

Payment Systems in Thailand

**Payment Systems Group
Bank of Thailand
<http://www.bot.or.th>**

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Preface

Ever since people began buying and selling goods, a payment system of some form has always been a part of the daily lives of people. Payment system has developed and evolved with the expanding economy and the advancing technology. The complexity of modern economic system and technology has made payment system all the more important, deserving of continuous development in order to ensure that it keeps pace with the needs and requirements of the business sector, the financial institutions, and the general public.

The Payment System Group, Bank of Thailand, is responsible for overseeing and developing the country's payment system in order that it is efficient and appropriately modernized. This book compiles background information about the payment system in Thailand, and is intended to be used as a study reference for financial and banking sector professionals and anyone wishing to gain an overall picture of the payment system as well as understand the methods, procedures, processes and mechanisms involved. It is hoped that such understanding of the payment system, and how it relates to the country's economic transactions, would be of use in guiding private-sector developments in conjunction with the overall policy direction of the Bank of Thailand.

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1. Introduction

Payment system refers to the process of delivery or transferring of means of payment to settle financial obligations resulting from economic activities. Payment system involves 3 principal components:

- (1) Institutions and individuals, referring to payers, payees, and institutions, in particular the financial institutions such as commercial banks that act as payment intermediaries.
- (2) Legal procedures, rules and regulations, terms of agreement, and customary practices specifying the roles, responsibilities, and relationships between the different institutions and individuals, together with the payment mechanisms involved.
- (3) Means of payment or payment media, such as cash, financial securities, plastic card, account-based funds transfer, as well as payment through electronic media.

1.1 Thai Payment System

The majority of the general population in Thailand still prefers to carry cash for purposes of making daily payments for goods and services. Should the transaction value exceed the amount of cash a person normally carries, one could obtain cash from a nearby Automated Teller Machine (ATM), or use a credit card, provided the retailer is set up for credit card transactions.

On the other hand, the commercial and financial circle has a preference for cheque as the payment medium, as it has full legal backing for payment and debt settlement purposes. That is, the cheque bearer can take legal action against the payer in the event that the cheque cannot be honored due to insufficient funds. Moreover, the Bank of Thailand (BOT) also issues BOT cheques to financial institutions and government agencies that maintain deposits with BOT for payment purposes.

Thai payment system has gradually developed over time. The pace of development is especially advanced in the metropolitans with the requisite infrastructure such as modern communication and transportation, the urban affluence, and the sheer number of service users that warrant the investments in the systems and equipment. These include, for instance, ATM machines, credit card services, or Electronic Funds Transfer at Point-of-sale (EFTPOS). Thai commercial banks first introduced cash-service ATM to the public in 1983. The service became very popular, probably due to the fact that ATM service is compatible with the societal preference for cash. Subsequently, commercial banks made their individual ATM networks inter-connected with one another, so that ATM service became more widely available and useful to the general public.

Beside cash-related developments, other aspects of payment system development include credit cards, debit cards, smart cards, direct credit, direct debit, and electronic banking services such as tele-banking and office-banking. These have become popular particularly among urban population with steady incomes.

Payment systems for financial institutions have also evolved alongside retail development. For instance, there is the BAHTNET system, an electronic funds transfer system whereby an institution can effect high-value transfer from its account at BOT to another BOT account on a Real Time Gross Settlement (RTGS) basis, transacting either on its own behalf or on the behalf of a client. As for interbank clearing, BOT operates the Electronic Clearing House (ECH) to provide net balance calculation and settlement services for handling interbank cheque clearing and retail funds transfer (Media Clearing). The ATM and interbank credit card clearing and settlement, however, are operated by the private sector.

In addition, there are other payment service providers, for instance, the Communication Authority of Thailand, who provides postal order and postal money order, a popular medium due to its wide area of service coverage. There are also the Counter Service Co., Ltd. and the Telecommunication Co. Ltd. who provide utility bill payment services.

1.2 Financial Institutions in Thailand

Financial institutions constitute one of the principal components of the payment system. There are various types of banking and non-bank financial institutions. Banking institutions include BOT, commercial banks, International Banking Facilities (IBF), specialized banks (i.e. the Government's Savings Bank, Bank for Agriculture and Agricultural Cooperatives, EXIM Bank, and the Government Housing Bank). Non-bank financial institutions include finance companies, finance and securities companies, credit foncier companies, and life insurance companies, etc. There are also other financial institutions that play a minor role in the payment system. These include Savings Cooperatives and pawn shops, for instance (figure 1.1).

Financial institutions that play the crucial roles in the Thai payment system include the followings:

1.21 The Bank of Thailand

Established in 1942, BOT is responsible for all central banking activities. These include printing and issuing notes, acting as a banker for the government agencies and other financial institutions, and being the lender of last resort for commercial banks, finance companies, and finance and securities companies. Moreover, BOT formulates and implements monetary policy in order to maintain financial stability, oversees the payment system, and supervises the operations of financial institutions. The supervised institutions include commercial banks, finance companies, finance and securities companies, credit foncier companies, and specialized banks, as designated by the Ministry of Finance.

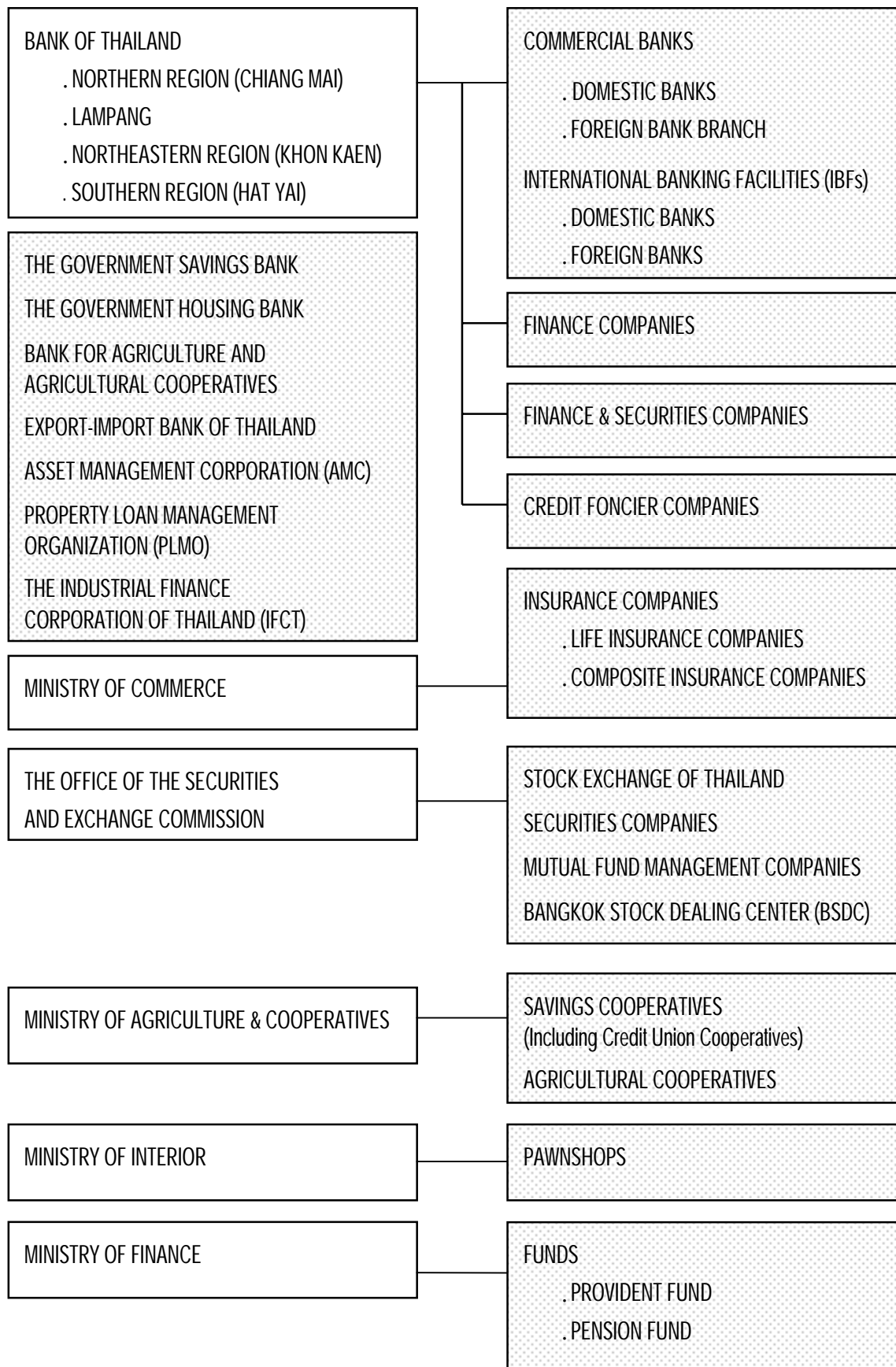


Fig. 1.1 Financial institutions in Thailand (as of December 31,1999)

1.22 Commercial banks

Established under the Commercial Banking Act, the business of commercial banking consists of taking time, saving, and current deposits, issuing certificates of deposit, securing loans domestically and from abroad, lending, buying and selling of foreign exchanges, and trading bills of exchange and other tradable financial securities. Commercial banking also pertains to various other businesses customarily performed by a commercial bank, including funds transfer services. Presently, commercial banks may also apply for additional licenses from BOT in order to expand their scope of businesses, i.e. to include such items as International Banking Facilities (IBF) ^{BOK 1.1}, information and consultancy services, underwriting sales of government and state-enterprise securities, managing mutual funds, and acting as debt-collection agents, etc.

In Thailand, commercial banks are the largest form of financial institutions in terms of asset holding. They also enjoy nationwide networks of branches. As such, they play an important role in mobilizing savings and lending funds to people and businesses (figure 1.2).

1.23 Specialized Banks

Specialized banks are government-owned banks that were established under specific legislation. Their objectives are to provide financial services to their target customer groups. Different specialized banks operate variously as follows:

(1) Government Savings Bank (GSB) Established in 1913, its function is to mobilize funds from the public for investment and lending to the government, state enterprises, and the private sector. Of all the banking institutions, it enjoys the largest number of branches, spreading throughout the country. GSB even operates on-land and on-water mobile deposit-taking units that can reach the people in the remotest corners. Funds are mobilized from the public in the forms of time, call, current, and endowment deposits, as well as GSB lottery. In addition, GSB also provides domestic traveler's cheque, a service not provided by any other bank. Since 1996, GSB has added the ATM facility to their customers. However, it is a closed network, not yet linked with the commercial banks' ATM Pool.

(2) Government Housing Bank (GHB) Established in 1953 to provide financial support for public housing needs, the bank's capital pool is drawn from deposits, foreign and domestic borrowings, and the bank's capital funding.

(3) Bank for Agriculture and Agricultural Cooperatives (BAAC) Established in 1966 for the purpose of financially assisting the agricultural sector, the bank provides favorable terms of assistance to promote the livelihoods and economic activities of farmers, farmer's groups, and agricultural cooperatives. Its capital source derives from deposit taking, bond issuance, foreign and domestic borrowings, and securing BOT loans.

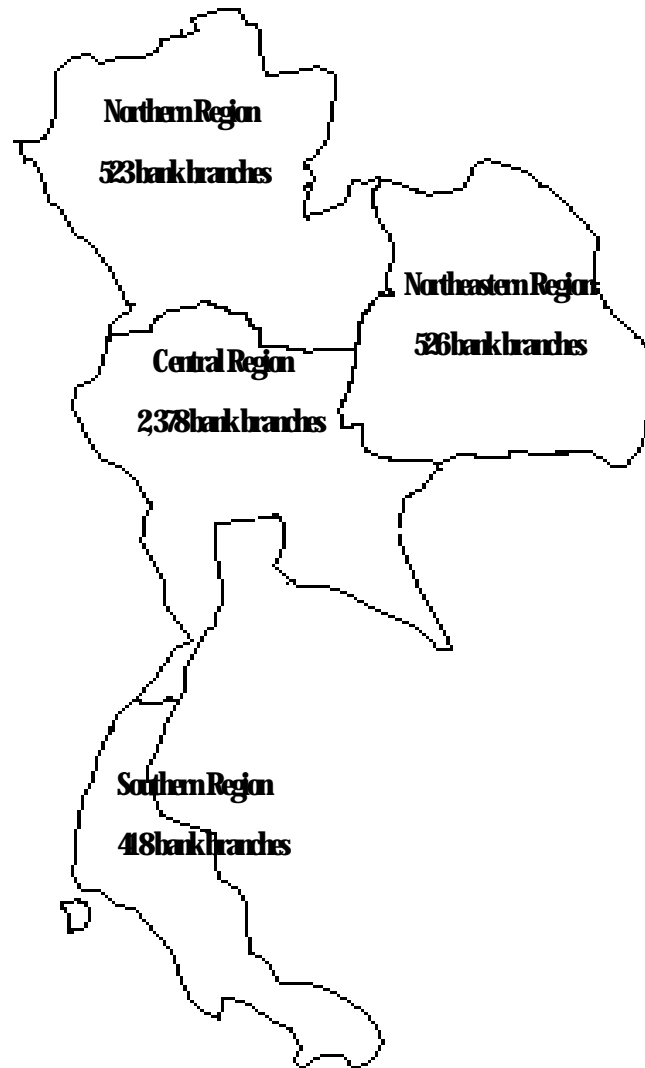


Fig 1.2 Commercial banks all over the Kingdom 3,845 branches
(as of December 31, 1999)

(4) Export-Import Bank of Thailand (EXIM) Established in 1994 for the purpose of providing financial support for international trades and foreign investments, it offers direct loans, guarantees loans, insures exports, or provides other financial services as necessary. EXIM also plays a role in advising import-/export-related matters to Thai businesses. Its capital source comes from domestic and foreign borrowings as well as the issuance of debt instruments.

1.24 Finance, Finance and Securities, and Credit Foncier Companies

Second in importance to the commercial banks, finance companies, finance and securities companies, and credit foncier companies play a crucial role in the Thai financial system. Authorized by the Act on the Undertaking of Finance Business, Securities Business, and Credit Foncier Business of 1979, this group of financial institutions normally raises capitals from the issuance of promissory notes, used as evidences of borrowing from the public. These financial institutions may also issue bills of exchange and certificates of deposit. Finance businesses are under the BOT supervision, while securities businesses are under the supervision of the Securities and Exchange Commissions (SEC).

Following the financial liberalization in 1991, financial institutions were granted permissions to perform more diverse businesses, such as IBF, for instance. This led to a rapid growth of capital market development, with heavy competitions within the financial industry. However, many of these financial institutions had since succumbed to the financial crisis in 1997, and had to be closed down or merged with the government-owned banks. In turns, this provided the opportunity for foreign banks to buy up equity stakes, thus enabling them to operate commercial banking, finance company, and finance and securities company businesses. A number of legislation amendments had been implemented to accommodate such operations by foreign joint-investors.

Even though there are diverse types of financial institutions in Thailand, with different core objectives, only commercial banks and specialized banks are allowed to provide payment-related services to their customers. With numerous branches throughout the country, and enjoying intimate relationships with the business and commercial circle, commercial banks clearly play an important role in providing funds transfer and payment services for business and commerce. In particular, payment with commercial-bank cheques figures prominently in the Thai economic system.

BOX 1.1 International Banking Facilities

On March 2, 1993, Thai authorities granted the commercial banks the permission to operate International Banking Facilities (IBF). As of December 31, 1999, there were altogether 46 domestic and international banking institutions that operate IBF businesses. Of these, 13 were Thai commercial banks, 18 were domestic branches of foreign banks, and 15 were foreign banks not operating domestic branches. IBF transactions involve foreign exchanges, with deposit taking and borrowing from abroad and lending to domestic and foreign clients. IBF transactions can be categorized as follows:

- Foreign Lending (out-out)
- Domestic Lending (out-in)
- Other IBF businesses, including buying and selling of foreign exchanges, aval, foreign loan guarantees for foreign clients, and opening L/C.

2 Institutional Aspects

21 General Legal Aspects

Among the institutions that provide payment services in Thailand, the principal remains the Bank of Thailand, established under the Bank of Thailand Act of 1942 and operating under the Royal Decree Regulating the Affairs of the Bank of Thailand of 1942. As per the Royal Decree, BOT operations which concern the payment system include issuing, managing, and printing notes and bank notes^{BOX 21}, managing the country's reserves, and operating the interbank clearing system. Second in importance are the Thai commercial banks and the local branches of foreign banks, which operate in accordance with the Commercial Banking Act of 1962 and are under direct supervision of the BOT.

Currency operations such as the issuance of notes are carried out according to the Currency Act of 1958. Other financial papers used as a means of payment such as cheques, bills of exchange, and promissory notes are under the Civil and Commercial Code.

Funds transfer in paper-based form falls under the Civil and Commercial Code. However, there is as yet no law specifically legislated to govern funds transfer through electronic means. As such, it is up to the service-providing commercial banks to set the guidelines and conditions of use with their clients. Moreover, these guidelines have not been standardized. As such, any dispute that may arise would have to be settled by the Civil and Commercial code.

21.1 BOT Regulations Pertaining to the Payment System

In its capacity as the provider of electronic interbank cheque clearing, large-value funds transfer (through BAHTNET), retail funds transfer (through Media Clearing), and provincial cheque clearing and collection services, BOT has established regulations and guidelines specifying the rights and responsibilities, as well as the conditions of use between the service provider and the members using the system. They are as follows:

- (1) The Bank of Thailand Regulation on BAHTNET 1995
- (2) The Bank of Thailand Regulation on ECS 1996
- (3) The Bank of Thailand Regulation on Media Clearing 1997
- (4) The Bank of Thailand Regulation on Interbank Settlement for Clearing Houses Operating Outside Bangkok 1996 and as amended in 1997
- (5) The Bank of Thailand Regulation on Interbank Settlement for Provincial Cheque Clearing in Bangkok 1997
- (6) The Bank of Thailand Regulation on Reporting the Net Clearing Position of Interbank Provincial Cheque Collecting in Bangkok 1999

21.2 Guidelines for Providing Electronic Funds Transfer Services

In its supervisory capacity over the payment system, BOT anticipates that the lack of specific law pertaining to electronic funds transfer may lead to an unfair treatment to customers. Therefore, with the principal concern over consumer protection, BOT introduced operating guidelines for commercial banks with regards to electronic funds transfer services. These are as follows:

- (1) Commercial Bank's Guideline on Electronic Funds Transfer, July 5, 1994
- (2) BAHNET Funds Transfer Guideline for Commercial Bank's Customer Service, April 5, 1999
- (3) Media Clearing Guideline for Commercial Bank's Customer Service, January 16, 1997

21.3 Revising the Legal Codes Concerning the Payment System

The lack of specific law pertaining specifically to the payment system means that payment transactions fall under the Civil and Commercial Code. However, BOT and other concerned government agencies are well aware of the rapid pace of development in computer and information technology, and hence the need to ensure that the legal framework stands ready to cope with such a rapid technological development. The Ministry of Justice and responsible agencies are in the process of revising the Civil Procedure Code in order to support the admissibility of electronic data as evidence in court. Moreover, official bodies have undertaken to draft altogether five information technology laws, as follows:

- (1) Data Protection Law
- (2) Computer Related Crime Law
- (3) Electronic Transactions Law
- (4) Electronic Signature Law
- (5) Electronic Funds Transfer Law
- (6) Universal Access Law

22 Roles of other institutions that provide payment services

Payment service providers play different roles according to the type of institutions. They are as follows:

221 Commercial banks

Commercial banks throughout the country provide paper-based media, such as cheques and drafts, as well as non-paper-based media, such as EFT and ATM, to individuals and legal entities in general.

222 Specialized Banks

Specialized banks, i.e. GSB, GHB, BAAC, and EXIM Bank, can issue cheques to their clients and provide funds transfer services to the general public.

223 Communication Authority of Thailand

Communication Authority of Thailand (CAT) provides payment services such as postal and money orders. Some are cash exchangeable at any post office location. Others require the payee to exchange for cash at specified locations only. They can be sent both domestically and abroad via normal post, EMS, or telegraph. In addition, CAT has extended its payment services to include the payment of utility bills, i.e. electricity, water, and telephone bills, as well as the payment of annual car taxes and traffic violation penalties, and funds transfer services with a number of commercial banks, etc.

The main advantage of using postal payment services is that they provide convenient methods of payment and funds transfer to the general public, particularly those in the rural areas, as there is a post office in every county. However, at present post offices cannot provide electronic funds transfer services.

It should be noted that, unlike commercial banks and other payment service providers, CAT is not under BOT supervision, but operates under the Postage Act of 1934 and the Ministry of Transportation's Ministerial Regulation.

224 Card Issuing Institutions

Card issuers in Thailand consist of commercial banks and prominent credit card companies, i.e. VISA, MasterCard, Diners, and American Express. In addition to making payment, these cards allow the card holders to withdraw cash from ATMs. Meanwhile, cash cards, which allow value refilling, are still in the initial stage of gaining acceptance, there being a limited number of stores that accept its use for transactions. Microcash is one example of such a cash card.

23 BOT Roles

The Bank of Thailand Act of 1942 stated three main responsibilities of the BOT as follows:

- (1) To exercise the authority to issue, manage, and print notes and bank notes.
- (2) To act as the banker for the government and financial institutions, whence administering an interbank clearing system
- (3) To act as an agent of the government in carrying out any entrusted responsibilities.

231 Note Issuance

According to the Bank of Thailand Act of 1942, BOT is the sole authority that can print, manage, and issue notes in Thailand. The BOT is authorized by the Currency Act of 1958 to issue notes under one of two conditions as follows:

(1) To issue notes in immediate exchange for notes previously issued and being withdrawn from circulation. Of the notes taken in, those deemed unusable are destroyed, while those in usable conditions are sorted out for further circulation.

(2) To issue in an immediate exchange for an equal value of currency reserves assets ^{BOX 2.2} as stated in Article 30 of the Monetary Act of 1958. These assets enter into the currency reserves account, and the notes go out into circulation.

The amount of new notes being issued depends on the economic situation and the public demand for various denominations. The 1992-1997 period saw increases in new notes ranging from 8 percent to 18 percent annually. In any event, each new note must be fully backed by the currency reserves assets.

232 Payment Services and Payment System Development

In its central banking role at the center of the country's payment system, BOT has devised relevant short-term and long-term payment system strategies. In 1981, BOT set up the Payment System Development Committee to draw up payment system development plans and to study and analyze the problem of structuring a payment system, with the Payment System Department ^{BOX 2.3} ultimately implementing the policies and plans.

In order that the undertaking proceeded in view of the economic and technological advances and business demands, BOT worked in conjunction with consulting committees on payment system and concerned bodies (please refer to figure 2.1) in outlining the guidelines, regulations, and operating procedures, and in establishing standards governing modern payment media.

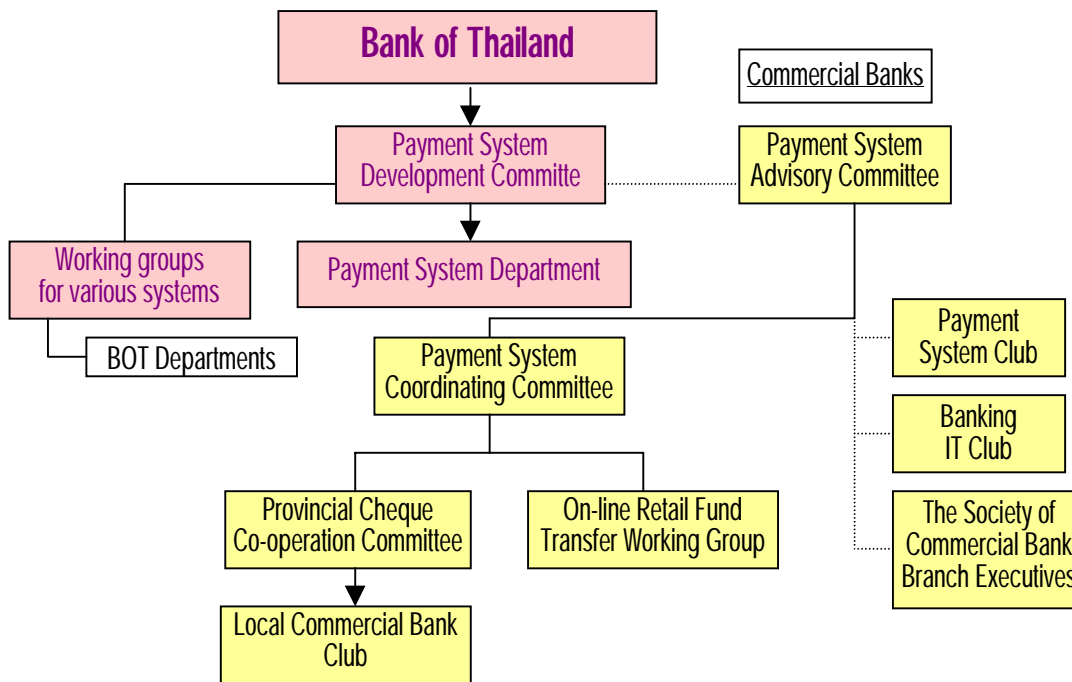


Figure 2.1: Organizational Chart of the Payment System Working Groups

BOT provides banking services to government agencies, state enterprises, commercial banks, and various financial institutions, whereby these institutions can open accounts with BOT and avail themselves to the following payment services:

(1) BOT cheque

Financial institutions having accounts with BOT can use BOT cheques as a means of payment within the limitations as stated by the BOT for different types of accounts:

a Government agencies and state enterprises can open accounts at the BOT for the receipt and outlay of budgetary allocations of funds, and may use BOT cheques for making payments. These payments generally include withdrawal of budgetary funds, making payments to individuals for construction contracts, goods delivered, and services rendered, etc.

b Thai commercial banks as well as branches of foreign commercial banks are required to open accounts at the BOT in order to deposit the legally required liquidity reserves and in order to maintain balances for interbank financial transactions. In fact, commercial banks will often use BOT cheques for making payments to banks and other institutions, as these cheques benefit from same-day clearing and settlement. In addition, BOT provides funds transfer services between commercial bank headquarters and provincial branches throughout the country, operating through BOT regional offices as well as through provincial treasuries acting as representatives of the BOT.

c. Specialized banks and other financial institutions that do not have to maintain liquidity reserves with BOT can still use BOT cheques for making payments in the same way as commercial banks.

d. Other financial institutions such as finance companies and finance and securities companies that must maintain liquidity reserves with BOT may use BOT cheques for making funds transfers between their accounts at BOT and other banks, but not for making payments to other individuals in general.

(2) Funds Transfer via the BAHNET System

BOT provides, via the BAHNET system, electronic funds transfer services for transferring funds between the accounts held at BOT by the commercial banks, financial institutions, and government agencies. Commercial banks can also perform third-party funds transfer on behalf of their customers nationwide, who would like to transfer funds to beneficiary accounts at other banks.

(3) Calculation and Settlement of Net Clearing Positions

a. Cheque clearing system BOT provides electronic interbank cheque clearing services for its member banks within Bangkok and its metropolitan areas. First, the member banks send cheque information on-line to the ECH, who then calculates the net clearing positions and carry out settlement via the BAHNET system. Physical cheques are then delivered to ECH later that evening. These are matched against electronic data processed earlier and are sorted for delivery to the paying bank for verification.

For interbank cheque clearing between provincial bank branches located within the same provincial clearing zone, the provincial clearing houses will send net positions to BOT for net clearing positions calculation and settlement. The settlement is done through the BAHNET system.

b. Media Clearing system BOT and its member banks have introduced the Media Clearing system in order to assist clients in making, on a regular basis and with pre-authorization, many small-item payments to accounts held at other banks, such as in the case of making salary, dividend, goods and services payments, and utilities bill payments. The ECH acts as the center for recording, processing, and calculating payment information, and settles the net clearing positions for the member banks through the BAHNET system.

233 Payment System Supervision

The main objective in supervising the payment system is to ensure fairness for service-providing banks and their customers, control the commercial banks' cost of

investment, and advise banks with regards to providing any kind of electronic funds transfer services. BOT has defined its roles on these matters as follows:

- (1) Regulate and supervise the payment system by issuing operating guidelines for commercial banks with regards to providing payment services, for instance, guidelines for providing electronic funds transfer services, guidelines for third-party transfer through BAHNET, and guidelines on Media Clearing
- (2) With regards to cash withdrawal using ATMs, BOT has the policy of having commercial banks utilize a common ATM network (ATM Pool), with one network serving the entire country. This should lower the commercial banks' cost of investing in ATM machines.

With regards to ATM service fees, BOT intends to foster open competition according to the market mechanism, but nonetheless supervises the fee schedule in order to ensure an adequate level of consumer protection.

- (3) With regards to establishing the On-line Retail Funds Transfer (ORFT) network, BOT supports commercial banks, through the Thai Bankers' Association, in providing retail interbank funds transfer via the ATM network. Commercial banks are presently preparing to start operating the system

234 Examination and Supervision of Financial Institutions

BOT is responsible for examining, analyzing, controlling, supervising, and monitoring financial institutions in order to ensure that they operate in a safe and sound manner, and that they comply with the legislation, official announcements, decrees, and guidelines, as specified by BOT. In addition, BOT also guards against unlicensed commercial banking securities and credit foncier businesses. Finally, BOT responsibilities extend to supervising the operations of specialized banks, as assigned by the Ministry of Finance.

235 Monetary Policy

BOT conducts its monetary policy through the liquidity reserve requirement, liquidity management, and moral suasion. With regards to liquidity reserve requirement, commercial banks, finance companies, and finance and securities companies must maintain reserves in proportion to the outstanding deposit and in accordance with the conditions specified by BOT.

As for liquidity management, BOT manages the liquidity condition through the Repurchase Market, through the Loan Window, and by conducting Bond Auction.

236 Public Debt Management and Custody of Government Securities

In addition to maintaining deposit accounts for the government, state enterprises and governmental institutions, BOT, in its capacity as a banker for the government, also manages public debt by lending to or arranging for financing for the government and state enterprises. The Ministry of Finance authorizes BOT to borrow on its behalf,

conducting treasury bill auctions for short-term borrowing and treasury bond auctions for long-term funding. In any event, BOT is responsible for sales, redemption, coupon payments, and registry for government bonds as well as state-enterprise bonds with governmental guarantee.

24 Roles of other institutions

241 Thai Bankers' Association

Thai Bankers' Association is the collaboration of the commercial banks registered in Thailand. The association's involvement with the Thai payment system concerns carrying out the BOT policy with regards to developing the ORFT system, which responds to the public needs for small-value interbank funds transfer services. (Details of ORFT are given in section 3.3.1.) A working committee with BOT representative is created.

To ensure that funds transfer transactions and various forms of payments between banks proceed smoothly, a number of institutional "Clubs" have been created under the association's auspice to seek coordination and cooperation in providing payment services. These include, for example, the Payment System Club, the Banking IT Club, the Credit Card Club, the Branch-Operation Manager Club, and the Provincial Bank Club, etc. Furthermore, the Thai Bankers' Association assumes an important role as the representative of Thai banks, advising BOT and other government agencies on the development of, and the issuance of regulations concerning, various payment and payment system innovations in order to ensure fairness to all parties concerned.

242 The Foreign Banks' Association

The Foreign Banks' Association is the collaboration of foreign commercial banks' branches, Bangkok IBF (BIBF), and representative offices. Its purpose is to work jointly with BOT and the Thai Bankers' Association on matters relating to the payment system.

243 The Thailand Securities Depository Co Ltd

The Thailand Securities Depository Co. Ltd. was established and majority-owned by the Stock Exchange of Thailand as the settlement and deposit center for Thai securities. It provides securities payment, delivery, deposit, and registry services to its members. Working in conjunction with BOT, it plans to develop a delivery-versus-payment (DVP) method for the clearing and settlement of securities through the BAHNET system. It is currently undergoing negotiation with the Securities Brokerage Co. Ltd. on this matter.

244 The Processing Center Co Ltd (PCC)

The Processing Center Co. Ltd (PCC) was established with the investment by a number of Thai commercial banks and private companies to function as a back-up computer center for stockholders and to provide cheque sorting services for a number of Thai commercial banks. Subsequently, when Thai commercial banks reached the BOT-initiated agreement to combine ATM networks into a common ATM pool, PCC's role then shifted into that of a Switching Center, processing information and calculating fees incurred between banks. Moreover, when the Thai Bankers' Association introduced the plan to develop the On-line Retail Funds Transfer (ORFT) system, PCC was entrusted with developing the system on the existing ATM network.

BOX 21 Bank Notes

The Bank of Thailand has been given the sole authority to issue bank notes according to the Bank of Thailand Act 1942, Section 23, which states as follows:

Section 23: “Until such time as the international monetary position has become sufficiently clear and stable, the issue and management of bank notes by the Bank of Thailand shall be governed by the provisions of the laws on the currency system and the term “note” used in the said laws shall be deemed to include bank notes issued by the Bank”

On the occasion of the commemoration of the sixtieth birthday of His Majesty the King on December 5, 1987, the Bank of Thailand issued its first “bank note” 60 Baht denomination, on June 3, 1987, in accordance with the Bank of Thailand Act in 1942, thereby performing all of the stipulated central banking duties for the first time in the central bank’s 45 year history. The issuance of bank note was thus a historical event in the country’s monetary system as well.

Note that the foreign commercial bank branches had previously brought bank notes into use on May 21, 1889, during the reign of King Rama V. These bank notes started to be withdrawn from the system in the year 1902, when Thai government started issuing its own notes for the first time.

BOX 22 Currency Reserves

According to Section 30 of the Currency Act in 1958, currency reserve comprises the following assets:

- (1) gold,
- (2) foreign currencies which are convertible currencies or any other currencies prescribed by a Ministerial Regulation, which must be in the form of deposit with a bank outside the Kingdom or with an international financial institution,
- (3) foreign securities payable in foreign currencies as stated in (2),
- (4) gold and foreign assets paid as subscription to the International Monetary Fund,
- (5) Reserve Tranche Purchase Certificate,
- (6) Special Drawing Right Certificate,
- (7) securities of the Thai Government payable in foreign currencies as stated in (2) or in baht,
- (8) domestic bills which the Bank of Thailand is permitted to purchase or rediscount, provided that the total value thereof does not exceed 20 percent of the total amount of notes issued.

With respect to the assets stated in (1), (2), (3), (4), (5) and (6) above, the Bank of Thailand shall be required to maintain their total value at not less than 60 percent of the notes issued.

BOX 23 Payment System Department, The Bank of Thailand

The Payment System Development Committee had established a number of working groups to study and recommend on the development of the payment system to the committee, to coordinate with consultant companies, develop the payment system in Thailand, as well as establish contacts and coordinate with various agencies both inside and outside the BOT. Of the many working groups established, one is the Payment System Development, which is responsible for the coordination with internal and external agencies related to the payment system. The working group's workload increased by many folds during the rather detailed system design phase, more than could be handled with the number of officers present in the working group. In August 1993, BOT established the Payment System Development Office (PSDO), to be responsible for the working group's responsibilities.

After the launching of BAHTNET and the first phase of the ECS, BOT has transferred the operation and workforce in the clearing house, which is then under the Deposits and Bond Department, to the PSDO to handle full-fledged electronic cheque clearing operation. Subsequently, in February 1996, BOT had elevated the status of the Payment System Development Office into the Payment System Department.

The Payment System Department is responsible for studying, analyzing and monitoring the payment system operations. It also supervises and develops large-value funds transfers, cheque clearing as well as media for making electronic funds transfer. Furthermore, the department is responsible for studying, surveying, analyzing, and recommending on the organizational structures, operations, laws, rules and regulations, etc., in accordance with, and in support of, monetary policy operations and long-term payment system development. Finally, it advises the Payment System Development Committee on any matter of relevance to the payment system development and ECH management policies.

3 Means of Payment

The most popular payment medium is cash. This is due to a variety of reasons. It is convenient to carry cash around for transactions; it is immediately accepted everywhere as a legal tender; cash is suitable for small-valued goods and services transactions in a country with a relatively low-income population; and in many parts of the remote outreach, there is no suitable substitute for cash. Other payment media, i.e. cheques, drafts, bills of exchange and promissory notes, were brought into use contemporaneously with the expansion of the economy and the development of the commercial banking system. The evolution of the commercial banks' roles as financial intermediaries for such financial services as deposit taking and funds transfer has made it convenient to deliver, transfer, and store cash. Subsequently, and with the development of computer and communication technology, various banks began offering electronic services to customers. These include making cash deposit to and withdrawal from different branches, cash deposit and withdrawal via ATM, and a number of plastic-card services, including credit card and debit card services. Banks offer new forms of services as the technology progresses, with Internet Banking being one example (figure 3.1).

3.1 Cash Payment

Cash consists of notes^{BOX 3.1} and coins^{BOX 3.2}. Notes account for 96 percent of the total cash in circulation, with coins minted and distributed by the Ministry of Finance making up the rest. Since cash is a basic mean of payment, it is used as an index to measure the people's purchasing power through the money supply (M1), which includes cash and current account deposits, held at commercial banks.

During 1993 - 1997, cash accounted for 73 percent of (M1) at end of period average. The figure shows that cash is a dominant means of payment in comparison to some other countries (figure 3.2)

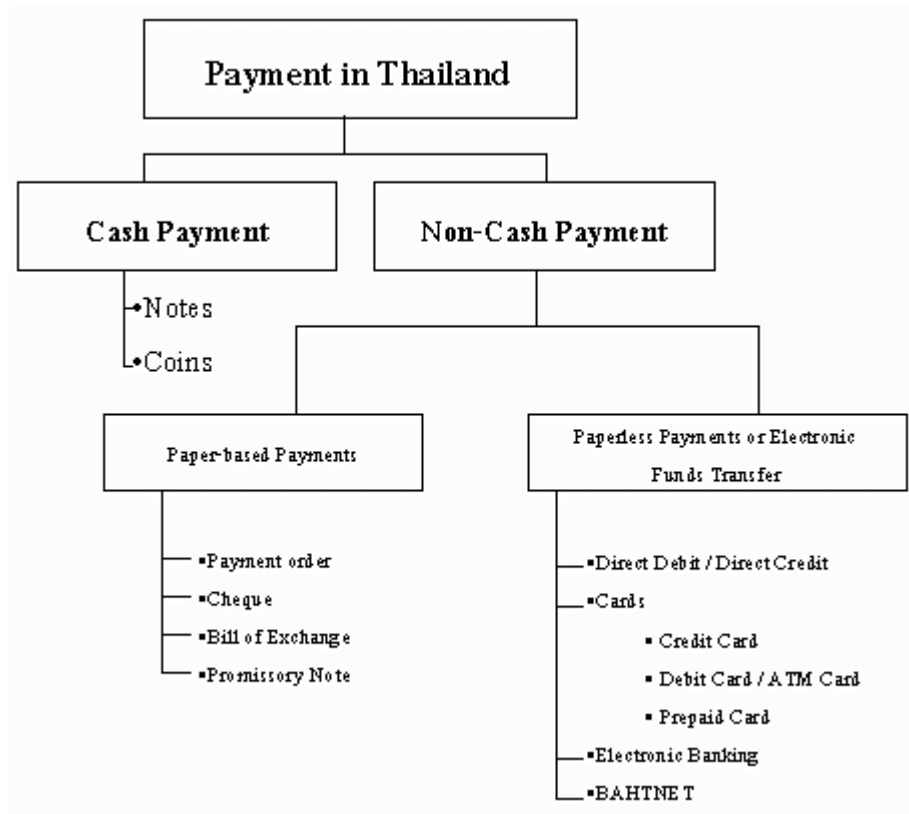


Figure 31: Payment in Thailand

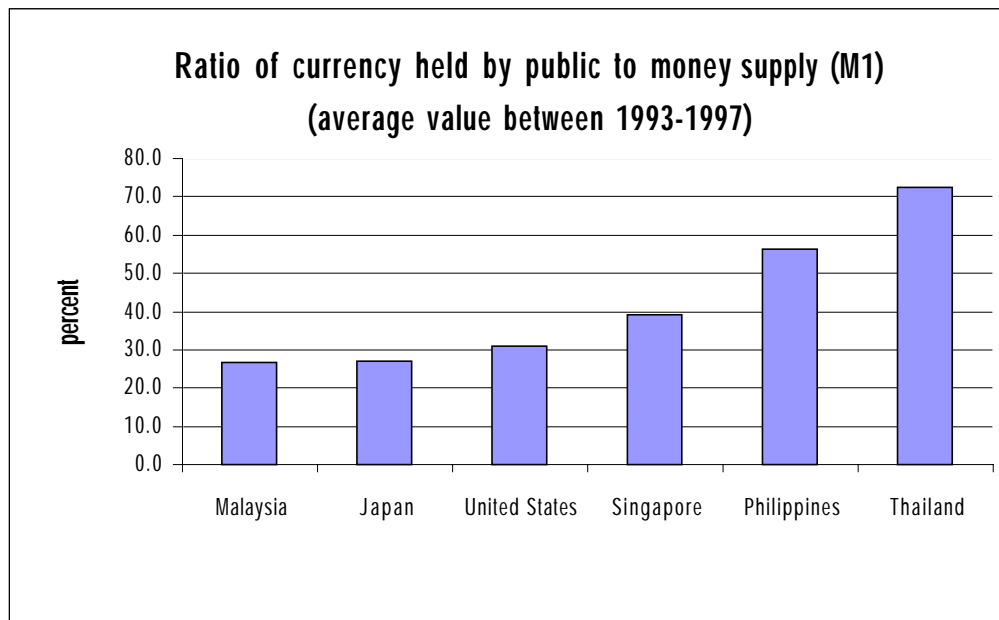


Figure 32 Average Cash as a Percentage of M1, 1993-1997

Cash-related management operations^{BOX 3.3}, most of which involve notes, entail a complicated and expensive process, from note printing, storage, transportation, amount verification, sorting out damaged notes to be destroyed, and the security measures necessary in all of these operations. With the economic expansion came the needs for higher volume of cash in circulation and the concomitant increase in cash-related costs. The business sector would also have to deal with increased economic burden, which could end up hampering business operations. Advanced economies have therefore developed non-cash payment alternatives, with hopes that such media would better facilitate business transactions and trades of goods and services.

32 Non-Cash Payment

At the end of 1997, deposit accounts with commercial banks numbered around 48 million, which translated into Baht 3.9 trillion or 83 percent of GNP. These deposit accounts form the basis from which customers can avail themselves to account-related, non-cash payment facilities. These include paper-based payment of cheques, drafts, and paperless payment such as prepaid debit transfers, credit and ATM cards, and electronic funds transfer, etc.

321 Paper-based Payments

(1) Payment Order is a form of payment in which the customer orders the bank to transfer funds from one's account to a beneficiary or to another bank account via telegraph, post, wireless, and telephone.

(2) Cheque is a means of payment in which the payer orders the bank to debit one's current account and credit the payee's account unconditionally. It is one of the most common forms of payments due to its convenience, unlimited order amount, and widely accepted in business circle.

(3) Bill of Exchange is a means of payment in which the payer orders a third party to act on one's behalf to pay the payee. It will be issued under designated conditions and time period, which may be pre-determined or may totally depend on the payee.

(4) Promissory Note is a means of payment in which the issuer promises to pay a certain amount to the beneficiary when the amount is due, i.e. at maturity.

322 Paperless Payment/EFT

As the application of computer and communication technology became commonplace in the banking and financial sectors, paper-based payments correspondingly evolved into electronic forms. These include EFT, ATM, EFTPOS, and international electronic funds transfer systems such as S.W.I.F.T. Presently, paperless payment media in Thailand comprise of the followings:

(1) Preauthorized Credit/Debit Transfer

Preauthorized credit / debit transfer was introduced by the commercial banks in 1987, beginning with the transferring of salaries from the employer's account into the employees' accounts held at the same bank, a method also commonly known as a direct credit service. Apart from this, a direct debit service was introduced for transactions that occur on a recurring basis, namely utility bills and credit card payments. Note that these types of services entailed funds transfers executed internally within the same bank. It was not possible at the time to provide such services across different banks.

In January 1997, BOT introduced Media Clearing as a retail funds transfer service for direct crediting and direct debiting across different banks. Section 4.3 discusses the Media Clearing system in more details.

(2) Plastic Cards

Plastic cards were developed in response to the consumers' desire to reduce cash holding and the desire for greater flexibility and convenience. Plastic cards are classified into 2 types according to the physical characteristics: magnetic cards and smart cards.

Magnetic cards, which have been around for quite some time, use magnetic stripes to store information, while smart cards utilize microchip technology for data storage, whence overcoming the security weaknesses of the magnetic medium. Smart cards were designed to prevent tampering and falsification with the stored information. For interoperability reasons, smart cards usually appear in the same size as credit cards. The electronic circuits, which are embedded in front or at the back of the cards, can store and evaluate the information on an off-line basis.

With the tremendous amount of information that can be stored, it is envisioned that in the future smart cards could well replace a wallet full of cash, credit/debit cards, ID cards, and health information tags. However, with the significant capital outlay necessary, smart card usage is still limited. Smart cards also suffer from the lack of a common standard and the infrastructure necessary to guarantee interoperability among cards originated from different sources.

Plastic cards can also be categorized according to the payment arrangement, such as whether the payers "pay later", "pay now", or "pay before" the transactions.

(A) Credit Cards

Credit cards imply a "pay later" type of payment. The issuer determines the cardholders' profiles and decides on the appropriate credit limits. A cardholder uses the credit card to buy goods or services, but will be exempted from making payment for a hitherto agreed-upon period of time, commonly known as a grace period. In any event, the issuer first pays for the goods or services that the cardholder buys. Later on, the monthly statement will be sent to the cardholder, showing the net balance and the due date by which the cardholder would have to submit payment. However, the issuer

may give the cardholder an option to schedule deferred payments at an interest subject to the issuer's condition. Minimum rate for deferred payments stipulated by the BOT is a payment of 10 percent of the amount due or a minimum payment of Baht 2,000.

Credit cards with no deferred payment contract offered are commonly known as charge cards. Often, the issuer is not a financial institution and therefore is unable to grant credit to its customers. The customers are required to pay the bill sent to them in full. Charge cards like American Express and Diners Club cards are generally used for paying for leisure activities, such as travels and entertainment. Another type of charge card that is commonly used is the retailer card. It is usually issued, for marketing reasons, by the department stores in order to help induce the customers to shop at their particular stores. These include, for example, Central department store and Robinson department store cards.

Credit cards issued by commercial banks rapidly grew in popularity among consumers in Thailand. By the end of 1997, there were some 1.5 million credit cards in Thailand, as compared with 1.4 millions in 1993. The value of transactions totaled Baht 150,000 million, or about Baht 12,500 million per month on average. However, the uses of credit cards abroad in 1997 amounted to Baht 11,000 million, a year-on-year decrease by about 22 percent from the end of 1996. This may reflect the economic factors and changes in the consumption pattern, as more Thai people tend to travel and buy goods domestically.

(B.) Debit Cards/ATM Cards

Debit cards imply a "pay now" type of payment, to be used in conjunction with the cardholders' saving or current accounts. Generally, the issuer would develop its ATM cards into debit cards. Examples include those issued by the Bangkok Bank, the Thai Farmer's Bank, and the Siam Commercial Bank. Examples of international debit cards include Maestro and Visa Electron Cards.

Debit card is appropriate for those who prefer not to carry around large sums of money and want to pay for goods and services out of their own accounts. The advantages for both the cardholders and the business owners are as follows:

- Not having to carry large sums of money means less risk of loss.
- No need to make stops at banks or ATMs for cash. Better and more effective cash management from the fact that the issuing bank will debit the account only on the amount tendered. The remainder still earns interest.
- The business owner can reduce both the expense and time for cash handling since the funds will be automatically transferred to them. No risk of theft and burglary for businesses, particularly those that operates 24 hours a day, such as a gasoline station and a supermarket, etc. The ATM customer base is very large. Aside from the convenience offered, card issuers need not screen cardholders, who must maintain positive balances in their accounts before direct debiting is possible, unlike commercial bank-issued credit cards, which necessitate credit screening. By December

of 1998, there were some 15.7 million ATM cards, or nine times the amounts of credit cards. The widespread acceptance of the debit card system, along with the commercial banks' efforts to develop their ATM cards into debit cards and to increase the number of EFTPOS service points, should see a significant reduction in the amount of cash usage.

(C.) Prepaid Cards

Prepaid cards imply a "pay before" type of payment. Here the cardholder pays the issuer in advance of transactions. These are designed to expedite the transactions for low-value goods or services such as the use of public telephone, car parking, expressway, or public bus fares, items normally paid with coins. This saves both the buyers and sellers the burden of making sure they have enough coins of appropriate denominations, counting and storing the physical coins. These inconveniences can all be overcome with prepaid cards.

The most commonly used prepaid cards in Thailand are the telephone cards, issued by the Telephone Organization of Thailand. Telephone cards have also rapidly gained popularity as "collectors' items", not unlike collectable stamps. Other prepaid cards are issued for cinema tickets and public bus fares, but their usage is still comparatively limited.

(3) Other Electronic Banking Services

Apart from the aforementioned EFT services, commercial banks also provide electronic banking services which each bank has its own term such as office-banking, home-banking, or tele-banking. It is an electronic service in which the customers can instantly access their account balance information and other information on an on-line basis using a telephone or a personal computer (PC), connecting to the bank's electronic network. The customer receives a password which will be used as a key to get into the bank's computer system and to perform such transactions as account balance inquiry, requesting a letter of credit, funds transfer and other types of payment. In addition, many commercial banks have developed their network to allow corporate customers to perform large-value and import/exported-related transactions over the bank's network via the Internet.

(4) BAHINET Funds Transfer

BAHINET is a large-value funds transfer system linking its users to the BOT current account system. It is a service designed for commercial banks and financial institutions with BOT accounts as well as for the general public who would use the third-party service to transfer funds from one's account to the beneficiary at another bank.

33 New Payment System Development

331 On-line Retail Funds Transfer

On-line Retail Funds Transfer (ORFT) is a funds transfer system being developed by the Thai Bankers' Association on advice of BOT. It would enable a customer of one commercial bank to make retail-level funds transfer to the transferee at other banks on an on-line basis. ORFT would be a further development of the ATM system in which interbank retail funds transfer can be performed on an on-line basis through an interbank network using the ATM platform.

332 Payment in Electronic Commerce

With the rapid advancement of the communication technology particularly the Internet came a new type of commerce, known as electronic commerce. A crucial factor in fulfilling the electronic commerce evolution is the underlying payment system, which in this context comes in 3 forms:

- (1) Credit card payment over the Internet using high-security technology.
- (2) Paper-based payment through cheques or funds transfer.
- (3) Payment with electronic money in the form of digital data electronically stored in a smart card or on the computer's hard disk.

There is a growing trend toward greater uses of electronic commerce in Thailand, with government and private-sector units realizing the importance and potential of electronic commerce throughout the world. The government had established the Electronic Commerce Working Group, fielded by representatives from various public- and private-sector organizations, to meet and discuss policies, guidelines, and standards with regards to technical, commercial, regulatory, and security considerations. This is to ensure that the development of electronic commerce and the smart card technology continue to evolve effectively in a common direction.

Most of electronic commerce payments are done via credit card and intrabank funds transfer where they are applicable.

BOX 31 Thai Notes

The use of monies among Thai people began before the founding of the Thai kingdom. During the Sukhothai era, the beginning of Thai kingdom, “Pod Duang” monies were introduced and used for the first time. Pod Duang is therefore considered to be a unique and genuine Thai monetary artifact, and its use in circulation lasted over 600 years until the year 1853, during the reign of King Rama IV, when two types of paper monies were introduced for circulation. Thai coins, meanwhile, were first minted in 1860 when the Royal Mint was built. A third type of paper monies was created during the reign of King Rama V, and started circulating in 1874. However, all types of paper monies did not gain wide acceptance, as the general public was still used to using Pod Duang monies. Subsequently, another kind of paper monies, bank notes, was introduced. Bank notes were treated as a kind of promissory note issued by branches of the Hong Kong and Shanghai Bank, Chartered Bank of India Australia and China, and by the Bank of Indochina. These were granted printing permissions in 1889, 1898, and 1899, respectively.

In 1902, during the reign of King Rama V, Thai government notes were first issued. These notes were printed by Thomas de la Rue of England. Since 1902, notes and coins became the principal monies used in the Thai monetary system, and the use of Pod Duang was phased out in 1904. Subsequently, in the year 1961, the government agreed to let the Bank of Thailand begin construction on the Note Printing Works, which was finished in 1969 and have been operating since. Presently, there are 6 denominations in circulation: 10 Baht, 20 Baht, 50 Baht, 100 Baht, 500 Baht, and 1,000 Baht notes.

BOX 32 Thai Coins

The issuance of coins in Thailand is the responsibility of the Royal Mint, the Ministry of Finance. There are two types of coins, namely coins for circulation, and commemorative coins. Normally, coins do not need to be backed up by reserves assets in the same way as notes, as the worth of the metal used to mint the coins is sufficient to establish the monetary value of the coins. At any rate, even though coins can be used to settle debts according to the law, the Ministry of Finance stipulates the amounts of debts that can be settled with coins. For example:

Coins	Maximum amount of debt to be settled with coins
Half or 1 Satang Coins	Baht 5
5, 10, 20, 25, 50 Satang Coins	Baht 10
1, 20 Baht Coins	Baht 500
5, 10 Baht Coins	Baht 1,000

The general public can exchange coins at the Royal Mint, the Ministry of Finance, and regionally at the provincial treasuries. Coins cannot be redeemed.

BOX 33 Cash-related Management Operations

The Bank of Thailand is responsible for printing, storing, and issuing notes according to the needs for notes of the government sector and private-sector financial institutions as well as for exchanges with old notes sorted out to be destroyed. The cycle begins with BOT planning notes printing in advance, and printing the various denominations according to the anticipated demand. The printed notes are then stored at the BOT head office and regional offices.

Notes are distributed by BOT to government agencies and state enterprises wanting to withdraw in cash against the fiscal budgets, to provincial treasuries needing the supply of cash for distributing to the commercial banks in their provinces, and to commercial banks requiring cash to satisfy the customers' withdrawals. These government agencies and financial institutions would tender cheques to withdraw cash from BOT.

Notes in circulation will return to BOT when government agencies, state enterprises, provincial treasuries, along with commercial banks and other financial institutions deposit them at BOT, both directly at BOT head office and regional offices as well as via provincial treasuries. Notes returned to BOT that deemed defective and/or in unserviceable are sorted out for destroy. New notes of the same amounts are brought out into circulation instead.

4 Interbank Payment and Settlement

Interbank payments can be classified into two types according to the nature of transactions that prompt interbank settlement: payment transactions for bank customers and payment transactions resulting from the banks' own businesses.

Customer transactions that result in subsequent interbank collection, payment and settlement include, for example, depositing cheques issued by a different bank, withdrawing cash from another bank's ATM, and paying with a credit card issued by another bank, etc.

Banks' own business operations also involve financial transactions that require interbank collection, payment and settlement. These include, interbank borrowing and lending, foreign exchange, trading, securities investment, as well as transactions on behalf of foreign residents involving payment instruments such as cheques, draft, cashier cheques, or BOT cheques.

Interbank payments are processed through a settlement center at the central bank or one operated by a commercial bank. In any event, the member banks must have accounts with the settlement bank, so that the banks with net debit position will have their accounts debited, while those with net credit position will have their accounts credited.

Such a method of interbank payment is a form of net settlement, whereby all interbank transactions are first netted, and payment is made once the calculation is completed and only on the net amount owed between banks. There is another method of interbank payment which is a form of gross settlement, namely the BAHTNET system, whereby each transaction simultaneously effects an account debit for the payer bank and an account credit for the payee bank on an item-by-item basis, hence the funds transfer is completed immediately.

Important interbank payment systems and settlement processes are as follows:

41 Interbank Electronic Cheque Clearing System (ECS)

41.1 Background

Until recently, interbank cheque clearing in Bangkok and the metropolitan area was a fully manual paper-based operation, with the member banks sorting the cheques by paying banks, calculating balances, and clearing among themselves. The method was subject to errors and there were delays in the clearing process effecting the financial market operations. Moreover, the increased daily cheque volume commensurate with economic growth and the worsened Bangkok traffic commensurate with urban growth meant that banks had to move up the cut-off time for depositing cheques for same-day collection, resulting in more and more bank customers missing the cut-off time. These cheques deposited late would be held for processing in the next day, with customers only able to withdraw against the cheques on the day after. These problems associated

with the manual operations were addressed by BOT with the introduction of the Electronic Cheque Clearing System (ECS). ECS relies on the electronic data read off the cheques, rather than on the physical cheques themselves, for purposes of calculating net clearing positions and customer account posting. This pertains to both normal and return rounds of collection, making Thailand the first country to operate on-line data transmission for both rounds.

The Electronic Clearing House (ECH) was established by BOT to operate the ECS, act as a center for exchanging cheques between member banks, and set regulations concerning interbank electronic cheque clearing. ECH became operational on July 16, 1996.

41.2 Regulations, Guidelines and Policies

Section 12 (16) of the Royal Decree Regulating the Affairs of the Bank of Thailand (1942) stipulates that operating an interbank clearing system constitutes a central banking responsibility, to be undertaken by BOT. As such, the Regulation of the Bank of Thailand Re: The Interbank Electronic Clearing in Bangkok (1996) was issued to ensure smooth ECS operations among member banks. This regulation specifies roles and responsibilities of member banks, operational procedures and other related operations. The regulation also stipulates that any problem relating to the interpretation of the rules should be resolved by BOT. Moreover, should a dispute arise concerning interbank clearing, as per the regulation, an arbitration panel appointed by member banks and by BOT would constitute the final arbiter.

41.3 Participants in the ECS

ECS members must legally constitute a commercial bank under the commercial banking law or a specialized bank established under a specific law. As of December 31, 1999, there were, including BOT, 38 ECS member banks, covering all member bank branches in Bangkok, Nonthaburi, Pathumthani, and Samutprakarn, as well as a number of branches in Samutsakorn, Ayutthaya, and Nakhonprathom, totaling some 1,820 bank branches. However, BOT plans to expand the scope of ECS operation to include other provinces in the near future.

The ECS system can handle both on-line and off-line ECS member banks. On-line members send cheque data to ECH via computer and communication networks; whereas, off-line members deliver physical cheques to ECH, who then read the cheque data and input the information into system on their behalf. At present, all ECS members are on-line members.

41.4 Types of Payment Instruments Handled through ECH

Payment instruments that are processed through ECS include cheques, drafts, bills of exchange, and promissory notes denominated in Thai Baht. However, these instruments must be issued by ECH member banks or have their payments guaranteed by ECH member banks.

41.5 Operational Procedures

(1) Normal Round Clearing

With ECS, customers can deposit their cheques at member banks almost any time during the banking hours. Each member bank determines its own cut-off time (approximately between 1:00 p.m. and 2:00 p.m.) within which cheque depositing customers will have their accounts credited and cheques sent for collection on the same day, and can withdraw against the deposits on the next business day.

Once on-line member banks received the cheques from their customers, they will read and transmit the cheque data on the code line, encoded with Magnetic Ink Character Recognition (MICR) printing to ECH electronically within the time limit. On the other hand, off-line member banks would have to send physical cheques to ECH for data capture. Both sources of cheque data will be combined to determine the preliminary net clearing positions, with the generated report or on-line data sent to member banks.

After that, ECS will extract and send information on high-value cheques (with amount from Baht 10 million upward) to member banks, who will then verify and possibly reject these cheques. Information on rejected high-value cheques will be removed from the new net clearing positions, while information on those not rejected will be used by paying bank to debit the paying customer accounts. The net clearing balances will be settled through the BAHTNET system. In the evening of the same day, on-line member banks must send the physical cheques to ECH for reading, sorting, and verification against the electronic information received during the day. The physical cheques are sorted by paying banks, bank branches, and account numbers, and used for verification purposes by the paying banks. Cheques sorted by banks or branches and accounts will be ready for pick up early the next morning.

(2) Return Round Clearing

On the morning of the next business day, member banks would send information on returned cheques, including reasons explaining why the cheques were returned, on-line or off-line to ECH for return-round net clearing position calculation and settlement via the BAHTNET system. The information on cheques not returned would be sent to the receiving banks, which, in turn, would release hold on their paid customers' accounts. The returned cheques are physically delivered to ECH, who would have them distributed to the sending banks later on.

41.6 Processing and Equipment

ECS relies on cheque data sent by member banks to ECH, who must have the necessary equipment and computers to read, receive, send, and process the data. They are described below (figure 4.1)

(1) Each on-line member bank is required to have a reader/encoder in order to be able to read the data printed on the code line of each cheque as well as encode the cash amount on each cheque with MICR ink type E-13B. These encoded cheques are then

sent to ECH in the evening. Each member bank must have a centralized information system that processes information from its branches and sends it to ECH electronically via an Electronic Clearing House Front End Processor (ECHFEP).

ECH uses a router, connected to member banks' ECHFEP machines, and a host machine, which processes cheque data sent by member banks to ECH and controls the operations of 6 reader/sorter machines. Each reader/sorter can read data stored in the code line at a rate of 1,700 cheques per minute, sorting them according to bank branches and account numbers. The data read is verified against the information sent electronically by on-line member banks.

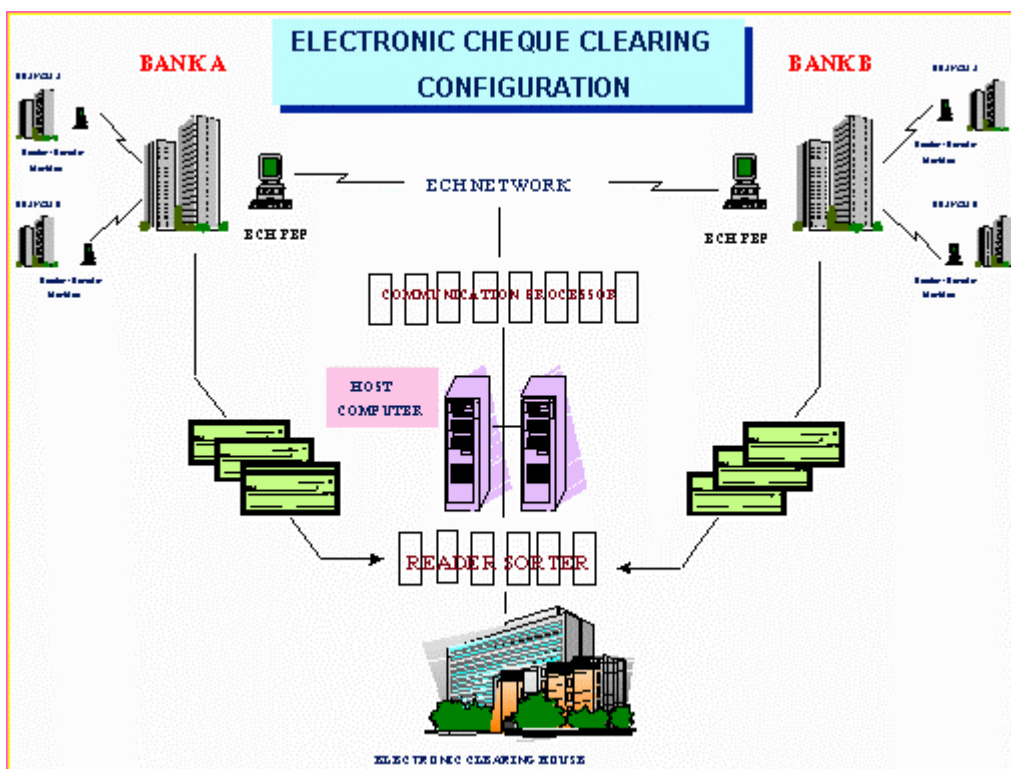


Figure 41: ECS Processing Equipment

41.7 Settlement Procedures

ECS calculates net clearing positions and prepares the electronic data for settlement via BAHNET, using its multilateral funds transfer function. The member banks' accounts at BOT will be debited/credited according to their net clearing positions. Credited banks will not be able to use the transferred funds for further transactions until after the return round of settlement in the next day.

Member banks can begin to accurately manage their funds as soon as they received the preliminary net clearing positions (by about 3:45 p.m.). If a debited bank found its BOT account balance to be insufficient for meeting settlement, then it could begin borrowing from another bank or from the money market. If the required amount could not be deposited in the debited bank's BOT account within the time limit, i.e. by 5:15 p.m., then that round of settlement will be deemed void. A new net clearing position calculation will be made, but with all items transacting with that particular bank excluded from the new calculation. The settlement will proceed as normal with respect to the remaining banks. The same settlement failure rule applies to the return round, except the normal round settlement will be re-calculated as well.

41.8 Pricing Policy

ECH is a non-profit operation. For ECS settlement and cheque sorting by banks, the sending banks are charged Baht 0.20 per cheque, while the paying banks are charged Baht 0.40 per cheque. For sorting by bank branches and account numbers, the paying bank would be charged Baht 0.60 per cheque. Moreover, in order to account for the quality of incoming cheques, ECH would charge Baht 5 for repairing each faulty cheque should the number of cheques rejected by the reader/sorter machines exceed 3 percent of the cheque volume.

At the same time, commercial banks charge their current account customers Baht 2 per cheque, and the customers are subjected to a further Baht 3 per cheque for a duty stamp. BOT supervises the setting of fees charged to bank customers to ensure that the overall fee structure is appropriate.

41.9 Security and Risk Management

For data security measures, the system employs secret codes in the data transmission. The Message Authentication Code (MAC) calculated from the incoming data for each item will be sent together with each data transmission to a paying bank. The paying bank debits its client account and prepares the return cheque data, which is sent back to ECH the next day. The system has to determine that the MAC value on the incoming message is identical to the one sent out by ECH. Moreover, should a member bank be unable to send information on-line, and has to rely on recording media, the system also provides secret codes for such a situation as well.

Because cheque information received electronically is used to calculate net clearing positions, the system minimizes operational risk from data transmission by separating out high-value cheques that can significantly effect the net clearing positions, and allowing the paying banks to examine and possibly reject these high-value cheques by 5:00 p.m., before the daily settlement commences around 5:15 p.m. Finally, there are operational procedures and contingency plans have been set up to handle emergency situations that may prohibit normal settlement procedures.

As for policies aimed at preventing settlement risks, BOT notes that commercial banks generally write high-value cheques to pay for foreign exchange transactions and that

interbank borrowing accounts for over 80 percent of daily cheque values. As a result, BOT plans to have commercial banks begin using BAHTNET funds transfers instead of high-value cheques by March 2000.

41.10 Contingency Plans

BOT has set up a backup ECH site at the BOT head office (Bangkhunprom) to handle any emergency situation that should prevent ECH from operating. The backup ECH can operate the entire cheque clearing process, from receiving and sending cheque data, to reading and sorting cheques with its 4 reader/sorter machines.

In addition, BOT has outlined operational procedures for handling varying degrees of emergency effecting member banks or ECH itself. For example, should a member bank be unable to send cheque information to ECH via a leased line, a dial-up line is to be used. Should an on-line operation fail, recording media can be used. And should a member bank be unable to prepare cheque data, the physical cheques can be delivered to ECH for processing.

42 Provincial Cheque Clearing

42.1 Background

In order to speed up and improve the efficiency of provincial cheque clearing, to reduce the cost and risk associated with cheque payments, and to facilitate cash management for member banks, BOT set out to improve the provincial cheque clearing system in the following ways:

- (1) Upgrading the provincial clearing houses to reduce the 3-7 days required to clear a cheque to a one-day clearing process. This entails expanding the clearing center coverage to include various districts within the province and some from a neighboring province. Originally the system only handled the civil district. Moreover, operational efficiency is improved through the introduction of computer systems and various improvements in the interbank settlement process. Whereas originally BOT representatives at the provincial treasuries performed interbank settlements, now these operations are centralized through the BAHTNET system (figure 4.2). BOT, in conjunction with the member banks, first upgraded the cheque-clearing center at Phuket on September 15, 1997, and has since expanded the program to other provinces, with the target of covering all 71 provinces. The details of the work process will be covered presently.

Provincial Cheque Clearing System

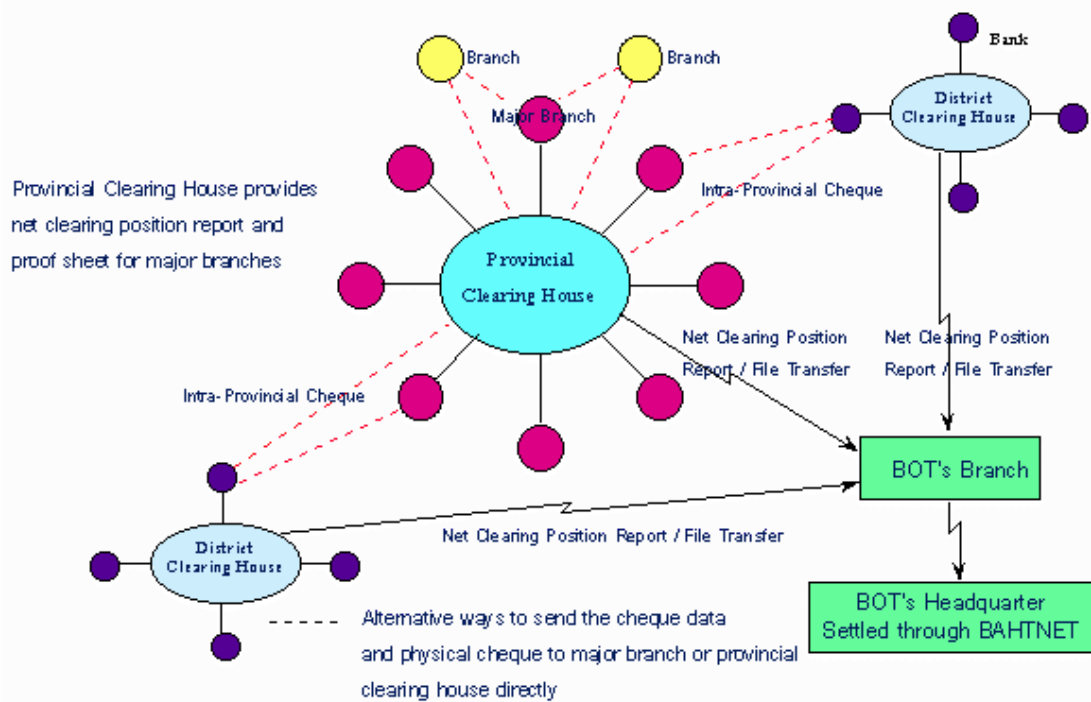


Figure42 Provincial Cheque Clearing System

(2) Improvement of the provincial bill for collection (B/C) procedures (for clearing cheques originating from different provincial clearing house domains) in order to reduce the 7-15 days previously required to within 6 working days. In the initial phase, BOT has issued a BOT regulation requiring the member banks to report B/C results to customers within the time limit. Subsequently, BOT intends to reduce the time required further:

The collecting bank has two alternatives of sending B/C for funds collection

First method: The collecting bank sends cheques to its branch that is located within the same clearing house as the paying bank. The cheques then enter one-day clearing, as per (1). Once the B/C results are known, the agent branch then notifies the original branch that called for collection.

Second method: Generally used when the collecting bank does not have a branch within the same clearing center as the paying bank, here the collecting bank sends the cheques through to the paying bank's headquarter via ECH, who calculates the net clearing positions for the member banks. The paying bank notifies its counterparty, the collecting bank, of the B/C results, and record the information for ECH, who then carries out interbank settlement via BAHTNET.

Both methods, according to an agreement reached among member banks, should take no more than 15 working days. With the new BOT regulation introduced, both methods must take no more than 6 working days. As for the development to improve system efficiency and achieve one-day clearing, this depends on the member banks' readiness with regards to acquiring the on-line signature authentication technology necessary in order that bank branches throughout the country would be able to authorize cheques on-line. BOT is in the process of establishing working plans that are appropriate for the new technologies.

422 Regulations, Guidelines and Policies

A. Upgrading of provincial cheque-clearing houses is done according to the following regulations, guidelines and operating standards:

- (1) Expanding the cheque-clearing coverage to include all districts in the province and some districts of nearby provinces. The domains are decided according to the economic relationship, the cheque-clearing traffics, and the viability of actually delivering the cheques to the clearing house for one-day clearing.
- (2) The system is based on one-day clearing, meaning that the exchange of physical cheques, interbank settlement and customer account crediting take place within the same working day, and that customers can withdraw cash on the next working day.
- (3) The nomination of a major bank branch as the representative for clearing.
- (4) Net clearing positions are sent to BOT headquarters for settlement on a daily basis.
- (5) Computer systems are used to expedite the recording of cheque data and the calculation of net clearing positions.
- (6) For branches in the outbound or remote districts, facsimiles of returned cheques can be exchanged for the return round, the process considered completed once the physical cheques are later returned in the next normal round of clearing.
- (7) Physical cheque delivery services are shared in order to save on operating costs.

With regards to the cheque clearing operations of the provincial clearing houses, member banks of each province jointly set operating guidelines, roles and responsibilities of each member bank, an agreement to which is signed and abided by all member banks. Regulations employed in all provinces are generally identical specification standards, differing only in some details, such as on matters of penalty charges, etc.

As for centralized interbank settlement of provincial clearing houses, there is the BOT Regulation on Interbank Settlement for Clearing Houses Operating Outside Bangkok 1996, as amended in 1997, which specifies the authority, roles and responsibilities for BOT in its capacity as the settlement service provider to member banks. The regulation also stipulates that member banks abide to BOT notification concerning guidelines,

procedures, and timeframes involved in interbank settlement, issued as per the regulation on settlement.

B. Concerning B/C, since 1981, Thai Bankers' Association was the one who specified B/C regulations and procedure, limiting B/C collecting time within 15 days. When sufficient progress has made 6-day B/C collecting possible, BOT issued the regulation requiring member banks to notify B/C results to customers within 6 days. This applies to both types of B/C collecting.

With regards to interbank settlement for B/C operations, BOT issued the Bank of Thailand regulation on Settlement of Inter-Provincial Cheque Clearing 1997. This specifies the authority, roles and responsibilities for BOT in its capacity as the settlement service provider to member banks, and spells out the member bank practices with regards to preparing B/C data of successfully collected B/C, for purposes of settlement within the specified timeframe.

423 Participants in the System

Members of a provincial cheque-clearing house consist of the BOT and commercial banks operating under the commercial banking law as well as specialized banks established under specific laws. There were 17 member banks, including BOT, as of December 31, 1999. Once the upgrading of provincial clearing houses is completed, there would be over 3,000 branches belonging to provincial clearing houses, with a particular branch being able to join more than one clearing house.

424 Operational Procedures

Daily operations of the one-day clearing system, using off-line computer systems developed by BOT for purposes of supporting member banks and clearing house operations, are outlined as follows (figure 4.3):

(1) Normal Round Clearing

When a member bank branch receives cheques deposited by customers, individual cheque information is entered into the system. The physical cheques will be sorted by bank, and sent to the main branch for compiling. The main branch sends the physical cheques together with the media containing cheque information to the clearing house by 1:00 p.m. The clearing house then prepares net clearing positions report for each bank branches. The in-clearing data is stored on media and is distributed to member banks together with a report. The net clearing positions combined with those from the return round will be sent to BOT via file transfer for settlement via BAHNET within the same working day.

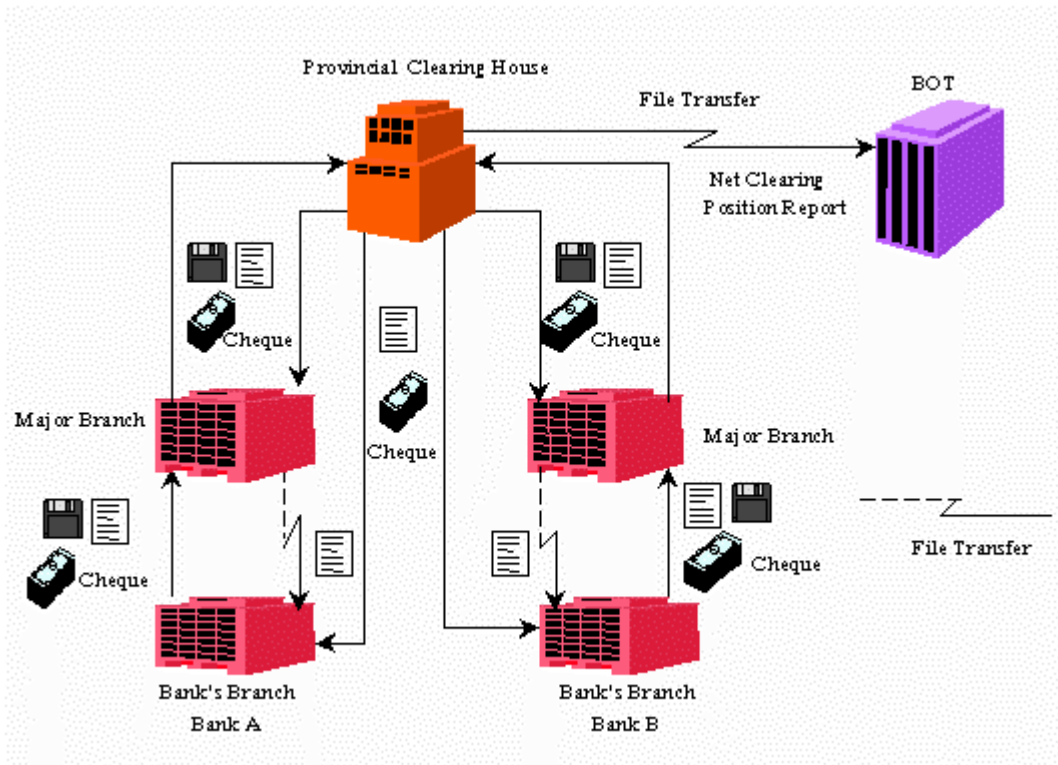


Figure 43 Operational Procedures for Provincial Cheque Clearing

(2) Return Round Clearing

On the next working day, the paying bank sort out returned cheques and enter the cheque information, together with the reasons for returning, to the system. For remote branches, facsimiles are used in place of sending in physical cheques. The main branch compiles the returned cheque information and delivers the returned cheques or facsimiles thereof, to the clearing house by 9:00 a.m. The clearing house then prepares net clearing position report for each bank branch. The information of the returned cheques is stored on media and distributed to banks together with a report. From there, the net clearing positions await those from the normal round for combined settlement on the same day.

4.2.5 Processing Equipment

The necessary processing equipment includes:

(1) Clearing House Side

Microcomputers with printers, fax modem, facsimile machines, backup power system (UPS), and telephone lines.

(2) Member Bank Side

Microcomputers with printers.

426 Settlement Procedures

For each upgraded provincial as well as district clearing house, BOT has developed the cheque settlement operations into a standardized, centralized system, one which enables more effective cash management by the member banks. By 3:00 p.m., clearing houses throughout the country send net clearing position information via file transfer to ECH, using encryption for data security.

At the ECH, the information will be decrypted and calculated for a net clearing position of each member bank. BOT regional branch will confirm the net clearing position with each member bank in the region. ECH will notify member bank headquarters of their net clearing positions between 4:00 p.m. and 4:45 p.m., and carries out settlement through BAHTNET by 5:00 p.m. Member banks with positive settlement balance can immediately use the funds.

427 Pricing Policy

In order to reduce settlement risk in provincial cheque clearing, BOT encourages the use of a centralized settlement system. BOT charges a bank at a non-profit seeking fee of Baht 1,000 per bank branch per year.

428 Contingency Plans

BOT has drawn up contingency plans as follows:

(1) Each clearing house must procure computer, telecommunication, and electrical backup systems, and staffs must be trained to be able to replace each other and operate manually. Moreover, there must be protection measures against computer virus. In the same vein, member banks are also required to secure backup machines at the main branches, which must be able to handle equipment failures at the main branches themselves as well as at the smaller branches.

(2) Contingency plans must be developed for each clearing house and member bank. For example, should a member bank be unable to deliver the cheque data to the clearing house, whether due to recording failure at main or at any other branches, the main branch will report the net clearing positions against each bank in aggregate to the clearing house. Manual operations will be used in case the normal process fails to function.

(3) In the event that a clearing house cannot send net clearing positions to BOT via file transfer, use facsimile instead. Should the facsimile fail, use other means of communication, such as mobile telephones, radio communications, or if no other means is available, postpone settlement to the next day.

43 Media Clearing

431 Background

In the past, each commercial bank provided funds transfer services to its clients, but provided that the transferor and transferee both have accounts at the same bank. In other words, it was not possible to transfer funds across different banks. In order to address this limitation, BOT developed an off-line Media Clearing retail funds transfer system. Media clearing is the convenient means for a customer in making interbank preauthorized debit / credit transactions that are large in volume and have a regular payment interval. ECH acts as a center for receiving and sorting information stored on electronic media, and calculating net balances for interbank settlement. Media Clearing started operation on January 16, 1997.

432 Regulations, Guidelines, and Policies

In order to ensure the smooth operation and service of Media Clearing system, there are regulations specifying roles and responsibilities between member banks and with ECH. The operating procedures and principles for resolving problems in the system are described in the following regulation and guideline:

(1) The Bank of Thailand Regulation on Media Clearing 1997

The regulation is applied to both member banks and ECH. Following the regulation, there are 3 additional BOT notifications on operating hours, service fees and settlement operations for retail funds transfer.

(2) Media Clearing Guideline for Commercial Bank's Customer Services

In view of consumer protection, the guideline was drafted for member banks to follow in making funds transfer agreement with their clients.

433 Participants in the System

A member bank of the media clearing system must be an ECH member, and is officially authorized by BOT to operate Media Clearing. At the end of 1999, member banks totaled 26 banks, including 13 Thai commercial banks, 2 specialized banks, and 11 foreign commercial banks.

434 Funds Transfer Services

Media Clearing carries out 2 types of funds transfer service:

(1) Credit Funds Transfer

Credit funds transfer is a funds transfer from the customer's account at one bank to another account at different bank. They are, for example, salary, dividend, and interest payments.

(2) Debit Funds Transfer

Debit funds transfer is a pre-authorized funds transfer in which a customer has agreed with a bank in prior for its account to be debited according to contractual terms such as a payment of insurance premium, mortgage and utility bills.

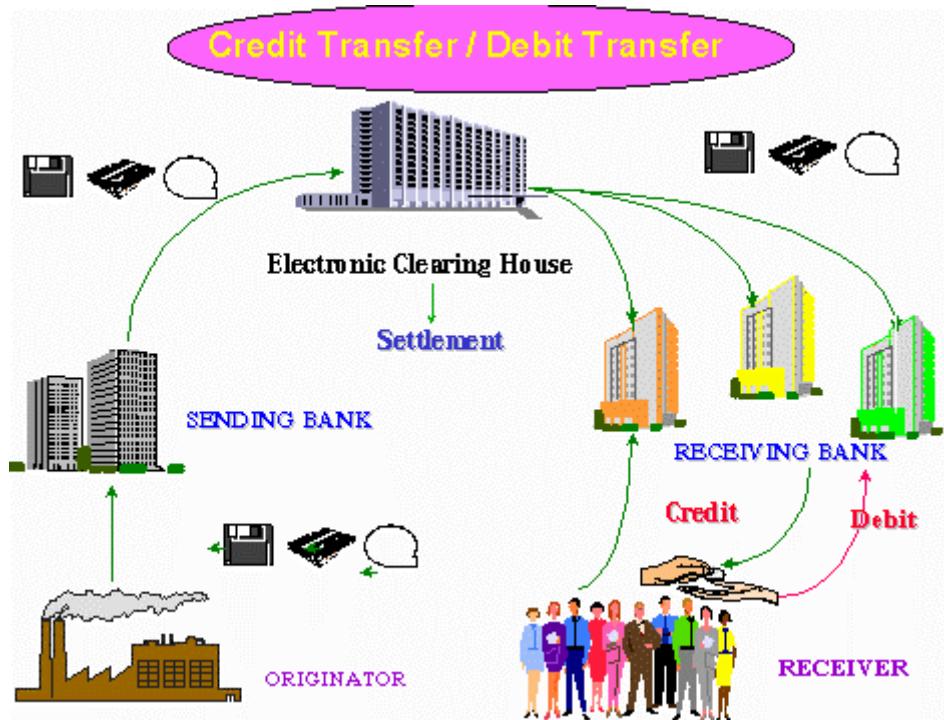


Figure 44 Media Clearing Operational Procedures

4.35 Operating Procedures

- (1) Service client prepares details concerning the transferring of funds or pre-authorized account debits to the member bank.
- (2) A member bank will sort out and verify in-house transactions before compiling other banks' funds transfer information and writing on the media in accordance with the specified standard. The media is to be forwarded to ECH.
- (3) ECH verifies the information stored on the media. Should an error occur, the media, together with an error report, would be returned to the member bank for correction. Verified media are compiled for further sorting, after which ECH calculates and records each bank's funds transfer details back onto the media, which are returned to member banks for processing.
- (4) On receiving the media and the preliminary net clearing positions, the member bank will check the stored information and post to the customers' accounts accordingly. Unsuccessful or returned items will be sent back to ECH on the next effective date.

(5) When ECH receives the media storing the information of returned items from member banks, it will verify the information, sort the items, and write the information of the returned items onto the media and send to the transferor banks.

(6) The member bank will receive information on the returned items, and the information will be used to adjust customers' accounts and to notify the customers accordingly. The member bank also receives the interbank net clearing positions, which is useful for funds management before settlement via the BAHTNET system on the effective date.

Every step involved in the sending and receiving of funds transfer data between member banks and ECH utilizes file authentication data security measure in order that both counterparties will be confident that the data is free from tampering during transmission. Moreover, each item processed at ECH will be protected by item authentication.

436 Processing Equipment

A computer is used by member banks to record funds transfer information is recorded onto electronic media such as magnetic tapes or discs. The media are brought to ECH for processing by sharing the processing equipment with the ECS.

437 Settlement Procedures

ECH will calculate the net clearing position and perform settlement via the BAHTNET system, debiting the net debtor banks' accounts and crediting the net creditor banks' accounts with BOT according to the amounts calculated on the effective date.

Should a net debtor bank have insufficient funds in its BOT account to cover payment and be unable to deposit sufficient funds within the time limit, then that settlement will be deemed void. Other banks will be notified and a new settlement calculation will be made, excluding items involving the defaulting bank. New net clearing positions are posted to member banks, followed by further crediting or debiting according to the new calculation.

438 Pricing Policy

(1) BOT provides media clearing services to encourage the use of electronic media in place of cash or cheques for making payments. Such should prove beneficial to the efficiency and cost effectiveness of the economic system as a whole. The pricing of services is based on creating the incentives to use the system, rather than based on a profit motive.

(2) In order to motivate member banks into sending information in advance, which would help evenly space out ECH workloads, fees are calculated at different rates, depending on the time the information is sent. If member banks send information many days ahead, their fees will decrease accordingly.

439 Contingency Plans

Since the media clearing system shares computer resources with ECS, it also benefits from a backup site located at the BOT head office (Bangkhunprom). As with ECS, programs and most recent data are backed up at the backup site at the end of each day.

44 BAHINET System

441 Background

As a result of the rapid economic and trade expansion experienced by the country, daily payment transactions grew in terms of both volume and value. Meanwhile, there were a limited number of payment instruments. Large-value payments were generally made using cheques, cashier cheques, or BOT cheques. Therefore, in order to facilitate high-value transactions, reduce costs and systemic risks, BOT developed an electronic large-value funds transfer. Known as BAHTNET, for Bank of Thailand Automated High-value Transfer Network, it is a financial infrastructure that supports payment system developments required for an international financial center. BAHTNET began its operation on May 24, 1995.

442 Regulations, Guidelines and Policies

Members of BAHTNET system have to maintain current accounts at BOT and abide by the BOT Regulation on BAHTNET 1995. The regulation specifies the authority, roles and responsibilities of BOT, in its capacity as the service provider, and the members. The regulation also specifies the types of services and the guidelines for using the services.

In the event of a dispute, BOT and the Thai Bankers' Association will each appoint an arbitrator, both of which would appoint an outsider as another arbitrator, thus forming the arbitrating committee.

As for a third-party transfer, in which a commercial bank provides a service to its client in transferring funds via the BAHTNET system into a receiver's account at another bank, the service must abide by the BAHTNET Funds Transfer Guideline for Commercial Bank's Customer Service. This is to ensure fairness to the customers who use the services. However, there is currently no specific law governing funds transfer or electronic funds transfer. Therefore, should a dispute arise, the case must proceed according to the Civil and Commercial Code.

443 Members of BAHINET

BAHTNET members, who must maintain deposit accounts with BOT and possess the required attributes, can be classified into 3 types, namely:

(1) Direct Member

A direct member is a member who is able to send funds transfer transactions, receive funds transfer, and perform other functions using its own workstation (WS) subsystem, which is directly connected to a BAHNET Host Computer (BHC).

(2) Associate Member

An associate member is a member who uses a direct member's WS subsystem to send and receive funds transfers.

(3) Other Member

Other member is a member who can only receive funds transfer to its account via BOT's WS subsystem

When the BAHNET system began operating, there were 33 direct members consisting of Thai commercial banks, foreign commercial banks, BOT itself, and the Industrial Finance Corporation of Thailand (IFCT).

As of December 31, 1999, direct members were as follows:

Thai Commercial Banks	13
Foreign Commercial Banks	21
Specialized Financial Institutions	5
Finance Companies and Finance and Securities Companies	10
Thailand Securities Depository Co. Ltd., (TSD)	1
BOT and	
Financial Institutions Rehabilitation and Development Fund (FIDF)	6
Government Agencies	<u>2</u>
Total	58

4.4.4 BAHNET Services

The system operates daily from 8:30 a.m. to 5:30 p.m., except on bank holidays. It offers the following services:

(1) Funds Transfer

A member can transfer funds from its account to another member's account or between its own accounts at BOT.

(2) Third Party Funds Transfer

Third-party funds transfer is a funds transfer on a client's order, from the client account to a beneficiary account at another bank. The service is available nationwide.

(3) Inquiry

A member can access to the information pertaining to its own current account at BOT, i.e. the account balance and its movements, and inquire the status of items in a queue and those already processed.

(4) Bilateral Communication

A member can communicate with another member via the BAHTNET system at any time during the operating hours.

(5) Message Broadcast

Normally used to broadcast messages from BOT, this feature allows a member to broadcast messages to all members. A member simply sends the message to BOT, who would then broadcast it over the system.

(6) Multilateral Funds Transfer (MFT)

This is a BAHTNET function that allows a number of simultaneous debit/credit funds transfers. It is used by BOT for making daily settlements, for example, for ECS and media clearing purposes.

445 Operational Procedures

(1) Funds Transfer

A member can send a funds transfer order through their WS subsystems, which is connected to BHC. As soon as the BAHTNET system recognizes the funds transfer order, it passes the order on to the BOT current account system for verification and balance checking, making sure that the payer has sufficient funds in the account to cover the request. Once satisfied, the system automatically debits the transferor's account and credits the transferee's account and immediately dispatch debit and credit advices accordingly. A funds transfer order with insufficient funds will be stacked in a queue, and will resume execution automatically once the account balance fills up to the level required. Orders remaining unexecuted at the end of the day will be canceled, and the notifications sent to the transferors immediately.

(2) Inquiry

Within a WS subsystem, a member can inquire about the number of incoming and outgoing items, and check on the status of its connectivity with BHC. For the inquiry on account balance and movements, the inquiry will be sent to the BHC which will then be forwarded to the BOT current account subsystem for further inquiry processing.

(3) Bilateral Communication

A member uses its WS subsystem to send messages, via BHC, to be printed out at the receiver's WS subsystem.

(4) Message Broadcast

A member sends the intended broadcast message in printed form, facsimile, or bilateral communication to BOT. If approved, BOT would use its WS subsystem to broadcast

the message to all member WS subsystems via BHC. The messages will appear on screen and will be printed as well.

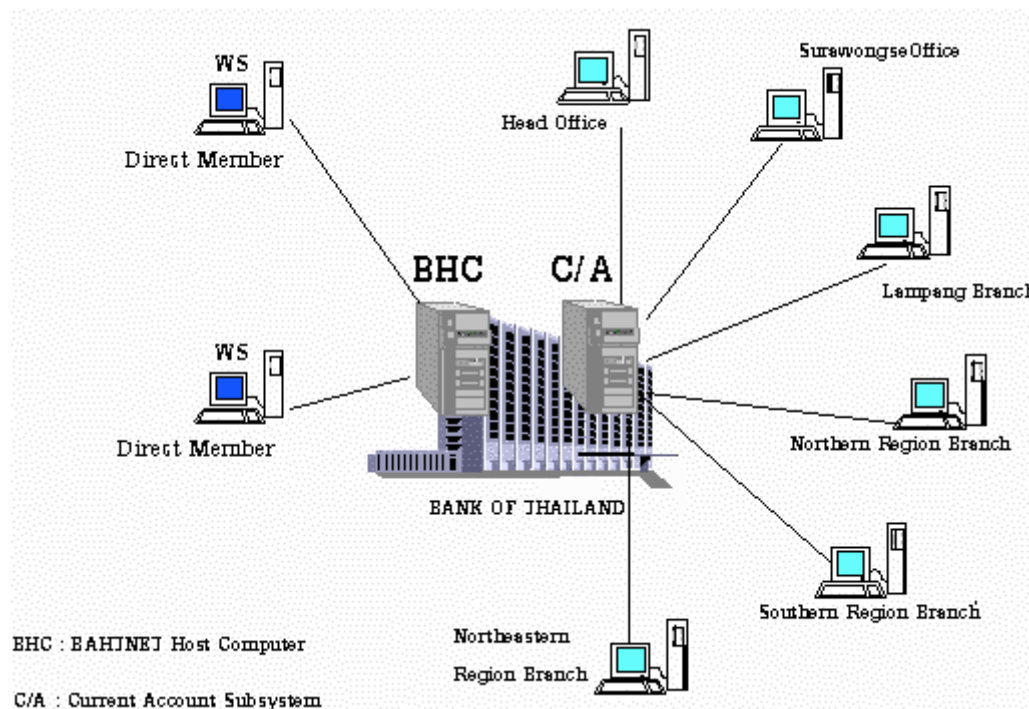


Figure 4.5: BAHTNET Configuration

4.4.6 Processing Equipment

The BAHTNET system comprises of 3 subsystems as follows:

(1) Workstation (WS) Subsystem

A workstation (WS) subsystem is a computer network installed in a member's office. It can perform the BAHTNET functions as previously mentioned. The WS subsystem at BOT, however, can perform additional functions such as Multilateral Funds Transfer (MFT), Pre-Authorized Debit Transfer (PAD), and message broadcast.

(2) BAHTNET Host Computer (BHC) Subsystem

BHC is a computer network located at the BOT head office (Bangkhunprom). It functions as a message-switching center, receiving and sending messages between the WS subsystem and the current account subsystem.

(3) Current Account (C/A) Subsystem

This is BOT's current account computer system.

The connection between WS subsystems and BHC subsystem is point-to-point, employing Protocol X.25 via the digital leased line from the Telephone Organization.

of Thailand, operating at the speed of 9.6 KBPS (kilobits per second). A back-up connection is via an ordinary public switched line or a dial-up line.

447 Security Measures

With regards to sending and receiving data between the WS subsystems and the BHC subsystem, data security measures are as follows:

- (1) For controlling the connection between a member WS subsystem and the BHC subsystem, 2 out of the 3 senior officers with funds transfer authority must enter their passwords as well as use master key codes stored on diskettes, each diskette being different from other officers'.
- (2) For message authentication, Message Authentication Code (MAC) is used to ensure that both sender and receiver have been authorized for sending and receiving the data. This prevents the alteration of message during the transmission process.
- (3) A data encryption scheme is used to convert both the transmitted data and MAC into encrypted streams. This preserves the secrecy of the message, preventing information theft.

When a message is received at the BHC or WS subsystem, the encrypted message goes through decryption, and MAC is verified.

The key used to generate MAC and encryption varies and changes daily. Moreover, the keys also differ for different WS subsystems.

448 Settlement Procedures

BAHTNET is an irrevocable funds transfer system, which operates on a Real Time Gross Settlement (RTGS) basis. It requires greater level of liquidity than the traditional net settlement system. Therefore, the transferor has to have an adequate amount of funds in its current account at BOT in order to be able to successfully execute the funds transfer order. However, the transferor may momentarily face liquidity shortage, which would halt the transfer order. The BAHTNET utilizes the following mechanisms for handling such a situation.

- (1) A Queuing Mechanism is used to help prioritize the unexecutable funds transfer orders, which are placed in a queue until such time as the account balance has enough funds to cover the funds transfer orders.
- (2) A Gridlock Resolution system is an optimization process to help resolve a gridlock situation due to liquidity shortage. The system searches the queue for a combination of funds transfer orders that have a manageable net clearing position, in which case these funds transfer orders are executed simultaneously.

449 Liquidity Management

Due to the high degree of liquidity required to operate the BAHTNET system, BOT enables more efficient liquidity management for members by providing the following facilities:

- (1) Intraday Liquidity Facility (ILF) provides needed liquidity to BAHTNET members on an intraday, fully collateralized basis. A BAHTNET member who is eligible for loan window facility can sell its securities to BOT with a contract to buy back on the same day, hence a repurchase or repo operation.
- (2) The extension of the BAHTNET services enables a member to make on-line funds transfer among its accounts maintained at the BOT head office as well as the four BOT regional branches in Chiang Mai, Lampang, Khon Kaen, and Hat Yai.
- (3) The centralized settlement of provincial interbank cheque clearing via BAHTNET allows member banks to manage the funds between their branches more efficiently.

4410 Pricing Policy

BOT has developed BAHTNET as a financial infrastructure to increase the efficiency while reducing systemic risks within the payment system. There is no profit motive. In fact, the BAHTNET fee structure is meant to entice potential electronic funds transfers away from paper-based system.

With regards to the setting of service fees charged by member banks to their clients, BOT lets the market mechanism work freely, but initially set the ceilings in order to cap the fees to within a reasonable level.

4411 Risk Management

BAHTNET funds transfer is based on RTGS and is irrevocable. As such, it is a system with already a high degree of risk control. Items that cannot be settled immediately would be placed in a queue, and the transfer orders would only proceed when funds become sufficient. Unexecuted orders remaining in the queue at the end of the day would be cancelled. Altogether this implies that BAHTNET is a relatively safe payment system. In any event, BOT continues to push for high-value transactions, i.e. interbank lending and foreign exchanges, to be executed via BAHTNET. Moreover, there is a plan to introduce a delivery versus payment (DVP) system for securities transaction within the BAHTNET framework.

4412 Backup Solutions

The BAHTNET has been designed to operate continuously during the opening hours. With that requirement, there are backup systems both in terms of equipment and procedures. These are as follows:

- (1) Both the BHC and current account computers are of a fault tolerant design, able to operate in the event of component failure, allowing repairs without a pause in the operation.

(2) When the main connection lines between WS subsystems and BHC fails, members can use a dial-up line as a backup.

(3) Should a member WS subsystem, or its connection, fails to the extent that BHC connection cannot be established, members can still use the backup methods. A member can place a telephone call to BOT to request funds transfers, or a member can use BAHTNET's Message Input Service (MIS) to request BOT to perform funds transfers on its behalf.

(4) BOT has set up BAHTNET system backup site at the BOT Surawongse office, to be used in the event the main center cannot continue functioning.

45 ATMNetwork

Automated Teller Machine, or commonly known as ATM, is among the more popular banking tools introduced by Thai commercial banks. Since its introduction, BOT encouraged commercial banks to share ATM machines in order to minimize redundant investment costs. In the initial phase, there were two ATM networks, namely the BANKNET, led by the Bangkok Bank, and the SIAMNET, led by the Siam Commercial Bank and the Thai Farmer's Bank. In 1993, BOT pushed commercial banks toward establishing a common ATM Pool as a single ATM network operating throughout the country. As a result, the public experiences greater convenience, which later drives the foreign banks to join the network. At the end of 1998, there were 5,188 ATM machines nationwide, with daily transactions and values averaging approximately 1,000,000 transactions and Baht 2,270 million.

Transactions operated on an ATM machine owned by a different bank would be processed by Processing Center Co. (PCC), which acts as the Switching Center for the interbank ATM network. Each commercial bank calculates its own net clearing positions by 9:00 a.m. of the next working day. The Bangkok Bank acts as a settlement bank, and each ATM pool member opens a current account with the Bangkok Bank. Commercial banks with net debit clearing positions will transfer funds to their Bangkok Bank accounts via BAHTNET by 2:00 p.m., afterwards Bangkok Bank will settle the accounts by 3:30 p.m. However, the fees commercial banks charged each other for using another bank's ATM are settled once a month by the same method, with PCC calculating the net clearing positions.

46 EDC Network

Electronic Data Capture or EDC machine is a device that a credit card issuing bank installs at a retail store. Its main function is to authorize or reject the use of credit cards by cardholders. In addition, EDC machines can be used with debit, ATM, and stored-value cards, provided a pin pad or a chip reader is added. Presently, a typical shop may have many EDC machines, each of which taking only one kind of cards, so that there would be, for example, one for Visa and one for MasterCard. This is due to the fact

that each bank wants to maximize transactions for which they are acquiring banks. The trend results in there being approximately 30,000 EDC machines (as of mid 1998) throughout the country, a rather high figure in comparison with the values of card usage. Most EDC machines are installed within major metropolitan areas.

Settlements between issuing and acquiring banks can be categorized into 2 types as follows:

(1) For settlements between domestic institutions, the credit card companies, i.e. Visa International and MasterCard International, processes the information received from member banks and notifies each institution its net clearing positions. In Thailand, Chase Manhattan Bank is the settlement bank for every bank that offers credit card services. It debits the net paying banks' accounts and pay banks with positive net positions with cashier cheques by 11:00 a.m. of each day. Settlement is considered complete once all the cashier cheques are effective.

(2) For settlements involving financial institutions abroad, the credit card companies processes the information received from member banks and notifies the net clearing positions as well as the agreed-upon currency conversion rates, with representative banks abroad acting as the settlement banks.

47 Future Development Plans

BOT plans to develop the payment system further for continued increases in efficiency and technological advancement, reaping benefits for the country's overall payment system. These plans include:

471 BAHINET II

BOT plans to develop the BAHNET II system, with aims to increase efficiency and scope of services, including the management and settlement of debt securities, the expansion of the BAHNET system to various regions, linking information exchanges with BOT representatives at provincial/district treasuries throughout the country. BOT also plans to improve the system to better suit the application needs of members. The system is due to being operational by the year 2001. BAHNET II should provide a sound infrastructure with which to reduce settlement risks and to facilitate debt securities transactions according to the international standard, which calls for a delivery versus payment (DVP) system. The said system would send computer commands on-line, registering the debt securities on a book entry basis and posting the current accounts with BOT. At this stage, such services are available on securities for which BOT is the registrar. This is offered as an alternative for the liquidity management of financial institutions. The DVP facility is expected to boost trading transactions in the secondary market, which leads to the establishment of benchmark interest rates and to further development of the capital market.

4.7.2 Expanding the Service Area of ECS

Interbank cheque clearing in Bangkok and its metropolitan areas with ECS relies on on-line cheque information sent to ECH for immediate processing. The speed and convenience derive from the fact that physical cheques only need to be delivered later.

At present, the service coverage of ECH includes all member bank branches in Bangkok, Nonthaburi, Pathumthani, Samutprakam, and some branches in Samutsakom, Ayutthaya, and Nakomprathom.

Clearly, it would be beneficial to extend the service area of interbank clearing to cover other nearby provinces, as cheque transactions between Bangkok and those provinces would reduce to one-day clearing. However, such a move would effect the operations and costs for member banks, in particular with regards to the bank headquarters' operations and/or the signature authentication processes.

4.7.3 Developing the Bill for Collection (B/C) Operations

B/C clearing currently takes less than 6 working days. To reduce B/C clearing time further, BOT together with member banks extend the coverage of a provincial clearing house at each of the major regional provinces, namely Chiang Mai, Songkhla, Khon Kaen, and Nakom Ratchasima, for instance. At any rate, it is critical that member banks adjust their internal work systems to allow cheque authorization from different branches.

4.7.4 Electronic Data Interchange System

Electronic Data Interchange (EDI) entails a business information exchange based on a standardized format, with a closed computer network connecting the members. In Thailand, there have been EDI standards applied among commercial, transportation, import-export, taxation, and insurance circles, etc.

Presently, the use of EDI system is not yet widespread. This is due to the lack of connection with payment system, hence Financial EDI. BOT supports the EDI development by bringing together business information exchange, i.e. goods buying and selling, transportation, tax payments, and on-line electronic payment operations. Such would complete the circuit. This all depends on cooperation among business sector, commercial banks, and governmental organization, in developing and promoting the EDI system to the extent that the entire process, from initiating a transaction to paying for it, can proceed without the need to re-key any piece of information. EDI would contribute to the overall development of the economy by reducing cost and time involved, thus lowering total outlay for a business operation and increasing competitiveness.

The trend is to develop EDI for using over the Internet, which is an open system. This would greatly increase the use of EDI, but it then becomes necessary to bolster data security measures.

5 Exchange and Settlement of International Payments and Thai Securities Transactions

5.1 Exchange and Settlement of International Payments

International payment transactions cover the situation whereby the payer and/or the payee is not domiciled in Thailand. Such items include personal travel expenses, payment for goods or services, international trade, international securities trading, as well as foreign exchange transactions and capital movements.

Payment for such transactions could be carried out in a number of ways. Apart from foreign currency-denominated cash transactions, other means of payment are as follows:

5.1.1 Traveller's Cheque and Personal Cheque

The most commonly used currencies of denomination include the US Dollar, Japanese Yen, Deutsche mark (now EURO), and Pound Sterling. Settlement proceeds by sending the actual cheques physically, for purposes of calculation and settlement, to the local representative banks of the currency denomination.

5.1.2 International ATM Network

The international ATM network is a global network principally comprising the following networks: PLUS, CIRRUS, and American Express. It thus enables the cardholders to withdraw cash in local currency from the local ATM. This type of service minimizes the need to carry cash and/or traveller's cheque and reduces the steps and time necessary to obtain local-currency cash. Via an on-line computer system, the ATM cardholder's account will be debited automatically each time the card is used. In addition, VISA, MASTER, and American Express cardholders can withdraw money from such a networked ATM as well. With regards to clearing and settlement between the ATM-operating bank and the ATM/credit card-issuing bank, the service provider performs the clearing process, while the representative bank handles the settlement.

5.1.3 International EDC Network

In addition to providing the infrastructure for domestic credit card and debit card payment, the Electronic Data Capture (EDC) and EFTPOS network also handles international credit card usage. The most popular cards used for international payment are VISA, Master, and American Express card, to which most banks are member and issuing institutions.

These cards owe their popularity to the convenience and universal acceptance by shops, hotels, restaurants, and businesses all over the world.

For clearing and settlement, the credit card company's transaction processing center will use its computer system to calculate net clearing position, which will then be sent to the settlement bank.

51.4 Payment in International Electronic Commerce

International electronic commerce transactions, particularly those trading over the Internet, have been on the rise. In Thailand, the means of payment over the Internet are mainly credit card while international electronic funds transfer and electronic money are to a lesser extent.

As to the clearing and settlement of electronic money, the issuing institution abroad will transfer the electronic money directly to and from payee and payer respectively.

51.5 Payment via the deposit account

A business entity in Thailand that is allowed to open a foreign currency deposit account at the financial institutions in Thailand will be able to transfer funds from the account for payment of transactions payable in foreign currency. Besides, a non-resident entity is allowed to open a Thai baht deposit account which enabling the payment via the deposit account for transactions be done in Thai baht.

51.6 International banking funds transfer

International banking funds transfer order is usually operated through S.W.I.F.T message carrier network which all commercial banks are members. Funds transfer order will then be sent from a local sending bank to a receiving bank abroad, which is its representative through S.W.I.F.T. Conversely, funds transfer order from abroad will reach a local receiving bank through S.W.I.F.T. for payment transaction in Thailand.

5.2 Exchange and settlement of securities transaction

Securities exchanged in the Thai capital market include equity, bond, hybrid securities and derivatives. The exchange of securities can be performed in two ways:

- (1.) Exchange through formal market such as the Stock Exchange of Thailand (SET) and the BOT's repurchase market (R/P).
- (2.) Exchange through informal market over the counter (OTC) in which prices, payment, settlement and other conditions will be determined by both the seller and purchaser.

The settlement, which includes delivery and payment of securities, will depend on the market regulation and on the types of securities as described below.

5.2.1 Equity and Hybrid Securities

The SET is a market for the exchange of stock and hybrid securities, which is done through the computer system known as ASSETS (Automated System for the Stock

Exchange of Thailand). At the end of each day, Thailand Securities Depository Company (TSD) will be responsible for the settlement process. One working day after the transaction took place (T+1), TSD will confirm the deal and inform the net clearing position (calculated on multilateral net basis) to its members for payment within 3 working days after trading (T+3). Cheque is commonly used as the means of payment on which it will be effective on the fourth working day after trading.

The delivery of the securities will be done by the TSD acting as the registrar on a scripless, book-entry basis. Securities payment and settlement process will be completed on the fourth working day (T+4).

The value of securities traded through the SET in 1999 amounted to Baht 1,609.8 billion.

5.2.2 Private Sector Debt Instruments

The majority of private bond trading is done through informal market over the counter (OTC), which gives the trading partners more flexibility on trading, payment and delivery of bonds. The payment is usually in the form of cheque. In 1999, the trading of private bonds amounted to Baht 32.8 billion.

5.2.3 Public Sector Debt Instruments

Public-sector debt instruments are used as a legal reserve requirement and a loan guarantee for the BOT's R/P market, loan window, and Intraday Liquidity Facility (ILF) for funds transfer through the BAHTNET system. BOT acts as a registrar for most of public bonds. At the end of 1998, the total value of public-sector bonds in the market amounted to Baht 727.5 billion. Most of the public-sector bonds are traded over the counter. The payment is usually in the form of cheque.

Trading over the BOT's R/P market can be used as liquidity management by financial institutions. Those who have excess liquidity buy bonds with interest incentives while those having low liquidity sell bonds with contractual terms to buy back at a designated time. The BOT acts as a trading center that matches the trading order and inform the results to the members while giving priority to those members that give the best offer. Demand and supply of liquidity in the market determine the interest rate. The trading value in 1998 amounted to Baht 31.6 trillion.

Trading over the R/P market is done over the phone and can be done during 2 periods daily at 9:30-10:30 a.m and 3:30-4:30 p.m. Delivery and payment is done by BOT on the same working day (T).

At the beginning of 1999, the BOT offered the semi-auto delivery versus payment facility for public bonds registered with the BOT. Payment will be done through the current account at the BOT. Those who do not have a current account at the BOT have to order the commercial bank to pay on their behalf through the commercial bank's account at the BOT. The settlement will be completed simultaneously (semi-auto DVP) and can be done on the same day as the trading date (T).

524 Derivatives

Derivatives are being used as a financial tool for risk management. At present, the trading of derivatives still lack a clear structural framework, official market, and specific legislation which have caused inconsistency for the delivery and payment. In addition, these impediments have prevented the state intervention on supervision and regulation. As a result, the Securities and Exchange Commission (SEC) and other related parties have foresee the need to develop derivatives in such a way which benefits the capital market by drafting legislation pertaining to the establishment of derivative market for easier supervision and investor protection. On March 1998, it was approved by the Cabinet members and proceeded to the Parliament before being enacted. The legislation will cover only those financial products such as securities, foreign currency, gold, financial and securities index, interest rates, and crude oil. The development of derivatives market will give the investors more options and be used as a financial tool for risk management.

BOX 51

Equity consists of common stock and preferred stock. Debt instruments are classified into private-sector and public-sector debt instruments. Private-sector debt instrument is mainly corporate debenture. Public-sector debt instruments are government bonds, state enterprise bonds those avaled by the Ministry of Finance, and BOT bonds which include the bonds issued by the Financial Institutions Rehabilitation and Development Fund (FIDF) and Property Loan Management Organization.

Hybrid securities consist of convertible debenture and warrant.

Derivatives, a type of financial tool for risk management, can be described as agreements or contracts concerning a change in value of an underlying asset which could be securities, foreign exchanges, interest rates, gold price, oil prices, price index, and commodity prices e.g. maize, wheat and Para rubber etc.

6 The Bank of Thailand's Roles in the Payment System

6.1 The Bank of Thailand Policy and Implementation

Since 1992, BOT has engaged itself in developing the payment system, operating under the following mandates:

(1) Develop the payment system as the financial infrastructure for banks, financial institutions, government agencies, and other institutions that maintain deposit accounts with BOT. In order to reduce risk and improve efficiency for the payment system, BOT develops and provides services in areas that need to be undertaken by the public sector, in activities that contribute to the economic and financial development of the country.

(2) Support payment system developments undertaken by the public and private sectors in order to ensure that the country's overall payment system is fully integrated and contributive to the efficiency of the overall economy. Encourage the market mechanism in the setting of appropriate fee structures.

(3) Supervise and oversee the payment systems, both systems operated by BOT and those operated by the private sector, in order to ensure safety, convenience, and standard in keeping with the directions of development of an international payment system. This will enhance Thailand's capacity to handle competitions and changes in the international financial and investment environment, at the regional as well as global levels.

In keeping with the policies cited above, BOT plays 3 critical roles with respect to the payment system

(1) As a Service Provider

As one who holds deposit accounts of banks and financial institutions, BOT provides interbank settlement services. To improve the efficiency of the country's overall payment system in aggregate, BOT had developed and begun providing services on 4 electronic payment systems as follows:

System	Nature of Services Provided	Operations Commencing
BAHTNET	Real-time large-value funds transfers between financial institutions, account balances affected instantaneously	May 24, 1995
Provincial Cheque Clearing	Clearing and settlement of provincial cheques	May 24, 1996
Electronic Cheque Clearing System (ECS)	Electronic cheque clearing in Bangkok and its metropolitan areas	July 16, 1996
Media Clearing	Interbank retail funds transfer	January 16, 1997

In addition to the various services mentioned above, BOT seeks to continually develop and improve the systems in order to provide better performance, more types of services, and expand the user base both in terms of geographical coverage and the number of service users. The system development and improvement respond to the need of the service users and the changing business and technological environments.

(2) As a Regulator Overseeing the Payment System

BOT is responsible for the payment system, supervising as well as advising, seeking to ensure that the payment system embodies the following characteristics:

- Minimizes risk, in particular the systemic risk
- Ensures fairness to all parties involved
- Efficient, meaning convenient and fast services, low costs in making payments, reliable results, flexibility to deal with varying operating conditions
- Variety of means of payment in which the service users can choose according to different situations

The above objectives are to be achieved by:

- Encouraging financial institutions to employ RTGS instead of Net Settlement when making certain types of payment transactions, thereby reducing systemic risk
- Issuing relevant regulations and guidelines to ensure orderliness in the system usage by members, shore up public confidence, and protect consumers, i.e. regulations on payment system uses, guides for providing fair payment services to customers, rights and responsibilities between payment service providers and their clients, etc. And with guidelines comes the supervision to ensure compliance.
- Pushing for the relevant legislation that serves as the legal infrastructure to the payment system
- Coordinating with and supporting the development of payment systems that belong to the public and private sectors, i.e. in the form of advices, participation in working groups, and guidelines issued in support of system development, etc. Always rest on the principle of encouraging competitions and market mechanisms.
- Steps in when a dispute arises, or when the public petitions

(3) As a Facilitator

Owing to the rapid advancement of technology, with the introduction of new technology being applied to payment systems and media, such a development brings about modern conveniences and opens up commercial opportunities that, in turn, increase the volume and complexity of financial transactions. BOT, as a facilitator in the process of outlining frameworks and development directions relating to the country's payment systems, coordinates closely with the public and private sector,

ensuring that various forms of transactions being currently develop are compatible with each other, and work in support of the country's monetary system. The study on the viability of electronic cash has also been made in which various organizations have been invited to share their views regarding the setting up of relevant standards. These include, for example, safety standard, data standard that enforces compatibility between commercial and financial transactions, data sharing with clearing and settlement processes, and equipment sharing that further supports various other payment system developments.

62 Problems and Obstacles in the Present Payment System

The development of the country's payment system according to the policies just outlined, in particular the large-value funds transfer, cheque clearing and retail electronic funds transfer, while aimed at creating the financial infrastructure in supportive of the country's economic expansion, has fallen short of goals in a number of ways. According to follow-up studies on the use of various payment media:

(1) The public's propensity to hold cash has not diminished. Cash in circulation accounted for more than 70 percent of the money supply. At the height of the economic expansion, the volume of bills out to circulate grew as much as 10 percent annually. Meanwhile, cash incurs high production, storage, transportation, and disposal costs. Moreover, there is a limit on production and circulation amounts, and cash is subject to theft and counterfeiting.

(2) Banks and financial institutions still use cheques to effect high-value payments, resulting in high net value involved in the daily settlement. Should any member bank find itself short of liquidity, and unable to secure funds to settle its negative clearing position, this would effect a wide circle of retail cheque users. Between 1997 and 1998, high-value cheques of over Baht 100 million accounted for about 0.5 percent (or 1,000 cheques per day) of cheque volume, while the total values amounted to 80 percent (or around Baht 344,000 million per day) of all cheques written each day. Meanwhile, interbank funds transfer via BAHNET, using RTGS method, accounted to merely Baht 13,000 million per day.

(3) BOT supports setting up provincial clearing houses so that cross-district, same-province collection becomes a one-day operation. But for cheques across provinces, it will take 6 working days. The problem lies between the 6 working days where a payer's account could have been debited long before a payee's account is credited.

(4) Service providers of electronic payment media in the form of plastic cards, i.e. credit and debit cards, still lack cooperation when it comes to sharing card-reading equipment. Part of the problem stems from the pressure to compete for profits; part of it is due to differences in technical standards.

(5) While information technology proceeds rapidly, legislative reform to support the advancement takes time, and the discrepancy may expose parties involved to sources of risks and unfairness.

6.3 Solution Guidelines

- (1) Study and develop new means of making payment, better suited to the economic and social conditions of the country, to encourage media substitution for cash. The media must not entail too high an investment and operating cost.
- (2) Reach an agreement with BAHTNET system member banks to stop using cheques for interbank transactions, i.e. foreign exchange, interbank lending, and executing funds transfer on behalf of foreign domiciles, and to start using RTGS via the BAHTNET system
- (3) Coordinate with member banks to reduce B/C collection to less than 6 working days. And urge the member banks to have payer and payee's accounts settled simultaneously.
- (4) Jointly specify smart card standards, and support organizations involved to use a common standard, thereby enabling efficient sharing of equipment and network resources.
- (5) Assist with the organization responsible for the legislation of information technology laws, and the legislative amendment that would allow electronic data to qualify for full status as legal evidence.

6.4 Further Implementation Guidelines

- (1) In order to support electronic commerce and businesses, for which the business and governmental sector had jointly created networks and organizations that act as a center for trafficking EDI data, BOT sees it fit to coordinate the use of financial EDI for purposes of making payments. BOT will study the system layout jointly with commercial banks and related organizations to ensure a full-circuit usage of EDI.
- (2) Support member banks in their use of technology to reduce B/C time, for instance, the technology to send cheque or signature images on-line in lieu of sending the physical cheques across different regions, a technology that would help reduce B/C time to one day.
- (3) Even though the semi-auto delivery of and payment for government-sector debt instruments already work according to the delivery versus payment (semi-auto DVP) mechanism, members are still unable to execute the items on-line. As such, the system still cannot handle large volume of transactions efficiently. This is particularly problematic when the authority needs to issue a lot of bonds in order to mobilize funds, domestically as well as from abroad, to be used in the development of the country and in bailing out financial institutions.

BOT, in conjunction with other organizations involved, has set out to develop the domestic government bond market through the amendments and reforms of relevant legislation, and by speeding up the development of said securities delivery and payment system into BAHTNET II, which would become operational by the year 2001.

Finally, BOT will perform a feasibility study on linking a payment versus payment (PVP) system of making delivery and payment on securities or foreign exchanges with PVP systems already operating in such regional countries as Hong Kong, Australia, and New Zealand. This may prove critical in the future development of Thailand as one of the principal investment hubs of the region.

Glossary

Part B: Standard Red Book terminology

- ATM (Automated Teller Machine)** electro-mechanical device that permits authorized users, often using machine-readable plastic cards, to withdraw cash from their accounts and/or access other services, such as balance enquiries, transfer of funds or acceptance of deposits; ATMs may be operated either on-line with real-time access to an authorization database or off-line.
- Bookentry** an accounting system which permits the transfer of claims (e.g. securities) to facilitate elimination of physical movement of paper documents.
- Cash Dispenser** electro-mechanical device that permits consumers, often using machine-readable plastic cards, to withdraw bank notes (currency) and, in some cases, coins; see *automated teller machine (ATM)*.
- Cheque** written order from one party (the drawer) to another (the drawee, normally a bank) requiring the drawee to pay a specified sum on demand to the drawer or to a third party specified by the drawer; widely used for settling debts and withdrawing money from banks.
- Clearing** a set of procedures whereby financial institutions present and exchange data and/or documents relating to funds or securities transfers to other financial institutions at a single location (clearing house). The procedures often also contain a mechanism for the calculation of participants' bilateral and/or multilateral net positions with a view to facilitating the settlement of their obligations on a net or net net basis. See also *netting*.
- Credit Card** card indicating that the holder has been granted a line of credit. It enables him to make purchases and/or draw cash up to a pre-arranged ceiling; the credit granted can be settled in full by the end of a specific period, or can be settled in part, with the balance taken as extended credit. Interest is charged on the amount of any extended credit and the holder is sometimes charged an annual fee.

Credit Risk	the risk that a counterparty will not settle an obligation for full value, either when due or at any time thereafter. In exchange for value systems, the risk is generally defined to include <i>replacement cost risk</i> and <i>principal risk</i>
Credit Transfer	one or more payment orders, beginning with the originator's payment order, made for the purpose of placing funds at the disposal of a beneficiary. In the course of a credit transfer, payment orders may be transmitted through separate <i>credit transfer systems</i> .
Daylight Overdraft	credit extended for a period of less than one business day, in a <i>credit transfer system</i> with end-of-day <i>final settlement</i> , daylight credit is tacitly extended by a receiving institution if it accepts and acts on a <i>payment order</i> even though it will not receive final funds until the end of the business day.
Debit Card	card enabling the holder to have his purchases directly charged to funds on his account at a deposit-taking institution (may sometimes be combined with another function e.g. that of a <i>cash card</i> or <i>cheque guarantee card</i>).
Debit Transfer	funds transfer in which debit collection orders made or authorized by the payer move from the bank of the payee to the bank of the payer and result in a charge (debit) to the account of the payer; for example, <i>cheque</i> -based systems are typical debit transfer systems.
Decryption	the process of transforming encrypted data back into its original form
Direct Debit	debit on the debtor's bank account initiated by the creditor, based on the prior written agreement of the debtor.
DVP (Delivery versus payment)	phrases used to summarize the conditions that must hold if the counterparties to a transaction in an exchange-of-value system are not to be exposed to principal risk (the risk that one counterparty loses the full value of the transaction); DVP in its most rigorous form implies that both the asset transfer and the related funds transfer are simultaneously irrevocable and unconditional for the parties involved.
EFTPOS	a terminal at a retail location which is designed to capture, and

(Electronic Funds Transfer at Point of Sale)	in some cases also transmit, payment information by electronic means.
Electronic Commerce, E-commerce	Commercial activity that takes place by digital processes over a network. Most new business-to-business and business-to-customer transactions are being delivered on the Internet.
Electronic Money	value stored electronically in a device such as a chip card or a hard drive in a personal computer.
Encryption	Scrambling computerized information to secure data by using special algorithms for transmission or other purposes. Passwords are stored within the system and are often encrypted, so that even when unauthorized access of their file takes place, they cannot be read or understood.
Finality	refers to the point at which the final and irrevocable transfer of value has been recorded in the books of the relevant settlement institution. The timing of settlement can be any of the following: immediate, same day (end of day), next day.
Gross Settlement	a transfer system in which each <i>credit transfer</i> or <i>debit collection</i> order is settled individually (i.e. without netting debits against credits).
MICR (Magnetic Ink Character Recognition)	a technique by which documents are read by machines for electronic processing.
Netting	an agreed offsetting of positions or obligations by trading partners or participants in a system. The netting reduces a large number of individual positions or obligations to a smaller number of positions. Netting may take several forms which have varying degrees of legal enforceability in the event of default of one of the parties.
Net Settlement	a <i>netting</i> system in which <i>direct participants</i> settle only their net net positions resulting from the clearing process; see also <i>clearing</i> .
PIN (Personal Identification Number)	the alphanumeric code which the cardholder may need to quote for verification of identity. In electronic transactions, it is seen as the equivalent of a signature.

Prepaid Card	card loaded with a given value, paid for in advance.
RTGS (Real Time Gross Settlement)	a gross settlement system in which each transaction is processed and settled in real-time. This means that settlement takes place at the same time as or before the instruction is passed to the transferee.
Securities Depository	a facility for holding securities which enables securities transactions to be processed by book-entry. Physical securities may be immobilized by the depository or securities may be dematerialized (i.e. so that they exist only as electronic records). In addition to safekeeping, a central securities depository may incorporate <i>comparison, clearing</i> and <i>settlement</i> functions.
Settlement	completion of a payment or the discharge of an obligation between two or more parties. Frequently used to refer to the payment or discharge of interbank transactions or a series of prior existing transactions.
Settlement Risk	general term used to designate both credit and liquidity risk in a transfer system, i.e. the risk that a party will fail to meet one or more obligations to its counterparties or to <i>a settlement agent or settlement institution</i>
Smart Card	A credit card containing an integrated circuit that gives it a limited amount of “intelligence” and memory. Smart cards are being used for identification and to encode information such as a person’s medical history.
S.W.I.F.T. (Society for Worldwide Interbank Financial Telecommunication)	an international financial transaction message network. Created and owned by banks, the network is also available to some categories of non-bank institutions.
Systemic Risk	the risk that the failure of one <i>participant</i> in an <i>interbank funds transfer system</i> or securities settlement system, as in financial markets generally, to meet his required obligations will cause other participants or financial firms to be unable to meet their obligations when due.