

Association for Information Systems

AIS Electronic Library (AISeL)

ICEB 2003 Proceedings

International Conference on Electronic Business
(ICEB)

Winter 12-9-2003

A Prototype of Retail Internet Banking for Thai Customers

Pornpriya Koedrarueng

Rawin Raviwongse

Follow this and additional works at: <https://aisel.aisnet.org/iceb2003>

This material is brought to you by the International Conference on Electronic Business (ICEB) at AIS Electronic Library (AISeL). It has been accepted for inclusion in ICEB 2003 Proceedings by an authorized administrator of AIS Electronic Library (AISeL). For more information, please contact elibrary@aisnet.org.

A Prototype of Retail Internet Banking for Thai Customers

Pornpriya Koedraru
Technology of Information System
Management, Faculty of Engineering
Mahidol University, Salaya 73170
Thailand

Rawin Raviwongse, Ph.D.*
Department of Industrial Engineering
Faculty of Engineering, Mahidol University
Salaya, 73170, Thailand
egrrv@mahidol.ac.th
* Corresponding Author

Abstract

Internet Banking is one of the channels for providing banking services. It is a delivery means that banks employ to expand their services in addition to traditional services provided through a branch's counters and ATMs. This paper aims at investigation, design, and development of an Internet-based retail banking prototype for Thai customers. The data were gathered from three major sources which were; (i) a survey on existing Internet banking services both overseas and in Thailand, (ii) questionnaires distributed to Internet users, and (iii) interviews with the executives of the major Thai banks. It was found that more than half of the sample Internet users in Thailand are very interested in using Internet banking services. The main features needed are balance inquiry, bill payment, fund transfer, business information, and payment for goods purchased. The prototype was then developed and validated.

1. Introduction

For a long time, banking has been one of the most important business sectors. It deals with almost all other businesses ranging from small activities to very large ones. Banks serve as financial intermediaries for individuals, companies, corporations and institutions both in public and private sectors.

In the banking business, providing good services to customers is an essential element of which every bank is conscious. In Thailand, most Thai banks have expanded their operations by setting up more branches to gain access to more customers. Having more branches enables banks to provide services covering larger areas although it requires large amounts of money for construction and equipment, as well as the high cost of hiring more staff.

Due to technological breakthroughs, banks have brought automatic teller machines (ATMs) to provide services to the customers. With these machines, the customers can make deposits, withdraw money, and check an account balance almost any time they want, in addition to the bank-working hours. Nevertheless, numbers of ATMs are limited, i.e., they cannot be available everywhere and there are several transactions that require customers to go to the bank by themselves.

Such transactions include opening a new account, borrowing money, etc. At the same time, banks have limited working hours, thereby bringing inconvenience to the customers. Owing to exorbitant costs, banks are obviously unable to open more branches, install ATMs everywhere, or extend working hours to facilitate and respond to the demand of every customer.

Contributed by substantial growth in information technology, especially with the advent of the Internet, both public and private sectors have modernized their operations in favor of providing services to their customers. In terms of banking business, many banking activities can be done through the Internet that will make banking services available any time and anywhere, covering the customers' offices, or even customers' homes. This will eliminate the necessity of setting up more branches and install ATMs everywhere. The customers can perform several banking transactions through their personal computers with modems, and their Internet account numbers. Such a process is called "Internet Banking".

Like traditional banking, Internet banking can be divided into two main categories, i.e., personal banking or retail banking and business banking or corporate banking. For retail customers, although they have small amount of money compared to corporate ones, they all comprise a large customer base and their banking activities do occur more often and regularly. Therefore, Internet banking can be another efficient channel of delivering services to such customers.

Although Internet banking, originated in western countries, is a good alternative that helps to get rid of exorbitant costs incurred from establishing new branches and ATMs, it may lead to some important problems in Thailand. In the case of Thai banks, there may exist some questions of what is the suitable strategy in delivering the service, what are the most appropriate features to be included or what are the actual customers' requirements, as well as which way Thai Internet banking will move to in the future. Therefore, this study aims to; (i) investigate retail banking services on the Internet, (ii) conduct a series of interview and a questionnaire survey in order to study the needs for Internet banking services for Thai customers, and (iii) develop a prototype of a retail banking service on the Internet for Thai customers. The proposed prototype is focused on the front office

system. It also simulates the host of the bank system by building a three-tier architecture including a front office system, database system and some processes in the back office system that support the front office.

2. Review of Literature

2.1 Internet Banking

In general, there are three ways banking services can be offered electronically to the home market [1]. The first is when banks supply their customers with bank-branded software to load onto their computers at home. Then, by using a modem and dialing the bank's main computers, customers can query their balances, review their account activity, transfer funds between accounts, and pay bills. This client-based service, for which bank software is loaded directly onto the client, is offered by banks such as Citicorp and Bank of America. The limitation of this kind of service is that the customer must dial the bank directly from his or her computer. This type of connection might prove a hardship when traveling overseas.

The second kind of delivery mechanism available to banks is to use an on-line service provider. By giving their customers access to their accounts by one of these avenues, the banks are taking advantage of an existing global network infrastructure to deliver their services. In doing so, they are, in effect, outsourcing many of the security issues and responsibilities as well. Institutions such as First Chicago Bank and Bank of America are using this method, and, through various online service providers, they are providing customers with home banking.

The third method of delivering home banking services is by owning and maintaining a dedicated Web server. This mechanism provides the capability of offering customers a fuller range of services, but increases the risk for the Web owner. Financial institutions such as, Security First Network Bank and Wells Fargo have gone down this route. These banks have developed their own Web servers, and offer services directly on the Internet. Examples of Banks that offer Internet Banking are reviewed as follows;

2.1.1 Foreign Banks

- Security First Network Bank

In mid-1995, the U.S. government's Office of Thrift Supervision gave approval to Security First Network Bank (SFNB) to provide Internet-based banking services. SFNB, formed by three banking companies (Huntington Bancshares, Inc., Wachovia Corp., and Area Bancshares Corp.), is an FDIC-insured bank that basically exists only on the Internet. In October 1995, SFNB opened its government-insured checking accounts to its customers via the Internet, and as of that date it was the only bank to have received approval to

conduct online operations between accounts, update balances in real time, open accounts, and reconcile bank statements. Services also include an on-line check register that functions similarly to personal finance software, and customers can view digital images of their cleared checks. (At present, SFNB is under RBC Group).

- Citibank

Citibankonline.com, the online banking component of Citigroup, continues to enhance its already broad online banking offering. With a single login, Citibank online banking customers can view all of their accounts held at Citibank. Credit card customers can link their account to view it alongside other deposit and loan products. Furthermore, customers have the ability to link or unlink their accounts together, at their discretion. Online banking customers can also make internal transfers from their deposit accounts to their loan accounts, including their Citibank credit cards [2].

Other Internet banks are shown in Table 1.

TABLE 1
Examples of Internet Banking Services

Bank	Online Services
NetBank [4]	Account summary, tax information, fund transfer among accounts, bill payment, check copy request, check & deposit slip reorder request, bank mail, and financial calculator.
Nbank [5]	Account summary, transfer among accounts, bill payment, pending transaction, custom reports, notification system, password and personal information.
Wells Fargo [6]	Account information, foreign currency, travelers cheques, cashier's / official bank check, check copy reorder, statement request, user preferences, transfer funds, online bill payment, financial planning.
ANZ [7]	Balances and transaction history, credit card statements, fund transfer and bill payment, business accounts, share trading and investment management.
USABancShares [8]	Interactive customer service, account balance, ask questions through web site, account summary, fund transfer, loan advance, loan payment, bill payment, and message center.
Bank of America [9]	Account balances, accounts summary, fund transfer, self-service feature (reorder check, order a copy of a check or statement), download transaction information to financial management software, send and receive secure customer online mail, bill payment and bill presentment.
BankOne [10]	Account summary, download account activity, funds transfer, bill payment, bill presentment, customer service (read messages, send a message, update profile, reorder check), and financial management software.
Fleet [11]	Online Banking with HomeLink (check balance, check recent transactions, confirm cleared deposit, confirm check cashed, bill payment, personal financial software, customized PIN, online investment).

2.1.2 Thai Banks

- Siam Commercial Bank

Sceasy.com was a new service, initiated in September 1999, by the Siam Commercial Bank (SCB). SCB is the first bank in Thailand to introduce this kind of service under the name "www.scbpark.com" later changed to "www.sceasy.com". The present version of the service allows customers to use the following online services: sign-up, balance inquiry, fund transfer, fund transfer to the third party, current and past statement inquiry, check withholding, bill payment, loan application, and online shopping [3].

- Bank of Asia

Bank of Asia was the second bank in Thailand to provide an Internet banking service called "AsiaCyberbanking". Its system was tested in January 2000, and became available around September 2000. Bank of Asia does not provide application services on the Internet banking for the following reasons:

1. Before giving approval to each Internet banking applicant, the bank requires signed documents for identification purposes, despite the application screen being available in its web site. The bank considers the Thai postal service as unreliable: documents sent to customers and returned to the bank may be delayed or undelivered. Therefore, customers have to apply in person at the bank.

2. There are more likely to be junk files submitted by those who do not really want to apply for the service. Nevertheless, the bank does create mandatory information management to eliminate these junk files [12].

So far, customers in AsiaCyberbanking service include both individual and corporate customers. Online account summary, account inquiry, inter-account fund transfer, bill payment, etc. are available to individual customers, while online import-export and remittance services are provided to corporate ones [13].

- Thai Farmers Bank

Thai Farmers Bank's Internet service formally commenced operation on December 2000 under the website name "www.gototfb.com". The range of services includes application for services (such as opening a new account, applying for TFB Internet banking), balance inquiry, viewing all transactions occurred, inter-account fund transfer, fund transfer to a third party, inter-bank fund transfer, salary payment (juristic person users only), bill payment transactions, and personal information changes [14, 15]. (Thai Farmers Bank is now Kasikorn Bank. -- www.kasikornbank.com).

Other Thai banks that offer Internet banking include Bank of Ayudhya (www.krungsrionline.com), Krung Thai Bank (www.ktb.co.th), and Bangkok Bank (www.bbl.co.th).

2.2 Features Comparison between Foreign and Thai Internet Banking

A survey on Internet banking services offered by foreign banks, particularly those in the U.S., and Thai banks reveals a noticeable difference. The former are largely non-branch banks, i.e., each bank simply establishes its own head office and delivers services through electronic channels such as ATMs, the Internet, phone, etc., whereas the latter mainly provide services through their own branches and subsequently introduce Internet banking as another means of delivering services.

With regard to pattern of services, both foreign and Thai banks generally provide the same basic services including account summary, statement inquiry, bill payment, and fund transfer. Differences exist only in the detail of each service, and other supplement services in each bank. Some features of these services are summarized below.

2.2.1 Fund Transfer

Currently, features in fund transfer service provided by foreign and Thai banks are similar. That is, they offer inter-account fund transfer and fund transfer to a third party whose pre-authorization is registered. Nevertheless, they differ in that foreign banks permit their customers to transfer funds across banks for inter-account fund transfer and/or fund transfer to a third party, depending on the policy of a particular bank. First Internet Bank of Indiana (www.firstib.com), for instant, offers inter-account fund transfer both within the bank and across banks, while fund transfer to a third party is not allowed at all. Through "Live Chat" inquiry, the expert from the bank clarifies authenticity for security reasons, and if customers wish to transfer funds to a third party, they can use a cheque instead [16]. Several foreign banks also perform the same service.

2.2.2 Bill Payment

In general, functions in bill payment services offered by both foreign and Thai banks are similar for single payments for the current day or the future. After transactions have been done, customers can check both history and pending transactions, which can be cancelled prior to due date. Some Thai banks, however, do not provide all of these functions but only offer immediate bill payment. Almost all foreign banks prefer to have multiple payment (customers can pay bills to many payees in one process) and recurring payment (customers can set up scheduled future payments covering long period) options.

One obvious difference in this service as provided by foreign and Thai banks lies in the fact that foreign banks generally offer an "add payee" function, customers simply fill out payee's name, address,

account number, and then select payee types available in a combo box such as electric, gas, credit card, etc. Generally Thai banks, on the other hand, do not provide this "add payee" feature. Their customers are permitted to make payments only to payees specified by the banks. Other Thai banks though provide an "add payee" feature, but payees must be in the banks' list, i.e., they are required to make contact with the banks before being in the payee list.

Finally, although the Internet banking services provided by banks around the world have some different features, they have one thing in common, that is, almost every bank requires their customers to be local residents only. For this reason, it might be inferred that Internet banking is a service designed under the concept of "Think Global, but Do Local," even though the Internet contains technology that can link people worldwide.

2.3 Important Factors for Internet Banking Services

From the preliminary survey, it can be concluded that the first thing that should be emphasized when developing Internet banking is customers' need. Focus should be given to new systems seeking to supply new services. Banks should introduce advanced services that attract a large number of customers.

Secondly, banks should study consumer behaviors. Even if excellently developed, Internet banking will be futile unless customers like it. Consumers, for example, may be concerned or unsure about the system, and prefer traditional services. Banks should, therefore, try to inform and convince them.

The third factor is security. In order to make customers feel safe, special attention should be paid to the security system. The fourth factor is the user interface. Banks should simplify system usage procedure and provide response time at an acceptable level.

Finally, functions should be able to off-load work from branches, so that users are aware that services provided through Internet banking are the same as those at branches, but the former is far more convenient. All of these are major points to which an Internet banking developer should pay careful attention. Nevertheless, the structures of Internet banking and timing to implement it depend critically on which particular policy the banks' executives concentrate. Nowadays, technology stands ready to serve the decision.

3. Vision of Thai Bank's Executives

The following section derives from the interview with four Thai bank's executives, one from the Bank of Asia, Thai Farmers Bank, Krung Thai Bank, and Siam Commercial Bank. The results of the interview are summarized as follows; [17, 18, 19, 20]

3.1 Policy of Internet Banking and the Whole Picture

Normally, the core banking system is made up of two parts: a deposit system and a credit system. The services are provided as either "services at the branch", where customers take their passbook to the counter for any transaction or "self-services", where transactions are performed via automatic machines such as ATMs. Self-service also include non-cash services such as telephone banking, and Internet banking that does not involve cash but is concerned with such transactions as statement inquiry, inter-account fund transfer, payment for purchased goods and services, etc. A non-cash service is one of the channels that enable banks to offer more services to their customers; however, this is rather new for the Thai banking system.

The core banking system in Thailand remains unchanged. Deposit and credit systems are still the dominant part of retail banking. In view of Internet banking, a major concern that plagues one of the executives is the question whether Thai banks are "following a craze." In Thailand, so far, there are approximately 600,000 to 800,000 Internet users, mostly (around 500,000 to 600,000) consisting of students, and the remaining of 200,000 are workers in private companies. When compared to the whole Thai population of 66 million, this figure is substantially small. Although the ratio in some countries is higher, Thai banks are less likely to compete with banks in those countries. Nowadays there are a large number of virtual banks offering in several countries, and most of them do not establish an office or branch, i.e., they are virtual banks in a real sense. The only investment required is to open web sites that impose a very low cost. Comparatively, Thai banks incur substantial costs, due to their established offices and branches.

If, in fact, the Thai banks are "following a craze", the immediate question is "do we need Internet banking now?" The answer is "yes", because unless banks do it now, they are more likely to lose their customers sooner or later. New customers, mostly of a young generation, will replace the old ones. These new customers, by nature, are eager to learn new things, and hence more likely to enjoy new technology. It is, consequently, reasonable for banks to provide Internet banking to serve this group of customers.

3.2 Security Concern on Internet Banking

The security system is another crucial issue for Internet banking to which banks pay careful attention. Bank of Asia, for example, has set up preventive measures; standardized by ABN-AMRO Bank (Bank of Asia is a member of ABN-AMRO Bank). Security systems initiated by the measures include a firewall and data encryption. In addition, the bank inserts its own

add-on module into the security system. At present, the bank follows a 128 Bit SSL standard. Similarly, Thai Farmers Bank also employs the same security system, i.e., firewall, and it is in the process of obtaining a SSL-128 Bit standard.

With respect to digital signature, the opinions are different. Since digital signature is quite new for Thailand and a law has not created to support it, some banks are currently studying on how to apply it to their Internet banking services. Thai Farmers Bank insisted that digital signature is unlikely to be used in Thailand because of the lack of CA, which is very difficult to obtain, inconvenient, and costly. The Siam Commercial Bank's Executive viewed this issue on a different point, he clearly suggested that SSL is sufficient, and digital signature is not necessary, as evidenced by the boom in e-commerce in the U.S., where identification verified through credit card number is sufficient. The application of digital signature imposes more expense and complex procedures to the users, and may have a negative affect on the use of Internet banking.

3.3 Customer Database

To the question whether the "Internet-banking customer database should be integrated with, or segregated from, the existing customer database", a senior director of Bank of Asia supported the concept that the customer database should be integrated because transactions generated from the Internet service have to be incorporated with normal transactions. On the other hand, the Thai Farmers Bank Executive suggested that there should be no integration (i.e., Internet-banking database and normal database). The two cannot be fully integrated, when considering terms of design. The reason is that once customers register on the Internet, the bank must have a database that keeps such data. In short, some data must be segregated, whereas others must be shared.

The Executive Vice President of Krung Thai Bank indicated that the customer database should depend on implementation methods as well as the computer system of a particular bank, and the segregated system might be more beneficial. The Vice President of Siam Commercial Bank expressed his view that the two databases should be segregated, because information on Internet-based customers is different from those of normal customers. The database may be shared, but detail may be different because the marketing concepts for Internet-banking customers are very much different from those of normal customers. At present, the customer database of Siam Commercial Bank is still integrated, but this may not be so in the future, depending on the policy. In conclusion, Thai banks should integrate databases, that is, allowing customers to have accounts that can be used either through Internet banking or branches' counters. Later, these accounts may be separated.

3.4 Feasibility of Internet Banking in Thailand

From the point of view of banks' executives, they all believe that Internet banking is likely to grow significantly in the near future. The major reason contributing to such growth is the steadily increasing number of Internet users and most of them are well educated and middle-class people in society. They, therefore, tend to rapidly accept new technology. Seemingly, the likely growth is independent of e-commerce law, and most banks are now in the process of Internet banking development. Although the law will serve to assure users legally, it may introduce more difficulties to the application of the system. However, banks' major concern lies in the competition; if some banks develop Internet banking whereas another bank does not do, this bank is more likely to lose customers, particularly prospective customers. Generally, targeted customers of these banks are the new generation people with a relatively high education.

Growth of Internet banking in Thailand depends crucially on an appropriate timing and number of Internet users. Obviously, the greater the number of Internet users, the higher the chance of success will be.

The Critical Success Factor (CSF) for Internet banking implementation in Thailand can be summarized into 5 areas;

- Customers' confidence in the security system: the extent to which the system is reliable for the customers.
- Convenience and simplicity that the system provides.
- Banks' policy on timing and priority of implementation.
- Banks' marketing strategies to enhance customers' demand.
- High system flexibility in response to market demand.

3.5 Strengths and Weaknesses of System Development

Bank of Asia's executive stated that the strength of the Internet banking system of the bank is that its database is characterized by a CIS (Customer Information System) which enables the bank to see the whole picture of their customers. Once Internet-customer logs in to the system, all information on that customer will be shown on only one screen, thereby bringing about convenience to the customer. He or she does not have to know whether the account is current or saving or time deposit, and does not have to key-in an account number, because it will be shown by the system. This system, as a consequence, allows the bank to add on several functions easily. The bank pays great attention to its security system, which several parties can be concerned about. Presently, the security system is quite reliable.

Thai Farmers Bank's executive indicated that convenience is the strength of their system, whereas the small number of users or a very low demand is the weakness of the bank's Internet services. It is estimated that there are approximately 800,000 Internet users, which is smaller than the number of mobile-phone users, over half of these Internet users are students.

Krung Thai Bank's executive said that easy access to the system and availability to the customers is an important strength and security might be the major weaknesses of their system at the moment. Siam Commercial Bank's executive said that since the bank is the first to launch Internet banking, its brand name should, therefore, be its strength. Another strength is that the bank uses its own staff to write software, thus leading the bank to achieve a higher degree of flexibility than those that cannot write their own software.

All the executives agree that the budget for system development is a major concern. Internet banking requires a large amount of investment. The approximate figures for implementing internet banking for the four banks are: 20 million baht (500,000 USD) for Bank of Asia, 20 – 30 million baht (500,000 – 750,000 USD) for Thai Farmers Banks, 10 million baht (250,000 USD) for Krung Thai Bank, and 30-40 million baht (750,000 – 1 million USD) for Siam Commercial Bank.

3.6 Obstacles to System Development

It can be summarized from the interviews that the problems and obstacles of developing internet banking in Thailand are as follows;

- 1) Highly changing requirements cause the bank to consistently monitor the market and adjust the system accordingly.
- 2) Most customers perceive Internet banking as a 24-hour service, but in fact, most of the other systems of the bank do not run 24 hours a day, since they are run with a batch system at night.
- 3) Since Internet banking has to utilize resources from several departments, the supports from managerial level as well as the cooperation from operational level are very crucial.
- 4) Owing to rapid change in technology, human resource development keeping up with the change poses a certain problem.

4. Prototype Development

The methodology used for prototype development was substantially based on a Software Development Life Cycle (SDLC) comprising eight different steps, i.e. preliminary planning, study of relevant theories and researches, data collection, analysis, design, development of system prototype, verification test and

improvement, and conclusion and documentation.

4.1 User Requirement Analysis

User requirement was obtained from the analysis of banks' customer requirements for Internet banking services. The analysis is entirely based on questionnaires surveyed, covering 318 participants. Of this, 245 are Internet users, whereas 73 have never used the Internet. Most of the latter are relatively ill educated, rather aged, and Internet-illiterate. On the grounds of data analysis, it is found that those who are Internet-illiterate provide no relevant information for this research, and thus are ruled out from the analysis.

The questionnaire analysis reveals the five most popular services as, in order, balance inquiry, bill payment, fund transfer, business information, and payment for the purchased goods or services. It should be noted that although the business information service provides customers with banking and other economic information is one of the first services offered via banks' web sites, it is still of interest for all customers. In regard to payment service for goods or services purchased via the Internet, customers want to make payments from their own accounts, in addition to credit cards, which are widely used in e-commerce.

Also demonstrated by questionnaire analysis, highly secure service is what Thai Internet users require first. The other crucial elements are reliability, confidentiality, facilities, fast process, good user interface, and variability. Furthermore, the most important influences in attracting Internet users to Internet banking services are time saving and fast processing. The other reasons center around facilities, elimination of the need to travel to banks, a new alternative, 24-hour service, modernity, and cost saving. On the other hand, factors that dissuade Internet users from using Internet banking services are uncertainty in security system, no need to use, lack of support by law, unwillingness to pay more fee, and non-ISP member.

The figures from questionnaire analysis show that those who are willing to use the service at the level of "very interested" and "interested" account for up to 64.5%, while the level of "moderate" comprises 20.8%, and "not interested" and "indifferent" are made up of only 14.7%. Of this number, those who are most likely to use the service account for 12.7%. Based on an estimated number of Internet users in 2005, prospective users of Internet banking service will approximately vary between 353,943 and 408,238 throughout Thailand.

4.2 Proposed Prototype (CNet Bank)

The prototype developed in this paper is called "CNetBank", shown in Figure 1., and is divided into six main parts: banking information, system sign-in,

banking transactions, customer information management, system administrator, and customer help services. The first part includes banking information, help for general customers, and application for CNetBank online member. The second part covers not only the verification of a customer's authority, but also the identification of whether the customer signing in is either a CNetBank customer or CNetBank system administrator. CNetBank customers can access both the third and fourth part of the system. In the third part, a customer can do several banking transactions involving account summary, statement, bill payment and funds transfer, while in the fourth part, a customer can manage his or her information such as changing personal information, editing a personal account, and changing user name and password. In the CNetBank system, an administrator can access the fifth part to simulate the back-office system. The final part, customer help service, is divided into two sections – help for general customers, and help for Internet banking members. Both types of help perform similar function, except that the latter provides member information for the relevant members only.



Figure 1. CNet Internet banking startup page

From the system point of view, the prototype consists of two main parts: front-office functions and user interface. In this prototype, it is focused solely on the presentation of a front-office system, whereas the back-office system is partly presented in the administrator center page in order to simulate the back-end operation of pending transaction and recurring fund transfer processes.

The front-office system of this prototype, called CNetBank Personal Online, contains the major service features developed on the basis of user requirements derived from the customer survey using questionnaires. Furthermore, it was developed under the guidelines obtained from the visions and conceptions on Internet Banking derived from four Thai bank executives' interviews. Service functions mentioned above can be represented in the structural chart, a top-down chart showing each level of a design, its relationship to other

levels, and its place in the overall design structure shown in Figure 2.

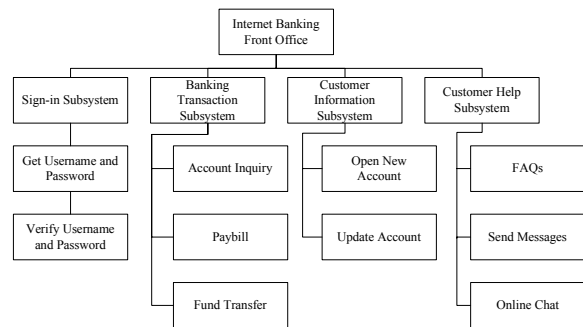


Figure2. Structural Chart for Front Office System

4.3 Features

The advantages of the CNetBank are summarized as follows;

1) Customers who open at least one savings account or current account with the bank can apply for the Internet Banking service online by filling out only one account number. Right after being given approval, a customer is allowed to increase or decrease number of his or her account and third party account all of which are used in Internet Banking service without asking for permission to the bank. This is because the system is designed to link with all account information and personal information of customers. As such, the system can instantly check the number of customers' accounts during online time. Furthermore, if the customer opens another account after applying for an Internet Banking service, information on this new account will appear in the "account management" screen of that customer, and a customer can select this new account to be used in Internet Banking. On the other hand, a customer can withdraw any account from Internet Banking, and then all information on that account will no longer exist. This "account management" feature, therefore, provides customers with high flexibility in managing his or her accounts used in Internet Banking.

2) Customers can conduct bill payment and fund transfer by specifying "today transaction" and/or "future transaction". This service allows customers to be well prepared for their bill payment and fund transfer. For example, if customers know that they will be busy at any given date in the future, they are, by this service, assured that their bill payment and fund transfer will be conducted.

3) Transaction checking is another key feature that enables customers to check both history and pending transactions that occurred in either payee account, payer account or both for up to 12 months. For pending transactions, customers can cancel them prior to the due date.

4) In fund transfer, customers can set a period of

recurring fund transfer for up to 12 periods, thereby saving their time and expenses in traveling to the bank.

5) Every fund transfer transaction provides a memo for customers to take note. When a transaction is viewed, the memo will appear behind it. For bill payment, customers do not have to write a memo, because it will be automatically managed by the system.

6) In this prototype, customers are permitted to deal with their own security information at any time. That is, they can change user name and password themselves. They can also change their address and personal information themselves.

7) The customer help center offers four service channels including frequently asked questions (FAQs), message sending, online chat, and a call center. The key feature lies in the online chat that provides real time conversation between customers and bank staff through the Internet. When online chat is in use, the bank will instantly know whom the bank is talking to and his or her personal information. This enables the bank specialist to respond to customers' questions more effectively, and to offer products and services more suited with the customers' interest.

4.4 Experts' Validation

From interviewing Internet banking experts, the following comment and suggestions on the CNetBank prototype were provided.

1) In reference to the security system, modern systems typically require customers to use their e-mail address as a user ID instead of an arbitrary name when they apply for the service.

2) In online application forms, they should require customers to fill out only necessary information such as personal information and bank account number both for verification, and current address for contact with the bank. Here, an e-mail address is very important. Any other unnecessary information should not be required because it may cause customers to be tired and must be kept in the database that, in practice, should not be bulky.

3) For web design in Internet Banking services that mainly involve money, they should be simple, easy to use and understandable.

4) An "Account summary" describing information on all accounts customers have with the bank is a good idea. However, it should be available for customers to choose which accounts do appear or do not appear in the "account summary". This is because some customers do not want account information to be shown in Internet Banking.

5) With respect to the system configuration of actual Internet Banking used nowadays, when customers are applying for Internet Banking services, they will access a web application server with several web servers working together. Networks are linked as an Ethernet

with load balance working as an operator. Before ODBC linking to the host transaction server where the customers' information is kept in the database server and transaction information are kept in the transaction server, there will be a firewall dealing with enhanced security. Transaction server processes occur through a watch table, a file used for time checking in updating transactions. Upon the information being updated, the system will link it to be processed in the bank's host, which is usually a mainframe system.

4.5 Comparison between the proposed prototype and the actual system

1) The survey on Thai banks reveals that, in light of bill payment, any payee whose name and account number is available in the payee list typically contacts banks before hand. If a payee is not in the bank's contact list, an Internet Banking member of that bank will not be able to use the bill payment service to make payments to that payee, and will not be able to add the payee to the bill payment service. In order to use bill payment service, the payee and payer are also required to be customers of counterpart banks. These are two limitations imposed by both Thai banks and this prototype. Some eminent foreign banks, on the other hand, allow their customers to add a payee at will, by simply filling out the payee's information.

2) In light of fund transfer, the system in this prototype permits customers to conduct inter-account fund transfer and fund transfer to a third party with the condition that both sending and receiving accounts must be opened with CNetBank. Fund transfer to foreign banks is not allowed, however. In any case, the survey on fund transfer transactions in Internet Banking services of Thai banks shows that Siam Commercial Bank and Thai Farmers Bank provide fund transfer to a third party. The former requires that both accounts be in the same bank (intra-bank only), while the latter allows inter-bank fund transfer through the Internet. For the foreign banks, some of them such as Netbank, allow customers to make inter-bank fund transfer to a third party via the Internet, whereas some banks impose conditions that a counterpart bank be a nominated company only.

3) Customer information linked to Internet Banking may cause some customers (who are not confident in doing Internet Banking transactions) to be uncertain whether their information will be available if hackers attack the system. In a real banking system, an extremely reliable security system is established. It is required that there be a firewall and other necessary check points in the back end system. Moreover, transaction information in the Internet must be encrypted through secure socket layer (SSL) for at least 40 bits (from a standard of 128 bits) so that it is difficult for a hacker to access the system. In this system, on the

other hand, is not necessary to implement SSL, because the developed system is only a prototype.

4) In light of service fees for all types of fund transfers and bill payments offered in the CNetBank, there is no function designed for charging the fees from customers, because the business rule of the CNetBank allows them to use its services free of charge. This is applied to any transactions at any time (not just during the promotion period). However, this is not the case in the real world where banks can gain substantial income from charging service fees for every transaction occurring in their Internet banking services.

5) Regarding security in fund transfer to the third party, banks pose a limit on the amount of the transfer. Some banks, for instant, set a limit amount of 500,000 Baht (USD 125,000) per day for each username. CNetBank, allows customers to transfer up to 50,000 Baht (USD 1,250) per transaction. This means that, in a single day, customers can transfer funds to a third party several times. However, it might be unsecured for the bank to do so.

6) In order to facilitate customers, CNetBank permits its customers to immediately add the account number of other persons into the system for the purpose of fund transfer. Customers are not required to submit requests to the bank for permission, in view of security; this might be unsecured as well. In practice, banks have to pre-approve customers' requests prior to giving approval. For example, Siam Commercial Bank sends a letter of agreement to their customers to sign and return to the bank. Thai Farmers Bank requires their customers to submit a copy of an identification card and census record after adding an account number of other persons. Upon verifying these documents, the bank allows the other account number to be used in its system.

7) The online chat service provided in this system is viewed in terms of technology development that supports the bank's customers. It can be said that real banks can afford to provide this service or even voice chat, ICQ, and Internet phone to support their customers in addition to a traditional call center. There may be an issue whether these services are worthwhile in the long run, because banks have to allocate people for delivering the services. This point should be left to economist to further investigate, and if it turns out that the services are not worth investing in, online chat provided in this prototype may become a weak point.

8) CNetBank is merely a prototype and efficiency of hardware resources obtainable limit development tools used in the development. For example, Microsoft Access, which cannot be used in the real banking business, is employed as a database management system, but it can be used in CNetBank prototype because the information on customers used in this system is imaginary and small.

5. Concluding Remarks

As long as businesses are in a highly dynamic and competitive environment, the search for modern technology is unavoidable. Internet banking is another channel to provide value added services to either existing or new bank customers. The survey from the executives of four Thai banks reveals that there is a potential growth for retail Internet banking in Thailand. Therefore, this paper proposes the prototype of a retail Internet banking system that meets the requirements of Thai customers. The data from the interview and the questionnaire are used to develop such a prototype, called CNetBank.

CNetBank prototype is divided into six parts – banking information, system sign-in, banking transactions, customer information management, system administrator, and customer help services. The first part includes banking information, help for general customers, and application for CNetBank online member. The second part covers not only the verification of a customer's authority, but also identification as to whether the customer signing in is either a CNetBank customer or CNetBank system administrator. CNetBank customer can access both the third and fourth part of the system. In the third part, a customer can do banking transactions including account summary, statement, bill payment and funds transfer, while in the fourth part, a customer can manage his or her information such as changing personal information, editing a personal account, and changing user name and password. In the CNetBank system, an administrator can access the fifth part to simulate the back-office system. The final part, customer help service, is divided into two sections –help for general customer, and help for Internet banking members. Both types of help perform similar function, except that the latter provides member information for the relevant members only.

After prototype development was initially carried out, it was evaluated, reviewed, and commented on by experts. The prototype was then improved and adjusted in accordance with these comments. Ultimately, the prototype was completed with several prominent advantages contained in the service features derived from the survey on user requirements that identify customer needs. In addition, the prototype provides flexibility in account management, time scheduling in transactions, checking for both history and current transactions, and scheduling of recurring fund transfers for up to 12 periods, etc.

References

- [1] T. Bernstein, A. Bhimani, E. Schultz, and C. Siegel, *Internet Security for Business*, John Wiley & Sons, New York, 1996.

- [2] Citibank overview, Available from: http://www.gomez.com/scorecards/comments.asp?topcat_id=1&firm_id=244&subsect=, [Accessed 2001 March 7]
- [3] SCB Internet Banking (Internet banking of Siam Commercial Bank PCL.), Available from: <http://www.scbeasy.com>, [Accessed 2000 May 4].
- [4] NetBank, Inc., Available from: <http://www.netbank.com> [Accessed 2000 May 2].
- [5] NBank online Banking, Available from: <https://www.nbank.com/online/default.asp> [Accessed 2000 May 4].
- [6] Wells Fargo Online, Available from: <https://banking.wellsfargo.com> [Accessed 2000 May 4].
- [7] ANZ Internet Banking (Australia and New Zealand banking Group Limited), Available from: <https://anz.com/INETBANK/default.asp>, [Accessed 2000 May 5].
- [8] USABancSharesBank.com, Available from: <http://www.usabancshares.com>, [Accessed 2000 May 7]
- [9] Bank of America Corporation, Available from: <http://www.bankamerica.com>, [Accessed 2000, May 6].
- [10] Bank One Corporation, Available from: <http://www.bankone.com>, [Accessed 2001 March 6].
- [11] FleetBoston Financial Corporation, Available from: <http://www.fleet.com>, [Accessed 2001 March 6].
- [12] AsiaPhone (Bank of Asia call center), Available from: Tel: 285-1555, 088-2-28522 [Accessed 2001 Jan 17].
- [13] AsiaCyberbanking (Internet Banking of Bank of Asia Pcl.), Available from: <https://asiacyberbanking.com> [Accessed 2001 Jan 5].
- [14] Thai Farmer Bank Call Center, Available from: Tel: 02-1571 * 0 [Accessed 2001 Feb 15].
- [15] TFB e-Internet Banking (Internet Banking of Thai Farmer Bank Pcl.), Available from: <http://www.tfb.co.th/tfbbank/>, [Accessed 2001 Feb 7].
- [16] Live Chat First Internet Bank of Indiana, Available from: <https://connect.firstib.com/OnlineBanking/chat/> [Accessed 2001 Feb 27].
- [17] A. Noi-Am, Senior Director (Information Technology), Bank of Asia (Public) Company, Interview, February 29, 2000.
- [18] A. Podhilohakul, Senior Director (Marketing and Retail Banking), Thai Farmers Bank (Public) Company, Interview, March 8, 2000.
- [19] C. Kangwanpong, Executive Vice President (Information Technology), Krung Thai Bank (Public) Company, Interview, March 13, 2000.
- [20] A. Laorakpong, Vice President (Technology Application), Siam Commercial Bank (Public) Company, Interview, April 28 2000.