>&</sup>lt;sup>1</sup> EDC stands for Electronic Data Capture, which refers to the equipment used to accept electronic payment. It may also be called EFTPOS or card swipe terminal.

# Box 2: EDC – A Payment Channel that the Business Sector should not overlook

At present, electronic card such as debit card and credit card is one of the payment instruments that gains popularity. At the end of 2016, there were around 54 million debit cards and 20 million credit cards in Thailand. However, the number of EDC per capita was still not high at 139 persons per machine, when compared with developed countries, such as Malaysia and Australia with the number of EDC per capita at 32 persons per machine and 25 persons per machine, respectively. Moreover, the distribution of EDC was still concentrated in Bangkok and major provinces, which was one of the factors causing limited widespread of card usage. Consequently, the government initiated Card Usage Expansion Project by having selected commercial banks distribute EDC installation to merchants and various payment points to push Thailand forward into a cashless society with high living standards and increase the country's competitiveness.



Merchants interested in installing EDC during the period of the Card Usage Expansion Project will receive various benefits as follows.

- No purchase/rental fee for the first EDC installation
- A lower Merchant Discount Rate (MDR) for transactions via debit cards issued in the country of not exceeding 0.55 percent of payment value (traditionally at 1.5 2.5 percent)
- Double Tax deduction for debit card's MDR expense
- Merchants participating in the Card Usage Expansion Project and the general public who accept debit cards for payments of goods and services via EDC between May 2017 and April 2018 will receive a chance to win prizes

Government agencies that receive payments of service fees and taxes via cards can also provide efficient services with increased accuracy and transparency to the general public.

In addition, merchants and the general public can receive the following benefits from EDC installation.

### Benefits to Merchants

- Provide convenience or increase payment channels for customers.
- Save cost in cash management and cash logistics.
- Reduce risks from robbery and employee fraud
- Reduce risks of providing incorrect change and receiving counterfeit banknotes
- Able to use customers' spending information stored in the system for analysis to develop various promotions that better meet customers' needs

### Benefits to General Public

- Increase payment options and facilitate payments without having to wait for change
- Reduce risks of carrying large amounts of cash, such as risks of robbery or loss
- Enhance efficiency in expense management since users can track their spending via various channel including slip, Mobile banking, Internet Banking, and updating passbook.

Moreover, both merchants and the general public will receive a chance to win prizes for every payment transaction via debit cards until 30 April 2018.

Merchants interested in receiving card payments for goods and services should consider which type of EDC is appropriate to their business model. Currently, there are 3 types of EDC which are suited to different uses as follows.

- 1. EDC (Electronic Data Capture) Suitable for general merchants with fixed Point of sales as it requires LAN connection.
- 2. Mobile EDC Improved from the general EDC by including a SIM card in the machine to connect to cellular network signals so that the machine can be conveniently moved to various locations. It is suitable for merchants receiving payments off-site or those always on the move such as merchants at exhibitions.
- 3. Dongle The latest technology in EDC that allows mobile phones and tablets to function in the same way as portable EDC. It is suitable for small merchants with limited space or merchants receiving frequent off-site payments such as food delivery services, mobile stores and taxis.

### 1.2 Creating Confidence in e-Payment Usage

Technological developments, especially mobile devices, can be used as a channel for various types of financial services to increase usage convenience by allowing users to access financial services anywhere and anytime. However, convenience often comes with risks. Therefore, the BOT focused on supervision of service providers in order to ensure appropriate security and align with standards by issuing relevant policies and standards to build confidence in using payment services.

### 1.2.1 Guiding Principles for Trusted Mobile Payments

In 2016, the BOT developed the Guiding Principles for Trusted Mobile Payments to ensure payment security and increase confidence in usage for users and mobile payment service providers (both banks and non-banks). The Guiding Principles serve as a guideline to enhance and build good standards of services so that users are confident and increase mobile payment usage. The Guiding Principles consist of six key principles as follows;

- 1) Risk Management: To ensure that mobile payment service providers have risk management processes that cover information technology security risk, cyber risk and operational risk.
- 2) Secure Authentication: To ensure service providers have processes and methods to protect against risks of identity theft.
- 3) Consumer Protection and Consumer Education: To protect users against risks or potential frauds, including unauthorized access to users' confidential data, and to continuously educate users to foster their awareness of payment transaction security.
- 4) Openness and Interoperability: To support fair competition and serve innovative choices for customers and to promote investment in information technology infrastructure that supports efficient mobile payments.
- 5) Anti-Money Laundering/Combating the Financing of Terrorism (AML/CFT) and Fraud Protection: To ensure that service providers comply with relevant laws and have processes, such as verification of customer identity and Know Your Customer/Customer Due Diligence (KYC/CDD), to protect against fraud risks.

6) Consideration of User Experience: To create satisfaction of user experience which will encourage users to change their behaviour to increasingly use their mobile as a main payment channel. This will lead to an increase in the proportion of e-Payment and a decline of cash usage in the future.

### 1.2.2 Promotion of Security in Electronic Card Usage

The BOT, with approval of the Payment Systems Committee (PSC), stipulated a timeframe for migration of magnetic debit cards and ATM cards to chip cards in order to enhance security and consumer confidence in electronic card usage, increase efficiency, and widen service connectivity of both domestic and international service providers. In this regard, debit cards and ATM cards issued after 15 May 2016 must be chip cards. In addition, commercial banks must upgrade the majority of their ATMs to support chip cards by 15 May 2016. For remaining ATMs, these must all support chip cards by 31 December 2016. At the end of 2016, all financial institutions have upgraded all of their ATMs to support chip cards. Commercial banks have also been instructed to change all magnetic cards to chip cards by 31 December 2019.

Moreover, the PSC agreed to have all debit cards be used of local card network to promote competition in service provision, and to set service fees that are reasonable to promote widespread debit card issuance and debit card usage instead of cash as per the government's policy to promote e-Payment services. The BOT proposed to the Electronic Transactions Commission (ETC) to issue the Notification on Rules, Procedures and Conditions for Undertaking Electronic Payment Service Business for the part on services related to debit cards issued and used domestically, which was published in the Government Gazette on 11 August 2016. The said Notification specifies that issuers must issue debit cards that are of local card brand and acquirers must be able to support debit cards that are of local card brand.

# 1

### Box 3: Get to Know the Local Card Network

The debit card network is a network that provides electronic payment services to members who are card issuers and acquirers, and must at least provide the following services.

- (1) Marketing services under their own business/trade name
- (2) Switching services for payments
- (3) Direct debit services

In the past, the majority of debit cards were of international card brand such as Visa, MasterCard and Amex in order to pay for goods and services locally and internationally. Recently, in order to encourage merchants to accept debit cards instead of cash, some countries have been starting to setup local card brand to promote competition within the debit card business and to reduce cost in card acceptance by merchants. Local debit cards have been issued to serve users' needs for domestic spending. However, banks might issue co-badge debit cards which combine both local card brand and international card brand (2-in-1) to support customers both domestic and international spending. Examples of countries with local card brand namely:

Country	Name of Local Card Brand	Details
Singapore	NETS	The company has 3 banks as shareholders which are DBS Bank, Oversea-Chinese Banking Corporation Bank (OCBC) and United Overseas Bank (UOB). Currently, NETS provides debit cards and e-money cards.
Malaysia	MyDebit  MyDebit	MyDebit started providing services in 2015 as a result of advocacy by the central bank of Malaysia (Bank Negara Malaysia). Currently only debit cards are provided.

# 1.2.3 Cooperation between the BOT and the Office of the National Broadcasting and Telecommunications Commission (NBTC)

During the past 2-3 years, technological advancement has led a rapid development of financial and payment services, especially mobile payment services which help increase convenience as well as speed and respond to new-generation lifestyle in digital era. Customers have also become more receptive toward technology with a strong and constant growth of mobile banking usage.

However, these changes have created challenges for regulators in many areas, such as new types of risk, especially cyber threats, as well as user knowledge and understanding. Thus, it is important to have collaboration among relevant regulators to share information, knowledge, expertise, and lay down consistent regulatory frameworks. In this regard, the BOT signed a Memorandum of Understanding with the office of The National Broadcasting and Telecommunications Commission (NBTC) in June 2016 to jointly conduct a study on how to regulate payment services used via mobile and wireless devices.

Previously, the BOT and the NBTC have coordinated in various activities, namely enhancing user authentication of transaction services via mobile phones, jointly supervising telecommunications service providers and payment service providers, and promoting digital literacy.

For enhancing user authentication to promote confidence in making transactions via mobile phones, including PromptPay in which mobile phone numbers are used instead of bank account numbers, the NBTC set the standards for authenticating users for new SIM card issuance requests, change in SIM card ownership requests, and personal information change requests. These standards require users to bring their national ID cards when requesting to change or transfer mobile phone numbers, which will enhance financial transaction service security and protect against risks of making transfers to incorrect mobile phone numbers or to mobile phone numbers falsely assumed by criminals to financial fraud.

Additionally, the NBTC and mobile phone network service providers developed a system for the general public to perform self-check for both prepaid and postpaid services by dialing \*179\* followed by the 13 digit national ID number and #. The system will then send a message stating whether or not the mobile phone number has

been registered with a national ID card number with a mobile phone network service provider.

Furthermore, the BOT together with the NBTC took part in pushing the Telecommunications Association of Thailand under the Royal Patronage (TCT) and the Thai Bankers' Association (TBA) to sign a memorandum of understanding to enhance security standards for financial transactions via mobile phones. This will help improve the efficiency of the country's payment infrastructure by creating a mechanism for linking and exchanging mobile phone user status information. This will help commercial banks to carefully and securely manage users who have registered to PromptPay with their mobile phone numbers in making transactions under the users' voluntariness and with their consent.

### 1.3 FinTech Development

Financial Technology (FinTech) refers to the adoption of technological innovations on financial products and services to the general public in order to enhance efficiency and reduce operational costs. This will lead to enhance the country's competitiveness, help better satisfy the customers' diverse needs, inclusively increase the access to financial services with convenience, timeliness, and lower service costs.

At present, the majority of financial service, customers are accustomed to the embrace of technologies and basic financial services such as withdrawing and transferring funds via ATMs, which are considered FinTech from the early days. However, in virtue of the evolution of technological advances, users can now increasingly conduct their financial transactions via electronic devices. The key revolutionary technologies are:

1) The QR code technology for payments via mobile devices to provide financial services with greater convenience and speed as well as to reduce cash consumption.

- 2) Blockchains and distributed ledger technologies with encryption to enhance security and reliability in conducting various financial transactions such as the document verification and money transfer validation.
- Biometrics for verification & authentication, such as the recognition of fingerprints, voice, iris, and face, which are more accurate and reliable.
- Big data together with machine learning and Artificial Intelligence (AI) for analytic purposes. These are mechanisms for smarter
- Financial Innovations Insurance **Payments** Mobile Payments Advanced Sensors QR Code for payment Wearable computers Cross border remittand Biometric Standard/ Open APIs Big Data Capital Lending Blockchain Raising P2P Lending QR Code Crowdfunding (Debt & Equity) Digital Lending Saving & Investment Automated trading platforms Robo-Advice
- processing and better results based on the learning from previous actions and outputs, leading to the offering of financial services and products that better serve the customers' satisfaction and their levels of acceptable risks.
- 5) Standard/Open Application Programming Interfaces (APIs) as a standardized mechanism to technically connect one system to the others so that they collaborate interoperably and effectively. This includes the exchange of useful information for providing and developing new financial products.

#### The role of BOT in Promoting FinTech

The BOT appreciated the importance of promoting the embrace of financial innovations to develop financial products and services, also focused on consumer protection and retaining associated risks within the acceptable level. The policy includes the continually driving on establishment of necessary infrastructures and standards, promoting data sharing and analysis, and building collaboration, cooperation and exchange of information in both public and private sectors. Furthermore, in terms of development and supervision of FinTech, the BOT has encouraged current service providers, both banks and non-banks, to adopt new technologies in potentially developing products and services as well as building their capabilities. This aims to foster niche players and support Thai FinTech to enhance their competitiveness and sustainability, including attaining credibility and consumer acceptance.

5

The BOT thus has provided the opportunity for banks and non-banks to test their financial innovations that leverage new technologies. The testing approach is under the Regulatory Sandbox framework within the limited environment. Associated risks need to be contained although accommodative regulations can be provided. On 21 December 2016, the BOT issued the guideline on participation in the Regulatory Sandbox<sup>2</sup> accordingly to promote financial innovations.

In addition, the BOT has organized consultation sessions so called FinTech Clinic to provide recommendations to service providers who request for regulatory requirements before registering for the Regulatory Sandbox or obtaining permission under relevant laws/regulations.

<sup>&</sup>lt;sup>2</sup> https://www.bot.or.th/Thai/FIPCS/Documents/FPG/2559/ThaiPDF/25590251.pdf

### Box 4: BOT's Regulatory Sandbox

The Regulatory Sandbox is an area that provides an opportunity for financial innovation to be tested within the limited scope with accommodative regulatory framework.

Financial products and services to be tested must be under the BOT's authorities such as loans, payments and money transfers, and other similar transactions. These financial products and services must be innovations which have never been offered or not similar to those existed in Thailand and are of benefit to consumers and the financial system.

During testing under the Regulatory

Sandbox, participants can provide services to a limited number of actual customers. Therefore, service providers must employ proper governance and protection of consumer rights in terms of protecting confidential data and system security. The BOT will continuously monitor progress and perform evaluations in order to ensure the effectiveness of testing and readiness of participants to comply with BOT regulations and relevant laws. Participants are able to provide the services in the general public after being granted the permission to exit the BOT's Regulatory Sandbox.

For FinTech startups, the BOT encourages these players to engage into the FinTech Community to prepare for participating in the Regulatory Sandbox. Currently, the private sector plays a role in supporting and incubating FinTech startups in different approaches, such as the incubation and accelerator program, including establishing various communities.

## Regulatory Sandbox

- Build a FinTech Ecosystem by promoting financial innovation developments that are beneficial to the system with flexible regulatory framework
- Promote competition. Increase consumer choices.
- FIs and FinTech/tech firms can test new innovations within a limited environment to control impacts.
- Supervisors can learn, understand and set appropriate regulatory





### Regulatory Sandbox Framework

### **Application**

### Sandbox

- uses new technology
- is widely beneficial
- has clear study results/outcomes
- has clear testing plan/success indicators/exit criteria

#### In Process

#### Testing

- tested in a limited environment
- has consumer protection processes
- has risk management
- reports information to the BOT
- complies with laws and regulations

#### Exit

#### Sandbox Exiting

- Success: Service is ready
  - requests for permission under relevant laws
- Unsuccessful:

### Terminate service

 Has appropriate process to take care of consumers

The BOT considers that the Regulatory Sandbox will be an important mechanism to help exploring and exchanging experiences between financial service providers and the BOT. This will potentially foster the appropriate imposition of policies, supervision and risk management in support of financial innovations.



### 1.4 Actions to Support Payment Systems Linkage with ASEAN Countries

The BOT, in collaboration with ASEAN Working Committee on Payment and Settlement Systems (WC-PSS), have formulated a strategic framework for payment systems development in the region for 2016 — 2025, in three main areas: 1) Payment Systems linkage and Interoperability; 2) Cross-border Capital Market Settlement; and 3) Policy Harmonization and Standardization to promote cross-border retail payments via new and low-cost channels or service providers, as well as to exchange information among member countries in the areas of risk management relating to cross-border payments, oversight framework, and preparation of payment systems to be compliant with PFMI.

The BOT has proceeded through WC-PSS to encourage cross-border payments via potential bank and non-bank service providers, to improve regulatory and oversight framework to facilitate cross-border payments, and to promote alignment of rules and regulations, in order to foster safe and efficient alternative payment channels.

Furthermore, the BOT provided technical assistance on payment systems relating to infrastructure development and payment regulations to the Bank of the Lao P.D.R. (BOL) and the National Bank of Cambodia (NBC). This technical assistance will enhance those two countries' payment systems and support payment systems linkage between Thailand and these countries in the future.

### Box 5: General Principles for International Remittance Services

International remittance, especially the transfer of money back to the workers' home countries, has experienced continuous growth. In 2015, transfers to developing countries all over the world recorded a value of over 439 billion US dollars. This is an important source of income for the livelihood of households, as well as having a role in economic growth. Some small countries see the proportion transfer income receipts amounting to one third of their GDP. For ASEAN countries, these include Philippines (9.8%), Vietnam (6.7%), Myanmar (5.0%) and Cambodia (3.0%) as the countries with the highest proportions of transfer income receipts to GDP in 2015, respectively.

However, when considering the remittance channel of ASEAN workers, it can be found that the majority of workers, especially those from CLM countries, preferred to transfer money via informal channels such as via unauthorized money transfer agents or giving cash to their relatives. Thus, workers are at risk of losing money from such transactions.

Because of the importance of international remittance to the economy and the risk from the informal channels, the BOT and the central banks of ASEAN countries, under the WC-PSS, agreed that ASEAN member countries should have a common policy to promote international remittance through both bank and non-bank service providers to ensure reliability, security, ease of access and lower costs. This was done especially to promote more transfers through formal channels. The policy is based on the World Bank's General Principles for International Remittance Services (2007) as a framework for implementation.

The General Principles for International Remittance Services cover the following five topics:

1) Transparency and Consumer Protection: Service providers should provide clear and complete details of their services, such as transaction fee, speed of transfer and exchange rates, so that users can compare information from each service provider before choosing services. Moreover, there should be appropriate consumer protection.

- 0
- **2)** Payment System Infrastructure: Payment systems infrastructure development should be effective and create a network between service providers so that it would support international remittance services.
- 3) Legal and Regulatory Environment: The legal and regulatory environment for international remittance should be appropriate, fair, reasonable, non-discriminatory and in compliance with international standards. There should be cooperation between the regulatory authorities of each country, which will support the expansion of international remittance services.
- **4) Market Structure and Competition:** The market for international remittance services should not be monopoly but should be competitiveness. All service providers should have access to the local payment systems without discrimination to promote fair competition among all players in the market.
- 5) Governance and Risk Management: Service providers should have appropriate governance and direction in risk management to ensure that international remittance services are secure and effective.

The BOT, as the Chair of Policy Harmonization and Standardization, will proceed the policy by gathering information of the current situation and the future payment direction relating to international remittance services in member countries in order to formulate a policy to promote international remittance through formal channels.

### 2 Improvement in Legal Framework

### 2.1 Royal Decree on Regulating Electronic Payment Services of Specialized Financial Institutions B.E. 2559 (2016) (Royal Decree on SFIs e-Payment)

The BOT advocated the issuance of the Royal Decree on SFIs e-Payment in order to supervise SFIs' payment services according to the same standards required for bank and non-bank e-Payment service providers. The Royal Decree on SFIs e-Payment was published in the Government Gazette on 30 March 2016 and came into effect on 28 July 2016.

Moreover, the BOT prepared notifications on the supervision of service providers under the Royal Decree on SFIs e-Payment, including those of the Electronic Transactions Commission (ETC) and the BOT. Such notifications comprise regulations on business commencement, practices during business operation and specific requirements by business type, IT security, governance and consumer protection. The notifications were published in the Government Gazette on 25 August 2016.

### 2.2 Revision of Laws and Notifications on the Supervision of e-Payment Service Providers

Revision of the regulations on the supervision of e-Payment service providers is to ensure that it is appropriate and in line with developments in the economic environment and business models; thus, reducing risks and impacts that may result to service users, promoting confidence on the payment systems and providing operational flexibility to service providers. These regulations included the Royal Decree on Regulating Electronic Payment Services B.E. 2551 (2008), and the Notification of the Ministry of Finance on Business that Requires a Permit According to Section 5 of the Notification of the Revolution Council No. 58 (e-Money business) summarized as below.

1. Regulations were revised to strengthen supervision in line with the current economic situation. For instance, license applicants are required to possess strong financial conditions to allow for business and service continuity. The qualifications and prohibited characteristics of the directors or persons with the power of management were prescribed in accordance with the Anti-money Laundering Act and the Counter-Terrorism Financing Act. e-Money business scope was expanded to cover foreign currencies. In addition, service providers are now required to separate the accounting for payment service fund from other current funds. The rules on regulatory compliance were also revised to reduce the burden on service providers, including the rules on opening, relocating or closing of branches, thereby allowing greater operational flexibility.

- 2. Regulations were prescribed to require service providers to maintain sound financial position and liquidity so as to ensure service continuity and absence of damage and loss to service users. Moreover, non-bank e-Payment service providers are now required to maintain the ratio of net equity to outstanding balance of funds collected in advance from customers above the regulatory requirement at the end of each quarter.
- 3. Additional regulations were added on the supervision of e-Payment agents so that appointment of agents would be credible. In this regard, service providers are now required to assume the same responsibility as would be in the case that they themselves provide such services. Policies and guidelines on the appointment of credible agents are also required to be prescribed.

### 2.3 Payment Systems Act B.E. 2560 (2017)

The BOT in collaboration with the Ministry of Finance pushed for the legislation of the Payment Systems Act in order to enhance payment systems and payment services supervision; thus, ensuring efficiency, soundness, security and reliability. On 1 December 2015, the Cabinet approved the principles underlying the Payment Systems Act and decided to annul the Royal Decree on Regulating Electronic Payment Services B.E. 2551 (2008) and the Notification of the Ministry of Finance on Business that Requires a Permit According to Section 5 of the Notification of the Revolution Council No. 58 (e-Money business), dated 4 October 2004, upon the effectiveness of the new Act. In this connection, the Payment Systems Act was published in the Government Gazette on 18 October 2017 and will come into effect on 16 April 2018.

### Box 6: Structure of the Payment Systems Act B.E. 2560 (2017)

The structure of the Payment Systems Act comprises six chapters, each of which is summarized below.

Chapter 1 Highly Important Payment System (e.g. BOT's payment systems) (Section 5 - 11)

> BAHTNET, ICAS Under the BOT

(Section 12 -15)

- <u>License Approval</u> <u>Registration</u> - Prescribed by
- Ministry of Finance - Approved by Ministry of Finance
- Prescribed by
- Ministry of Finance - Approved by BOT
- (Section 16 23)
- License Approval - Prescribed by Ministry of Finance
- Approved by Ministry of Finance
- Registration Ministry of Finance - Approved by BOT

Chapter 4 Supervision, Examination and Rectification of Condition or Operation (Section 24 - 35)

Chapter 5 Appeal (Section 36)

Chapter 6 Penalties (Section 37)

- Administrative offences (Section 37 43)
- Criminal offences (Section 44 56)

Transitional Provisions (Section 57)

Business operators formerly prescribed by the Minister of Finance can continue business operation for another 120 days from the date of the announcement by the Minister of Finance

Chapter 1 Highly Important Payment System: Prescribes the characteristics of highly important payment systems, specifying payment systems operated by the BOT as highly important payment systems. The Minister of Finance has the power to announce additional highly important payment systems. Moreover, the start and end of payment finality protection period are more clearly prescribed, along with requirements on settlement collaterals to prevent risks, including systemic risk to the payment systems.

Chapter 2 Designated Payment Systems: Prescribes the characteristics of designated payment systems under supervision. The Minister of Finance has the power to announce payment systems with the set characteristics as designated payment systems along with details e.g. types of designated payment systems and names of providers of designated payment systems. Providers of designated payment systems must obtain approval from the Minister of Finance prior to business commencement.

Chapter 3 Designated Payment Services: Prescribes the types of payment services that are required to be licensed or registered. The Minister of Finance has the power to announce payment services that require approval from the Minister of Finance and payment services that require registration with the BOT. Types or characteristics of business operations may also be prescribed. Furthermore, a provision for float protection is made in case a service provider is bankrupted. In this regard, float will be regarded as service users' assets and will not be included in a pool for payment to

Chapter 4 Supervision, Examination and Rectification of Condition or Operation: For payment systems and payment services under supervision, the BOT has the power to announce regulations pertaining to services e.g. oversight of financial position and performance, standards for business operation, management according to good governance principles and risk management.

creditors.

**Chapter 5 Appeal:** In case an order receiver does not agree with the order, he/she will have the rights to appeal.

Chapter 6 Penalties: Consists of administrative offences associated with non-compliance with the set regulations and conditions, and criminal offences associated with failure to obtain a license or registration prior to business commencement, failure to notify the BOT in case of business rehabilitation, bankruptcy or administration of assets, and failure to provide information to the BOT as requested.



# 3

### Payment Systems Oversight

### 3.1 Payment Systems Stability

The BOT has a responsibility in overseeing payment systems stability to ensure that operations are efficient with security measures, consumer protection, risk management and suitable operations as per the Principles for Financial Market Infrastructures (PFMI) of the Bank for International Settlements (BIS).

There are two categories of important payment systems under the BOT's oversight.

- 1) Systemically Important Payment Systems (SIPS): SIPS are infrastructures that support interbank high-value funds transfer and payment. There is only one SIPS in Thailand, that is, the Bank of Thailand Automated High-Value Transfer Network (BAHTNET), operated by the BOT.
- 2) Prominently Important Retail Payment Systems (PIRPS): PIRPS include the Imaged Cheque Clearing and Archive System (ICAS), operated by the BOT, and interbank retail funds transfer systems such as ATM pool and interbank retail bulk payment systems, operated by National ITMX Co. Ltd. (NITMX).

### 3.1.1 Bank of Thailand Automated High-Value Transfer Network: BAHTNET

BAHTNET is an important high-value funds transfer system that caters for funds transfer between financial institutions with deposit accounts at the BOT, for example, interbank funds transfer, third-party funds transfer, funds transfer for securities settlement and multilateral funds transfer. The BOT, thus, needs to supervise BAHTNET's compliance with PFMI so that its operation and risk management are sound, thereby enabling services to be offered with no interruption in both normal and emergency circumstances.

Transactions Trillion baht (in millions) 1000 800 4 3 600 2 400 1 200 0 0 2012 2013 2014 2015 2016 Volume -Value

Figure 1: Volume and Value of Funds Transfer through BAHTNET

Source: Bank of Thailand

The volume and value of funds transfer through BAHTNET continued to grow steadily. In 2016, funds transfer through BAHTNET totalled at 4 million transactions, equivalent to 874 trillion baht or 60.86 times of GDP. From last year, the volume and value of transactions expanded by 10.76 percent and 10.52 percent, respectively. The average volume stood at 16,446 transactions per day while the average value recorded at 3.58 trillion baht per day.

Categorized by transaction types revealed that bilateral repurchase operations (bilateral RP) was the highest proportion, reaching 47.15 percent with 407.34 trillion baht, followed by securities trading at 15.55 percent, interbank funds transfer at 13.82 percent, in-house funds transfer at 12.65 percent, foreign exchange transactions at 7.49 percent, and interbank borrowings at 3.33 percent.

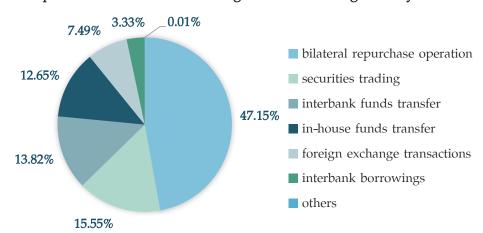


Figure 2: Proportion of Funds Transfer through BAHTNET Categorized by Transaction Types

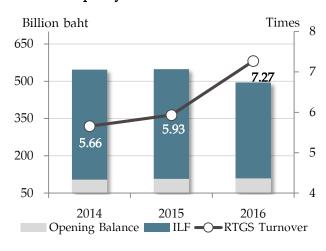
Source: Bank of Thailand

#### Management of Key Risks in BAHTNET

#### 1) Liquidity Risk and Settlement Risk

The key objective is to ensure that BAHTNET members had adequate liquidity to support BAHTNET funds transfer without incurring settlement risk. In 2016, members' intraday liquidity consisted of opening balances and Intraday Liquidity Facility (ILF), averaging at 385.54 billion baht per day, which was sufficient to support BAHTNET funds transfer without incurring settlement risk and funds transfer was conducted

Figure 3: Daily Average of BAHTNET Intraday
Liquidity



Source: Bank of Thailand

smoothly in real-time. Moreover, in terms of liquidity turnover, calculated from the proportion of average transfer value per day to members' intraday liquidity per day, it was observed that liquidity turnover had improved from 2015, increasing from 5.93 times to 7.27 times.

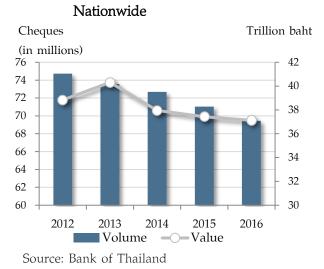
#### 2) Operational Risk

Operational risk is a key risk in BAHTNET. At the same time, management of systems continuity is

an important factor in supporting smooth-functioning of payment systems. Therefore, the BOT supervises payment systems to ensure that they can continue to operate with no interruption in both normal and emergency circumstances. The BOT, as operator of BAHTNET, prescribed target system availability at 99.80 percent in 2016. From previous operations, BAHTNET's system availability was at 100 percent, higher than the target set. In this regard, the BOT monitors BAHTNET's system availability continually and reports results to concerned management and the PSC every six months.

#### 3.1.2 Imaged Cheque Clearing and Archive System: ICAS

Figure 4: Volume and Value of Interbank Cheques ICAS is an important retail funds

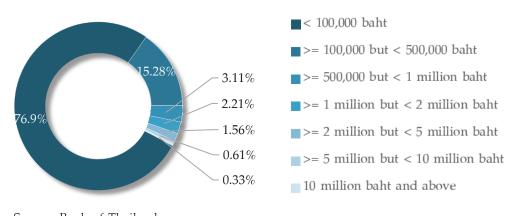


transfer system that caters for interbank imaged cheque clearing. The BOT oversees operation of ICAS according to PFMI <sup>3</sup>. In 2016, interbank cheques nationwide totalled at 69.44 million cheques, representing 37.13 trillion baht, declining in volume from 2015 by 2.23 percent and declining in value by 0.81 percent. The volume and value of interbank cheques averaged at 284,618

cheques and 152.19 billion baht per day, also trending downwards due to domestic economic condition coupled with notable increase in e-Payment during many previous years.

Most interbank cheques were less than 100,000 baht in value, representing 53.22 million cheques, equivalent to 76.9 percent of all interbank cheques. This was followed by interbank cheques of between 100,000 - 500,000 baht, representing 15.28 percent of all interbank cheques and decreasing by 1.89 percent from 2015.

Figure 5: Volume of Interbank Cheques Classified by Value in 2016



<sup>&</sup>lt;sup>3</sup> The PSC prescribes supervisory guidelines for Prominently Important Retail Payment Systems (PIRPS) by referring to certain areas of PFMI, including legal risk, good governance, policy and framework for risk management, settlement through the central bank account, criteria for administration of assets or bankruptcy, operational risk management, access and participation requirements, communication procedures and standards and disclosure of rules, key procedures and market data. Financial risk, investment risk, exchange of value settlement risk, risk management for tired participation are not included since PIRPS cater for retail funds transfer, transfer value is not high and settlement is sent to be cleared in the high-value funds transfer system (SIPS).

#### Management of Key Risks in ICAS

The BOT continuously managed operational risk and service continuity of ICAS whereby the target of system availability was set at 99.80 percent. In 2016, ICAS' system availability recorded at 99.99 percent, higher than the target set. The BOT monitors ICAS' system availability continually and reports results to concerned management and the PSC every six months.

#### 3.1.3 Interbank Transaction Management and Exchange: ITMX

The BOT oversees NITMX which is a Prominently Important Retail Payment System (PIRPS) by virtue of the provisions of the Royal Decree on Regulating Electronic Payment Services B.E. 2551 (2008) and applies PFMI in the oversight of NITMX as relevant. Recommendations on risk management strengthening were provided by the BOT.

#### 3.2 Preparation for the Financial Sector Assessment Program (FSAP)

In 2016, the BOT made preparation for the Financial Sector Assessment Program (FSAP) which is jointly conducted by the International Monetary Fund (IMF) and the World Bank in 2018. In this regard, the payment systems comprise one module to be assessed in accordance with the Principle for Financial Market Infrastructures (PFMI).

In this regard, the BOT completed a self-assessment for BAHTNET to ensure that its risk management complies with PFMI in two areas, namely BAHTNET's operation and risk management (Principles for FMI) and the BOT's oversight responsibility of BAHTNET (Responsibilities of Authority). The purpose of this exercise was to step up the oversight and ensure that payment systems to be in line with international standards e.g. legislations on payment finality, availability of a code of conduct and procedures on default management, and drafting of a risk management framework for BAHTNET. These executions will be completed in 2017.



#### Box 7: Getting to Know FSAP and benefits from Program Participation

The Financial Sector Assessment Program (FSAP) is a jointly development program of the International Monetary Fund (IMF) and the World Bank to assess a country's financial sector in two dimensions: (1) financial sector stability, in order to assess risks that can cultivate vulnerabilities in the country's financial sector and examine the financial sector supervisory and financial protection frameworks to ensure efficiency and align with international standards; and (2) financial sector development, in order to assess the capacity of the financial sector in supporting sustainable economic growth e.g. economic infrastructure, capital market development and financial access.

Participation in the FSAP will enhance confidence on the country's financial systems stability and drive financial sector supervisory authorities to step up supervisory practices to be better aligned with international standards.

Thailand participated in the first FSAP in 2007 where the assessment followed five areas of international standards on supervision, including (1) financial institution supervision; (2) capital market supervision; (3) important payment systems; (4) monetary policy transparency; and (5) AML/CFT. The overall assessment results were satisfactory. Some observations were noted although they have already been rectified.

However, the FSAP was revised in 2009 following the U.S. financial crisis in order to better reflect vulnerabilities and risks to financial system stability. International standards that are used as benchmarks have also been revised to enhance risk management and supervision in various dimensions. As for payment systems standards, the CPSS<sup>4</sup> and the IOSCO<sup>5</sup> have developed the Principle for Financial Market Infrastructures (PFMI) to be used in assessing Financial Market Infrastructures (FMIs), which for Thailand include the BAHTNET and the Securities Settlement System.

<sup>&</sup>lt;sup>4</sup> The Committee on Payment and Settlement Systems (CPSS) is responsible for formulating international standards on oversight of efficiency and stability of payment systems, under the umbrella of the Bank for International Settlements (BIS).

<sup>&</sup>lt;sup>5</sup> The Technical Committee of the International Organization of Securities Commissions (IOSCO) is responsible for formulating international standards on oversight of efficiency and stability of payment systems and securities related systems, under the Bank for International Settlements (BIS).

#### 3.3 Cooperative Oversight

To foster cooperation on the oversight of FMIs in order to ensure cohesiveness, stability, security, efficiency, adequate risk management in accordance with PFMI and suitable prevention of systemic risk, the BOT, as overseer of the BAHTNET, along with the Securities and Exchange Commission (SEC), as supervisor of the Central Counterparties (CCP) operated by Thailand Clearing House (TCH); the Securities Settlement System (SSS); and Central Securities Depositories (CSD) operated by Thailand Securities Depository (TSD), agreed to conduct regular meetings for information and knowledge sharing to ensure the efficiency and effectiveness of interconnected FMIs. A Memorandum of Understanding (MOU) between the BOT and SEC was signed to ensure compliance with PFMI in relation to the principle of Responsibility E: Cooperation with other authorities, which requires a formal arrangement for cooperative oversight between overseer of interconnected FMIs. The scope for cooperative oversight was set to include development of policies and development plans for interconnected FMIs, management of key risks, plans for the potential recovery, wind-down, safety and soundness. These will together, ensure that oversight of the country's FMIs result in system stability, security and efficiency.

#### 3.4 Supervision of e-Payment Service Providers

The BOT supervises e-Payment service providers to ensure sound risk management in the provision of financial transaction services and foster reliable and secure e-Payment services. In this regard, the BOT supervises key e-Payment service providers according to various legislations, including the Notification of the Revolution Council No. 58 (e-Money business), the Royal Decree on Regulating Electronic Payment Services B.E. 2551 (2008) and the Royal Decree on Regulating Electronic Payment Services of Specialized Financial Institutions B.E. 2559 (2016).

# 3.4.1 Supervision According to Notification of the Ministry of Finance on Business that Requires a Permit According to Section 5 of the Notification of the Revolution Council No. 58 (e-Money business)

The BOT supervises non-bank e-Money service providers as authorized by the Notification of the Ministry of Finance on Business that Requires a Permit According to Section 5 of the Notification of the Revolution Council No. 58 (e-Money business), dated 4 October 2004.

In 2016, the BOT approved and granted the licenses for more 3 e-Money service providers to offer e-Money services on mobile phone applications for payments of goods and services at participating retailers and via online channel. As the result, there were a total of 14 e-Money service providers licensed under the Notification of the Revolution Council No. 58 at the end of 2016.

# 3.4.2 Supervision According to the Royal Decree on Regulating Electronic Payment Services B.E. 2551 (2008) and the Royal Decree on Regulating Electronic Payment Services of Specialized Financial Institutions B.E. 2559 (2016)

The BOT has a legal mandate to supervise e-Payment service providers according to the Royal Decree on e-Payment and the Royal Decree on SFIs e-Payment, which are subordinate to the Electronic Transactions Act B.E. 2544 (2001). Accordingly, there are three categories of supervisory levels, namely, List A for businesses that are required to make notification to the BOT, List B for businesses that are required to apply for registration with the BOT, and List C for businesses that are required to acquire licenses before providing services. In 2016, the BOT supervised e-Payment service providers according to the Royal Decree on e-Payment and the Royal Decree on SFIs e-Payment as follows.

1) Registered for List B applications and licensing for List C applications to the ETC for approval. In 2016, according to the Royal Decree on e-Payment, there were 2 applications for registration, 15 applications for licensing and according to the Royal Decree on SFIs e-Payment, there were 6 applications for licensing, with totally 21 applications. From the application we received, most of them were internet payment gateway service providers, bill payment service providers and e-Money service

providers. However, there was one List B service provider and 5 List C service providers who cancelled the license.

At the end of 2016, there were one List A service provider, 10 List B service providers, and 103 List C service providers<sup>6</sup> (consisting of 30 banks, 6 SFIs and 67 non-banks). The total number of licenses issued was 170.

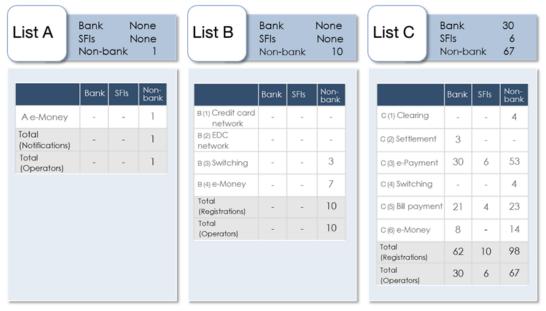


Figure 6: e-Payment Service Providers

- 2) Supervised and conducted off-site monitoring in compliance with the Royal Decree on e-Payment and related notifications: The BOT monitored complaints to service providers, and followed up on the investigation to ensure legal compliance. In 2016, some non-compliance findings with prescribed legislations were found, but those were not material impact to the services. In this case, result of oversight activities and findings of non-compliance by service providers were reported to the ETC. The concerned service providers were also notified and the issues were promptly addressed.
- **3)** Conducted on-site examination at offices of e-Payment service providers. In 2016, the BOT conducted on-site examination and observed operations of non-bank e-Payment service providers under List B and List C. Consideration was given to businesses that were widely used among users, extent of impact on users, financial

<sup>&</sup>lt;sup>6</sup> List of e-Payment service providers can be found on the BOT's website (https://www.bot.or.th/English/PaymentSystems/OversightOfEmoney/ListOfEmoney/Pages/eMoneyProvider.aspx)



soundness of service providers, and complaints from users. The BOT examined and assessed service providers' operations in terms of financial soundness, governance, business risk management and IT risk management. Findings were reported to service providers and follow-ups were conducted to ascertain that improvements were carried out as per the orders, thereby fostering payment systems stability and confidence in e-Payment services.

## II. Payment Systems Trends

## 1

#### Overall payment systems usage in 2016

In 2016, Thailand's e-Payment usage continued to grow steadily. The volume of e-Payment transactions totalled at 3,215.3 million transactions, growing by 23.8 percent from the previous year. In particular, internet banking/mobile banking transactions expanded significantly by 83.4 percent in terms of volume and 32.7 percent in terms of value, reflecting a change in consumers' behaviour towards innovative payment services. Meanwhile, cheque usage started to contract slightly at approximately 1-2 percent from last years in terms of both volume and value, and would likely contract further going forward.

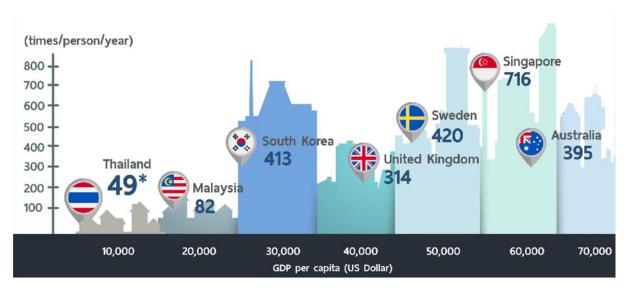


Figure 7: e-Payment usage in Thailand compared to various countries

Sources: BIS (2016) Statistics on payment, clearing and settlement systems in the CPMI countries, Bank of Negara Malaysia and Bank of Thailand

Data on Thailand's volume of e-Payment per capita per year showed a rather high growth from 39 times/person/year on 2015 to 49 times/person/year on 2016. However, Thailand's e-Payment usage remained relatively low compared to other countries, especially developed countries. Given Thailand's high concentration of payment infrastructure in large cities, most Thais still could not access e-Payment

<sup>\* 2015</sup> data for foreign countries and 2016 data for Thailand

widely. At the end of 2016, approximately 2 out of 5 Electronic Data Captures (EDC) terminal could be found in Bangkok.

The volume of transactions per capita per year classified by e-Payment types indicated that e-Money was the highest at 16 times/person/year, followed by mobile banking at 9 times/person/year and credit cards at 7 times/person/year. E-Money was mostly used for low-value daily payments e.g. airtime top-ups, convenient store purchases, and sky train ticketing. Meanwhile, the volume of mobile banking usage leapfrogged last year, growing by 122 percent per year, given that transactions such as transfers and payments via smart phone applications could be performed conveniently and quickly. For electronic cards, most Thais still preferred credit cards to debit cards owing to the former's offering credit terms with 30-45 day with no interest if payment is made before due date, together with discounts from participating stores. Moreover, using debit cards for payment was not yet popular because the majority of people did not realize that they can be used for point of sale payments and thus, continued to use them mostly for cash withdrawals.

#### 1.1 General public and business sector's spending

#### General Public

In 2016, payment transactions by the general public continued to grow steadily, expanding by 18.7 percent in terms of value from previous year. Most of the growth stemmed from internet banking/mobile banking which leapfrogged while transactions via ATM/CDM trended downwards as most people became aware that internet banking/mobile banking is more convenient and faster. In 2016, the value and volume of internet banking/mobile banking transactions stood at 9.3 trillion baht with 404.4 million transactions, growing by 61.4 percent and 90.2 percent, respectively, from the previous year. Payments and transfers via ATM/CDM began to contract by as much as 8.0 percent after a growth of 7.2 percent was seen in 2013. In addition, cash withdrawals at ATM/CDM started to slow down with a smaller growth in terms of value of only 2.6 percent compared with the 9.2 percent growth observed in 2013.



Figure 8: Proportions of Thais' Spending during 2013 — 2016 (General Public)

Source: Bank of Thailand

#### **Business Sector**

While payment usage by the general public expanded quite significantly, that of the business sector grew only marginally by 3.6 percent from the previous year in terms of value due to the slow economic recovery. Classified by types of payment, cheque usage began to decline while e-Payment became more popular. In this regard, direct credit/direct debit, internet banking/mobile banking and ITMX bulk payment expanded by 11 percent overall while cheque usage began to decrease slightly by only 1 percent from the previous year in terms of both volume and value. This was because businesses used cheque for many purposes. For example, using cheque as credit terms or using cheque as legal evidence when filing a lawsuit.

Proportion of Volume 2013 25.3% 2014 24.3% 2015 23.5% 7.9% 7.6% 2016 22.0% 61.7 50% 0% 10% 20% 30% 40% 60% 70% 80% 90% 100% Proportion of Value 66.3% 14.2% 2013 2014 64.2% 2.69 13.8% 61.7% 15.8% 2015 58.9% 2016 2.89 15.7% 0% 10% 20% 30% 60% 70% 90% 100% Cheque ■ Direct credit/ Direct debit NITMX bulk payment ■ Internet/ mobile banking

Figure 9: Proportions of Thais' Spending during 2013 - 2016 (Business Sector)

Source: Bank of Thailand

Last year's trend in payment transactions demonstrated that Thai businesses and the general public began to adjust their behaviours toward e-Payment due to its convenience and speed. In this regard, PromptPay which commenced operation at the end of 2016 would serve as a critical infrastructure to enable the business sector and the general public to make transfer and e-Payment more conveniently at lower fees. Moreover, development and improvement in other payment infrastructures such as a nation-wide distribution of EDC, promotion of debit card payment by giving away prizes for merchants and card holders under the National e-Payment Master Plan, introduction of welfare cards for the poor, and promotion of QR code for mobile payment, would further stimulate greater e-Payment usage by the business sector and the general public in the future.

#### 1.2 Cash withdrawals and deposits

Over the past several years, growth in cash usage has been declining. In 2016, the volume of cash withdrawals expanded by only 3.9 percent from the previous year while in 2012, it grew as high as 7.5 percent. The main channels for cash withdrawals were over the counter and via automated machines (ATM/CDM).

In 2016, Thais withdrew cash from ATM/CDM 26 times/person/year, equivalent to 89.8 percent of total cash withdrawals from various channels (1,716.9 million transactions). This amount included cash withdrawals from in-house machines, interbank machines, machines abroad and cash advances. The other 10.2 percent comprised cash withdrawals over the counter. Compared to last year, it can be observed that cash withdrawals over the counter decreased by 9.6 percent while cash withdrawals via ATM/CDM increased by 5.7 percent, in line with the trend in reducing commercial bank branches and increasing ATM/CDM this year.

Cash withdrawals at ATM/CDM (abroad)

Cash withdrawals at ATM/CDM (in-house)

Cash withdrawals at the counter

1.0%
Cash withdrawals at ATM/CDM (interbank)

Figure 10: Proportion of volume of Cash Withdrawals in 2016

Source: Bank of Thailand

In terms of value, for large amount of cash, Thais preferred to withdraw cash over the counter to ATM/CDM with the former representing 83.2 percent of total value of cash withdrawals or 41,438.0 billion baht -5 times higher than ATM/CDM withdrawals. One reason for a high value of cash withdrawals over the counter was because

ATM/CDM withdrawals imposed a maximum limit of 20,000 - 30,000 baht per transaction with additional daily limit that vary from bank to bank in order to protect relevant risks for banks and customers. Thus, when withdrawing a large amount of cash was required at once, customers preferred to perform the transaction over the counter. In this regard, the average value of cash withdrawals over the counter stood at 212,434.1 baht per transaction, increasing from 174,125.0 baht per transaction observed in the previous year. Meanwhile, the total value of ATM/CDM withdrawals registered at 7,793.7 billion baht, averaging at 4,539.3 baht per transaction, decreasing marginally from 4,676.8 baht per transaction observed in the previous year.

In 2016, Thais continued to deposit cash over the counter more frequently than through Cash Deposit Machines (CDM) though the average number of transactions for over the counter deposits and CDM deposits were more or less similar at 6.0 times/person/year and 4.4 times/person/year, respectively. However, for large amount, Thais preferred to deposit cash over the counter to CDM with the former registering an average value of 148,037.4 baht per transaction while the latter recorded an average at 9,197.2 baht per transaction. Similar to ATM/CDM withdrawals, CDM deposits also had a maximum limit per transaction of 100,000 baht. Most CDM deposits were in-house deposits or 96.3 percent of total CDM deposits due to the absence of fees whereas interbank CDM deposits incurred quite a high charge rate at 50-120 baht per transaction.

25.7% CDM (in-house)

Over the counter

57.9% 42.1%

1.3% ATM card (in-house)

1.6% CDM (interbank)

Figure 11: Proportion of volume of Cash Deposits in 2016

#### 1.3 Payment at Point Of Sales

In 2016, e-Payment at points of sale, namely debit cards, credit cards and e-Money, increased steadily with higher growth rates than cash<sup>7</sup>. Nonetheless, cash continued to be the most popular medium of payment for goods and services at points of sale, constituting 68.4 percent and 85.1 percent of total spending at points of sale in terms of volume and value, respectively. Meanwhile, the proportions of volume and value for e-Payment at point of sale stood at 31.6 percent and 14.9 percent, increasing from the previous year by 1.1 percent and 0.4 percent.

Credit card via

EFTPOS

13%

7,815.3 billion Baht

EFTPOS

1.5%

C (Unit : percent)

Figure 12: Proportion of value of Payments at Points of Sale in 2016

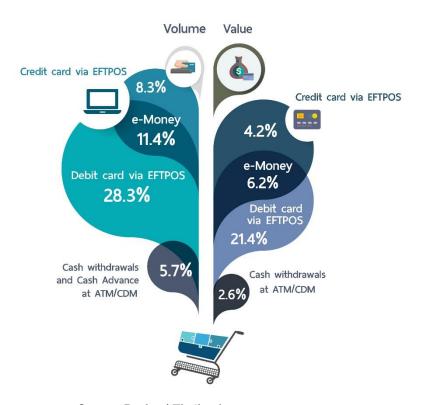
Source: Bank of Thailand

Considering different types of e-Payment at points of sale, credit cards remained the most popular choice for payment as Thais were more familiar with using credit cards for payments of goods and services at points of sale compared to other electronic mediums. Moreover, credit cards could be used for installment purchases and many banks focused on promoting credit cards. In this connection, the proportions of volume and value of credit card payment at points of sale stood at 47.9 percent and 88.0 percent.

<sup>&</sup>lt;sup>7</sup> Assuming that cash withdrawals and cash advances at ATM/CDM reflect usage of cash for payments of goods and services at points of sale. In 2016, cash withdrawals and cash advances grew by 2.6 percent in terms of value which was less than all types of e-Payment at points of sale.

In addition, many commercial banks have been continually promoting debit card usage over the past year. This resulted in a significant growth in debit card payment at points of sale of 28.3 percent and 21.4 percent in terms of volume and value.

Figure 13: Volume and Value Growth in Payments at Points of Sale in 2016 (Compared to Previous Year)



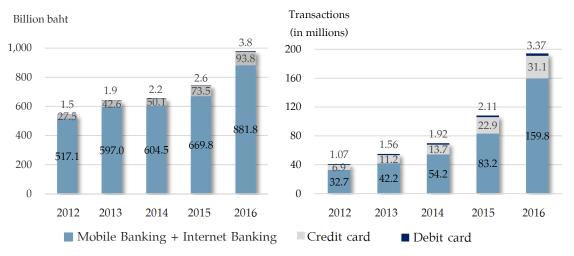
Source: Bank of Thailand

As for behaviour of e-Payment at points of sale, analysis of average spending reflected that people preferred to use e-Money for daily miscellaneous payments those were of low-value e.g. payments at convenient stores or transportation ticket purchases. On the other side, debit cards and credit cards were used for higher-value transactions. In particular, the average value of credit cards transaction was the highest as they could be used for installment purchases; hence people tended to use them to pay for high-value goods. The average value of payments at points of sale by e-Money stood at 87.2 baht while that by debit cards and credit cards were 2,049.0 baht and 3,153.5 baht, respectively.

#### 1.4 Online payment

Over the past five years (2012 - 2016), Thais' online payment continued to increase steadily. Especially in 2016 compared to 2015, a significant growth were observed in line with the expansion of Thailand's E-Commerce market value<sup>8</sup>. In this connection, the volume of online payment recorded at 194.3 million transactions, growing by 79.6 percent, while the value stood at 979.4 billion baht, increasing by 31.3 percent.

Figure 14: Value and Volume of Online Payment by Various Services in 2012 - 2016



Source: Bank of Thailand

Considering the proportions of online payment by various services in 2016, it was found that internet banking/mobile banking still retained the highest proportion in terms of value compared to other services at 90.0 percent of total value of online payment. This was because people preferred to use internet banking for high-value online payment such as purchases of Retirement Mutual Funds (RMF) and Long-term Equity Funds (LTF). The average value of internet banking was 17,710.4 baht per transaction, higher than that of mobile banking (1,955.7 baht per transaction), debit cards (1,130.7 baht per transaction) and credit cards (3,017.2 baht per transaction). The proportion of electronic cards (debit cards and credit cards) for online payment did not change much over the past years, registering at 10.0 percent of the total value of online payment.

<sup>&</sup>lt;sup>8</sup> From the Electronic Transactions Development Agency (ETDA)'s Report on E-Commerce Survey in 2016, projected growth of Thailand's E-Commerce market value was 12.4 percent.

Mobile banking &Internet banking 159.8 (82.3%)

Debit card 3.4 (1.7%)

Unit: millon transactions (%)

Figure 15: Volume of Online Payment in 2016

Source: Bank of Thailand

Moreover, looking at value and volume of online payment growth, it could be seen that mobile banking had the highest growth of 122.6 percent and 114.6 percent. This owed to the rising popularity of smart phone transactions. Online payments by debit cards followed with increasing popularity, growing by 47.8 percent and 59.5 percent in terms of value and volume as commercial banks more actively promoted debit card usage among customers.

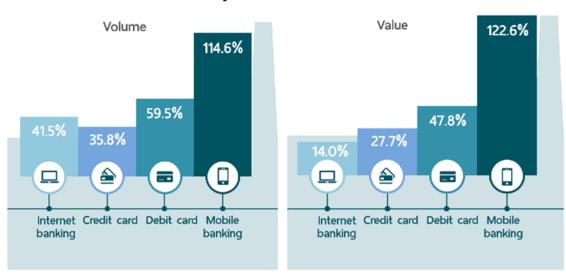


Figure 16: Growth in Volume and Value of Online Payment in 2016 (Compared to Previous Year)

#### 1.5 Payment abroad

In 2016, 7.7 million Thais travelled abroad<sup>9</sup>, increasing by 950,000 persons from last year, equivalent to a 14.0 percent growth. The trend was consistent with higher spending abroad where Thais increased spending abroad from 0.22 trillion baht in 2015 to 0.25 trillion baht in 2016, equivalent to a 12.2 percent rise.

In general, spending abroad can be grouped into three categories, namely payment via electronic cards (debit cards and credit cards) at points of sale abroad, foreign currency exchange<sup>10</sup> and ATM/CDM withdrawals abroad. It was found that Thai travellers preferred using electronic cards and exchanging foreign currency for payment to withdrawing cash from ATM/CDM abroad due to the latter's rather high fee<sup>11</sup>. Moreover, electronic cards have been gaining popularity over recent periods, representing 56.5 percent of total value of spending and growing by 15.6 percent from last year. Credit card and debit card payments stood at 121.5 billion baht and 20.7 billion baht, respectively. Meanwhile, cash usage from foreign currency exchange and ATM/CDM withdrawals from machines abroad represented 32.7 percent and 10.8 percent of total value of spending, equivalent to 82.3 billion baht and 27.1 billion baht, respectively. Foreign currency exchange grew by 11.1 percent while ATM/CDM withdrawals from machines abroad expanded by a mere 0.1 percent.

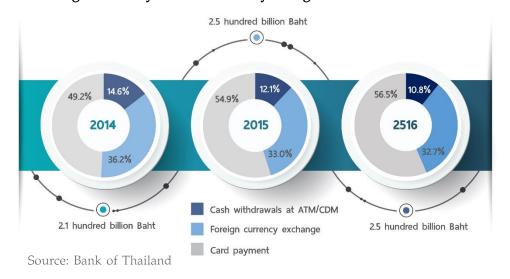


Figure 17: Payments Abroad by Categories in 2014 - 2016

<sup>&</sup>lt;sup>9</sup> Source: Department of Tourism, Ministry of Tourism and Sports

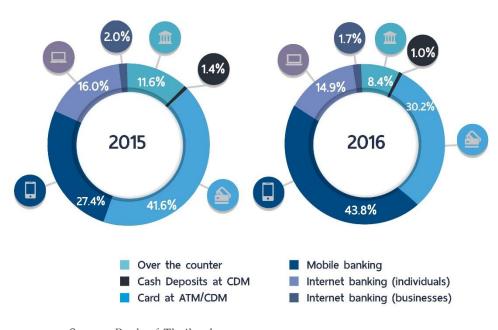
<sup>&</sup>lt;sup>10</sup> Foreign currency exchange transactions at commercial bank branches only

<sup>&</sup>lt;sup>11</sup> Fee for ATM/CDM withdrawals from machines abroad is approximately 100 - 250 baht per transaction, depending on the destination country's fee calculation and the exchange rate that prevails on the transaction date.

#### 1.6 Funds transfer

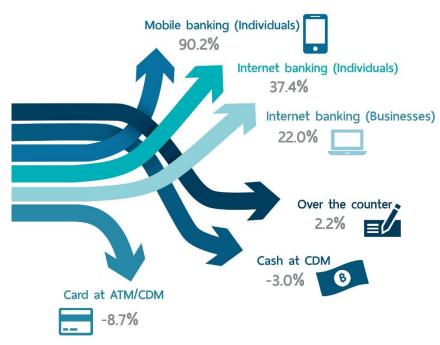
In 2016, Thais changed their money transfer behaviour overall, from transfers by electronic cards at ATM/CDM to transfer by mobile banking. The proportion of transfers by electronic cards at ATM/CDM notably presented the decrease from 41.6 percent to 30.2 percent while that of transfers by mobile banking rose from 27.4 percent to 43.8 percent, in line with this year's growth in the number of mobile banking accounts. Moreover, the increasing number of mobile banking stemmed from many factors, including the rising popularity of smart phones, development of more convenient and secure mobile banking applications, continued advertisement and promotion campaign as well as the more convenient and faster of making payment transaction compared to other channels. As a result, transfers by mobile banking reached the highest growth compared to all channels, expanding by 90.2 percent in terms of value and 123.6 percent in terms of volume. Nevertheless, cash deposits at CDM<sup>12</sup> contracted slightly in terms of value by 3.0 percent and volume by 0.1 percent while transfers over the counter grew only marginally.

Figure 18: Proportions of Volume of Funds Transfer via Various Channels 2015 - 2016



<sup>&</sup>lt;sup>12</sup> CDM deposits where the CDM owning bank is not the same as the account depositing bank are regarded as transfer by cash at CDM

Figure 19: Growth in value of Funds Transfer via Various Channels in 2016 (Compared to Previous Year)



Source: Bank of Thailand

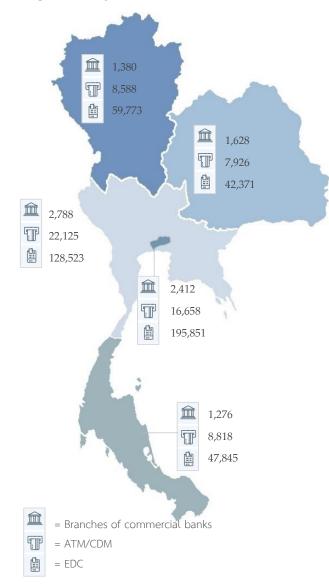
Regarding the average value of transfers, it was found that mobile banking was still used mainly for low-value retail funds transfer. In 2016, the average value of transfers by mobile banking stood at 11,095.0 baht per transaction, similar to that of transfers by cards at ATM/CDM which recorded at 11,071.5 baht per transaction. Meanwhile, transfers by internet banking of individuals, also used for retail funds transfer, registered a higher average value of 60,778.2 baht per transaction. At the same time, transfers by internet banking of businesses saw quite a high average value of 875,458.5 baht per transaction as most transfers were for trading/commercial purposes. Transfers over the counter were mostly high-value funds transfer, as reflected by the highest average value across all channels of 1,465,109.6 baht per transaction.

### 2 Major Channels and Payment Instruments

#### 2.1 Payment Service Infrastructure

Branches of financial institutions decreased for the first time in 2016. At the end of the year, branches of Thai commercial banks, foreign banks and Specialized Financial Institutions (SFIs) totalled at 9,484 branches, decreasing by 20 branches from 2015. Branches of commercial banks decreased by 42 branches while those of foreign banks decreased by 1 branch. In contrast, SFIs continued to expand their presence by 23 branches.

Figure 20: Payment Service Infrastructure in 2016



Source: Bank of Thailand

One factor in bank branches decreasing was due to the attempt to minimize operating costs whereas providing more new service channels for people. Moreover, given the advancement in technology that resulted of various development financial and e-Payment that is convenient, secure and easily accessible, people became more familiar and adjusted their behaviour toward higher utilization of e-Payment. This was reflected in the continued expansion in the volume of transactions through electronic channels, various from internet banking/mobile banking to electronic cards.

At the end of 2016, the number of ATMs/CDMs continued to increase, totalling at 64,115 machines, up by 683 machines or growth rate at 1.1 percent from previous year. However, this was a declining growth rate when compared to previous period.

Regarding the adequacy of ATM/CDM in Thailand, there were 972 ATMs/CDMs per one million persons. Compared to our neighbouring countries or developed countries, Thailand had a lot more ATMs/CDMs per population. For instance, Singapore had 507 ATMs/CDMs per one million persons and Sweden had 333 ATMs/CDMs per one million persons.

At the end of 2016, the number of EDCs stood at 474,363 machines, increasing by 57,520 machines from the previous year. The increase dispersed equally among all regions at approximately 11 - 17 percent. Compared with other countries, it was found that Thailand had 7,195 ECDs per one million persons. Meanwhile, developed countries such as Australia, the U.K., Sweden and Singapore had many times more EDC per population, at 40,130,30,078,18,660, and 31,096 EDCs per one million persons, respectively. This showed that Thailand has the ability to install EDCs in many more areas so that people could increasingly access to e-Payment in the future.

Table 1: Number of ATMs/CDMs and EDCs of Various Countries

Unit: Machines per one million persons

	Thailand	Malaysia	Australia	U.K.	Sweden	Singapore
No. of ATMs/CDMs**	972	N/A	1,329	1,079	333	507
No. of EDCs*	7,195	10,203	40,130	30,078	18,660	31,096

Source: Statistics on payment, clearing and settlement systems in the CPMI countries - Figures for 2015, Malaysia's Payment Statistics: BNM, Bank of Thailand

<sup>\*</sup> End-2015 data for foreign countries and end-2016 data for Thailand

#### 2.2 Cash

The ratio of currency (notes and coins) in circulation to Gross Domestic Product (GDP) is an indicator of cash requirement in the economic system. In 2016, Thailand's currency in circulation to GDP stood at 9.3 percent, stabilizing from 9.1 percent recorded in the previous year. Compared to other countries of similar economic growth, countries in Asia and developed countries, for example, Malaysia, South Korea, Singapore, Australia, the U.K. and the U.S., their demand for cash was lower than Thailand. Particularly, Sweden, a country committed to becoming a cashless society, had a ratio of currency in circulation to GDP of only 1.7 percent together with a continually declining trend. However, Japan and Singapore, despite being developed countries with high volume of e-Payment per capita (almost 100 times/person/year and 716 times/person/year, respectively, in 2015), continued to possess higher demand for cash than Thailand at 19.4 percent and 9.5 percent.

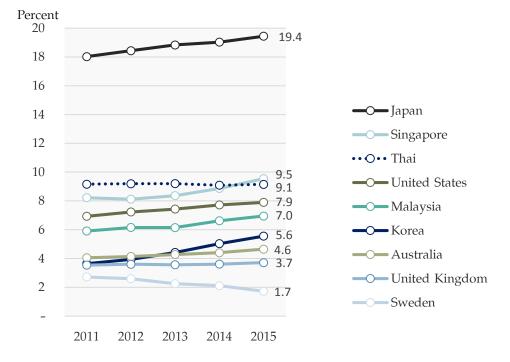


Figure 21: Currency in Circulation to GDP

Source: Statistics on payment, clearing and settlement systems in the CPMI countries, Figures for 2015 and Bank of Thaialand

2

In terms of component breakdown, the proportion of cash in the hands of households and businesses was the highest at 79.0 percent, followed by the proportion of cash held by commercial banks at 17.8 percent. Meanwhile, the proportion of cash held by SFIs stood at 3.1 percent. The rest were held in the hands of other institutions, including the government and cooperatives.

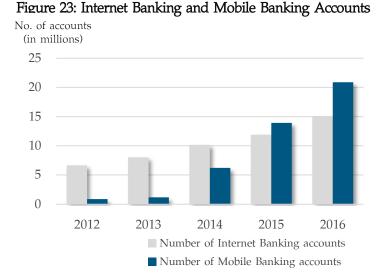
Billion baht 1,750 1,500 ■ Held by other institutions 1,250 ■ Held by SFIs 1,000 750 ■ Held by commercial banks 500 250 Held by businesses and households 0 2012 2013 2014 2015 2016

Figure 22: Compositions of Cash at Main Institutions

#### 2.3 Internet banking and Mobile banking

Source: Bank of Thailand

The trend in mobile banking popularity increased notably last year as a result of the higher number of smart phone 13 users and banks' development of mobile banking



applications which are easier to use, more convenient and more secure to perform financial transactions. The number of mobile banking accounts grew by a high 50 percent from 13.9 million accounts in 2015 to 20.9 million accounts at the end

<sup>&</sup>lt;sup>13</sup> Statistics of mobile phone users categorized by feature phone and smart phone for different age groups and administrative areas in 2016, prepared by the National Statistics Office, showed that the number of smart phone users in Thailand were 31.7 million persons, increasing by 33.7 percent from 2015.

of 2016. The ratio of mobile banking accounts to total deposit accounts stood at approximately 1 to 8.

The volume and value of mobile banking transactions expanded by as much as 121.7 percent and 91.6 percent from 2015, in line with the expansion in the number of service users. Meanwhile, the number of internet banking accounts expanded by 22.8 percent per year. At the end of 2016, there were 15.1 million internet banking accounts while the volume and value of internet banking transactions rose by 26.3 percent and 12.9 percent.

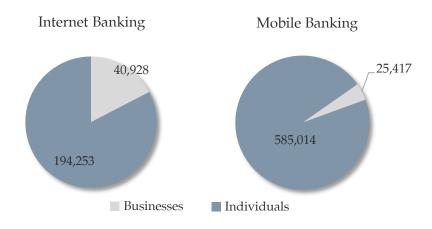
In terms of transaction types of both internet banking and mobile banking, it was found that in 2016, most transactions were in-house funds transfer, representing 57.9 percent of all transactions and growing by 88.3 percent from the previous year. Interbank funds transfer and payments for goods and services expanded by 75.7 percent and 87.4 percent, respectively.

Internet banking (Volume) Mobile banking (Volume) Transactions Transactions (in millions) (in millions) 250 600 500 200 400 150 300 100 200 50 100 2012 2013 2014 2015 2016 2012 2013 2014 2015 2016 In-house fund Interbank fund Payment for goods Salaries and Others transfers and services wages transfers Internet banking (Value) Mobile banking (Value) 30,000 6,000 25,000 5,000 20,000 4,000 15,000 3,000 10,000 2,000 5,000 1,000 0 2012 2013 2014 2015 2016 2012 2013 2014 2015 2016 In-house fund Interbank fund Payment for goods Salaries and Others transfers and services wages

Figure 24: Volume and Value of Internet Banking and Mobile Banking

In terms of transaction values of internet banking and mobile banking in 2016, the former was found to be higher due to the business sector's preference for internet banking for high-value funds transfer for trade, payments for goods and services and salaries and wages. At the same time, most mobile banking transactions were performed by the general public or small businesses for low-value funds transfer. Nonetheless, due to the high frequency and large customer base, the volume and value of mobile banking funds transfer registered a remarkable growth of 123.6 percent and 90.3 percent. This observation signalled that the majority of people started to recognize the benefits and were becoming more familiar with this channel of service. In this connection, the volume and value of payments for goods and services via mobile banking also expanded strongly at 114.6 percent and 122.8 percent.

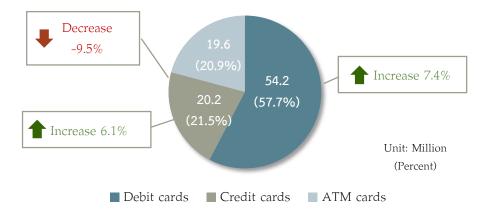
Figure 25: Volume of Internet Banking and Mobile Banking (Businesses and Individuals)



#### 2.4 Card Payments

Similar to previous years, debit cards continued to be the electronic card type that recorded the highest number of cards and the growth rate was highest in 2016. One explanation was that most banks focused on promoting debit cards with customers rather than normal ATM cards due to the former's superior features such as cash withdrawals and deposits, electronic payments at points of sales and online payments. The growth in the number of debit cards was in line with the expansion in electronic payments at points of sale and online payments by debit cards. At the end of 2016, there were 54.2 million debit cards issued in total, representing a growth of 7.4 percent. Meanwhile, ATM cards decreased from the previous year to record at 19.6 million cards, representing a contraction of 9.5 percent.

Figure 26: Proportion of electronics card at the end of 2016 and growth/decline rate in 2016 (Compared to Previous Year)



Source: Bank of Thailand

At the same time, banks continued to promote credit card usage, resulting in a steady growth in the number of credit cards. In 2016, the number of credit cards expanded by 6.1 percent from last year, totalling at 20.1 million cards.

In terms of usage behaviour associated with each card type, the following differences could be observed.

- Most ATM cards were used for cash withdrawals from ATMs/CDMs, followed by funds transfer, payments for goods and services, and cash deposits. All types of ATM transactions contracted in terms of both volume and value, consistent with the continual decrease in the number of cards.

- Most debit cards were still used in the same manner as ATM cards as the majority of transactions were for cash withdrawals at ATMs/CDMs, representing 76 percent of total volume and 60 percent of total value, respectively. However, electronic payments at points of sales and online payments by credit cards expanded more strongly than in previous years.
- Most credit cards were used for electronic payments for goods and services at points of sale, followed by online payments. Both types of transactions recorded significant growth. Meanwhile, cash advances at ATMs/CDMs grew only marginally.

Table 2: Volume and Value of Electronic Cards in 2016

	Volume (million transactions)			Value (billion baht)		
2016	ATM	Debit	Credit	ATM	Debit	Credit
	cards	cards	cards	cards	cards	cards
Withdrawals*	318.6	1,488.8	21.1	1,402.4	6,775.4	142.6
	(-15.1%)	(9.1%)	(1.6%)	(-15.4%)	(4.3%)	(1.9%)
Funds transfer	59.7	274.4	n/a	407.2	3,234.9	n/a
	(-6.2%)	(2.7%)	(n/a)	(-12.3%)	(-8.3%)	(n/a)
Payments for goods	10.2	107.4	412.2	35.9	296.4	1,296.1
and services**	(-19.7%)	(13.2%)	(10.0%)	(-1.7%)	(15.0%)	(5.5%)
Deposits	10.0	95.5	n/a	79.8	968.2	n/a
	(-18.3%)	(12.4%)	(n/a)	(-11.7%)	(5.7%)	(n/a)

<sup>()</sup> represents growth rates in 2016 compared to 2015

<sup>\*</sup> refers to cash withdrawals or cash advances from ATM/CDM

 $<sup>^{**}</sup>$  refers electronic payments for goods and services at points of sale or bill payments at ATM/CDM

#### 2.5 e-Money)<sup>14</sup>

The number of e-Money service providers in accordance with the Royal Decree on Regulating Electronic Payment Services B.E. 2551 (2008) expanded steadily from previous years as the continual growth in total market value and number of service providers attracted new service providers to the market. At the end of 2016, there were 30 service providers<sup>15</sup>, up by 4 service providers from last year. All new service providers were non-bank. Meanwhile, the number of bank service providers remained at eight. Overall, there were 1 List A service provider, 7 list B service providers and 22 List C service providers<sup>16</sup>.

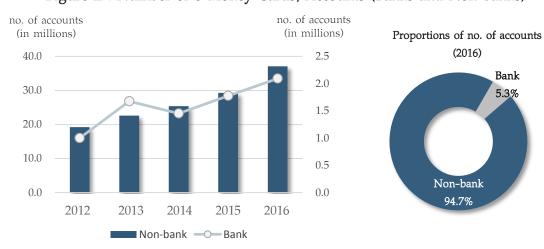


Figure 27: Number of e-Money Cards/Accounts (Banks and Non-banks)

Source: Bank of Thailand

Number of cards or accounts, volume and value, include only e-Money used in place of cash for payments for goods and services, excluding e-Money for airtime top-ups

<sup>&</sup>lt;sup>15</sup> Refer to list of e-Money service providers according to the Royal Decree on e-Payment at www.bot.or.th under "Payment Systems" > Oversight of e-Payment Service Providers

List A refers to e-Money that is used to purchase specific goods or services that pre-determined by a single service provider, excluding e-Money used specifically to provide convenience to consumers without profit-making from its issuance e.g. department store food court card.

List B refers to e-Money that is used to purchase specific goods or services that are pre-determined from multi-service providers at locations under the same distribution and service network systems e.g. department store gift card

List C refers to e-Money that is used to purchase specific goods or services that are pre-determined from multi-service providers anywhere with no restriction single distribution and service network systems e.g. BTS card that can be used to pay for transportation as well as goods and services at designated stores.

16 68

The yearly increase in the number of e-Money accounts<sup>17</sup> reflected that people were becoming more familiar with and were increasingly adopting e-Payment, consistent with the shifting trend in service models during the past 2-3 years from computer network-based to smart phone application-based. As a result, customers could access services easily and conveniently. At the end of 2016, the number of e-Money accounts totalled at 39.2 million accounts, rising by 8.1 million accounts from the previous year or 26.1 percent. Of these e-Money accounts, 97.4 percent were offered by non-bank service providers.

In 2016, the volume and value of e-Money continued to increase by 21.8 percent and 34.5 percent from 2015. At the end of the year, e-Money transactions totalled at 1,076.3 million transactions. The total value of transactions recorded at 90.9 billion baht in value, increasing by 23.3 billion baht.

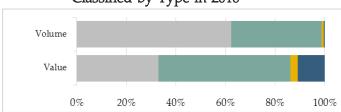
Transactions Transactions (in millions) (in millions) Million baht Billion baht 1,200 3.5 7,000 90 1,000 80 3.0 6,000 70 2.5 800 5,000 60 2.0 4,000 50 600 1.5 40 3,000 400 30 1.0 2,000 20 200 0.5 1.000 10 0.0 0 0 2012 2013 2014 2015 2016 2012 2013 2015 2016 Bank -O-Non-bank Bank -- Non-bank

Figure 28: Volume and Value of e-Money

<sup>&</sup>lt;sup>17</sup> including card-based e-Money and network-based e-Money

Overall, it could be observed that e-Money services by both banks and non-banks still expanded continually where they were used for payments of low-value goods and services, averaging at 84.5 baht per transaction. This showed that e-Money was mostly

Figure 29: e-Money Transactions, Classified by Type in 2016



	Airtime	Payment for	e-Money	Others
		goods and services	transfers	
Volume	670.1	393.6	9.2	3.3
Value	29,887.0	48,611.7	2,529.3	9,918.3

Source: Bank of Thailand

used for people's daily spending. Categorized into four transaction types, namely airtime top-ups, payments for goods and services, e-Money transfers and others<sup>18</sup>, it could be seen that e-Money was mostly used for airtime top-ups since a major proportion of e-Money accounts belonged to service providers in the same

network as mobile phone network operators. Hence, airtime top-ups by e-Money could be done conveniently by debiting funds from mobile phone e-Wallet, resulting in its popularity. In this connection, the average value of airtime top-ups stood at 44.5 baht. Meanwhile, the second most popular e-Money transaction was payments for goods and services which saw an average transaction value of 123.5 baht.

<sup>&</sup>lt;sup>18</sup> including e-Money withdrawal and card expiry

# III. 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

PFMI 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
Table 2	Technological infrastructure
Table 3	Narrow money (at year-end, million Baht)
Table 4	Settlement media used by non-banks (at year-end, billion Baht)
Table 5	Settlement media used by banks (at year-end, billion Baht)
Table 6	Indicators of the use of various cashless payment instruments Volume of transactions (in thousands)
Table 7	Indicators of the use of various cashless payment instruments Value of transactions (billion Baht)
Table 8	Use of credit cards and debit cards via EFTPOS (monthly average per card, Baht)
Table 9	Cash withdrawal via ATM (monthly average per card, Baht)
Table 10	Notes and coins (at year-end, million Baht)
Table 11	Institutional infrastructure
Table 12	Payment instructions handled by selected interbank settlement systems - Volume of transactions (in thousands)
Table 13	Payment instructions handled by selected interbank settlement systems - Value of transactions (billion Baht)
Table 14	Securities transfer instructions handled by securities settlement systems - Volume of transactions
Table 15	Securities transfer instructions handled by securities settlement systems - Value of transactions (billion Baht)

Гable 16	Number of participants in selected payment and settlement systems
Гable 17	Number of Automated machines and EFTPOS terminals
Гable 18	Number of electronic payment cards
Γable 19	Sources of payment revenues of Thai commercial banks (million Baht)
Гable 20	Sources of payment revenues of foreign bank branches (million Baht)
Гable 21	Daily averages of BOT payment services - Volume of transactions
Гable 22	Daily averages of BOT payment services - Value of transactions (billion Baht)
Гable 23	Peak day figures of BOT payment services - Volume of transactions
Гable 24	Peak day figures of BOT payment services - Value of transactions (billion Baht)
Γable 25	Use of mobile banking
Γable 26	Use of internet banking
Гable 27	Use of ORFT (Online Retail Funds Transfer) - Volume of transactions (in thousands)
Гable 28	Use of ORFT (Online Retail Funds Transfer) - Value of Transactions (billion Baht)
Гable 29	Bill payment at counters. Volume of transactions (in thousands)
Гable 30	Bill payment at counters. Value of transactions (billion Baht)
Гable 31	Use of e-Money
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Table 1: Basic statistical data

	2011	2012	2013	2014	2015	2016
Population (millions)	64.08	64.46	64.79	65.12	65.73	65.93
GDP current price (billion Baht)	11,306.9	12,357.4	12,921.2	13,203.7	13,672.9	14,360.6
GDP per capita (Baht)	176,461	191,706	199,431	202,745	208,016	217,811
Exchange rate vis-à-vis US\$ (at year-end)	31.70	30.63	32.82	32.96	36.08	35.82

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

Table 2: Technological infrastructure<sup>1</sup>

	2011	2012	2013	2014	2015	2016
Total fixed network telephone subscribers (millions)	6.66	6.36	6.04	5.69	5.31	4.71
Total mobile telephone subscribers (millions) <sup>2</sup>	77.60	85.01	92.94	97.09	102.94	118.35
Postpaid	7.97	9.78	11.28	12.85	17.78	22.74
Prepaid	69.64	75.23	81.66	84.24	85.16	95.61
Total Internet users (millions)	21.17	23.06	26.14	27.65	39.47	43.87
Penetration rates						
Fixed network telephone (%)	10.40	9.87	9.33	8.74	8.08	7.14
Mobile telephone (%)	121.11	131.88	143.45	149.08	156.61	179.50

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

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

	2011	2012	2013	2014	2015	2016
Narrow money (1+2)	1,414,298	1,598,262	1,661,303	1,682,470	1,778,050	1,864,165
1. Currency outside Depository Corp.&	1,036,016	1,136,303	1,188,888	1,200,331	1,250,926	1,335,952
Central Gov.						
Banknotes in circulation	1,248,569	1,350,932	1,425,282	1,503,679	1,539,848	1,627,997
Coins in circulation	46,953	50,864	54,322	56,622	59,888	63,986
Less: currency held by Central Gov.	986	854	1,115	1,247	1,094	1,115
Less: currency held by Depository Corp.	258,520	264,639	289,601	358,723	347,716	354,916
Held by commercial banks	221,289	210,596	238,668	299,916	290,772	301,309
Held by finance companies	0	0	0	0	0	0
Held by Specialized Financial Institutions	36,905	53,602	50,538	58,385	56,544	53,211
Held by savings cooperatives	326	441	395	422	400	396
Held by money market mutual funds	0	0	0	0	0	0
2. Transferable deposits at Depository Corp.	378,282	461,959	472,415	482,139	527,124	528,213
Transferable deposits at Bank of Thailand	3,053	4,554	3,225	2,708	2,697	5,050
Transferable deposits at commercial banks	368,192	451,295	464,220	475,561	519,296	518,085
Transferable deposit at SFIs	7,037	6,110	4,970	3,870	5,131	5,078

 $<sup>^{\</sup>rm 1}\,\mathrm{Data}$  source was changed since 2016 and all data was reviewed.

<sup>&</sup>lt;sup>2</sup> Data as of November 2016

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

	2011	2012	2013	2014	2015	2016
Currency outside Depository Corp. & Central	1,036	1,136	1,189	1,200	1,251	1,336
Gov. <sup>1</sup>						
Transferable deposits at Depository Corp.	378	462	472	482	527	528
Narrow money	1,414	1,598	1,661	1,682	1,778	1,864
Broad money <sup>2</sup>	13,560	14,967	16,062	16,808	17,552	18,289

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

	i ena, omien be	,				
	2011	2012	2013	2014	2015	2016
Balances held at central bank	59.3	88.7	89.8	95.6	98.7	113.7
Stock of high-quality liquid assets <sup>1</sup>	-	-	-	-	-	3,491.3
Required reserves	488.5	655.6	668.2	733.5	759.3	-
Free reserves	2,004.5	2,489.4	2,575.2	2,529.8	2,362.4	-
Transferable deposits at other banks	7.9	6.5	3.7	4.5	2.8	3.2
Memorandum item:						
Institutions borrowing from central bank	0.0	124.7	119.4	98.9	78.8	61.7

<sup>&</sup>lt;sup>1</sup> Banknotes outside depository corporations and coins issued by central government.

<sup>&</sup>lt;sup>2</sup> Narrow money and quasi money (other deposits at Depository Corp.+securities other than shares)

<sup>&</sup>lt;sup>1</sup> 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)

	2011	2012	2013	2014	2015	2016
Paper-based:	115,427	122,875	118,365	118,791	120,455	118,297
In-house cheque <sup>1</sup>	41,833	48,145	44,793	46,103	49,418	48,851
Interbank cheque	73,594	74,730	73,572	72,687	71,037	69,446
Electronic payment cards:	2,480,439	2,827,638	3,182,137	3,404,389	3,641,507	3,974,893
ATM card	561,136	539,056	535,350	498,939	477,615	404,478
for cash withdrawal via ATM	429,288	424,354	415,872	397,356	375,426	318,319
for other purposes <sup>2</sup>	131,848	114,702	119,478	101,583	102,189	86,159
Debit card <sup>3</sup>	1,231,241	1,406,350	1,576,484	1,691,737	1,823,812	1,997,366
for cash withdrawal via ATM	920,029	1,059,075	1,165,118	1,241,829	1,365,214	1,505,143
for purchasing purpose via EFTPOS	25,057	30,748	37,221	43,871	56,218	71,146
for other purposes <sup>4</sup>	286,155	316,527	374,144	406,037	402,380	421,077
Credit card <sup>5</sup>	339,865	369,920	401,093	425,781	456,728	496,751
for purchasing purpose	308,212	343,346	373,046	397,697	421,201	462,188
for other purposes <sup>6</sup>	31,653	26,574	28,047	28,083	35,526	34,563
e-Money <sup>7</sup>	348,198	512,311	669,210	787,932	883,352	1,076,298
Automated:	296,861	332,324	346,410	349,034	369,644	392,645
Direct credit <sup>8</sup>	178,147	204,829	214,657	211,479	224,222	234,202
Direct debit <sup>9</sup>	88,086	93,531	93,636	96,205	100,568	107,630
ITMX Bulk Payment	27,901	31,018	34,864	37,944	41,231	46,801
BAHTNET <sup>10</sup>	2,728	2,946	3,253	3,406	3,623	4,013

<sup>&</sup>lt;sup>1</sup> Some banks do not report in-house provincial cheques and inter-provincial cheques.

<sup>&</sup>lt;sup>2</sup> Data include purchasing goods and services, deposit and funds transfer.

 $<sup>^{3}</sup>$  Domestic and oversea spending of Thai debit cards.

<sup>&</sup>lt;sup>4</sup> Data include purchasing goods and services via other channels, deposit and funds transfer.

<sup>&</sup>lt;sup>5</sup> Domestic and oversea spending of Thai credit cards and domestic spending of foreign credit cards.

 $<sup>^{\</sup>rm 6}$  Data include cash with drawal, cash advance, deposit and funds transfer.

<sup>&</sup>lt;sup>7</sup> Data exclude top-up cards.

<sup>&</sup>lt;sup>8</sup> Intra-bank pre-authorized direct credit.

<sup>&</sup>lt;sup>9</sup> Intra-bank pre-authorized direct debit.

 $<sup>^{10}</sup>$  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)

Table 7: Indicators of the use of various cashless payment instruments - Value of transactions (billion Baht)								
	2011	2012	2013	2014	2015	2016		
Paper-based:	56,168	64,832	64,581	61,595	61,583	60,895		
In-house cheque <sup>1</sup>	20,363	25,989	24,262	23,632	24,142	23,762		
Interbank cheque	35,805	38,843	40,319	37,963	37,441	37,133		
Electronic payment cards:	11,496	13,350	14,498	15,091	15,246	15,215		
ATM card	2,677	2,437	2,451	2,411	2,254	1,911		
for cash withdrawal via ATM	1,804	1,852	1,846	1,775	1,659	1,401		
for other purposes <sup>2</sup>	873	584	606	636	595	510		
Debit card <sup>3</sup>	7,620	9,489	10,475	10,997	11,201	11,389		
for cash withdrawal via ATM	4,275	5,136	5,743	6,081	6,397	6,873		
for purchasing purpose via EFTPOS	81	94	100	107	135	161		
for other purposes <sup>4</sup>	3,264	4,259	4,633	4,809	4,670	4,355		
Credit card <sup>5</sup>	1,174	1,389	1,524	1,626	1,723	1,824		
for purchasing purpose	964	1,157	1,282	1,384	1,465	1,572		
for other purposes <sup>6</sup>	211	232	241	242	258	258		
e-Money <sup>7</sup>	24.7	35.4	48.0	56.2	67.6	91.0		
Automated:	780,284	667,134	699,527	778,999	814,821	901,257		
Direct credit <sup>8</sup>	10,163	12,495	13,500	14,065	15,199	16,623		
Direct debit <sup>9</sup>	3,014	3,749	4,117	4,467	6,250	7,588		
ITMX Bulk Payment	1,393	1,771	2,187	2,469	2,538	2,941		
BAHTNET <sup>10</sup>	765,714	649,119	679,723	757,998	790,834	874,106		

<sup>&</sup>lt;sup>1</sup> Some banks do not report in-house provincial cheques and inter-provincial cheques.

<sup>&</sup>lt;sup>2</sup> Data include purchasing goods and services, deposit and funds transfer.

 $<sup>^{\</sup>rm 3}$  Domestic and oversea spending of Thai debit cards.

<sup>&</sup>lt;sup>4</sup> Data include purchasing goods and services via other channels, deposit and funds transfer.

 $<sup>^{5}</sup>$  Domestic and oversea spending of Thai credit cards and domestic spending of foreign credit cards.

<sup>&</sup>lt;sup>6</sup> Data include cash withdrawal, cash advance, deposit and funds transfer.

<sup>&</sup>lt;sup>7</sup> Data exclude top-up cards.

<sup>&</sup>lt;sup>8</sup> Intra-bank pre-authorized direct credit.

<sup>&</sup>lt;sup>9</sup> Intra-bank pre-authorized direct debit.

 $<sup>^{\</sup>rm 10}$  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)

	2011	2012	2013	2014	2015	2016
Credit card <sup>1</sup>	4,011	4,598	4,871	5,325	5,477	5,013
Debit card <sup>2</sup>	181	191	194	196	248	265

Source: Bank of Thailand

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

	( · · · ) · · · · · · · · · · · · · · ·	,,				
	2011	2012	2013	2014	2015	2016
ATM card	7,711	8,265	8,381	8,229	7,586	8,209
Debit card <sup>1</sup>	9,198	9,956	10,579	10,979	11,678	11,123

Source: Bank of Thailand

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

` •	2011	2012	2013	2014	2015	2016
Notes and coins	1,346,438	1,401,796	1,479,604	1,560,301	1,719,372	1,773,469
Notes:	1,299,485	1,350,932	1,425,282	1,503,679	1,659,484	1,709,483
500000 Baht	117	118	118	118	134	152
1000 Baht	1,028,838	1,102,770	1,202,441	1,282,400	1,318,903	1,317,006
500 Baht	119,826	128,217	138,695	124,976	140,933	173,682
100 Baht	108,220	121,358	129,095	141,047	140,768	155,103
80 Baht	0	149	150	151	152	152
70 Baht	0	0	0	0	0	1,393
60 Baht	1,173	1,175	1,178	1,181	1,187	1,247
50 Baht	9,599	13,194	13,347	19,070	18,379	19,208
20 Baht	28,045	28,840	30,801	36,884	35,372	37,885
10 Baht	3,340	3,336	3,334	3,332	3,330	3,329
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:	46,953	50,864	54,322	56,622	59,888	63,986

 $<sup>^{1}\,</sup> Domestic \ and \ oversea \ spending \ of \ Thai \ credit \ cards \ via \ EFTPOS \ and \ domestic \ spending \ of \ foreign \ credit \ cards \, .$ 

<sup>&</sup>lt;sup>2</sup> Domestic and oversea spending of Thai debit cards via EFTPOS.

<sup>&</sup>lt;sup>1</sup> Domestic and oversea cash withdrawal of Thai debit cards via ATM.

**Table 11: Institutional infrastructure** 

Table 11: Institutional infrastructure						
	2011	2012	2013	2014	2015	2016
Central Bank						
Number of Institutions	1	1	1	1	1	1
Number of Branches	3	3	3	3	3	3
Number of Accounts <sup>1</sup>	231	241	182	182	181	173
Value of Accounts (million Baht) <sup>1</sup>	353,916	381,223	439,175	310,132	533,250	265,949
Thai Commercial Banks						
Number of Institutions	16	16	16	17	19	18
Number of Branches	6,183	6,421	6,696	6,986	7,040	6,998
Number of Accounts	77,588,699	81,344,121	84,433,032	86,582,576	88,529,904	90,579,826
Value of Accounts (million Baht)	7,367,485	9,540,114	10,350,543	11,065,024	11,347,475	11,525,152
<b>Specialized Financial Institutions</b>						
Number of Institutions	6	6	6	6	6	6
Number of Branches	2,240	2,348	2,549	2,445	2,445	2,468
Number of Accounts	37,366,503	48,233,488	54,377,970	59,539,994	63,243,722	68,569,387
Value of Accounts (million Baht)	2,249,904	3,199,296	3,604,591	3,901,266	4,214,675	4,450,107
Foreign Bank Branches						
Number of Institutions	15	15	14	14	12	11
Number of Branches	18	19	19	19	19	18
Number of Accounts	96,165	86,556	89,617	79,641	72,132	68,580
Value of Accounts (million Baht)	623,338	679,790	700,469	789,461	798,701	908,302

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

	2011	2012	2013	2014	2015	2016
Paper-based:	73,927	74,705	73,572	72,687	71,036	69,446
Intra-provincial Cheque in Bangkok and	52,432	53,137	52,051	50,215	48,701	47,322
vicinity <sup>1</sup>						
Intra-provincial Cheque in Regional Area <sup>2</sup>	14,775	14,800	13,312	11,455	11,053	10,775
Inter-provincial Cheque <sup>3</sup>	6,720	6,768	8,209	11,017	11,283	11,350
Automated:	130,554	150,962	170,153	184,270	192,769	192,450
BAHTNET <sup>4</sup>	2,728	2,946	3,253	3,406	3,623	4,013
ITMX Bulk Payment	27,901	31,018	34,864	37,944	41,231	46,789
ORFT-ATM	99,926	116,997	132,035	142,920	147,916	141,648

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

<sup>&</sup>lt;sup>1</sup> Data exclude regional office.

<sup>&</sup>lt;sup>1</sup> ICAS was implemented to replaced ECS on 4 February 2012.

<sup>&</sup>lt;sup>2</sup> Provincial Cheque Clearing migrated to ICAS since 15 November 2012 and implemented nationwide in December 2013.

 $<sup>^{\</sup>rm 3}$  Inter-provincial Cheques cleared via ICAS since 16 May 2013.

 $<sup>^{\</sup>rm 4}$  Data include funds transfer, third party funds transfer and Multilateral Funds Transfer.

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

,	2011	2012	2013	2014	2015	2016
Paper-based:	35,998	38,740	40,319	37,963	37,440	37,133
Intra-provincial Cheque in Bangkok and	32,053	34,445	35,980	33,530	33,063	32,852
vicinity <sup>1</sup>						
Intra-provincial Cheque in Regional Area <sup>2</sup>	3,508	3,811	3,684	3,500	3,368	3,245
Inter-provincial Cheque <sup>3</sup>	438	484	655	933	1,008	1,036
Automated:	767,749	651,660	682,762	761,411	794,347	877,955
BAHTNET <sup>4</sup>	765,714	649,119	679,723	757,998	790,834	874,106
ITMX Bulk Payment	1,393	1,771	2,187	2,469	2,538	2,939
ORFT-ATM ( Online Retail Funds Transfer )	642	771	852	944	975	910

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

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

	2011	2012	2013	2014	2015	2016
Bond registry system:						
Government securities	7,204	7,979	4,222	2,009	1,372	511
Book-entry system:						
Equity securities (in millions)	2.66	3.09	3.72	4.09	4.72	5.47
Government securities (in millions)	0.14	0.18	0.19	0.20	0.20	0.21

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

Table 15: Securities transfer instructions handled by securities settlement systems

Value of transactions (billion Baht)

	2011	2012	2013	2014	2015	2016
Bond registry system:						
Government securities	22.08	28.05	50.00	22.75	49.52	94.44
<b>Book-entry system:</b>						
Equity securities	1,028.71	839.00	1,220.00	1,027.83	1,081.33	1,209.11
Government securities	80,468.68	82,954.00	81,839.00	87,274.82	86,804.54	116,869.57

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

<sup>&</sup>lt;sup>1</sup> ICAS was implemented to replaced ECS on 4 February 2012.

<sup>&</sup>lt;sup>2</sup> Provincial Cheque Clearing migrated to ICAS since 15 November 2012 and implemented nationwide in December 2013.

<sup>&</sup>lt;sup>3</sup> Inter-provincial Cheques cleared via ICAS since 16 May 2013.

 $<sup>^{4}</sup>$  Data include funds transfer, third party funds transfer and Multilateral Funds Transfer.

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

Table 10. Number of participants in selected pays	2011	2012	2013	2014	2015	2016
BAHTNET <sup>1</sup>	64	65	64	64	65	66
Intra-provincial Cheque in Bangkok and	38	36	36	36	37	38
vicinity <sup>2</sup>						
Intra-provincial Cheque in Regional Area <sup>3</sup>	22	21	23	36	23	23
Inter-provincial Cheque <sup>4</sup>	37	35	36	36	37	35
ITMX Bulk Payment	32	32	31	30	33	32
Bond registry system:						
Government securities	341,968	283,597	211,631	113,842	460,436	461,723
Book-entry system:						
Equity securities and Government	89	86	86	38	39	39
securities						

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

Table 17: Number of Automated machines<sup>1</sup> and EFTPOS terminals<sup>2</sup>

	2011	2012	2013	2014	2015	2016
<b>Total of Automated machines</b>	47,759	52,242	56,851	61,614	63,432	64,115
Bangkok	15,099	15,802	16,304	16,727	16,790	16,658
Central	16,658	18,036	19,640	21,288	21,894	22,125
Northeast	6,091	7,128	7,270	9,255	9,699	7,926
North	4,760	5,474	6,110	6,853	7,142	8,588
South	5,151	5,802	7,527	7,491	7,907	8,818
Total of EFTPOS terminals	267,168	264,004	311,356	388,673	416,843	474,363
Bangkok	133,712	129,680	146,012	186,273	176,158	195,851
Central	61,134	61,824	76,939	93,386	111,471	128,523
Northeast	17,751	18,897	24,004	29,621	36,432	42,371
North	25,966	29,184	34,105	42,846	50,905	59,773
South	28,605	24,419	30,296	36,547	41,877	47,845

Source: Bank of Thailand

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

	2011	2012	2013	2014	2015	2016
Total	77,818,347	83,966,632	87,970,298	93,491,615	93,919,633	94,020,965
Credit card <sup>1</sup>	15,328,291	16,870,025	18,626,864	20,303,751	18,974,195	20,136,341
ATM card	23,756,810	24,108,467	24,101,957	25,066,799	21,743,686	19,638,033
Debit card	38,733,246	42,988,140	45,241,477	48,121,065	50,413,672	54,152,675

<sup>&</sup>lt;sup>1</sup>Data include funds transfer, third party funds transfer and Multilateral Funds Transfer.

<sup>&</sup>lt;sup>2</sup> ICAS was implemented to replaced ECS on 4 February 2012.

<sup>&</sup>lt;sup>3</sup> Provincial Cheque Clearing migrated to ICAS since 15 November 2012 and implemented nationwide in December 2013.

<sup>&</sup>lt;sup>4</sup>Inter-provincial Cheques cleared via ICAS since 16 May 2013.

<sup>&</sup>lt;sup>1</sup> Automated Teller Machines (ATM) and Cash Deposit Machines (CDM)

<sup>&</sup>lt;sup>2</sup> Data include commercial banks and some credit card companies.

<sup>&</sup>lt;sup>1</sup>Data include non-bank.

Table 19: Sources of payment revenues of Thai commercial banks (million Baht)<sup>1</sup>

	2011	2012	2013	2014	2015	2016
Total	57,190	65,571	71,680	76,257	81,715	87,648
Credit card	19,867	24,049	27,419	29,501	31,347	33,210
ATM/Debit card and e-banking	19,288	22,475	25,194	26,851	29,275	31,575
Money transfer and collection	15,937	16,875	16,944	17,896	19,178	21,051
Cheque-related fee	2,098	2,172	2,123	2,009	1,915	1,812

Table 20: Sources of payment revenues of foreign bank branches (million Baht)<sup>1</sup>

	2011	2012	2013	2014	2015	2016
Total	4,153	3,991	4,428	4,323	3,964	4,153
Credit card	2,945	2,653	3,011	2,844	2,758	2,903
ATM/Debit card and e-banking	49	50	50	48	41	42
Money transfer and collection	1,029	1,162	1,234	1,310	1,063	1,109
Cheque-related fee	130	126	133	121	102	99

Source: Bank of Thailand

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

	2011	2012	2013	2014	2015	2016
BAHTNET <sup>1</sup>	11,180	12,025	13,278	13,901	14,909	16,446
Intra-provincial Cheque in Bangkok and	214,885	216,886	212,453	204,961	200,415	193,941
vicinity <sup>2</sup>						
Intra-provincial Cheque in Regional Area <sup>3</sup>	60,553	60,407	54,336	46,756	45,484	44,160
Inter-provincial Cheque <sup>4</sup>	27,543	27,625	33,505	44,966	46,431	46,516
ITMX Bulk Payment	114,346	126,606	142,304	154,874	169,674	191,758

Source: Bank of Thailand

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

	2011	2012	2013	2014	2015	2016
BAHTNET <sup>1</sup>	3,138	2,649	2,774	3,094	3,254	3,582
Intra-provincial Cheque in Bangkok and	131	141	147	137	136	135
vicinity <sup>2</sup>						
Intra-provincial Cheque in Regional Area <sup>3</sup>	14.4	15.6	15.0	14.3	13.9	13.3
Inter-provincial Cheque <sup>4</sup>	1.8	2.0	2.7	3.8	4.1	4.2
ITMX Bulk Payment	5.7	7.2	8.9	10.1	10.4	12.0

<sup>&</sup>lt;sup>1</sup>From 2013, data exclude securities custodian and letter of credit

<sup>&</sup>lt;sup>1</sup>From 2013, data exclude securities custodian and letter of credit

<sup>&</sup>lt;sup>1</sup> Data include funds transfer, third party funds transfer and Multilateral Funds Transfer.

<sup>&</sup>lt;sup>2</sup> ICAS was implemented to replaced ECS on 4 February 2012.

<sup>&</sup>lt;sup>3</sup> Provincial Cheque Clearing migrated to ICAS since 15 November 2012 and implemented nationwide in December 2013.

<sup>&</sup>lt;sup>4</sup> Inter-provincial Cheques cleared via ICAS since 16 May 2013.

<sup>&</sup>lt;sup>1</sup>Data include funds transfer, third party funds transfer and Multilateral Funds Transfer.

<sup>&</sup>lt;sup>2</sup> ICAS was implemented to replaced ECS on 4 February 2012.

<sup>&</sup>lt;sup>3</sup> Provincial Cheque Clearing migrated to ICAS since 15 November 2012 and implemented nationwide in December 2013.

<sup>&</sup>lt;sup>4</sup>Inter-provincial Cheques cleared via ICAS since 16 May 2013.

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

	2011	2012	2013	2014	2015	2016
BAHTNET <sup>1</sup>	18,581	19,303	22,190	21,820	29,033	28,827
Intra-provincial Cheque in Bangkok and	515,908	477,396	547,406	417,618	484,821	445,684
vicinity <sup>2</sup>						
Intra-provincial Cheque in Regional Area <sup>3</sup>	127,070	125,127	114,492	90,005	97,533	83,358
Inter-provincial Cheque <sup>4</sup>	125,934	125,189	172,463	184,197	188,315	190,831
ITMX Bulk Payment	359,198	417,015	508,748	473,040	574,555	615,266

Table 24: Peak day figures of BOT payment services - Value of transactions (billion Baht)

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	2011	2012	2013	2014	2015	2016
BAHTNET <sup>1</sup>	5,002.9	3,597.3	8,384.9	3,877.3	4,776.2	4,610.3
Intra-provincial Cheque in Bangkok and	259.1	268.2	283.4	266.0	297.5	248.6
vicinity <sup>2</sup>						
Intra-provincial Cheque in Regional Area <sup>3</sup>	23.3	25.7	26.8	25.6	25.1	22.4
Inter-provincial Cheque <sup>4</sup>	6.5	6.8	11.0	12.4	12.6	13.7
ITMX Bulk Payment	19.2	28.8	44.3	77.8	46.4	83.1

Source: Bank of Thailand

Table 25: Use of mobile banking

	2011	2012	2013	2014	2015	2016
No. of agreements	706,439	864,312	1,164,796	6,229,960	13,918,815	20,883,147
Volume of transactions	19,941,530	36,285,076	57,198,604	109,349,726	263,922,502	584,983,180
Value of transactions (million Baht)	186,511	439,960	751,558	1,364,022	2,800,299	5,360,605

Source: Bank of Thailand

Table 26: Use of internet banking

	2011	2012	2013	2014	2015	2016
No. of agreements	5,626,233	6,645,161	8,033,061	10,159,971	11,901,117	15,095,696
Volume of transactions <sup>1</sup>	83,841,394	125,276,726	161,784,249	188,408,939	186,236,816	240,461,111
Value of transactions (billion Baht)	8,779.7	14,112.1	19,548.0	20,500.4	23,629.7	29,706.3

 $<sup>^{\</sup>rm 1}\,{\rm Data}$  include funds transfer, third party funds transfer and Multilateral Funds Transfer.

 $<sup>^2\,\</sup>mbox{ICAS}$  was implemented to replaced ECS on 4 February 2012.

<sup>&</sup>lt;sup>3</sup> Provincial Cheque Clearing migrated to ICAS since 15 November 2012 and implemented nationwide in December 2013.

<sup>&</sup>lt;sup>4</sup> Inter-provincial Cheques cleared via ICAS since 16 May 2013.

<sup>&</sup>lt;sup>1</sup> Data include funds transfer, third party funds transfer and Multilateral Funds Transfer.

<sup>&</sup>lt;sup>2</sup> ICAS was implemented to replaced ECS on 4 February 2012.

<sup>&</sup>lt;sup>3</sup> Provincial Cheque Clearing migrated to ICAS since 15 November 2012 and implemented nationwide in December 2013.

<sup>&</sup>lt;sup>4</sup> Inter-provincial Cheques cleared via ICAS since 16 May 2013.

<sup>&</sup>lt;sup>1</sup> Enquiry transactions were excluded.

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

	2011	2012	2013	2014	2015	2016
Total	124,832	150,440	173,909	199,633	235,636	298,975
ATM	99,926	116,997	132,035	142,920	147,916	141,648
Counter	10,010	10,273	9,160	9,146	9,791	9,702
Internet banking	14,896	23,169	32,714	47,567	77,928	147,624

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

	2011	2012	2013	2014	2015	2016
Total	1,014	1,250	1,399	1,588	1,819	2,184
ATM	642	771	852	944	975	910
Counter	213	227	201	191	189	183
Internet banking	159	252	347	453	656	1,091

Source: Bank of Thailand

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

	2011	2012	2013	2014	2015	2016
Total	283,786	323,168	359,423	397,260	429,287	479,097
Total bill payment at bank counters	83,334	87,425	87,992	101,736	107,262	113,359
Cash	79,540	83,320	84,297	97,018	101,594	104,347
Cheque	1,658	1,663	1,560	1,911	2,321	3,007
Others	2,136	2,442	2,135	2,807	3,348	6,005
Total bill payment at non-bank counters	200,452	235,742	271,431	295,524	322,025	365,739
Cash	196,846	231,446	266,825	291,486	318,340	362,038
Cheque	298	351	346	333	361	358
Others	3,308	3,946	4,260	3,705	3,324	3,343

Source: Bank of Thailand

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

	2011	2012	2013	2014	2015	2016
Total	6,115	6,461	5,985	7,048	7,704	7,460
Total bill payment at bank counters	5,604	5,855	5,278	6,272	6,886	6,607
Cash	2,057	2,133	1,933	2,431	2,696	2,801
Cheque	2,620	2,613	2,506	2,361	2,629	2,705
Others	928	1,109	838	1,481	1,561	1,101
Total bill payment at non-bank counters	511	606	708	776	818	853
Cash	507	600	700	768	810	845
Cheque	2	2	3	3	3	4
Others	3	4	5	5	4	4

Table 31: Use of e-Money<sup>1</sup>

	2011	2012	2013	2014	2015	2016
No. of cards/accounts	13,804,287	20,220,438	24,286,746	26,852,975	31,070,380	39,181,287
Volume of transactions	348,197,980	512,331,773	669,210,802	787,932,371	883,352,315	1,076,300,313
Value of transactions (million Baht)	24,732.8	35,375.8	48,031.9	55,801.7	67,616.6	90,945.7

Source: Bank of Thailand

Data exclude top-up cards.

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

		1 0		`	,	
	2011	2012	2013	2014	2015	2016
Total fraud	150	179	204	426	2,321	593
Payment channels <sup>2</sup>	34	51	79	91	2,018	224
Payment instruments <sup>3</sup>	116	128	125	335	303	369

 $<sup>^{\</sup>rm 1}\,{\rm Data}$  collect from banks, some special financial institutions and some credit card companies .

<sup>&</sup>lt;sup>2</sup> Fraud through specific payment channels include phone banking, mobile banking, internet banking, pass book and other channels.

<sup>&</sup>lt;sup>3</sup>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

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## Payment Systems Report

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