



THE CREDIT CARD RECEIVABLE SYSTEM

by

Mr. Theadkiat Keawattana

A Final Report of the Three-Credit Course
CE 6998 Project

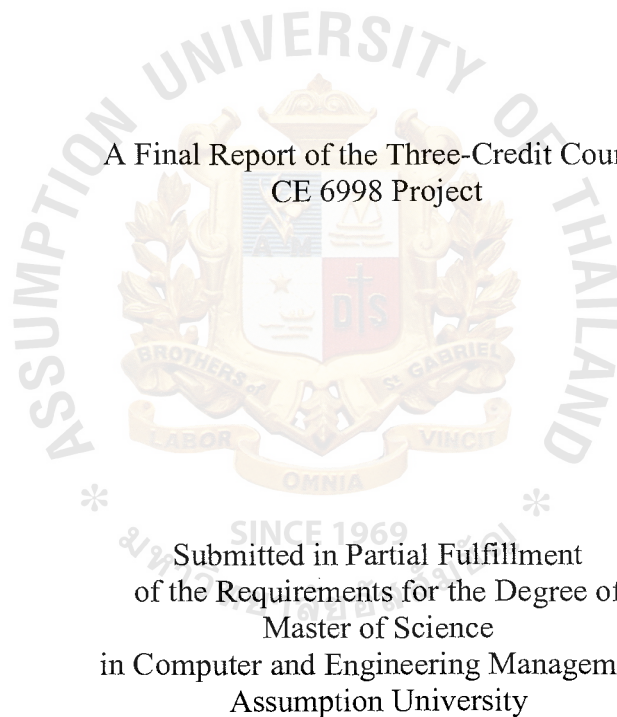
Submitted in Partial Fulfillment
of the Requirements for the Degree of
Master of Science
in Computer and Engineering Management
Assumption University

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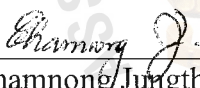
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The Graduate School of Assumption University has approved this final report of the three-credit course, CE 6998 PROJECT, submitted in partial fulfillment of the requirements for the degree of the Master of Science in Computer and Engineering Management.

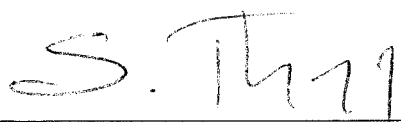
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ABSTRACT

The credit card usage is soaring for consumers because of its convenience. A bank provides a complete range of financial services by issuing the credit card and offers the point of sale unit for those merchants who want to expand their sale volume. Like Telephone Organization of Thailand (TOT), the credit card receivable system is employed to provide the immediate gratification of wants of subscribers. The objective of the project is to analyze the proposed system which uses the real time processing to solve the problem of the existing system. TOT takes 9 months for the system development project by identifying potential development project, selecting the attractive one, analyzing what users want from new system, designing the feature, implementing, and doing the maintenance.

The problem of the existing system is that it creates the duplicate received payment for office branches. It employs a paper numerously to communicate between the head office and office branches which costs money. It is time consuming when there is any issue change because its distribution of message must be done for 370 office branches throughout Thailand. The work flow is not smooth when an office branch has a mistake. The proposed system is developed to solve all these problems. The servers are used to send and retrieve the information between the head office and office branches. It increases the efficiency and effectiveness. The office branches can check the status of subscribers at the right time.

I think that the constraints of the proposed system is likely that when the network has trouble it will make losses totally. As I see that in the future TOT will change from the state enterprise to the company limited that causes TOT to be charged additional tax. Therefore, the credit card receivable system will be developed to add more functions.

ACKNOWLEDGEMENTS

I am indebted to the following people and organization. Without them, this project would not have been possible.

I wish to express my sincere gratitude to my project advisor, Dr. Chamnong Jungthirapanich. His patient assistance, guidance, and constant encouragement has led me to make the project completion.

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Above all, I would like to thank my family for their immense fervent encouragement, especially my parents who induce me at the outset of the project when I feel discouraged, until the project is completed.

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I. INTRODUCTION

1.1 Background

From the economic crisis, the general level of interest rates fell, and this was reflected by a gradual reduction in the interest rates that banks and thrifts paid their depositors for funds that these depository institutions used to make loans, such as credit card loans. Even though deposit rates and many loan rates fell during that period, credit card interest rates tended to stay constant or to fall by much smaller magnitudes.

Why should the credit card interest rate remain so much above other loan interest rates? One possible answer is that credit card rates are high because many who use the card are poor credit risks; delinquency rates on credit card loans are high, especially during economic recessions. Good credit risks pay their credit card balances promptly, avoiding most or all interest payments, but poorer credit risks take much longer to repay or do not repay at all. Hence, the higher credit card interest rates may compensate credit card lenders for the greater risks they incur by issuing credit cards to so many people.

Nowadays, in the real business, we need a centralized information system support center to handle the information needs to provide data processing and information related services to every department or all users in the organization. The growth in the use of computing services is soaring, the new technology has never been easily learned by users.

Bank provides a complete range of financial services including loans and deposits, international finance and foreign exchange, credit card, security, custodian etc. Due to the need of delivery of integrated customer and relationship information is being increasingly felt by banking worldwide by the following:

- (1) Greater focus on marketing and sales to win and retain customers

- (2) To solve the problem of duplicate received payment
- (3) To increase the efficiency in sending the information between head office and its branches, to reduce time consumption and to reduce paper usage.
- (4) To generate a variety of reports as required

1.3 Scope of the Research

The scope of this conceptual research is as follows:

- (1) Study the existing system and problem definition.
- (2) Analyze and present proposed credit card receivable system.
- (3) Design the output screen by using Microsoft Access.



II. LITERATURE REVIEW

2.1 Evolution of the Credit Card

The credit has been around for a while. People do not know the exact date but historians have the evidence of Roman banks making the interest bearing loans as early as 2000 BC. (www.Virtualschool.edu)

Fast forward to the rise of the British middle class who worked with bankers to create overdraft protection. This was automatically if an account does not have enough money in it to cover the checks written against it.

In United States, The Ford Motor Company played a large part in creating the consumer credit business. Even though the Model T was the first mass market car, not all Americans had that amount of cash saved up. Even if they did, many were reluctant to put it all into a motor car. So small loan companies, also called Finance Companies, began making the first car loans.

Credit cards have been a part of the American culture for almost 70 years. Credit cards are what people have either grown to love or grown to dislike. Either way credit cards are what people depend on for purchasing products, traveling, getting cash, purchasing gasoline, etc., credit cards have become essential. The Charge cards, one of the precursors to credit cards, came along during the 1950's and were first issued by the oil companies for drivers who wanted a convenient, cashless way to pay for gas. Unlike credit cards, charge cards do not give you the option of paying for purchases over time. The first true credit cards were issued by Visa and MasterCard and were not common until 1970's.

In 1970 a study was conducted by the Survey Research Center of the Institute for Social Research at the University of Michigan on the increasingly widespread use of credit cards by American families. "Survey findings inform us that half of all American families

use at least one credit card". This finding dates back 27 years ago, and the use of credit cards dates even further back, almost 70 years ago. "Prior to the first world war, credit cards were issued by a small number of hotels, oil companies and department stores. These cards served the dual purpose of identifying a customer with a charge account and also of providing a mechanism for keeping records of customers purchases".

In 1950 Frank X. McNamara started the Diner Club credit card operations, which started a trend, and then banks developed the concept of revolving credit cards. Customers could pay balances over periods of time while interest accrued. The revolving credit cards are in heavy existence today. Now, in 1997 almost every American family has a credit card, but how they obtain the credit card is now different. Instead of having to apply for the credit card in person or by mail, now consumers can apply for credit cards on the World Wide Web. Consumers as well as businesses are finding that offering on-line credit card applications are convenient, and banks to retail stores offer on-line applications.

On-line credit card applications have the same format as the credit card applications that one would get on the back of a pamphlet, or face to face in the store. The only difference between the on-line application and the written application is that one is completed by using the computer and the other is completed by pen or pencil (handwritten). The on-line credit card application first lets the customer see the terms of the contract, what exactly the rates are, and legal issues and so on. After the customer reads the contract and agrees to it then the customer will fill out the form, and at the end the customer will submit it to the institution. The on-line application takes up to 30 days and the institution which is issuing the credit card will send the response by regular mail not electronic mail.

Not every business offers on-line credit card applications and the reason why was because of the safety issue. Whenever I entered a credit card application on-line there was

a dialog box that popped up and it said "the information you submit is insecure and could be observed by a third party while in transit, if you are submitting passwords, credit card numbers, or other information you would like to keep private, it would be safer for you to cancel submission". When submitting an on-line application while in transit a third party could view the document one submitted because the transit is not a secured transit line. Having unsecured documents is what is preventing a lot of businesses from offering on-line credit card applications and deterring consumers from applying on-line. (www.board.creditnet.com)

Credit card applications are found all over the www. Businesses that are using on-line credit card applications range from banks to gasoline companies. Some of the top name banks offer on-line credit card applications such as, Nations Bank, Citibank, First USA Bank. Credit Unions are taking advantage of the Internet and using on-line credit card applications, retail stores, Best buy, and credit card companies such as, American Express. Not every business is offering on-line credit card applications but as technology increases, and security improves, eventually all businesses will offer on-line credit card applications.

One of the major advantages of offering on-line credit card applications for consumers is the convenience. Consumer can now apply for a Bank credit card, Department store credit card, Gasoline credit card , etc..., in the comfort of their own home or where there are Internet capabilities. The consumer doesn't have to go out of their way to go and apply face to face. Not only are the on-line credit card applications convenient for consumers, but they are also convenient for the merchants such as, banks, retail stores, gasoline companies, and credit card companies. Since the www is international, it allows the merchants to target a broader range. For example, if I wanted to

apply for a International Bank of Asia credit card, for the simple fact that I traveled to Asia a lot and I liked that bank so I wanted to apply for a credit card from them. Citibank is another good example of merchants benefiting from on-line credit card applications. Citibank is a global credit card company, and they offer a feature where you can select the language, in which that person's country speaks. This allows Citibank to reach customer outside of the English language, and the customers of Citibank feel more comfortable in filling out the application because it is in a language which they understand.

Although the Internet is a powerful communication tool for the world, people and businesses are still skeptical about the Internet and does not use it to its fullest capabilities. As I discussed in this paper about on-line credit card applications, how they are easy to use, convenient, and offers a wide range of people to benefit from it. Unfortunately there are some negative aspects about on-line credit card applications which makes businesses and people skeptical about the whole concept. One of the main reasons more businesses and more people haven't caught on to the concept is security. The information an applicant submits could be viewed by a third party, and filling out a credit card application is very confidential, mainly to the applicant. Businesses such as, MBNA credit cards, Nordstrom, Macy's, Bloomingdales, Circuit City, Exxon, Texaco, Crestar, etc..., do not offer on-line credit card applications. Also the process after filling out the on-line application takes up to 30 days. On-line credit card applications in the future will become a main source of people obtaining credit cards, putting mailing in the application second. This will only happen if the applications become secure in transit to the institution. More and more businesses will use the Internet and more people will fill out the applications on-line because they would be secured documents. This will happen as technology grow and the demand for Internet use

increases, to where every person in the world has direct access to the World Wide Web. (www.ecommerce.internet.com)

2.2 How to Use a Card

The credit cards along with all other types of plastic, offer flexibility and convenience. The consumers can buy goods and services without having to carry large sums of cash or a cheque book backed by a cheque guarantee card. The Banks pay a fee to one of the card payment schemes which allows them to issue cards bearing the scheme's logos. The consumers can use credit cards to purchase goods and services wherever they see logo that appears on the card. The cards can also be used to make cash withdrawals at ATMs and financial institutions displaying the appropriate logo. This is known as a cash advance. There may be either a handling fee to pay on the cash advance or interest charged from the day the withdrawal is made. A Personal Identification Number (PIN) can be issued, if the consumers wish, to allow cash withdrawals from a machine.

Some ATM cards can be used only to withdraw cash. Others are multi- purpose cards which roll debit cards, ATM cards and cheque guarantee cards into one. When either a credit or ATM card is used to withdraw money, the card is fed into the cash machine, the PIN keyed in and money is dispensed.

PINs must be never be disclosed to anyone, including family, friends, the police and employees of the card issuer. They should not be written down. If they are, they must be disguised and kept separate from the card. If they are recorded in an obvious place, the holders may not be entitled to a refund should someone else obtain cash with the card. Cash can be withdrawn over the counter from banks and building societies which display the appropriate logos. It is a similar procedure to the one used when making purchases in

shops, although additional identification may be needed. A small handling fee is usually levied.

There are a lot of outlets where the credit cards can be used. The credit cards are welcomed in shops, garages, travel agents, hotels and many other places. It can be used to order goods or services over the telephone, the internet or through mail. Typically, there are two types of credit card using as follows:

- (1) Buying in person
- (2) Buying at a distance

When paying by the plastic, the credit card is swiped by the sales assistant through an electronic terminal which which prints a sales voucher with the card and transaction details. Alternatively, the credit cards and Visa cards can be placed in an embossing machine to produce a voucher with card details. The consumers sign the voucher and the sales assistant compares their signature measure this is checked as well. Every credit card outlet has a limit on the amount it can accept for a single transaction. This is called the floor limit. Purchases above the floor limit must be authorized by the issuer of the credit card. The credit limit is the maximum which can be owed at any one time. The initial limit is set by the issuer using the information the consumers supply when applying for a card. Credit limits are designed to help them meet likely needs without borrowing more than they can afford. Limits can be changed upwards or downwards when their financial circumstances change or by automatic amendment applied by the issuer. Many issuers use sophisticated, computerized behavioral scoring systems to manage credit card accounts. These monitor consumers' spending and repayment patterns, allowing credit limits to be adjusted up or down in response to changing circumstances. They may decline an increased credit limit. Some issuers increase limits only at consumers' requests. One credit card account can

sometimes have two or more credit cards issued on it. Every month, the main cardholder is sent a bill. The bill lists all purchases made by the main and additional cardholder(s). Additional cardholder(s) share a credit limit with the main holder who is responsible for paying the bill, whoever made the purchases.

Credit cards offering revolving credit. The consumers can repay outstanding balances and incur new borrowing every month without the need to arrange a fresh agreement with the issuer provided they stay within the specified credit limit and meet regular monthly payments. When they repay the balance on the statement in full, no interest on the purchases is usually charged. If they repay only part of the balance on their credit card statements, interest is usually charged on each transaction from the date details of it reaches the account until it is paid off. As a general rule, they pay interest on the amount of money they borrow for the period of time that they borrow.

Although outlets which accept credit cards are guaranteed payment by credit card issuers within a few days, they do not have to pay for purchases until the payment due date on their monthly statements of account. They can therefore choose to spread repayments over several months. The statement will list all purchases processed since the previous monthly statement, as well as any outstanding balance from the previous statement. Statements include details of charges and repayments. When they receive the bill, they can either pay in full and usually incur no interest or pay in part. Depending on the issuer and the timing of purchases, they can receive up to a maximum of 56 days interest free credit if the bill is paid in full.

The benefits of the credit card are that some issuers offer up to 100 days free insurance against theft, loss or damage on most goods bought on their credit cards. The range of other card benefits offered by issuers includes discounts on holidays, membership

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of car rescue services and free assistance with legal, travel and medical issues. Some issuers offer loyalty schemes which enable customers to collect points towards free gifts, adventure day trips, money off certain makes of car or air miles as they spend. More than one card may be issued on the same account in different names. For example, a wife and husband can each have a card in their own name and all their transactions will appear on the same statement.

Authorizations are made electronically in a matter of seconds using EPOS machine(Electronic Point of Sale) which could eliminate the need for the merchant to complete the credit voucher required with the Visa clearing system. This voucher was normally transported to the bank, where the data were recorded on the magnetic tape. The EPOS system captures on the magnetic tape all of the voucher information. The merchant strips the credit card transaction data from the tapes, thereby leaving a tape that contains only The bank credit card transaction information. This tape is transmitted to the merchant's bank without the use of paper, and the payment process is initiated. The EPOS terminal system may be easily modified to accommodate the networks of Visa or the Interbank National Authorization System(INAS) for the automatic authorization of credit.

The consumers can use the credit cards to pay for things without being present themselves at the shop or outlet. Cheques and cash cannot be sent down a telephone line. The credit card details can. Sending cash through the post runs the risk of theft or loss. Using the credit card avoid these dangers.

Many companies allow the consumers to make purchases by telephone using the credit card. The company takes down the same details over the telephone as a shop records in person such as the card number, the expiration date (and sometimes the start date) and the name on the card. Also needed is the consumers' address as held by the issuer, to

confirm their identities. Mail order transactions require the same detail as a telephone order as well as their signature on the order form. As with all credit card transactions, they cannot cancel mail or telephone orders once completed.

2.3 Use of Cards and Liability for Charges (Source: American Express)

All amounts charged to a card account will be called “charges” in the agreement. Charges include, without limitation, any purchases of goods, services or other items, joining, annual, renewal, replacement or other fees for the basic card and any additional cards, monthly installments on an extended payment plan, interest, charges for services rendered directly to the cardmember by any bank or other institution, fees for returned cheques, any late payment assessments, other fees, expenses and all taxes that may be applicable. The consumers are liable for all charges made to their card account.

Charges may be made only at the service establishments. A service establishment is any service, industrial, commercial or other establishment authorized by the card issuing companies or their affiliated companies to accept the card. When a service establishment accepts the card for a charge, it will issue a charge record form which the consumers agree will be proof of the charge. The format and design of the charge record form, and whether their signatures are required, will be determined solely by the service establishment and other affiliated companies.

The consumers agree that, when requested by a service establishment at which they wish to make a charge, they will sign the charge record form with the same signature that was written on the signature panel on the back of the card. Failure to do so will not relieve them from liability for the charges.

No other person is permitted to use the card issued to the consumers for charges, for identification, or for any other reason. If they have let someone else use the card or they

have voluntarily relinquished physical possession of the card, this will not affect their liability for the payment of all charges made with the card issued to them. They agree not to sell or return for a cash refund any merchandise, tickets or services obtained with the card. Obviously, they may return an item or ticket to a service establishment for the credit to the card account if the service establishment permits such returns. They agree that service establishments may seek authorization before accepting any charges. The card issuing company or bank reserves the right to deny authorization of any charge they wish to make. Also, it may discontinue or suspend their use of the card to make charges, or for any other purpose, inside or outside the country's territory at any time, and without notice to them.

The consumers will be sent a monthly statement of charges, "the statement of account", to the basic cardmember for all charges made in connection with the card account. The basic cardmember will be liable for all charges, including those made in connection with the basic card as well as those made in connection with the additional cards. The additional cardmember will be liable for all charges made in connection with the additional card, even though they are sent the monthly statement of account to the basic card member and not the additional cardmember.

The payment methods are as follows:

(1) Direct Debit System of Payment

Whenever the consumers apply for the card, they may agree to authorize a participating bank to directly debit the bank account they designated and established with the bank (the bank account) for the total amount of charges shown as being owed to bank on their monthly statement of account. They must notify the bank immediately any time they change the bank account in connection with their direct debit authorization. They agree to pay any fees or

charges imposed by the bank account in connection with their direct debit authorization. Approximately ten days after the date their statement of account, the bank will be instructed to debit from the bank account the total amount of charges due on their card account and to credit this amount to the card issuing company or bank.

(2) Payment by Cash, Cheque, Money Order or Bank Draft

If the consumers wish to pay by cash, cheque, money order or bank draft, they agree to pay upon receipt of their monthly statement of account, the total amount of the charges shown in the statement as being owed to the card issuing company or bank.

(3) Currency of Payment

The consumers must pay either with ; for example, Thai currency or with a money order payable in Thai Baht. If the card issuing company or bank decide to accept payment made in some other form or other currency, their payment will not be credited to the account until such payment is converted into Thai Baht. The amount of Thai Baht so obtained will be credited to their card account. The card issuing company or bank reserve the right to charge the consumers any costs and expenses including foreign exchange conversion and other related currency fluctuation costs or losses incurred as a result of converting such payment into Thai Baht.

The card issuing company or bank may accept late or part payment, or any payment described as being in full or in settlement of any dispute. However, the acceptance of such payment will not prevent the bank from enforcing any of our rights under the agreement to under law to collect the

amount due hereunder, nor will such acceptance operate as consent to the modification of the agreement in any respect.

The bank may charge the consumers; for example American Express will charge the consumers Baht 750 (subject to VAT) to compensate for the additional expenses in respect of each payment by or for them which is not honored in full. If they have agreed to pay by the direct debit and if the debit instruction to their bank is not honored in full for any reason, a handling fee of Baht 100 (subject to VAT) will be levied. Such charges will be debited to their account.

For the late payment assessment, if the card issuing company or bank do not receive full payment of the charges shown on their monthly statement before the date on which their next monthly statement (the second statement) is made up, the unpaid balance of such charges will be designated in the second statement as previous balance. If the card issuing company or bank has not received full payment of the previous balance shown on the second statement within approximately thirty days after such amount was first billed, the unpaid amount will be treated as delinquent. The late payment assessment will be charged at the rate of ; for example for American Express, four percent or Baht 400 (subject to VAT) per month, whichever is greater, on any delinquent amount until it receives full payment of it. Details of late payment assessments will be included in their monthly statement, and unpaid assessments will also be treated as delinquent amounts. In calculating the late payment assessments, it will disregard any previous balance of less than Baht 2,000. The 4% assessment consists of a 1.25% charge to compensate for additional funding costs and a

2.75% charge for the collection expenses. The card issuing company or bank may take such action as it consider necessary for the recovery of unpaid charges and otherwise to protect the interests in respect of the issued and use of any card and provision of card facilities. The consumers agree to indemnify fully against all costs and expenses (including legal fees) which it incurs in respect of such action under the terms and conditions.

For the extended payment plan, the consumers may pay for certain purchases over a period of time if they elect an available extended payment plan when making the purchase. If they do, it will assess a finance charge at an annual percentage rate of 15%, plus an administrative charge at an annual rate of 3% for the period during which payments are required to be made.

They may prepay all or part of the total amount remaining unpaid for a purchase on an extended payment plan. If they do, they must inform in writing as to the amount they intend to prepay. Otherwise, the card issuing company or bank will record any overpayment as a credit on their card accounts, and such credits will not be applied to the amount charged on an extended payment plan until such amount become due and payable under such plan. If they allow the charge or portion for a payment on an extended payment plan purchase to become late, it may require immediate payment of the entire amount remaining unpaid for that purchase. If the bank requires payment of the entire amount, or if they decide to prepay some or all of it, the bank will calculate any portion of the finance charge it has not earned and credits that amount to their card account.

For a billing error, the consumers are responsible for confirming the correctness of each monthly statement of the card account. The card issuing company or bank will take reasonable steps to assist by providing information in relation to charges made to the card account. If a service establishment issues a credit slip in respect of a charge, it will credit the amount shown on the credit slip to the card account. No claim against a service establishment will entitle the consumers to any offset or counter claim. It will not be liable to them for any defect in any goods or services supplied to them by a service establishment, or for any refusal of a service establishment to honor or accept the card.

For the lost or stolen cards, the consumers should notify at once if the card is lost, stolen, or if they suspect it is being used without their permissions. Provided that they have acted in good faith, their liability to the company arising out of any unauthorized use of the card prior to such notification will be limited to Baht 1,000. If the lost card is subsequently retrieved, it will not be used. A replacement card will be issued to them. The replacement card and its subsequent renewals will be used instead. They will report the retrieval of the original card to it immediately, and they will cut such original card in half and return both halves to it.

For the replacement card, the card will be valid until the expiration date printed on the face of the card. By accepting the issuance of this card, they are requesting it to issue to them a renewal or replacement card before the current card expires for the basic card and each additional card. It will bill renewal fees annually. It will continue to issue renewal or replacement cards, until such time as they advise it in writing to cancel their card accounts.

The card issuing company or bank may provide the consumers with a participating financial institution. All decisions concerning whether to extend, continue or cancel a line of credit rest with it and the financial institution. By maintaining a line of credit they authorize the financial institution to transfer any necessary amount of funds from the line of credit granted by the financial institution to the card account as needed to settle any outstanding obligations. If their line of credit is suspended or canceled by the financial institution, it may permit them at its sole discretion to continue the use of the card. Their line of credit privileges, however, will be suspended or canceled until the financial institution decides to reinstate them. The line of credit agreement between them and the participating financial institution will regulate all rights, duties, payment obligations and other obligations relating to funds obtained by utilizing the line of credit facility.

The card issuing company or bank may provide the consumers with a personal identification number to enable the card to be used in an automatic teller cash dispensing machine. They will not disclose this number to any other person and they will accept full responsibility for all charges made by any person and processed on the automatic teller cash dispensing machine. They will accept the record of all charges so incurred as conclusive evidence of the same, which will be binding on them for all purposes.

2.4 Credit Card Transactions (<http://cause-www.colorado.edu>)

Terminology:

(1) Acquiring Bank

A bank that has a business relationship with a merchant and receives all credit card transactions from that merchant. The acquiring bank acts as a broker between the merchant's bank and the issuing bank

(2) Authorization

Approval of a credit card transaction for a merchant by the card-issuing bank

(3) Authorization Code

A code assigned by the card issuing bank to a credit card sale to show that the transaction is authorized.

(4) Bank Card

A credit card issued by a bank Visa and MasterCard are bank cards. American Express and Discover are not.

(5) Chargeback

A credit card transaction that is billed back to the merchant who made the sale. This happens when a credit cardholder disputes a charge on their bill by claiming the product was never delivered or the cardholder was dissatisfied with it in some way. Cardholders are supposed to try to obtain satisfaction from the merchant before disputing the bill with the credit card issuer.

(6) Electronic Data Capture

Entering and processing the sales drafts by electronic means. The credit card sale authorization will be allowed at the time of the purchase, and then at

night capture the sale draft by sending the sales draft data from the Point of Sale terminal to be processed. In online payment schemes, capture is used to denote the electronic deposit of the sales draft with the acquiring bank.

(7) Issuing Bank

The bank which issued the credit card to the consumer.

(8) Interchange

The transaction takes place between the acquiring bank and the credit card-issuing bank.

(9) Interchange Fee

A fee the acquiring bank pays to the credit card-issuing bank in order to process a credit card transaction involving a card holder's account. This fee is regulated by MasterCard and Visa, and is a percentage of the total transaction amount.

(10) Merchant Bank

The bank that authorizes a business to accept credit cards.

(11) Merchant Discount

A percentage of the retail sale the merchant pays as a fee to the acquiring bank for processing the credit card transaction. You can bet that this fee is always higher than the interchange fee the acquiring bank pays.

(12) Merchant Status

A business is considered a "merchant" once they have authorization from an acquiring bank or other financial institution to accept credit cards.

(13) Sales draft

An instrument showing an obligation on the cardholder's part to pay money, (i.e.. the sale amount), to the card issuer.

2.5 Normal Credit Card Transaction

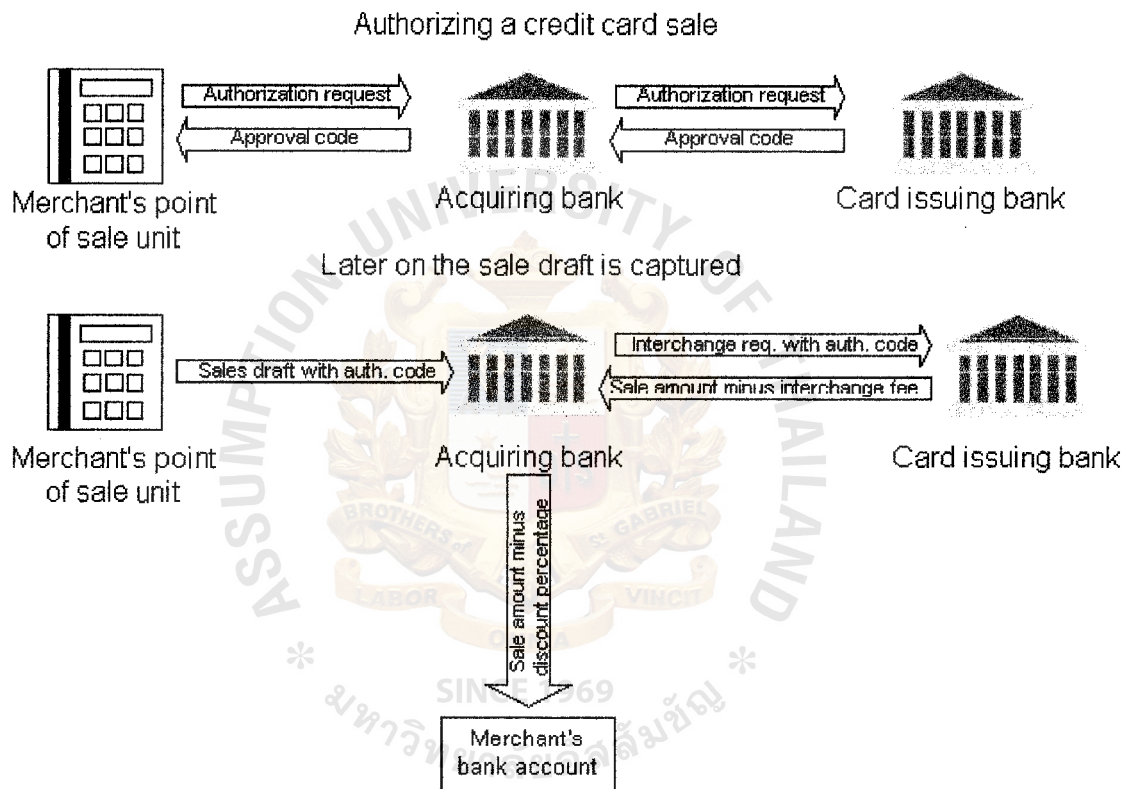


Figure 2.1. Payment Process Overview. (<http://www.virtualschool.edu>).

The overview presented above is far from complete. It does not cover the role of the financial networks, nor of the bankcard associations. Also, it is geared towards Visa and MasterCard transactions. There is no card-issuing bank with American Express and

Discover. These shortcomings aside, the sequence of events outlined above provides a good overview of the credit card payment process.

Overview of Credit Card Process

Steps involved in a normal credit card transaction:

- (1) Merchant calculates the amount of purchase and asks buyer for payment
- (2) Buyer presents merchant with a credit card.
- (3) Merchant runs credit card through the point of sale unit. The amount of the sale is either hand-entered or transmitted by the cash register.
- (4) Merchant transmits the credit card data and sales amount with a request for authorization of the sale to their acquiring bank. Point of sale units are usually set to request authorization at the time of sale, and then actually capture the sales draft at a later time.
- (5) The acquiring bank that processes the transaction, routes the authorization request to the card-issuing bank. The credit card number identifies type of card, issuing bank, and the cardholder's account.
- (6) If the cardholder has enough credit in their account to cover the sale, the issuing bank authorizes the transaction and generates an authorization code. This code is sent back to the acquiring bank. The issuing bank puts a hold on the cardholder's account for the amount of the sale. Note that the cardholder's account has not been actually charged yet.
- (7) The acquiring bank processes the transaction, and then sends the approval or denial code to the merchant's point of sale unit. Each point of sale device has a separate terminal ID for credit card processors to be able to route data back to that particular unit.

- (8) A sale draft, or slip, is printed out by the point of sale unit or cash register. The merchant asks the buyer to sign the sale draft, which obligates them to reimburse the card-issuing bank for the amount of the sale.
- (9) At a later time, probably that night when the store is closing up, the merchant reviews all the authorizations stored in the point of sale unit against the signed sales drafts. When all the credit card authorizations have been verified to match the actual sales drafts, the merchant will capture, or transmit, the data on each authorized credit card transaction to the acquiring bank for deposit. This is in lieu of depositing the actual signed paper drafts with the bank.
- (10) The acquiring bank performs what is called an interchange for each sales draft, with the appropriate card-issuing bank. The card-issuing bank transfers the amount of the sales draft, minus an interchange fee to the acquiring bank.
- (11) The acquiring bank then deposits the amount of the all the sales drafts submitted by the merchant, less a discount fee, into the merchant's bank account.

III. RESEARCH METHODOLOGY

3.1 Overview

Nowadays many organizations employ a computer system to store, retrieve, organize, and maintain the information. The computer system takes a critical role and reinforces the flow of works of each department include producing a routine report necessary to a management. It provides the immense benefits to the organization and helps it to achieve its goals by increasing the productivity and effectiveness.

The factors which are considered and important to both the public and private organization are incomes and expenses. Especially the organization of a business sector always considers the incomes and expenses as a capability measurement index of an organizational leader. The net profit which is proceeded shown as a success of the organization.

The benefit is to make convenience to customers for their payments using the credit card instead of payment by cash. At present this payment method is soaring and considered tremendously by many merchants. Thus, Telephone Organization of Thailand embraces the credit card processing system in order to give another payment choice and to provide convenience for its users.

The system is developed with the purpose of solving the problem of the traditional payment method that is paying by cash and improving the efficiency of the service.

3.2 Research Direction

The system development process comprises 6 steps as follows: The project duration takes approximately 9 months.

3.2.1 Project Identification and Selection

In this phase, it is to identify the need for a new or enhance system. TOT recognizes as a corporate and system planning process. Information needs of TOT as a

whole are examined, and projects to meet these needs are proactively identified. TOT deems most likely to yield significant its benefits, given available resources, are selected for subsequent development activities. Project identification and selection consists of three primary activities that are identifying potential development projects, classifying and ranking projects, and selecting project for development. Potential projects can be evaluated and selected using a broad range of criteria such as potential benefits, resource availability and requirements, and risks. This first life cycle phase does not deal with a specific project but rather identifies the portfolio of projects to be undertaken by TOT. Thus, project identification and selection is a pre-project step in the life cycle.

3.2.2 Project Initiation and Planning

The two major activities in this phase are the formal, yet still preliminary, investigation of the system problem or opportunity at hand and the presentation of reasons why the system should or should not be developed by TOT. A critical step at this point is determining the scope of the proposed system. The formal definition of a project is based on the likelihood that TOT is able to develop a system that will solve the problem or exploit the opportunity and determine whether the costs of developing the system outweigh the benefits it could provide. In this phase, it is to conduct a more detailed assessment of one particular project selected during the first phase. This assessment does not focus on how the proposed system will operate but rather on understanding its feasibility of completion given the available resources. Feasibilities include economic, technical, operational, schedule, legal and contractual, and political. It is crucial that TOT understand whether resources should be devoted to a project, otherwise very expensive mistakes can be made. It is said that this phase identifies where projects are either accepted for development, rejected, or redirected. It includes

forming the project initiation team, establishing customer relationship, developing a plan to get the project started, setting project procedures, and creating project management environment.

After completing all analyses, a credit card processing system can be developed. A credit card processing system includes a level description of the proposed system or system change, an outline of the various feasibilities, and an overview of issues specific to the project. An objective of this process is to make sure that all relevant parties understand and agree with the information contained in the plan before subsequent development activities begin. Project initiation and planning is a challenging and time consuming activity that requires active involvement from many TOT participants.

3.2.3 Analysis

In this phase, it is to determine what the users want from a proposed system, to study the requirements and to structure them according to their inter relationships and to eliminate any redundancies, and to compare these alternatives initial designs to match the requirements within the cost, labor, and technical levels TOT is willing to commit to the development process.

The purpose of analysis is to determine what information and information processing services are needed to support selected objectives and functions of TOT; consequently, analysis is fundamentally an intelligence activity to capture and structure information. Analysis includes the following steps:

(1) Requirements Determination

The requirements determination process, the systems development team attempts to discover important information about how the authorities now perform and how they will need to perform their jobs in order to meet

future conditions. Included in this information will be answers to the following questions:

- (a) How does the current system function? Is the system manual?
- (b) What data are necessary for proper functioning of the supported area?
- (c) What kind of reports are generated?
- (d) How do people use the system to perform their work?

A study of current operations gives insights on system requirements. It is the basis for discovering possible incremental improvements, and provides necessary information for subsequent steps involved in converting from the current to a replacement system.

Moreover it proceeds some more questions as follows:

- (1) How should a new or replacement system function?
- (2) What data would be needed for it to operate smoothly?
- (3) What kind of reports would it need to generate?
- (4) How would a new system alter employees' jobs?

(2) Requirements Structuring

This activity creates a thorough and clear description of current operations and new information processing services. Requirements structuring has three sub-activities that concentrate on the structuring different views or dimensions of the information system.

(a) Process Modeling

Process Modeling involves graphically representing the functions, or processes which capture, manipulate, store, and distribute data between a system and its environment and between components within a system. A common form of a process model is a

data flow diagram which is one of several notations that are called structured analysis techniques.

Deliverables for the process modeling are the context data flow diagram(DFD), DFD of the current physical and logical system.

Definitions and symbols for the process modeling based on DeMacro&Yourdon are as follows:

(1) Process

Definition: The work or actions performed on data so that they are transformed, stored, or distributed.

Symbol:



Figure 3.1. Process Symbol.

(2) Data Store

Definition: Data at rest, which may take the form of many different physical representations.

Symbol:

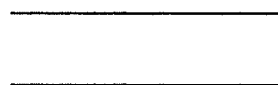


Figure 3.2. Data Store Symbol.

(3) Source or Sink

Definition: The origin and or destination of data sometimes referred to as external entities.

Symbol:



Figure 3.3. Source or Sink Symbol.

(4) Data Flow

Definition: Representation of a data motion, moving from one place in a system to another

Symbol:

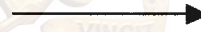


Figure 3.4. Data Flow Symbol.

(b) Logic Modeling

It involves representing the internal structure and functionality of the processes represented on data flow diagrams. Processes must be clearly described before they can be translated into a programming language. The logic modeling is employed to indicate when processes on DFD occur and to represent the contents and structure of a data flow diagram's data flows and data stores.

Deliverable for the logic modeling is the Structured English which is a modified form of English that is used to specify the contents of process boxes in a DFD.

(c) Conceptual Data Modeling

It is a representation of TOT data. The purpose of a conceptual data model is to show as many rules about meaning and interrelationships among data as are possible. Conceptual data modeling is one kind of data modeling and database design carried out throughout the systems development process. In the logical design phase, the final Entity Relationship Model(E-R) developed in analysis is matched with designs for systems inputs and outputs and is translated into a format from which physical data storage decisions can be made in the physical design phase.

An entity-relationship data model is a detailed, logical representation of the data for an organization. It is expressed in terms of entities in the business environment, the relationships or associations among those entities, and the attributes or properties of both the entities and their relationships.

3.2.3 Logical Design

The fourth phase of the SDLC in which all functional features of the system chosen for development in analysis are described independently of any computer platform. The system could be implemented on any hardware and systems software. The idea is to make sure that the system functions as intended.

3.2.4 Implementation

During the implementation, it is to turn system specifications into a working system that is tested and then put into use. Implementation includes coding, testing, and installation. During coding, programmers write the programs that make up the system. During testing, programmers and analysts test individual programs and the entire system in order to find and correct errors. During installation, the new system becomes a part of the daily activities of the organization.

Implementation activities include initial user support such as the finalization of documentation, training programs, and ongoing user assistance. Note that documentation and training programs are finalized during implementation; documentation is produced throughout the life cycle, and training occur from the inception of a project.

TOT uses the single location installation by trying out a proposed system at one site (head office) and using the experience to decide if and how the new system should be used throughout office branches.

3.2.5 Maintenance

When a system is operating in an organization, users sometimes find problems with how it works and often think of better ways to perform its functions. The organization's needs with respect to the system change over time. In maintenance, programmers made the changes that users ask for and modify the system to reflect changing conditions.

IV. THE EXISTING SYSTEM

4.1 Background of the Organization

The telephone was first invented in the United States of America in 1876 by Alexander Graham Bell. The telephone system consisted of two telephone receivers placed far apart, but connected with each other by means of an electrical cord. Consequently, communications was made possible by means of the transformation of sound into electricity, which was converted back into sound upon reaching its designated terminal. What this type of system lacked, however, was the capability of forming of telephone network

The Importation of the Telephone into Thailand

In 1881, five years after the first telephone had been invented in 1876, a telephone system was imported into Thailand by the Minister of Defense, His Royal Highness Prince Phanurangsriswangwongs.

It is to the Prince, therefore, that credit must go for introducing this modern form of communication to Thailand. He installed the first telephone line from Bangkok to Paknam, in Samutprakarn, for the purpose of informing Bangkok of the news concerning the arrival and departure of ships at Paknam.

Vision 2003

We will be a leading Communication Company in South East Asia and the Thai market leader, while fulfilling a public service provider role.

Mission

Deliver world class communications solutions using advanced technology with flexible, responsive working style and thus be our customers' first choice carry out our public service provider role in a way appropriate to the changing market structure. It is

to make a fitting contribution to society and the conservation of the environment
provide appropriate returns to shareholder and a rewarding work environment for our
employees seek alliances to exploit international.

Values

- (1) Customers come first
- (2) World-class quality
- (3) Innovation
- (4) Speed and responsiveness
- (5) Individual initiative and development
- (6) Teamwork
- (7) Accountability
- (8) Integrity and transparency

Motto = BEST

B = BEST IN BUSINESS

E = BEST IN EMPLOYEE

S = BEST IN SOLUTION

T = BEST IN TECHNOLOGY

Making the NMT 470 MHz Public Radio Telephone Prototype

- (1) This project makes use of the NMT 470 MHz system used in the TOT mobile phone system, applying the system to public telephone signal systems. This benefits people in remote areas where TOT telephone lines are not available or not sufficient.
- (2) The project also helps expand the public telephone service when there is an urgent need or a shortage of wire pairs and numbers. Moreover, it adds to the efficiency of the NMT 470 MHz mobile phone service.

Making the Call Counter-Timer Prototype

This is a study of applications to design a call counter-timer prototype, using the micro-controller to control communications equipment. The prototype, will be an additional device to be used with a regular phone that is rented out per minute. It is expected that the prototype can be developed further into a commercially available product.

Public Internet

This is a public communication service to provide knowledge and information for people in the region. Users can access the Internet with the TOT Card instead of paying for subscription. People thus have an equal opportunity to use the Internet.

Another objective is to link various communities so they can exchange information and learn about each other faster.

Also, the public Internet will increase the public's potential in using information technology to access data and information for self-development.

In addition the project adds to the value of the TOT Card on the IP Network. At present, the service is available in Chiangmai Province. The TOT aims to make the service available at 300 service offices nationwide by the end of this year.

Development of Wire Installation Pulleys

The project aims to protect field workers from the danger of falling from a height while installing and correction problems with wires especially when exerting force to pull wires. The pulleys will help reduce the force needed to pull wires. Statistics have shown that a number of field workers have been in accidents due to the lack of such device. This equipment will be of great use in improving safety and protecting both the TOT 's property and the lives of TOT workers.

Small-sized Operations and Maintenance Centers

Small-sized operations and maintenance centers are designed in such a way that the database is spread out, Data sent from public telephone is forwarded to the maintenance center in each area for analysis and processing. After that all the data at the maintenance center is sent to the central operation and maintenance center. Service charge data then is sent to the database service center for further payment processing.

As a control and maintenance system, the center will be used in managing and provides data from TOT Card public phones.

The center helps increase efficiency and reduce the time required in maintenance work and helps upgrade the public telephone service.

TOT's Privatization Plan

On may 18,1999, the Ministry of Transport and Communications has approved on the Privatization plan of TOT and CAT. This privatization plan consists of two phases.

Phase 1 Register for establishing TOT Company Limited (State Enterprise)

According to the Corporation Act.

Phase 2 Privatize according to the Telecommunication Development Master Plan:

- (1) Establish a Holding Company
- (2) Transform to a Company Limited
- (3) Transform to a Public Company Limited

Phase 1 Register for establishing TOT Company Limited (State Enterprise) according to the Corporation Act in order to privatize TOT , which is a state enterprise, into a company limited, it is necessary to apply the Corporation Act to turn TOT “asset” into “ capital share” . The registering of TOT as a company limited which is expected to be around August 2000 also has to Comply with the Corporation Act.

Determine the business, rights, debt, responsibilities and assets of the state enterprise to be transferred.

Determine the capital / register shares, number of shares, and the share value

Determine the management structure of company

Prepare memorandum and regulation of the company transforming from a state agency

Organize public hearings

Phase 2 Privatize according to the Telecommunication Development Master Plan

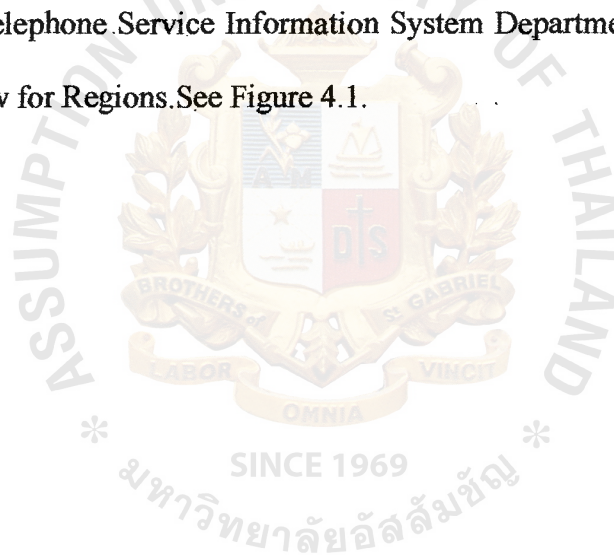
- (1) The Ministry of Transport and Communications and the Ministry of Finance set up a "Holding Company" while TOT Co.,Ltd. is an operator with its shares entirely owned by the holding company. According to the TOT privatization plan, this holding company is expected to be established in May 2000.
- (2) Transform TOT a state enterprise into a company limited with the government holding less than 50% of shares while the rest will be held by strategic partner(s) it is expected to have a strategic partner(s) by mid 2002 and private placement by mid 2003.
- (3) Transform TOT from a company limited to a public company limited and offer initial public offerings (IPO) while the government holds less than 30% of total shares, The Privatization Plan is expected to:
 - (a) Register TOT as a public company limited around early 2004
 - (b) Offer IPO and register at the Stock Exchange of Thailand
 - (c) Dilute the share of the public company limited

ECR Real Time Processing Project

ECR Real Time Processing Project is developed to reinforce the working process for the organization by using servers in the area of telephone service. The credit card receivable system that is a part of ECR is employed to serve the convenience to both customers and users. For the ECR Real time Processing project, here I will focus the necessary functions for the credit card receivable system.

4.1 The Existing Process Study

The existing system has many entities and activities involved in the process. The involved departments comprise Information Technology Department, Comptroller Department, Telephone Service Information System Department. The overview shows the process flow for Regions. See Figure 4.1.



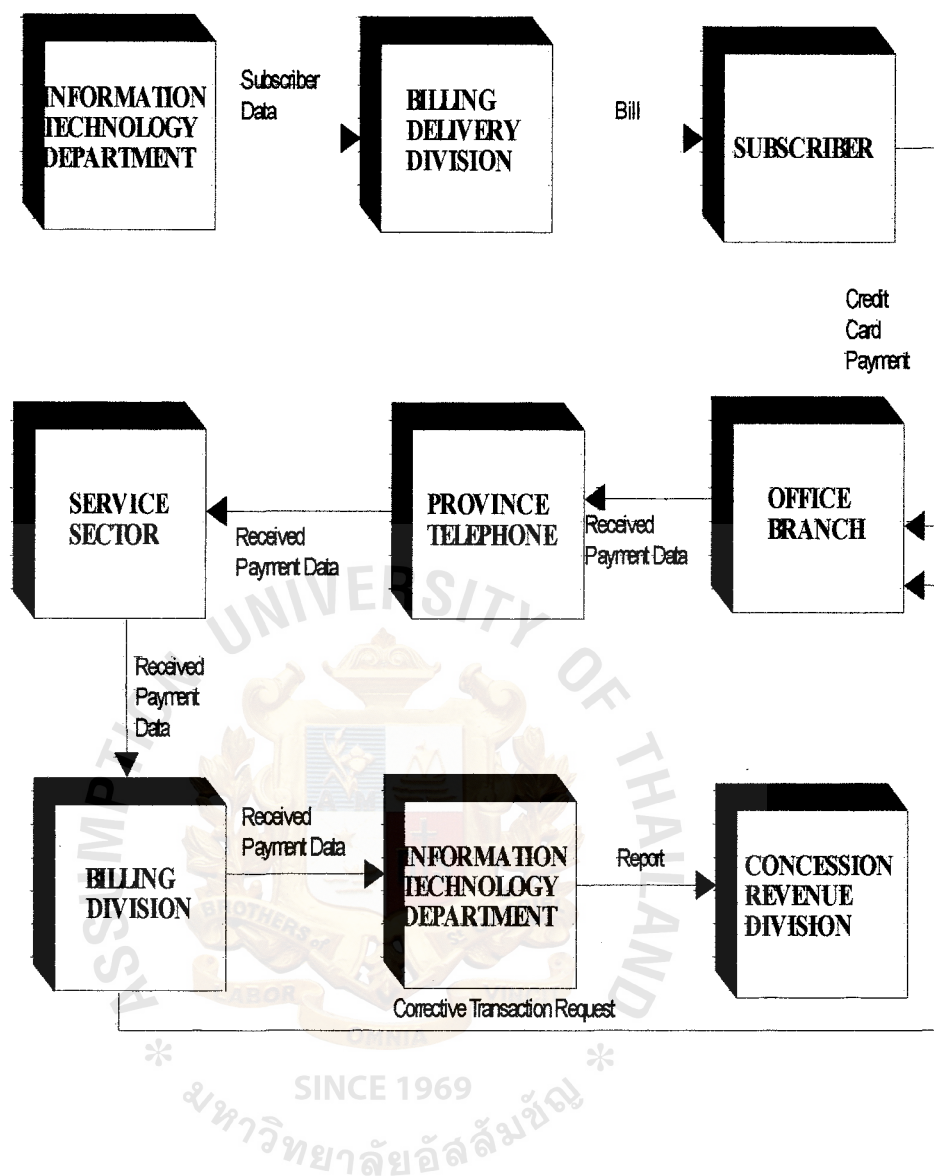


Figure 4.1. Existing Process Flow for Regions.

Description of the process flow

4.2.1 Information Technology Department

It has a data of the subscriber and is responsible for sending the information and subscriber's status to Billing Delivery Division. Information Technology Department collects the telephone service usage of the subscriber for each month and all expenses that the subscriber must pay. It sends the new debits to Billing Delivery Division.

4.2.2 Billing Delivery Division

This division receives the subscriber data from Information Technology Department and prepares for the bill issuing. The process of the bill issuing with the aim of collecting the payment from TOT's service is to arrange the bill and to send the bill through the mail. The process duration does in one month.

4.2.3 Subscriber

After receiving the bill, the subscriber must pay the telephone service within 10 days of receiving the bill at the office branches. The main payment type consists of cash, cheque, and credit card. Here it will focus on the credit card payment only.

4.2.4 Office Branch

The credit card type that the office branch accepts includes Local, Visa, and Master card. The subscriber is free of charge for the credit card usage from TOT.

4.2.5 Province Telephone

Province Telephone depends on the service sector that is controlled by Region Telephone Service Department. The province telephone will collect the received data from its controlled office branches and send it to the service sector.

4.2.6 Service Sector

Service Sector receives the payment data from all province telephone and then sends it to the Billing Division at the center.

4.2.7 Billing Division

Billing Division received the fax of pay-in data from the service sector and checks the correction of the received payment with the available bill. If any errors happen, it will contact with the trouble office branch. For the correct transaction, Billing Division will inform Information Technology to process next.

4.2.8 Information Technology Department

Information Technology Department collects the data and checks it again before deducting the former debit account into the credit account.

4.2.9 Concession Revenue Division

Concession Revenue Division receives the report separated by the partners (TA, and TT&T) from Information Technology Department.

Process Flow for the Metropolitans

The process flow totally is the same as Regions but the office branches send the received payment data to Service Sector directly because it does not have the Province Telephone. (See Appendix D.1.)

Current Problem

- (1) The current problem is that it often has problem of the unmatched transaction for the office branch and affects Province Telephone that cannot send the received payment data to Service Sector until the balance account is coming up. Therefore, it is time consuming and will make the process flow unsmoothly.
- (2) It needs a number of areas to store the information from fax data and uses papers numerously that incurs expenses and sometimes they may be lost.
- (3) It has no a server employed to store the data in order to run the real time processing; therefore, it consumes too much time to send and to receive the information between head office and its branches.
- (4) Different office branches cannot check the status of the subscriber whether he or she has paid or not. The problem of the duplicated payment may occur.

V. THE PROPOSED SYSTEM

5.1 System Design

The system design that will be shown in the form of context diagram and the logical data flow diagram simplifies the understanding of the credit card receivable system totally. (See Figure 5.1. and Figure 5.2.)

5.1.1 Context Diagram

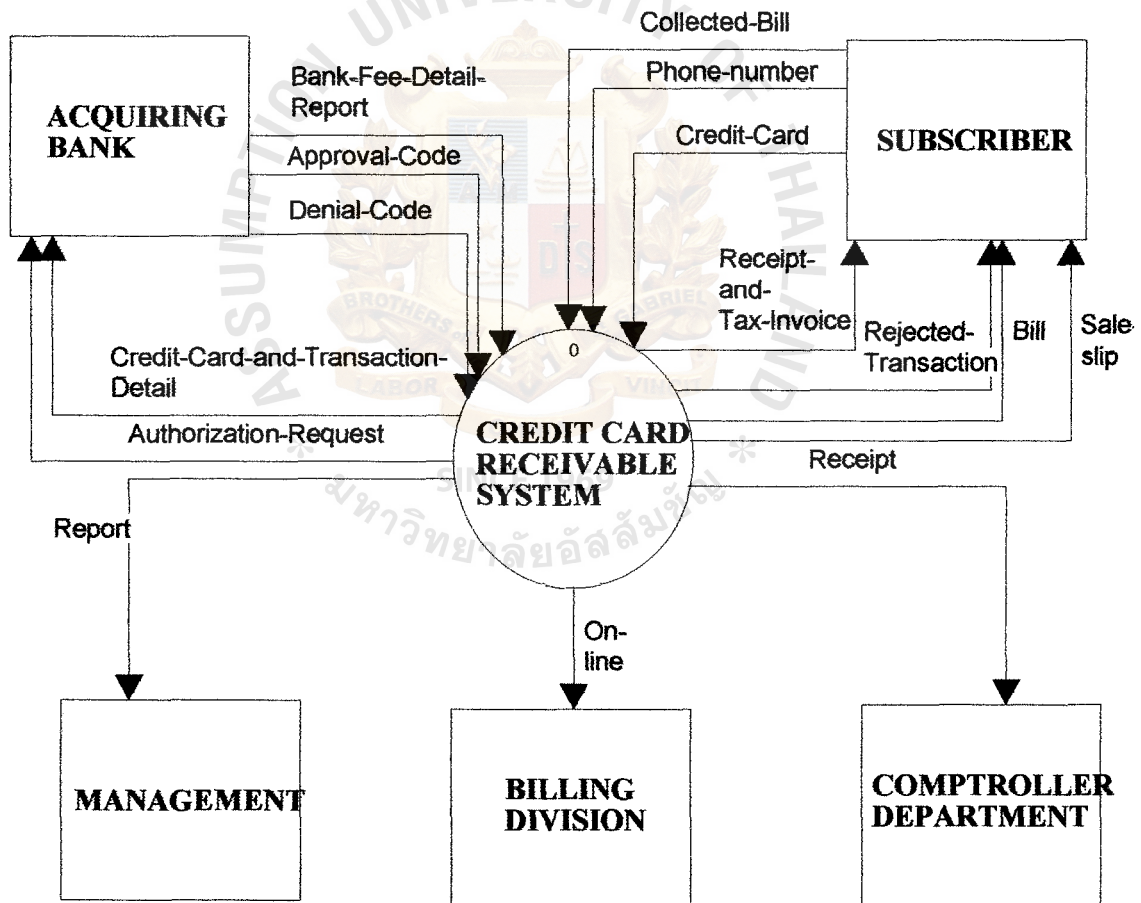


Figure 5.1. Context Diagram.

The context diagram as shown in the Figure 5.1 consists of:

(1) Acquiring Bank

A bank has a business relationship with TOT and receives any credit card transactions from TOT. EDC that TOT employs in the process of receiving the credit card payment is derived from the agreement between both TOT and banks by that bank will give the EDC entering and processing the sales drafts by electronic means. The credit card sale authorization will be allowed at the time of the capturing the card and every transaction that occurs, it will charge the discount fee according to the card type. The discount fee includes Local (1.5% of charged), Visa (1.6% of charged), and Master (1.7% of charged).

(2) Management

The top position for Metropolitan, Region, Sector, Province, and Commercial Section is responsible for planning, organizing, and controlling the work flow totally.

(3) Subscriber

The customer of TOT subscribes the services and pays the bill for that kind of telephone service. The services include the telephone line subscription, telephone line installation, telephone insurance, etc. The subscriber has a choice to select the partner such as TOT, TA and TT&T. Every month the subscriber needs to pay the telephone service at any available service outlet such as TOT's office branches, Outlet TA, Bank counter, Account debit.

(4) Comptroller Department

Comptroller Department comprises the division of Receivable Accounting, Concession Revenue Accounting, and Revenue Accounting.

(5) Billing Division

Billing Division is located at the head office that is a part of Billing Sector. All office branches must send the received payment data to Billing Division for checking the transaction and to match the debit account. If any problem occurs, it will contact with the trouble branch. The information of the subscriber and its debit account will be kept here; therefore, it embraces the bill sending to the subscriber. Information Technology will get the information from Billing Division.

Description of the context diagram

(1) Bill

Before the bill is sent to the subscriber, It needs to know the overview of the process. Computer System for Subscribers Data and Bill Collection Division that comes from Information Technology Department will send the subscriber data to Billing Division and then the bill will be sent from the Billing Delivery Division to the subscriber.

(2) Collected Bill

After the subscriber receives the bill from TOT, he or she will come to the service outlet to pay the telephone service. For the payment options, they include the payment by cash, cheque, and credit card. In this project I will focus on the credit card payment only. The user in the system here called cashier will collect the bill and receive the payment. The cashier will record by retrieving the data of name and address from the database. Before

doing this, the scanner will read the barcode which comprise three bars in the bill (See Appendix B.1). The first bar consists of 1 character of Partner type, 3 characters of Area Code, and 7 characters of Phone number. The second bar consists of 1 character of Vat code, 6 character of Office ID, and 4 characters of month and year. The third bar consists of not over 11 characters of Amount. After scanning, the data will be shown as Scan Bill Monitor. See Figure 6.15. The cashier can select the type of Receipt/Tax Invoice and then click the payment button. The received payment monitor will appear for choosing the type of payment. When the customer sends credit card, the cashier will use the Point of Sale (POS) or Electronic Data Capture (EDC). The data will be retrieved through the monitor. The maximum number of card will be used is two cards. The credit card receivable system will produce the selected Receipt/Tax Invoice.

(3) Phone number

If the subscriber does not take the bill, he or she must inform the cashier his or her phone number. The cashier will key the area code and phone number. See Figure 6.17. When the cashier clicks the search button the output screen will show the detail of the account number, phone number, office ID, month and year, debit amount, paid amount, and status. See Figure 6.18. Subsequently the cashier clicks the payment button and then the output screen will show the detail of debit amount and paid amount. Here the payment type is credit card usage therefore the cashier clicks the credit card button. The cashier captures the credit card at POS. The credit card receivable system will print out Receipt/Tax Invoice or Receipt/Tax Invoice (ABB).

(4) Credit Card

The subscriber must present the credit card to the cashier. The card types include Local Card, Visa Card, and Master Card.

(5) Credit Card and Transaction Detail

The credit card number and amount of the transaction will be sent to Acquiring Bank after the cashier captures the credit card.

(6) Authorization Request

After the cashier receives the credit card, he or she will capture with the Point of sale unit of which system will automatically ask the approval code to Acquiring Bank.

(7) Approval Code

Acquiring Bank will interact with Card Issuing Bank to ask the approval code. If the credit limit is OK, Card Issuing Bank will send the approval code to the Acquiring Bank.

(8) Denial Code

In case the credit limit of the cardholder has a problem, Acquiring Bank will send the denial code to the credit card receivable system.

(9) Rejected Transaction

POS will reject the transaction of the cardholder after getting the denial code.

(10) Receipt/Tax Invoice

2 types of Receipt/Tax Invoice that the credit card receivable system will produce is Receipt/Tax Invoice and Receipt/Tax Invoice (ABB). It will produce Receipt/Tax Invoice (ABB) when the subscribers are not registered in the Vat system of which payments are cash or credit card. See Appendix

B.2. And it will produce Receipt/Tax Invoice when the subscribers are registered in the Vat system or are not registered in the Vat system but paying by cheque. It also includes the payment by cash and credit card. And when the subscribers pay for their installation service or insurance fee. See Appendix B.3. The arrangement of the received payment counter at the office branches is as follows:

- (a) Producing Receipt/Tax Invoice (ABB)
- (b) Producing Receipt/Tax Invoice
- (c) Producing Receipt/Tax Invoice (ABB) and Receipt/Tax Invoice

(11) Sales Slip

The credit card receivable system will print out the sale slip for the subscriber. The original one is given to the subscriber and 2 copies will be kept.

(12) Bank Fee Detail Report

The acquiring bank performs what is called an interchange for each sales draft, with the card issuing bank. The card issuing bank transfers the amount of the sales draft, minus an interchange fee to the acquiring bank. The acquiring bank then deposits the amount of all the sales drafts submitted by the operator or supervisor, less a discount fee, into TOT's account. Bank fee detail report is checked to find the mistake. If any mistake happens, the corrective transaction will be taken.

(13) Receipt

Receipt consists of 1 original and 2 copies. For the original one is giving to the subscriber and For 2 copies, one is sent to the head office and another is kept at office branches.

For Receipt (ABB), the copy of the journal will be kept in the office branches.

Both of the receipt type will be kept as the evidence in order to pay the income tax and it needs to store at least 5 years.

(14) Report

At the end of each day, The credit card receivable system will produce the daily report for the manager of the office branches, director of province telephone, and senior director of the sector. The monthly report is also produced as well. The detail of both type of report is described in the logical data flow diagram (Level1).

(15) On-line

The information of received payment of all office branches will be sent on- line from the credit card receivable system to Information Technology Department cut the debit account for those who have already paid the telephone service.

5.1.2 Logical Data Flow Diagram (Level 1)

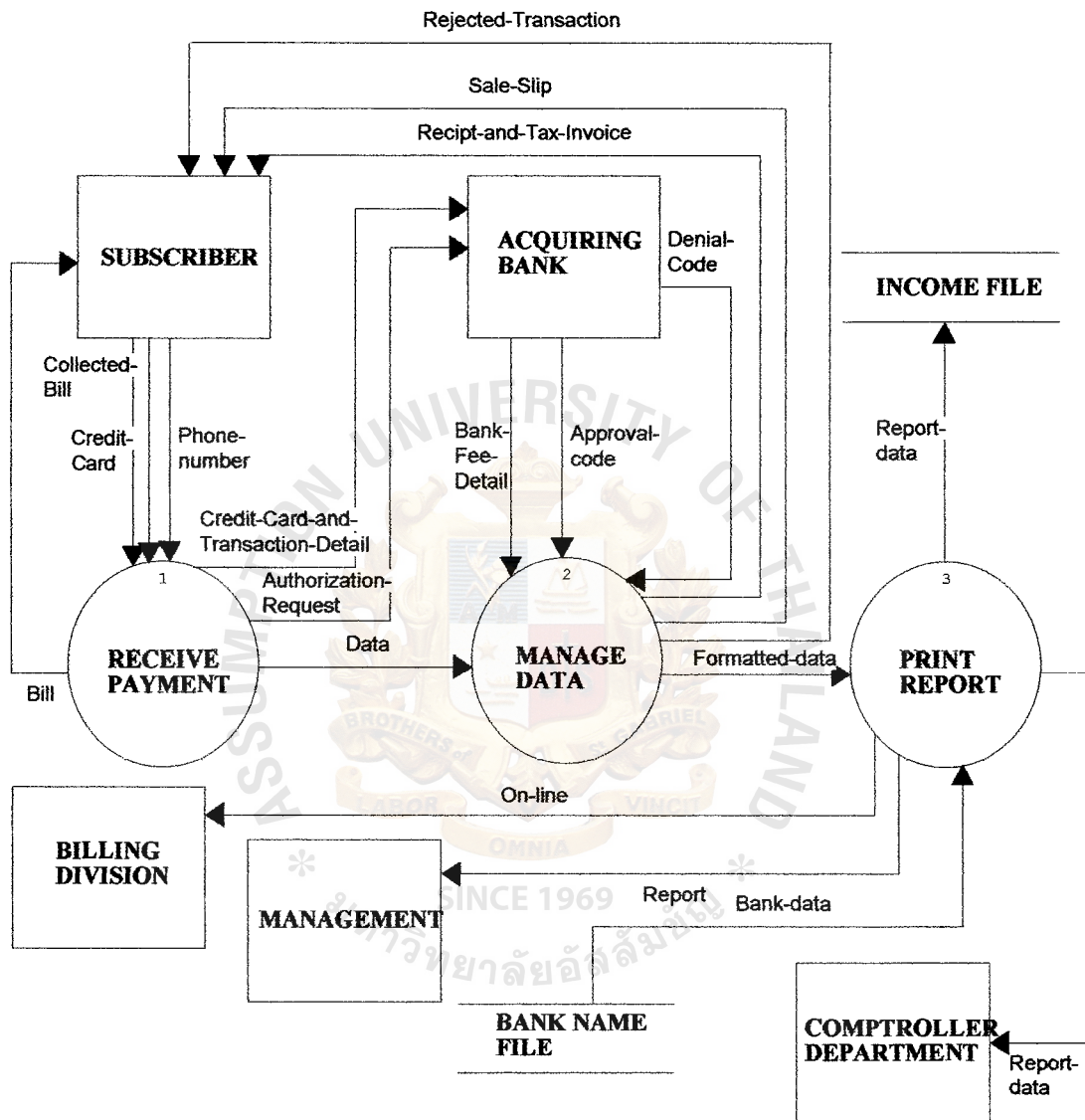


Figure 5.2. Logical Data Flow Diagram (Level 1).

The logical data flow diagram level 1 consists of 3 processes as follows:

(1) Receive Payment

After receiving the payment by the credit card, the users (here include the cashier, operator, and supervisor) will check the corrective transaction. If any mistake happens, the supervisor will follow the right procedure.

For the close shift, The credit card receivable system will produce the Received Payment Data report for shift and Summary Total report for shift (See Table 6.1. Close Shift Report.). The cashier will match the balance amount from both the received payment data and summary total report.

The cashier will send cash, cheque, copy of sale slip from received payment, close shift report, and original invoice separated by the partners to the operator and supervisor. They will approve the correct transaction from the provided document.

At the end of each day, the cashier will cut the journal paper of the received payment for each credit card receivable system and send them to the operator and supervisor.

The operator and supervisor will do Received Payment report. (See Tables 6.3., 6.4., 6.5., 6.6., 6.7., and 6.8.) They are to check the above document from the cashier.

(2) Manage Data

The document of received payment consist of the following items:

(a) The original bill

It is separated by the partners. (TOT, TA, and TT&T)

- (b) Copy of Receipt/Tax Invoice (yellow one)

It is separated by the account ID for the Partners. It is to sum the total received amount and to send to the involved department.

Subsequently, the report will be printed by the workstation.

- (c) Copy of Receipt/Tax Invoice (white one) for all account ID
- (d) Receipt/Tax Invoice (ABB) (journal paper)

Copy of Receipt/Tax Invoice (white one) for all account ID and Receipt/Tax Invoice (abb) are kept for the evidence since the received date for 5 years.

(3) Print Report

The cashier will check the corrective transaction and if any mistake happens, he or she will send it to the supervisor for edition. The supervisor closes POS at ECR and prints the Daily Sale report (See Tables C.1. and C.2.). He or she also prints the Credit Card Payment report from the workstation. (See Table 6.9.) It needs to check the correction of the bank ID and amount of Credit Card Payment report from the Electronic Data Capture. If there is any mistake, it must be corrected before setting the settlement process to the bank.

The supervisor or operator will send online received payment data of an office branch to Billing Division to deduct the debit account of the subscriber.

The daily reports needed for printing from the workstation are as follows:

- (a) Close Shift Report
- (b) Received Payment Report—Sale Slip and Bank Fee

- (c) Daily Sale Report
- (d) Income Tax Report
- (e) Received Payment Report—Account ID
- (f) Received Payment Report—Cashier
- (g) Credit Card Payment Report
- (h) Daily Bank Fee Report
- (i) Day to Day Bank Fee Report
- (j) Total Received Payment Report—Partner

The operator and supervisor are responsible for arranging the monthly report as well. The monthly reports are as follows:

- (a) Monthly Income Tax Report
- (b) Monthly Total Received Payment Report—Partner
- (c) Monthly Bank Fee Report
- (d) Received Payment of Office Branches Report—Card Type and Bank
- (e) Bank Fee Detail Report
- (f) Transferred Amount of TOT's Account Report

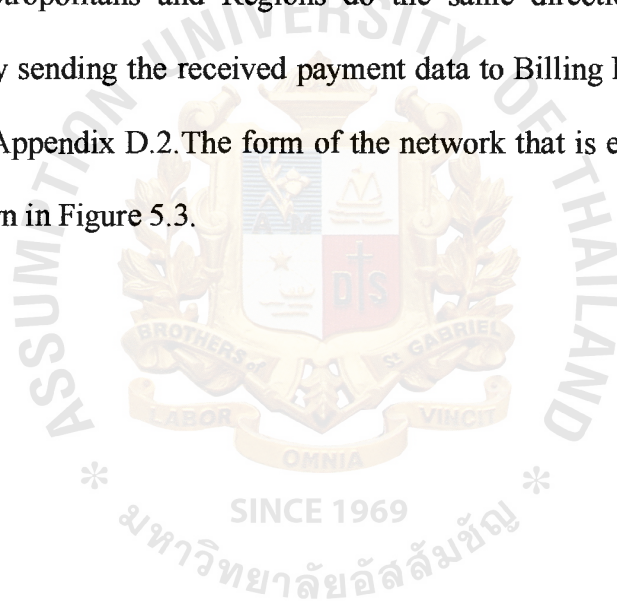
5.2 Hardware Requirements

The hardware requirements necessary for doing the transaction are as follows:

- (1) Data Sharing Unit
- (2) ECR (Standalone)
- (3) ECR (Lan)
- (4) Barcode Reader
- (5) USP 1KVA
- (6) USP 6KVA
- (7) Receipt Printer

- (8) Report Printer
- (9) File Server
- (10) Application Server
- (11) Database Server
- (12) Hub 12 Ports
- (13) Modem
- (14) Point of Sale

The process flow of the proposed system is different from the existing process flow. The Metropolitans and Regions do the same direction that office branch is independent by sending the received payment data to Billing Division directly and it is shown in the Appendix D.2. The form of the network that is employed in the proposed system is shown in Figure 5.3.



5.3 Cost Benefit Analysis

5.3.1 Determining Project Costs

The credit card receivable system can have both tangible and intangible costs. Tangible costs refer to items that TOT can easily measure in Baht and with certainty. From the credit card receivable system, the tangible costs include user training and the lease of Data sharing unit, ECR (Standalone), ECR (LAN), Server (Application, Database, and Firewall), Hub 12 ports, and Modem. Here TOT has a policy of employing the lease option. The development cost is for Metropolitan, Central region, Eastern region, Southern region, North eastern region, and Northern region. See Tables 5.1, 5.2, 5.3, 5.4, 5.5, 5.6. The rent per month for Metropolitan is approximately 1,336,806 Bahts. Central region is incurred of 349,236 Bahts. The budget for Eastern, Southren, North eastern, and Northn region is about 252,262 Bahts, 363,472 Bahts, 354,215 Bahts, and 439,345 respectively. The user training cost that consists of 6 courses is charged of 1,200,000 Bahts and the course will be held at the Metropolitan and 5 regions within one year. Therefore, the total cost per year will be 38,344,032 Baht. Alternatively, intangible costs are those items that TOT cannot easily measure in term of Baht or with certainty. The intangible costs include the employee morale or operational efficiency. TOT does the contract with the consulting company and it will charge the consulting cost, equipment installation costs, and site preparation and modification.

Table 5.1. The Development Cost for Metropolitan.

| Office Branches | Lease | DSU | | ECR (Standalone) | | ECR (LAN) | | Server | | Hub 12 Port | | Modem | |
|-----------------|-------|--------|------|-------------------|------|-----------|------|---------|------|-------------|------|--------|------|
| | | Amount | Item | Amount | Item | Amount | Item | Amount | Item | Amount | Item | Amount | Item |
| Metropolitan 1 | 6 | 5,670 | | | 66 | 215,952 | 21 | 252,945 | 7 | 3,913 | | | |
| Metropolitan 2 | 3 | 2,838 | | | 59 | 193,048 | 18 | 216,810 | 6 | 3,354 | | | |
| Metropolitan 3 | 3 | 2,838 | | | 49 | 160,328 | 18 | 216,810 | 6 | 3,354 | | | |
| Metropolitan 4 | 4 | 3,784 | 1 | 3,204 | 57 | 186,504 | 24 | 289,080 | 6 | 3,354 | 2 | | 838 |
| Total | 16 | 15,130 | 1 | 3,204 | 231 | 755,832 | 81 | 975,645 | 25 | 13,975 | 2 | | 838 |

The rent per month for Metropolitan = 1,336,806 Bahts

Table 5.2. The Development Cost for Central Region.

| Office Branches | DSU | ECR (Standalone) | | ECR (LAN) | | Server | | Hub 12 Port | | Modem | |
|-----------------|-----|------------------|---------|-----------|--------|--------|---------|-------------|--------|-------|--------|
| | | Lease | 946.00 | Lease | 3,204 | Lease | 3,272 | Lease | 12,045 | Lease | 559 |
| | | Item | Amount | Item | Amount | Item | Amount | Item | Amount | Item | Amount |
| Central 1 | | 15 | 48,060 | | | | | 11 | | | 4,609 |
| Central 2 | | 12 | 38,448 | 6 | 19,632 | 6 | 72,270 | 11 | | | 4,609 |
| Central 3 | | 17 | 54,468 | 3 | 9,816 | 3 | 36,135 | 1 | 559 | 17 | 7,123 |
| Central 4 | | 15 | 48,060 | | | | | 13 | | | 5,447 |
| Total | | 59 | 189,036 | 9 | 29,448 | 9 | 108,405 | 1 | 559 | 52 | 21,788 |

The rent per month for Central region = 349,236 Bahts

Table 5.3. The Development Cost for Eastern Region.

| Office Branches | DSU | | ECR (Standalone) | | ECR (LAN) | | Server | | Hub 12 Port | | Modem | |
|------------------|-------|--------|-------------------|--------|-----------|--------|--------|---------|-------------|--------|-------|--------|
| | Lease | 946.00 | Lease | 3,204 | Lease | 3,272 | Lease | 12,045 | Lease | 559 | Lease | 419 |
| | Item | Amount | Item | Amount | Item | Amount | Item | Amount | Item | Amount | Item | Amount |
| Eastern Region 1 | | 8 | | 25,632 | | | | | | | 7 | 2,933 |
| Eastern Region 2 | | 19 | | 60,876 | | | | | | | 19 | 7,961 |
| Eastern Region 3 | | 4 | | 12,816 | 9 | 29,44 | 9 | 108,405 | 3 | 1,677 | 6 | 2,514 |
| Total | | 31 | | 99,324 | 9 | 29,44 | 9 | 108,405 | 3 | 1,677 | 32 | 13,408 |

The rent per month for Eastern Region = 252,262 Bahts

Table 5.4. The Development Cost for Southern Region.

| Office Branches | DSU | ECR (Standalone) | | ECR (LAN) | | Server | | Hub 12 Port | | Modem | |
|-------------------|-----|-------------------|------------|------------|-------------|----------|------|-------------|------|--------|------|
| | | 946.00 Rent | 3,204 Rent | 3,272 Rent | 12,045 Rent | 559 Rent | 419 | | | | |
| | | Amount | Item | Amount | Item | Amount | Item | Amount | Item | Amount | Item |
| Southern Region 1 | | 11 | 35,244 | | | | | 8 | | 3,352 | |
| Southern Region 2 | | 10 | 32,040 | 7 | 22,904 | 6 | | 448 | 12 | 5,028 | |
| Southern Region 3 | | 11 | 35,244 | | | | | | 8 | 3,352 | |
| Southern Region 4 | | 6 | 19,224 | 4 | 13,088 | 3 | | 224 | 6 | 2,514 | |
| Southern Region 5 | | 10 | 32,040 | 3 | 9,816 | 3 | | 224 | 10 | 4,190 | |
| Total | | 48 | 153,792 | 14 | 45,808 | 12 | | 896 | 44 | 18,436 | |

The rent per month for Southern Region = 363,472 Bahts

Table 5.5. The Development Cost for North Eastern.

| Office Branches | DSU | ECR (Standalone) | | ECR (LAN) | | Server | | Hub 12 Port | | Modem | | |
|-----------------|------|-------------------|--------|-----------|-------|--------|-------|-------------|--------|--------|------|--------|
| | | Lease | 946.00 | Lease | 3,204 | Lease | 3,272 | Lease | 12,045 | Lease | 419 | |
| | Item | Amount | Item | Amount | Item | Amount | Item | Amount | Item | Amount | Item | |
| North Eastern 1 | | 20 | | 64,080 | 3 | 9,816 | 3 | 36,135 | 1 | 559 | 20 | 8,380 |
| North Eastern 2 | | 19 | | 60,876 | | | | | | | 16 | 6,704 |
| North Eastern 3 | | 22 | | 70,488 | 4 | 13,088 | 3 | 36,135 | 1 | 559 | 19 | 7,961 |
| North Eastern 4 | | 11 | | 35,244 | | | | | | | 10 | 4,190 |
| Total | | 72 | | 230,688 | 7 | 22,904 | 6 | 72,270 | 2 | 1,118 | 65 | 27,235 |

The rent per month for North Eastern = 354,215 Bahts

Table 5.6. The Development Cost for Northern.

| Office Branches | DSU | | ECR (Standalone) | | ECR (LAN) | | Server | | Hub 12 Port | | Modem | |
|-----------------|-------|--------|-------------------|---------|-----------|--------|--------|---------|-------------|--------|-------|--------|
| | Lease | 946.00 | Lease | 3,204 | Lease | 3,272 | Lease | 12,045 | Lease | 559 | Lease | 419 |
| | Item | Amount | Item | Amount | Item | Amount | Item | Amount | Item | Amount | Item | Amount |
| Northern 1 | 1 | 946 | 23 | 73,692 | 10 | 32,720 | 9 | 108,405 | 3 | 1,677 | 22 | 9,218 |
| Northern 2 | | | 7 | 22,428 | 3 | 9,816 | 3 | 36,135 | 1 | 599 | 7 | 2,933 |
| Northern 3 | 1 | 946 | 8 | 25,632 | 3 | 9,816 | 3 | 36,135 | 1 | 599 | 8 | 3,352 |
| Northern 4 | | | 18 | 121,752 | | | | | | | 16 | 6,704 |
| Total | 2 | 1892 | 56 | 179,424 | 16 | 52,352 | 15 | 180,675 | 5 | 2,795 | 52 | 22,207 |

The rent per month for Norther = 439,345 Bahts

Table 5.7. The Total Project Cost. (Per year)

| Project Cost | Baht |
|------------------------|------------|
| (1) Development cost | |
| Metropolitan | 16,041,672 |
| Central Region | 4,190,832 |
| Eastern Region | 3,027,144 |
| Southern Region | 4,361,664 |
| North Eastern Region | 4,250,580 |
| Northern Region | 5,272,140 |
| (2) User training cost | 1,200,000 |
| Total | 38,344,032 |

5.3.2 Determining Project Benefits

The credit card receivable system can provide many benefits to TOT. The mission of developing the credit card receivable system is derived from the serving the subscriber need first. According to TOT's mission, it will deliver world class communications solution using technology with flexible, responsive working style and thus be TOT's first choice carry out TOT's public service provider role in a way appropriate to the changing market structure. It is to make a fitting contribution to society and to return a rewarding work environment for TOT's employees. TOT will focus on the intangible benefit rather than the tangible benefit; therefore, the numerical reduced paper work or any material is not considered.

The credit card receivable system is developed to solve the customer problem and creates the benefit for the organization in term of reducing the job that always comes from the duplicated payment. The existing system creates the number of disgruntled customer. However, the proposed system uses the server technology that the user of the system can check the debit account of subscriber on the output screen through the server not through the mainframe; the database server can send the data of the subscriber's payment to the user directly that will save the time. The technology can reduce the paper usage because the proposed system uses the system software on the Netscape browser that means the user can contact directly on line to the involved departments instead of sending fax or mailing to them. The ECR hardware is changing by increasing the monitor size, using RAM 32 MB, and using window instead of DOS. The loss of fax paper or any other materials is lesser with the use of the proposed system and the area to store the information is increasing. TOT hopes that the credit card receivable system reaches TOT's values that is the accountable to customer, innovation, and speed and responsiveness.

VI. IMPLEMENTATION

6.1 Project Implementation Plan

6.1.1 Feasibility Study

The feasibility study is to study about current system, current hardware capability and the overall operation of the related system and human resources. The investigation of the existing problem and user requirement should be done.

6.1.2 System Analysis and Design

The system analysis and design involve the study in details about the current system and problem definition which will take time for interview and work through the related functions. After that we have to discuss with the management about the existing system, problems that occurred, and the draft proposed system. Finally we also present all these to the key users and the related operators.

6.1.3 System Implementation

Software application is taken as the major part of the system implementation. Microsoft Access is the selected application. The existing system is to consider their capacity is enough to handle the new proposed system.

It will perform testing and acceptance in order to ensure the effectiveness of the proposed system and the training program will be conducted to people according to their related work and authorization. The manual and guideline will be distributed to the users and related operators.

6.1.4 System Conversion

System conversion consists of data conversion and system installation. The methods used in conversion files will depend on the alternative selected for installation of the new system.

The credit card processing system has just been created, it means that the new proposed system has started. However, both the existing system and the new computerized system will operate concurrently for a period of time and this parallel operation coincides with business cycles. All input transactions are used to update the database that supports the new system.

The activities that must occur to implement the new system and put into operation, include the following:

- (1) All parameters have to be prepared.
- (2) All files have to be cleared.
- (3) All computer vendors have to be listed.
- (4) All new documents have to be documented.
- (5) All responsibilities have to be assigned to each activity.

6.1.5 Users Training

Training concerns only in-house training. The trainer is a system analyst who knows the overall organization in both personnel and credit card processing system. People will associate with the new system and know the details of what their role will be, how they can use the system and where they will do or will not do in the credit card processing system.

6.1.6 Project Implement Schedule

The development of this project will take 9 months and comprises the 3 main steps as follows:

- (1) Approving the user requirements, coding the program, and revising the process work flow. (It takes approximately 4-5 months.)
- (2) Implementing at the Head Office (It takes about 2 months.)
- (3) Implementing at the Offices Branches (It takes about 2 months.)

6.2 Test Plan

6.2.1 Testing System Software and System Development

This step is provided by a vendor that we have tested already when the software is loaded to the hardware.

6.2.2 Testing Application Software

- (1) Program testing with test data
 - (a) Test valid and invalid data
 - (b) Test possible variations in format and codes
 - (c) Output must be corrected and satisfactory
 - (d) File output from tested data must be correct
- (2) Linking testing data

System analyst tests the programs that they actually work together or tests all combinations by creating special test data to ensure that the system can detect errors and can handle normal or bulk transaction.

- (3) Full system testing with test data

The users become actively involved in testing. There are factors to take into consideration when testing:

- (a) Checking that documentation is clear enough and adequate for users to afford correct and efficient operation.
- (b) Determining if output is correct and that users understand it. This testing will include measures of error, timelines, ease of use and so on.

6.3 Prototype

The objective of the prototype is to serve as a model for the new system. When the user tests the prototype and feels satisfied, it will be developed for the actual

practice The prototype structure is designed by using Microsoft Access. The credit card processing system is detailed as follows:

- (1) Main Function
 - (a) Account ID Data
 - (b) Office ID Data
 - (c) Bank ID Data
 - (d) ECR Data
 - (e) User Data
 - (f) Partner Data
 - (g) ECR Host Data
 - (h) Tax ID Data
 - (i) Subscriber Data
- (2) Daily Process System
 - (a) Open ECR
 - (b) Close ECR
 - (c) Close Shift
 - (d) Start POS
 - (e) Close POS
 - (f) Pay-in Record
 - (g) Settlement Record
- (3) Payment System
 - (a) Scan Bill
 - (b) No Bill
- (4) Report System
 - (a) Close Shift Report

- (b) Received Payment Report—Sale Slip and Bank Fee
- (c) Daily Sale Report
- (d) Income Tax Report
- (e) Received Payment Report—Account ID
- (f) Received Payment Report--Cashier
- (g) Monthly Income Tax Report
- (h) Credit Card Payment Report
- (i) Daily Bank Fee Report
- (j) Day to Day Bank Fee Report
- (k) Monthly Bank Fee Report
- (l) Daily Total Received Payment Report—Partner
- (m) Monthly Total Received Payment Report—Partner
- (n) Received Payment of Office Branches
- (o) Bank Fee Detail Report
- (p) Transferred Amount of TOT's Account Report
- (5) Password Change
- (6) Quit Program

Main Menu is shown in the following Figure 6.1.

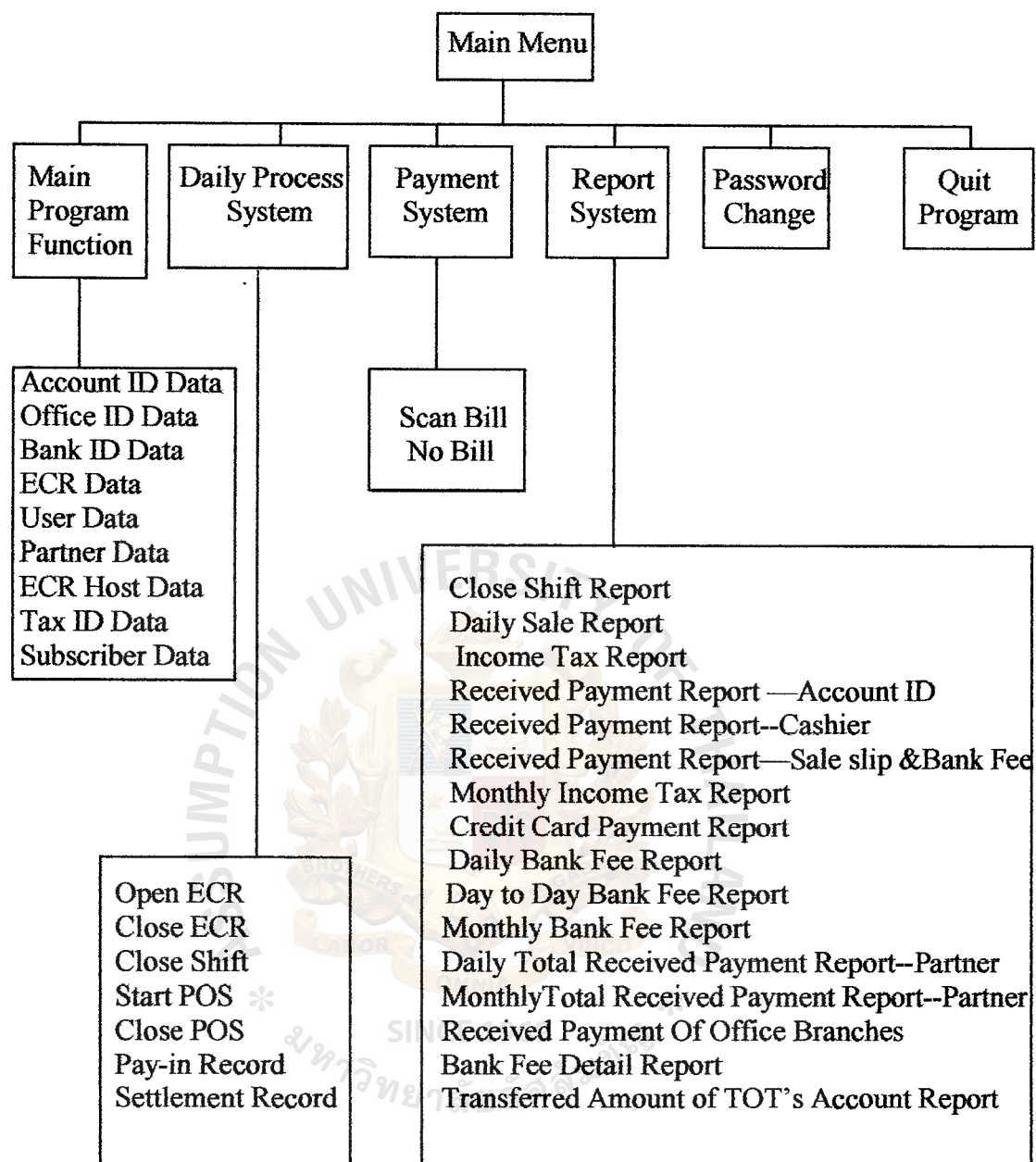


Figure 6.1. Main Menu.

The daily process

- (1) Opening the linux Gateway
- (2) Making the connection by using the modem
- (3) Opening the ECR
- (4) Start POS
- (5) Close POS
- (6) Close Shift
- (7) Close POS
- (8) End of Day
- (9) Printing the report

The user (here includes the cashier, operator, and supervisor) opens the ECR and will get the output screen in the following.

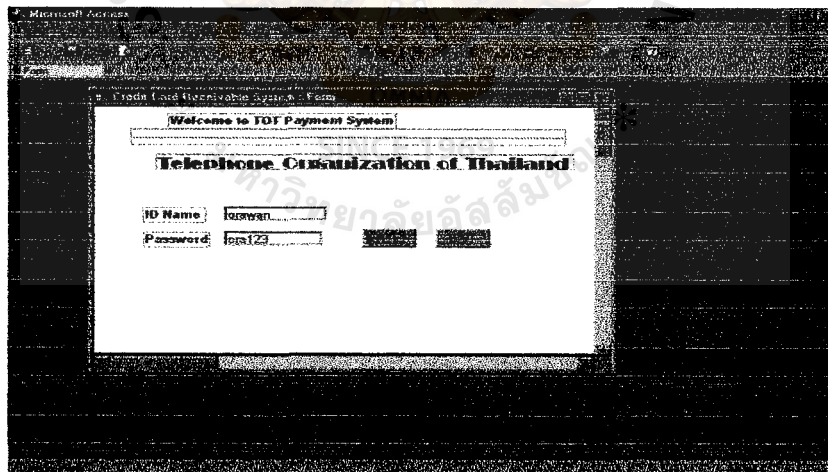


Figure 6.2. Open ECR Monitor.

Here the cashier will open the ECR and will come up with the TOT payment system monitor. He or she must key ID Name and Password and then click the ENTER button.

The next monitor that appears will be Main Menu Monitor as shown in the Figure 6.3.

Microsoft Access

Main Menu : Form

Telephone Organization of Thailand

Office Branch: 125235 Date: 10/09/01

User ID: lorawan Shift: 1 POS no.: P002

Buttons: [Grid of buttons, some obscured by watermark]

Watermark: SINCE 1969 มหาวิทยาลัยอัสสัมชัญ

Figure 6.3. Main Menu Monitor.

The cashier can see the main menu that consists of Main Function, Daily Process System, Payment System, Report System, Password Change, and Quit Program. Main Menu will be shown as below:

Microsoft Access

Main Function : Form

Telephone Organization of Thailand

Office ID: 124565 Date: 10/09/01

User ID: Orwan Shift: 1 POS no.: P002

| | |
|--------|--------|
| 124565 | 124565 |
| 124565 | 124565 |
| 124565 | 124565 |
| 124565 | 124565 |
| 124565 | 124565 |

Figure 6.4. Main Function Monitor.

The main function monitor comprises Account ID Data, Office ID Data, Bank ID Data, ECR Data, User Data, Partner Data, EDC Host Data, Tax ID Data, and Subscriber Data.

Look at the Account ID Data in the following figure.

Microsoft Access

Account ID Monitor

Telephone Organization of Thailand

Office: Head Office Date: 10/09/01

User ID: Puk Shift: 1 POS no.: P001

Account ID: 52540002

Partner: 1 (TOT)

Vat Code: 2

Amount: 1000

Figure 6.5. Account ID Monitor.

Account ID Monitor consists of the account ID, partner, vat code.

Description

- (1) Account ID: Key the number for 7 characters.
- (2) Partner: Click the selected Partner.

1 = TOT

2 = TA

3 = TT&T

- (3) Vat Code : Click the selected Vat Code.

0 = zero tax

1 = vat 7% (TOT charged)

2 = vat 7% (Subscriber charged)

3 = vat 10% (TOT charged)

4 = vat 10% (Subscriber charged)

(4) Amount: Key the number not over 11 characters.

Bank ID Data will detail the name and the bank ID of the bank.

Bank Id Data Monitor will be shown as below:

The screenshot shows a Microsoft Access window titled 'Microsoft Access' with a form named 'Bank ID Data: Form'. The form has a title bar 'Telephone Organization of Thailand'. It contains several input fields: 'Office' (Head Office), 'Date' (10/09/01), 'User ID' (Puk), 'Shift' (1), 'POS no.' (F002), 'Bank ID' (004), and 'Detail' (Thai Farmer Bank). Below the 'Detail' field, there is a field for 'ITFB'. The form is displayed in a standard Microsoft Access window with a menu bar and a toolbar.

Figure 6.6. Bank ID Data Monitor.

Description

- (1) Bank ID: Key the Bank ID for 3 characters.
- (2) Detail: Key the Bank Name (text) not over 60 characters.
- (3) Detail: Key the abbreviation name (text) for 3 characters.

The Office ID Data Monitor will be shown as below:

Microsoft Access

Office ID Data Form

Telephone Organization of Thailand

Office ID: 103585 Date: 10/09/01
 User ID: Poonsuk Shift: 1 POS no.: P002

Office ID: 103585 Office name: Surawong
 Region: 1 Tel.: 5254985
 Address: Shift 2 Payin: 004
 Shift 1 Payin: 006

Figure 6.7. Office ID Data Monitor.

Description

- (1) Office ID: Key the number for 6 characters.
- (2) Region: Key the number for 1 character.
 - 1 = Central Region
 - 2 = North Eastern Region
 - 3 = Northern Region
 - 4 = Southern Region
 - 5 = Eastern Region
- (3) Address: Key the text not over 80 characters.
- (4) Office Name: Key The text not over 60 characters.
- (5) Tel.: Key the number not over 20 characters.

(6) Shift1 Payin: Click the selected Bank ID for Shift

Shift 2 Payin: Click the selected Bank ID for Shift.

The information of ECR that the cashier can look at the ECR

Data Monitor as below:

Microsoft Access

ECR Data : Form

Telephone Organization of Thailand

Office: Head Office Date: 10/08/01

User ID: Puk Shift: 1 POS no.: P002

ECR no.: P000 Office ID: 10240

IP Address: 172.16.105.254 Reg: 0000000000

Slip no.: 000000 Informal Tax Invoice: 1200005

Tax Invoice: 01990002 Report no.: 1000001

Figure 6.8. ECR Data Monitor.

Description

- (1) ECR no.: Key the number or text for 4 characters.
- (2) Office ID: Key the number for 6 characters.
- (3) IP Address: Key the number not over 15 characters.
- (4) Reg: Key the number or text not over 16 characters.
- (5) Slip no.: Key the number not over 7 characters.

- (6) Tax Invoice (ABB): Key the number not over 7 characters.
- (7) Tax Invoice: Key the number not over 7 characters.
- (8) Report no.: Key the number not over 7 characters

The cashier can look at the user data by seeing the following

Figure:

The screenshot shows a Microsoft Access form titled 'User Data Monitor'. The form is divided into two main sections. The top section is titled 'Telephone Organization of Thailand' and contains fields for 'Office' (Head Office), 'Date' (10/09/01), 'User ID', 'Puk', 'Shift' (1), and 'POS no.' (P002). The bottom section contains fields for 'User Group' (3), 'User Name' (Somsona Pongpan), 'User ID', 'Puk', 'Office ID' (102405), 'Shift' (2), 'ECR no.' (P000), and 'User Status' (1). The form is displayed within a Microsoft Access window.

Figure 6.9. User Data Monitor.

Description

- (1) User Group: Click the selected user group.

1 = Administrator

2 = Supervisor

3 = Cashier

4 = Operator

5 = Other

- (2) User Name: Key the text not over 60 characters.
- (3) User ID: Key the text or number not over 10 characters.
- (4) Office ID: Click the selected Office ID.
- (5) Shift : Click the selected Shift.
1 = Morning
2= Afternoon
- (6) ECR no.: Key the number or text for 4 characters.
- (7) User Status: Click the selected User Status.
0 = User is off the system
1 = User is on the system

EDC Host Data monitor consists of the host data and bank ID. It will be shown as follows:

The screenshot shows a web-based interface titled "Telephone Organization of Thailand". It contains several input fields and buttons. The fields are: Office (with a dropdown menu showing "Head Office"), Date (with a calendar icon and the value "10/08/01"), User ID (with the value "Euk"), Shift (with a dropdown menu showing "1"), POS no. (with the value "F002"), Host ID (with the value "001"), and Bank ID (with the value "002"). There are also buttons for "Login" and "Logout".

Figure 6.10. EDC Host Data Monitor.

Description

- (1) Host Data: Key the number for 3 characters.

(2) Bank ID: Click the selected Bank ID.

002 = Bangkok Bank

004 = Thai Farmer Bank

006 = Krung Thai Bank

011 = Thai Military Bank

014 = Thai Commercial Bank

021 = Srinakorn Bank

025 = Krungsri Bank

The cashier can look at the partner data at Figure 6.11.

The screenshot shows a software window titled 'Partner Data Monitor'. Inside, there is a form titled 'Telephone Organization of Thailand'. The form contains several input fields: 'Office' (set to 'Head Office'), 'Date' (set to '10/09/01'), 'User ID' (set to 'Puk'), 'Shift' (set to '1'), and 'POS no.' (set to 'P001'). Below these fields, there is a section with a blacked-out area, followed by 'Office ID' (set to '103555') and 'Phone number' (set to '002 5466009'). The window has a standard Windows XP-style title bar and menu bar.

Figure 6.11. Partner Data Monitor.

Description

(1) Office ID: Click the selected Office ID.

(2) Phone number: Key the number for 7 character.

The detail of the vat code data is shown as below.

The screenshot shows a Microsoft Access form titled "Telephone Organization of Thailand". The form is titled "Vat Code Data : Form". It contains several data entry fields:

- Office:** Head Office
- Date:** 10/09/01
- User ID:** Puk
- Shift:** 2
- POS no.:** P002
- Vat Code:** 3
- Tax rate:** 10.0
- Start Date:** 31/12/00
- Finish Date:** 31/12/00

Figure 6.12. Vat Code Data Monitor.

Description

- (1) Vat Code: Key the number for 1 characters.
- (2) Tax Rate: Key the number not over 8 characters.
- (3) Start Date: dd/mm/yyyy
- (4) Finish Date: dd/mm/yyyy

The cashier can look at the subscriber data at the following figure:

Figure 6.13. Subscriber Data Monitor.

Description

- (1) Name-Surname: Key the text not over 80 characters.
- (2) Address: Key the text and number not over 80 characters.
- (3) Area Code: Key the number for 3 characters.
- (4) Phone number: Key the number not over 8 characters.
- (5) Office ID: Key the number for 6 characters.

When the cashier will do the transaction, he or she will click Payment System button in the Main Menu Monitor.

The output screen will show Scan Bill and No Bill button and it means that when the subscriber comes with the bill, the cashier will click the Scan Invoice button. If not, he or she will click No Invoice button. Payment System will be shown as Figure below:

The screenshot shows a Microsoft Access window titled "Payment system Form". The form is for the "Telephone Organization of Thailand". It contains several input fields: "Office" (set to "Head Office"), "Date" (set to "11/08/01"), "User ID" (set to "Puk"), "Shift" (set to "1"), and "POS no." (set to "P002"). Below these fields, there are three horizontal bars, likely representing a barcode or a list of items. The background of the form has a watermark of a Thai temple structure.

Figure 6.14. Payment System Monitor.

If the subscriber brings the bill to the office branch, the cashier will click the Scan Bill button and the output screen will be shown as follows:

Telephone Organization of Thailand

Office: Head Office Date: 10/09/01
 User ID: Puk Shift: 1 POS no.: P003

Name-Surname: Suksun kanhwan
 Address: 224/49 Soi Otan Ramindra Rd Benkhon Bldg 10220

| Phone number | Office ID | month | Amount | Discount | Vat code | Slip |
|--------------|-----------|-------|------------|----------|----------|------|
| | | | 2,500 baht | | | |

Payment: Phone number: 002-2488669 Office ID: 104425
 Vat Code:

Figure 6.15. Scan Bill Monitor.

After click the Scan Bill button, the monitor will show the detail as shown above. The cashier must click the Receipt (ABB) or Receipt and then clicks Payment button.

The output screen will be shown as the following:

Telephone Organization of Thailand

Office: Head Office Date: 10/09/01
 User ID: Puk Shift: 1 POS no.: P002

Cash: Bank Branch Cheque no. Amount
 Cheque: Bank Branch Cheque no. Amount
 Card no. Amount
 Credit Card: 60300566811234 2,000 baht

Debit Amount: 2,000 baht Balance:
 Amount: 2,000 baht

Figure 6.16. Received Payment Monitor.

Here when the output screen is shown as above, the cashier must click Credit Card button together with capture the credit card with POS and then the monitor will show the credit card number and amount. The credit card receivable system will print out the selected Receipt and sale slip. (See Table B.2. Receipt/Tax Invoice (ABB). and Table B.3. Receipt/Tax Invoice.)

If the subscriber does not bring the bill, the cashier will click the No Bill button in the Payment System Monitor as below:

The screenshot shows a Microsoft Access window titled 'Microsoft Access'. Inside, there is a form titled 'Telephone Organization of Thailand'. The form has several input fields with the following values:

| | | | |
|--------------|-------------|-------|----------|
| Office | Head Office | Date | 11/04/01 |
| User ID | Puk | Shift | 1 |
| POS no. | P002 | | |
| Area Code | 002 | | |
| Phone number | 6708449 | | |

Below the form, there are two buttons labeled 'SEARCH' and 'CLEAR'. The window also has a title bar with 'Form' and a menu bar with 'File', 'Edit', 'Format', 'Tools', 'Window', and 'Help'.

Figure 6.17. No Bill Monitor.

The cashier asks the phone number of the subscriber and then keys the area code and phone number. He or she will Search button.

The Payment for No Bill Monitor will appear as below:

| Account no. | Phone number | Office ID | month/year | Debit Amount | Paid | Status |
|--------------|--------------|-----------|------------|--------------|--------|--------|
| 21101000 | 002-2437655 | 102248 | 10/01 | 202.58 | | ok |
| 21101000 | 002-5594555 | 102248 | 10/01 | 900.00 | 0 | ng |
| 21101000 | 002-5594555 | 102248 | 10/01 | 900.00 | 900.00 | ok |
| Total | | | | 1,102.58 | | |

Figure 6.18. Payment for No Bill Monitor.

The monitor shows the detail of the amount number, phone number, office ID, month/year, debit amount, paid, and status of the subscriber.

The account number is defined by TOT. Here the advantage is that the system can know the status of the subscriber.

The amount paid will show and the cashier click Payment button. Then the output screen will show as Figure 6.16. Received Payment Monitor. And the cashier will click the credit card button together with captures the card with POS and clicks Payment button. The credit card receivable system will print out Receipt and sale slip.

The daily process consists of 2 shifts. When it closes shift, the cashier will click the Report System in the Main Menu and then click the Close Shift Report button in the Report System Monitor. See Figure A.26. Report System Monitor.

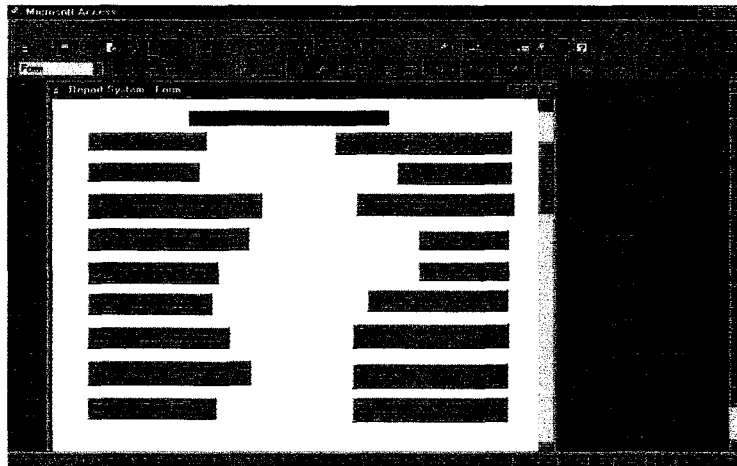


Figure 6.19. Report System Monitor.

The close shift report monitor will be shown as below:

 A screenshot of a Microsoft Access window titled "Close Shift Report Monitor". The window displays a form for "Telephone Organization of Thailand". The form has several input fields: "Office Branch" (801411), "Date" (26/05/01), "User ID", "Puk", "Shift" (2), and "POS no." (F001). Below these fields, there is a table with two columns: "Date" and "Shift". The table contains one row of data: "26/05/01" and "2". The form is titled "Telephone Organization of Thailand" and has a "PRINT" button at the bottom right.

Figure 6.20. Close Shift Report Monitor.

It is the close shift report for shift2. When the cashier wants the report, he or she will click PRINT button. The report will be as Table

6.1. The cashier presents the sale slip, close shift report, and original bill to the operator or supervisor.

At the end of day, the supervisor checks the copy of sale slip derived from Electronic Data Capture (EDC). If the errors happen, it needs to edit before settlement process with EDC to the bank.

The supervisor records the settlement as follows:

The screenshot shows a Microsoft Access window titled "Settlement Record : Form". The form is for the "Telephone Organization of Thailand". It contains several input fields for recording settlement data. The fields are organized into two main sections: a header section and a detailed settlement record section. The header section includes fields for Office (Head Office), Date (10/09/01), User ID (Puk), Shift (1), and POS no. (P003). The detailed settlement record section includes fields for Settlement Record Date (10/09/01), Office ID (136445), EDC Bank Code (100), Batch no. (10), Partner (1), Settlement Date (10/09/01), Amount (3,500 baht), and Received Date (10/09/01). The form is displayed over a background with a watermark of a Thai police emblem and the text "BROTHERS & GABRIEL SINCE 1982" and "มหาวิทยาลัยอัสสัมชัญ" (Assumption University).

| Telephone Organization of Thailand | |
|------------------------------------|-------------|
| Office | Head Office |
| Date | 10/09/01 |
| User ID | Puk |
| Shift | 1 |
| POS no. | P003 |

| Settlement Record | |
|------------------------|------------|
| Settlement Record Date | 10/09/01 |
| Office ID | 136445 |
| EDC Bank Code | 100 |
| Batch no. | 10 |
| Partner | 1 |
| Settlement Date | 10/09/01 |
| Amount | 3,500 baht |
| Received Date | 10/09/01 |

Figure 6.21. Settlement Record Monitor.

The settlement data will be sent to the Concession Revenue Division.

The received payment data will be shown as below:

Table 6.1. Close Shift Report.

| | | |
|-----------------------------|-------------------------|-------------------|
| | | TOT Laksi |
| Tel. 5511111 | | Tax.ID.4102000098 |
| 26/05/01 | | Reg#I060507101137 |
| Close Shift Report –Shift 1 | | |
| Date | 25/05/01 | |
| Code : C8014110 | Name : Somsri Siripakul | |

| | | |
|-------------|-----|---------------|
| Account No. | QTY | Amount |
| 21101000 | 72 | 536,629.64 |
| 21150000 | 1 | 5,700.00 |
| 51420000 | 1 | 2,918.00 |
| Total | | 74 565,247.64 |

Tax Invoice.

| | |
|--------|-----------|
| | Amount |
| Cash | 10,000.00 |
| Cheque | 20,000.00 |
| Credit | 15,000.00 |
| Total | 45,000.00 |

Tax Invoice (ABB).

| | |
|--------|----------|
| | Amount |
| Cash | 5,000.00 |
| Cheque | 1,000.00 |
| Credit | 500.00 |
| Total | 6,500.00 |

Microsoft Access

Received Payment Report - slip - Form

Telephone Organization of Thailand

Office ID: 821412 Date: 11/05/01

User ID: Puk Shift: 1 POS no.: P002

| Date | Amount |
|----------|--------|
| 11/05/01 | 1 |
| | 2 |

Figure 6.22. Received Payment Report (Slip) Monitor.

The supervisor will click PRINT button to print the report for Comptroller Department. The report will be as follows:

Table 6.2. Received Payment Report—Slip.

| | | |
|------------------------------|-----------------------|----------------------|
| TOT | | |
| Laksi | | |
| TEL. 5214955 | Tax. ID. 4102000098 | |
| 11/05/01 | Reg# I999999999999999 | |
| Received Payment Report—Slip | | |
| Date | 10/05/01 | |
| Code C8014120 | POS no. : P123 | |
| <hr/> | | |
| 0002.005-565165 | 03/44 | 2,356.31 |
| 0003.02-5651658 | 01/44 | 820.00 |
| <hr/> | | |
| Total | 3,176.31 | |
| 10:13 | 11/05/01 | Received by C8014120 |

The credit card payment data will be sent to Information Technology Department and will be kept at its office branches. The credit card payment monitor is as follows:

Microsoft Access

Form

S Credit Card Payment Monitor - Form

Telephone Organization of Thailand

Office ID: 102436 Date: 02/03/01

User ID: Puk Shift: 1 POS no.: P002

02/03/01

Figure 6.23. Credit Card Payment Monitor.

The supervisor clicks PRINT button and the report will be as follows:

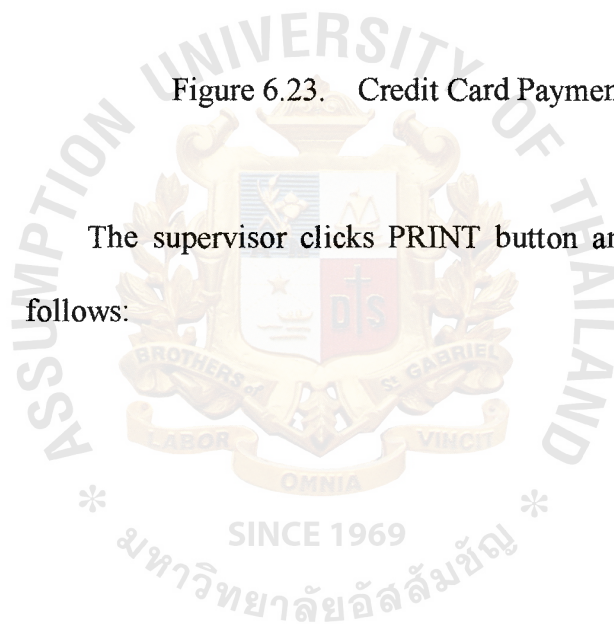


Table 6.3. Credit Card Payment Report.

| TOT | | | | | | | | | |
|----------------------------|--------------------|---------|--------------|-------------|--------|------|----------|------------|--|
| Credit Card Payment Report | | | | | | | | | |
| 02/03/01 | | | | | | | | | |
| Received Date | Credit Card Number | Bank ID | Phone no. | TOT | TA | TT&T | Total | Cashier ID | |
| 02/03/01 | 0200010323679114 | 002 | Bangkok Bank | 002-2352263 | 200.00 | | | CSH01 | |
| | 2251100035666678 | 002 | Bangkok Bank | 002-5622335 | 999.00 | | 1,199.00 | CSH01 | |
| | 1054695223045677 | 002 | Bangkok Bank | 002-9314557 | 450.00 | | | | |

Daily Sales Report Monitor will be as follows:

Microsoft Access

Telephone Organization of Thailand

Office: [] Head Office: [] Date: 12/10/01

User ID: [] Pub: [] Shift: 2 POS no.: P002

☐ ALL
☐ Receipt (abb)
☐ Receipt

[] [Print] []

Figure 6.24. Daily Sales Report Monitor.

Information Technology Department can retrieve the daily sale data separated by the Receipt (ABB) or Receipt from office branches and the supervisor can click PRINT button to print the report as Table 6.4. and Table 6.5.

Table 6.4. Daily Sales Report—Receipt (ABB).

TOT

Daily Sale Report—Receipt (ABB)

12/10/01

| Area Code | Phone Number | Office ID | Account ID | Amount | Vat Paid(7%) | Total | Receipt no. | CSH | Partner |
|--------------|-----------------|--------------|---------------|-----------------|-----------------|-----------------|-------------|-----|---------|
| 002 | 3416242 | 191242 | 21101000 | 512.15 | 35.85 | 548.00 | A002000029 | 02 | 1 |
| 002 | 6891424 | 230942 | 21201002 | 436.45 | 30.55 | 467.00 | A002000029 | 02 | 1 |
| 036 | 0254675 | 121242 | 21101000 | 246.73 | 17.27 | 264.00 | A002000030 | 02 | 2 |
| 002 | 8745124 | 060438 | 21201001 | 340.19 | 23.81 | 364.00 | A002000031 | 02 | 3 |
| Total | | | | 1,535.52 | 107.48 | 1,643.00 | | | |

Table 6.5. Daily Sales Report—Receipt.

TOT

Daily Sale Report—Receipt

12/10/01

| Area | Phone | Office | Account | Amount | Vat | Total | Receipt no. | CSH | Partner |
|--------------|---------|--------|----------|-----------------|---------------|-----------------|-------------|-----|---------|
| Code | Number | ID | ID | | Paid(7%) | | | | |
| 002 | 5053040 | 100830 | 21101000 | 2578.25 | 180.48 | 2758.73 | B004000005 | 01 | 1 |
| 002 | 5053041 | 120330 | 21201002 | 584.84 | 40.94 | 625.78 | B004000006 | 01 | 1 |
| 036 | 5250021 | 120535 | 21101000 | 712.73 | 49.89 | 762.62 | B002000006 | 01 | 2 |
| 002 | 2636749 | 120528 | 21201001 | 863.01 | 60.41 | 923.42 | B002000007 | 02 | 3 |
| Total | | | | 4,738.83 | 331.72 | 5,070.55 | | | |

If the supervisor needs to print the received payment report separated by the account ID, he or she can click PRINT button.

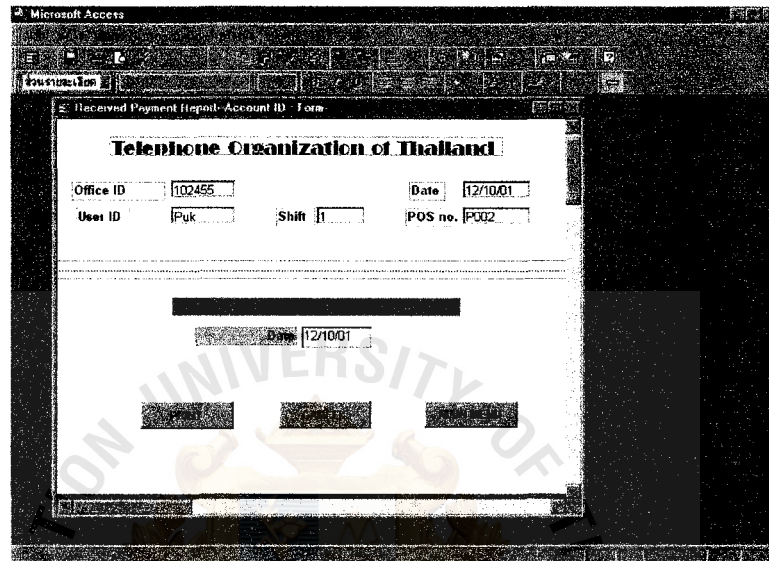


Figure 6.25. Received Payment Report (Account ID) Monitor.

The report will be as follows:

Table 6.6. Daily Received Payment Report.

TOT

Received Payment Report—Account ID

12/10/01

| Account ID | Item | Amount | Vat paid | Total |
|------------|------|------------|----------|------------|
| 21101000 | 46 | 90,524.44 | 6,336.70 | 96,861.14 |
| 21201001 | 26 | 10,587.81 | 741.17 | 11,328.98 |
| 21201002 | 6 | 3,114.03 | 217.97 | 3,332.00 |
| 33410000 | 1 | 2,727.27 | 190.91 | 2,918.18 |
| 51420000 | 3 | 6,050.00 | 423.50 | 6,473.50 |
| 51542000 | 2 | 200.00 | 14.00 | 214.00 |
| 51551000 | 1 | 4,439.25 | 310.75 | 4,750.00 |
| | 85 | 117,642.80 | 8,235.00 | 125,877.80 |

If the supervisor needs the received payment report separated by the Cashier, he or she can click PRINT button.

Microsoft Access

Received Payment Report-cashier: Form

Telephone Organization of Thailand

Office ID: 1102458 Date: 12/10/01

User ID: Puk Shift: 1 POS no.: P002

[Redacted Section]

Date: 12/10/01

[Redacted Section]

Figure 6.26. Received Payment Report (Cashier) Monitor.

The report will be as follows:

Table 6.7. Received Payment Report—Cashier.

| TOT | | | | | | |
|----------------------------------|-----|--------------------|-------|-----------|-----------|------------------------------------|
| Received Payment Report--Cashier | | | | | | |
| 12/10/01 | | | | | | |
| Bank ID | No. | Partner | Shift | Item | Amount | Cashier ID Name-Surname P004 |
| 106 | 026 | 1 | 1 | 3 | 1,880.20 | CSH01 Ms. Suwan Duangdow |
| 106 | 001 | 1 | 2 | 8 | 12,697.00 | CSH01 Ms. Suwan Duangdow |
| 106 | 126 | 1 | 1 | 2 | 1,000.00 | CSH01 Ms. Suwan Duangdow |
| 106 | 026 | 1 | 1 | 2 | 1,880.20 | CSH01 Ms. Suwan Duangdow |
| 106 | 026 | 1 | 1 | 3 | 1,880.20 | CSH01 Ms. Suwan Duangdow |
| Total | | Ms. Suwan Duangdow | 18 | 19,337.60 | | |

If the supervisor needs the report of the received payment separated by the Sale slip and bank fee, he or she can click the selected partner that he wants to see.

Microsoft Access

Received Payment Report (Sales Slip and Fee) Monitor

Telephone Organization of Thailand

Office ID: 102456 Date: 02/10/01

User ID: Puk: Shift: POS no.: P002

02/07/01

☒ TOT

☐ TA

☒ Thai Telephone

Figure 6.27. Received Payment Report (Sales Slip and Fee) Monitor.

The report will be as follows:

Table 6.8. Received Payment Report—TOT.

TOT

Received Payment Report of TOT Network

Date 2/7/01

| BANK | Card Type | | | | | | Total Fees |
|----------------------|------------|------------|------------|-----------|-------------|-----------|------------|
| | LOCAL CARD | | VISA CARD | | MASTER CARD | | |
| | Sales Slip | Fee (1.5%) | Sales Slip | Fee(1.6%) | Sales Slip | Fee(1.7%) | |
| Thai Farmer | 54,200.00 | 813.00 | | | | | 813.00 |
| Krung Thai | | | 9,500.00 | 152.00 | | | 152.00 |
| Thai Military | 65,400.00 | 981.00 | | | | | 981.00 |
| Thai | | | 9,995.00 | 159.92 | | | 159.92 |
| Commercial Srinakorn | | | | | 78,952.00 | 1,342.18 | 1,342.18 |
| TOTAL | 119,600.00 | 1,794.00 | 19,495.00 | 311.92 | 78,952.00 | 1,342.18 | 3,448.10 |

Table 6.9. Received Payment Report—TA.

TOT

Received Payment Report of TA Network—Sale Slip and Bank Fee

Date 2/7/01

| BANK | Card Type | | | | | | Total Fee |
|---------------|------------|---------------|------------|---------------|-------------|---------------|-----------|
| | LOCAL CARD | | VISA CARD | | MASTER CARD | | |
| | Sales Slip | Fee (1.5%) | Sales Slip | Fee (1.6%) | Sales Slip | Fee (1.7%) | |
| | | | | | | | |
| Thai Military | | | 10,000.00 | 160.00 | | | 160.00 |
| TOTAL | | | 10,000.00 | 160.00 | | | 160.00 |

If the supervisor needs the received payment report at the end of month separated by the Card type and Bank, he or she can click PRINT button.

Microsoft Access

Received Payment of Office Branches Report - Card type and Bank - Form

Telephone Organization of Thailand

Office ID: 124355 Date: 31/08/01

User ID: Puk Shift: 1 POS no.: P003

Month: 08/01

☒ All ☐ Select Bank: []

[Print] [Close] [Cancel]

Figure 6.28. Received Payment Report (Card Type and Bank) Monitor.

The report will be as follows:

Table 6.10. Received Payment Report of Card Type and Bank.

TOT

Received Payment of TOT Report

At the end of August 2001

| BANK | Card Type | | | | | | Total Fees |
|-----------------|------------|------------|------------|-----------|-------------|-----------|------------|
| | LOCAL CARD | | VISA CARD | | MASTER CARD | | |
| | Sales Slip | Fee (1.5%) | Sales Slip | Fee(1.6%) | Sales Slip | Fee(1.7%) | |
| Thai Farmer | 54,200.00 | 813.00 | | | | | 813.00 |
| Krung Thai | | | 9,500.00 | 152.00 | | | 152.00 |
| Thai Military | 65,400.00 | 981.00 | | | | | 981.00 |
| Thai Commercial | | | 9,995.00 | 159.92 | | | 159.92 |
| Srinakorn | 77,441.00 | 1,161.62 | | | 78,952.00 | 1,342.18 | 1,342.18 |
| TOTAL | 197,041.00 | 2,955.62 | 19,495.00 | 311.92 | 78,952.00 | 1,342.18 | 3,448.10 |

If the supervisor needs the report of Total received payment of the partner, he can click PRINT button.

Microsoft Access

Received Payment Report-saleslip and fee : Form

Telephone Organization of Thailand

Office ID: 102455 Date: 02/07/01

User ID: Puk Shift: 1 POS no: P002

_____ 02/07/01 _____

Figure 6.29. Total Received Payment Report of Partner.

The report will be as follows:

Table 6.11. Total Received Payment Report of Partner.

TOT

Total Received Payment Report of Partner

Date 2/7/01

| Bank | TOT | TA | TT&T | TOTAL |
|-----------------|------------|-----------|-----------|------------|
| Thai Farmer | 54,200.00 | 98,500.00 | 74,100.00 | 226,800.00 |
| Krung Thai | 9,500.00 | 0.00 | 0.00 | 9,500.00 |
| Thai Military | 65,400.00 | 0.00 | 0.00 | 65,400.00 |
| Thai Commercial | 9,995.00 | 0.00 | 0.00 | 9,995.00 |
| Srinakom | 78,952.00 | 0.00 | 0.00 | 78,952.00 |
| TOTAL | 218,047.00 | 98,500.00 | 74,100.00 | 390,647.00 |

If the supervisor needs the report of Total received payment of the partner at the end of July, he can click PRINT button.

Microsoft Access

การรายงานผล

Total received payment report of partner: Form

Telephone Organization of Thailand

Office ID: 102455 Date: 31/07/01

User ID: Puk Shift: 3 POS no.: P002

Month: 07/01

[Button 1] [Button 2] [Button 3]

Figure 6.30. Total Received Payment Report of Partner.

Table 6.12. Total Received Payment of Partner Report.

TOT

Total Received Payment of Partners Report

At the end of July 2001

| BANK | TOT | TA | TT&T | TOTAL |
|-----------------|-------------------|-------------------|------------------|-------------------|
| Thai Farmer | 54,200.00 | 98,500.00 | 74,100.00 | 226,800.00 |
| Krung Thai | 9,500.00 | 0.00 | 0.00 | 9,500.00 |
| Thai Military | 65,400.00 | 10,000.00 | 0.00 | 75,400.00 |
| Thai Commercial | 9,995.00 | 0.00 | 0.00 | 9,995.00 |
| Srinakorn | 156,393.00 | 0.00 | 0.00 | 156,393.00 |
| Bangkok | 45,623.00 | 0.00 | 0.00 | 45,623.00 |
| TOTAL | 341,111.00 | 108,500.00 | 74,100.00 | 523,711.00 |

VII. CONCLUSIONS AND RECOMMENDATIONS

7.1 Conclusions

Nowadays in the real business, we need a centralized information system support center to handle the information needed to provides the data processing. Also, the credit card usage is soaring and Telephone Organization of Thailand (TOT) that offers the telephone services for the subscriber through the partners, namely Telecom Asia (TA) and Thai Telephone Telecommunication (TT&T) takes for granted about the development of an information system for the credit card receivable system. The objectives are to analyze the proposed system of the credit card receivable system in real time processing, to solve the problem of duplicate received payment, to increase the efficiency in sending the information between head office and its branches, to reduce time consumption and to reduce a paper usage, and to generate a variety of reports as required. The scope of the research is to study the existing system and problem definition, to analyze the proposed system, and to design the output screen by using Microsoft Access. In literature review, the project introduces the evolution of credit cards, how to use a card, uses of cards and liability for charges, and credit card transactions. The overview simplifies the understanding of what entities relate in the credit card transaction. Acquiring Bank, Card issuing Bank, subscribers, and the merchant(here TOT is as a merchant). Acquiring Bank provides point of sale unit for TOT to do transaction with the subscribers who hold credit card from the Card Issuing Bank TOT expands its sale volume and must pay discount fee to Acquiring Bank. Acquiring Bank pay the interchange fee to Card Issuing Bank which receives the fee form the subscribers. It does not focus on the Card Issuing Bank in the project because it does not involve with TOT directly.

The system development process takes 9 months. The process is identifying the need for new system for all new projects, selecting the qualified projects. It is determining what users want from the new system, designing the features as user requirements, implementing the single location installation that the head office embraces the new system and then decide if and how new system should be deployed throughout 370 office branches. Finally it is doing maintenance.

TOT is a state enterprise that offers the telephone service and has 370 office branches throughout Thailand which comprises 4 metropolitans and 5 regions (Central, North-Eastern, Northern, Southern, and Eastern region). The subscriber receives the bill and comes to the office branches to pay the telephone service with or without bill. The subscriber presents the credit card and the cashier captures the card with Point of sale unit and prints out the Receipt/Tax Invoice or Receipt/Tax Invoice and sale slip to the subscribers. At the end of each day, the received payment data must be sent to the head office. Without servers for the existing system, it takes time because when some office branches have the problem of unmatched account the sector that is responsible for collecting all received payment data of all office branches for that sector must wait for the trouble office branch. With servers for the proposed system, each office branch can send the received payment to head office independently. The speed and precision of communication between the head office and office branch is effective and it will cut the cost of paper usage down. The proposed system can solve the problem of duplicate received payment by showing the status of the subscriber on the output screen and the cashier can know whether he or she pays the telephone or not. Also the proposed system can generate various reports as required.

7.2 Recommendations

In my opinion, the proposed system is developed to achieve all objectives; however, its constraint is that if the network fails the process flow will be delayed. As we know that the proposed system employs the type of the installation called single location installation which involves changing from the existing system to the new system in only one place or in a series of separate sites overtime. Here the first site to install is the head office. The key advantage is likely that it limits potential damage and potential cost by limiting the effects to a single location. Once management has determined that installation has been successful in the head office, the proposed system may be deployed in the rest of 370 office branches. The advantage is that the problems with the system can be resolved before deployment to the other office branches. I agree that this kind of the installation is quite less expensive than other methods and it creates the interest in making the installation success. However, the disadvantage is that if any errors occur resulting from the new system will have the direct impact on the users and how they do their jobs and if the new system fails, the delay may occur. I think that the single location installation has no back up system; consequently, the system may have the problem when servers are down. Is it possible to employ the parallel installation? I think this method has a less risk because the existing system continues to run alongside the proposed system until users and management are satisfied that the new system performs effectively and then the old system can be turned off. Its advantage of this kind of installation is that errors of the proposed system do not cost TOT much because the errors can be isolated and the business can run with the old system. Still, the parallel is expensive and management thinks considerably about its costs and benefits. Besides the installation type, management may look at the point that has a risk to cause a process flow delay. Here the server is an outstanding weak point although it creates

benefit enormously for the system. Look at the technology of the server, TOT may keep track of the technology innovation coming up to have an option when the new model of the server can reduce its errors. TOT may pay more investment, however, if it is well done and solve the problem of the existing server I think that it is worthwhile. The credit card receivable system is applicable for the comptroller only. The various data that derived from the application comprised the reports as the comptroller requirement solely. Therefore, it may be developed to fulfill the user requirement in the future. In the future it is likely that the proposed system adds more functions to deal with the additional tax because TOT will transform to the company limited and TOT is charged more tax.





APPENDIX A
OUTUT SCREEN

Microsoft Access

Close ECR : Form

Telephone Organization of Thailand

| | | | |
|---------------|-------|---------|----------|
| Office Branch | 10248 | Date | 09/04/01 |
| User ID | Puk | Shift | 1 |
| | | POS no. | P003 |

Close ECR

9/4/01

ENTER CANCEL

Figure A.1. Close ECR Monitor.

Microsoft Access

Close Shift - Form

Telephone Organization of Thailand

| | | | |
|---------------|-------|---------|---------|
| Office Branch | 10248 | Date | 2003/01 |
| User ID | Puk | Shift | 1 |
| | | POS no. | P003 |

Close Shift

| | |
|---------------|---|
| Received Date | |
| Shift | 1 |
| Bank ID | |

ENTER CANCEL

Figure A.2. Close Shift Monitor.

Microsoft Access

Start POS : Form

Telephone Organization of Thailand

| | | | |
|---------------|-------|---------|----------|
| Office Branch | 10248 | Date | 09/04/01 |
| User ID | Puk | Shift | 1 |
| | | POS no. | P003 |

Start POS

9/4/01

ENTER CANCEL

Figure A.3. Start POS Monitor.

Microsoft Access

Close POS - Form

Telephone Organization of Thailand

| | | | |
|---------------|-------|---------|----------|
| Office Branch | 10249 | Date | 09/04/01 |
| User ID | Puk | Shift | 1 |
| | | POS no. | P001 |

Close POS

9/4/01

ENTER CANCEL

Figure A.4. Close POS Monitor.

Microsoft Access

Income Tax Report : Form

Telephone Organization of Thailand

Office ID: 15223 Date: 10/09/01

User ID: Pak Shift: 1 POS no.: P002

Daily Income Tax Report

☒ All
☐ Receipt (abb)
☐ Receipt

PRINT CANCEL MAIN MENU

Figure A.5. Income Tax Report Monitor.

Microsoft Access

Monthly Income Tax Report - Form

Telephone Organization of Thailand

| | | | |
|-----------|-------|---------|----------|
| Office ID | 10248 | Date | 10/09/01 |
| User ID | Puk | Shift | 1 |
| | | POS no. | P002 |

Monthly Income Tax Report

Month: 09/01

PRINT CANCEL MAIN MENU

Figure A.6. Monthly Income Tax Report Monitor.

Microsoft Access

Bank Fee Report(daily) : Form

Telephone Organization of Thailand

Office ID: 110246 Date: 11/09/01

User ID: Puk Shift: 1 POS no.: P001

Bank Fee Report

Date: 11/09/01

☐ TOT

☐ TA

☐ Thai Telephone

PRINT CANCEL MAIN MENU

Figure A.7. Bank Fee Report Monitor.

Microsoft Access

Bank Fee Report(daily, daily) Form

Telephone Organization of Thailand

Office ID: 12443 Date: 10/09/01

User ID: Puk Shift: 1 POS no.: P002

Bank Fee Report

Date: 10/09/01 to 30/09/01

☐ TOT
☐ TA
☒ Thai Telephone

PRINT CANCEL MAIN MENU

Figure A.8. Day to Day Bank Fee Report Monitor.

Microsoft Access

Bank Fee Report(month) : Form

Telephone Organization of Thailand

| | | | |
|-----------|-------|---------|----------|
| Office ID | 12435 | Date | 10/09/01 |
| User ID | IPuk | Shift | 1 |
| | | POS no. | P002 |

Bank Fee Report

Month: 09/01

☐ TOT

☐ TA

☐ Thai Telephone

PRINT CANCEL MAIN MENU

Figure A.9. Monthly Bank Fee Report Monitor.

Microsoft Access

Transferred Amount of TOT's Account Report : Form

Telephone Organization of Thailand

| | | | |
|-----------|-------|---------|----------|
| Office ID | 14825 | Date | 10/09/01 |
| User ID | Puk | Shift | 1 |
| | | POS no. | P003 |

Transferred Amount of TOT's Account Report

Month 09/01

PRINT CANCEL MAIN MENU

Figure A.10. Transferred Amount of TOT's Account Report Monitor.

Microsoft Access

Received Payment of Office Branches Report - Card type and Bank : Form

Telephone Organization of Thailand

Office ID: 12435 Date: 10/09/01

User ID: Puk Shift: 1 POS no.: P003

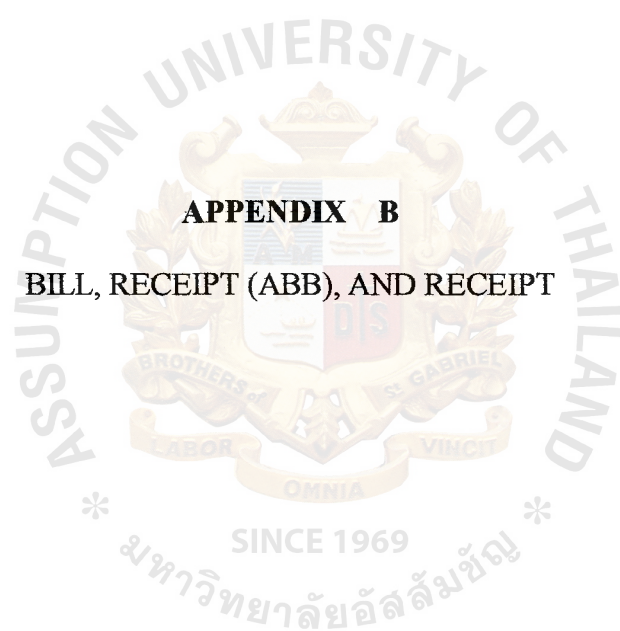
Received Payment of Office Branches Report--Card type and bank

Month: 09/01

☐ All ☐ Select Bank: Thai Farmer

PRINT CANCEL MAIN MENU

Figure A.11. Received Payment of Office Branches Report (Card Type and Bank)Monitor.



APPENDIX B

BILL, RECEIPT (ABB), AND RECEIPT

[illegible]

Figure B.1. Bill.

องค์การโทรศัพท์แห่งประเทศไทย
สำนักงานบริการจังหวัดยะลา

TAX ID. 4102000098 REG. T06050901133

25/06/2543

ใบเสร็จรับเงิน/ใบกำกับภาษีอย่างย่อ

ค่าบริการโทรศัพท์

| | | | |
|-------------------------|--------|-------|-----------|
| 002-2216984 | 190521 | 01/41 | 632.00 U |
| 002-2216986 | 300836 | 01/41 | 1493.80 U |
| 002-2216987 | 220521 | 01/41 | 55.00 U |
| 002-2216984 | 190521 | 01/41 | -632.00 U |
| รวม | | | 1548.80 |
| มูลค่าบริการที่เสียภาษี | | | 1407.99 |
| VAT | | | 140.81 |
| เงินสด | | | 1548.80 |
| เงินสด | | | 0.00 |

ITEM 2 **** VAT INCLUDED ****

25/06/43 15:28 Revd. by ... CSH02

T00004 B:00025 No. A001000004

Figure B.2. Receipt/Tax Invoice (ABB).


องค์การโทรศัพท์แห่งประเทศไทย
TELEPHONE ORGANIZATION OF THAILAND
 ๓๐/๒ หมู่ ๖ ถนนพหลโยธิน แขวงสามยุค เขตดุสิต กรุงเทพมหานคร 10200
 ๓๐/๒ หมู่ ๖ : 30/2 Moo 6, Phaholyothin Road, Samyuk Sub-town, Dusit District, Bangkok 10200
 โทรศัพท์ภายใน : ๑๐๐๐๐๐๐๐
 TAX PAYER NO.

ใบเสร็จรับเงิน/ใบกำกับภาษี
RECEIPT / TAX INVOICE
 เลขที่ : B001000091
 สาขา : กทม. - ศาลาแดง
 วันที่ : 29/07/2543 เวลา 16:23
 TIME :

๒ (Customer) : นายสมชาย ใจดี
 ชื่อ (Name) : นาย ส. ใจดี เลขที่บัตรประชาชน : ๙๙๙๙ ๙๙๙๙ ๙๙๙๙ ๙๙๙๙

| | | |
|-------------------------------------|-------------------------|---------|
| 21101000 ค่าบริการโทร | 042-3112241 251233 0642 | 100.00V |
| 21101000 ค่าบริการโทร | 042-3112145 101238 0642 | 121.00V |
| (รวมยอดค่าบริการโทรศัพท์ (รวมภาษี)) | | 221.00 |
| รวม | 221.00 | 221.00 |
| เงินสด | 15.47 CASH | 15.47 |
| CHANGE | | 205.53 |
| รวม | | 221.00 |

0008152 * CSW02 T00230 RE00 104050901113

Figure B.3. Receipt/Tax Invoice.



APPENDIX C

REPORT

Table C.1. Daily Income Tax Report—Receipt/Tax Invoice (ABB).

| TOT | | | | | |
|--|-------------------------|------|-----------|----------|-----------|
| Daily Income Tax Report—Receipt/Informal Tax Invoice | | | | | |
| 12/10/01 | | | | | |
| REG# | Tax Invoice ID | Item | Amount | Vat paid | Total |
| I000000000002 | A0020000008-A0020000034 | 27 | 30,178.23 | 2,112.49 | 32,290.72 |
| I060506101136 | A0040000007-A0040000011 | 5 | 10,016.46 | 701.14 | 10,717.60 |
| Total | | | 40,194.69 | 2,813.63 | 43,008.32 |

Table C.2. Daily Income Tax Report—Receipt/Tax Invoice.

| TOT | | | | |
|--|-----------------------|------|-----------|--------------------|
| Daily Income Tax Report– Receipt/Tax Invoice | | | | |
| 12/10/01 | | | | |
| REG# | Tax Invoice ID | Item | Amount | Vat paid Total |
| I060506101136 | B004000005-B004000012 | 7 | 77,448.11 | 5,421.17 82,869.48 |
| Total | | 7 | 77,448.11 | 5,421.17 82,869.48 |

Table C.3. Monthly Income Tax Report.

TOT

Monthly Income Tax Report

12/10/01

| Receipt Type | Item | Debit Account- TOT | Debit Account - TA | Debit Account- TT&T | Amount | Tax Paid | Tax=0 | Total |
|-------------------------|-------------|-----------------------------------|-----------------------------------|--|-----------------|-------------------|--------------|-------------------|
| Receipt (ABB) | 33 | 2,241.99 | 748.17 | 217.97 | 3,208.13 | 15,830.44 | 0.00 | 49,038.57 |
| Receipt | 7 | 5,343.93 | 0.00 | 0.00 | 5,343.93 | 16,341.82 | 0.00 | 81,685.75 |
| Total | 40 | 6,653.76 | 939.16 | 741.17 | 8,552.06 | 122,172.26 | 0.00 | 130,724.32 |

Table C.4. Bank Fee Detail Report.

| TOT | | | | | | | |
|----------------------------|----------|---------|----------------|---------------|------------------|--------------------|-----------|
| Bank Fee Detail Report | | | | | | | |
| For the month of July 2001 | | | | | | | |
| 31/07/01 | | | | | | | |
| Date | Amount | Bangkok | Thai Farmer | Krung Thai | Thai Military | Thai Commercial | Srinakorn |
| 1/07/01 | 8,284.39 | 75.00 | 3,648.70 | 152.00 | 1,015.00 | 159.92 | 2,503.80 |
| 12/07/01 | 135.00 | | 135.00 | | | | |
| 17/07/01 | 340.00 | | | | | | |
| 19/07/01 | 729.97 | | | | | | |
| 31/07/01 | 160.00 | | | | 160.00 | | |
| TOTAL | 9,649.36 | 75.00 | 3,783.00 | 152.00 | 1,175.00 | 159.92 | 2,503.80 |

Table C.5. Total Received Payment-- Bank.

TOT

**Total received payment
For the month of August 2001**

| Received Date | Amount | Bangkok | Thai Farmer | Krung Thai | Thai Military | Thai Commercial | Srinakorn |
|---------------|-------------------|-----------------|-------------------|-----------------|------------------|--------------------|-------------------|
| 1/8/01 | 520,711.00 | 5,000.00 | 226,800.00 | 9,500.00 | 67,400.00 | 9,995.00 | 156,393.00 |
| 2/8/01 | 9,000.00 | | 9,000.00 | | | | |
| 3/8/01 | 20,000.00 | | | | | | |
| 4/8/01 | 45,623.00 | | | | | | |
| 5/8/01 | 10,000.00 | | | | 10,000.00 | | |
| TOTAL | 605,334.00 | 5,000.00 | 235,800.00 | 9,500.00 | 77,400.00 | 9,995.00 | 156,393.00 |

APPENDIX D

EXISTING AND PROPOSED PROCESS FLOW AND ORGANIZATION CHART



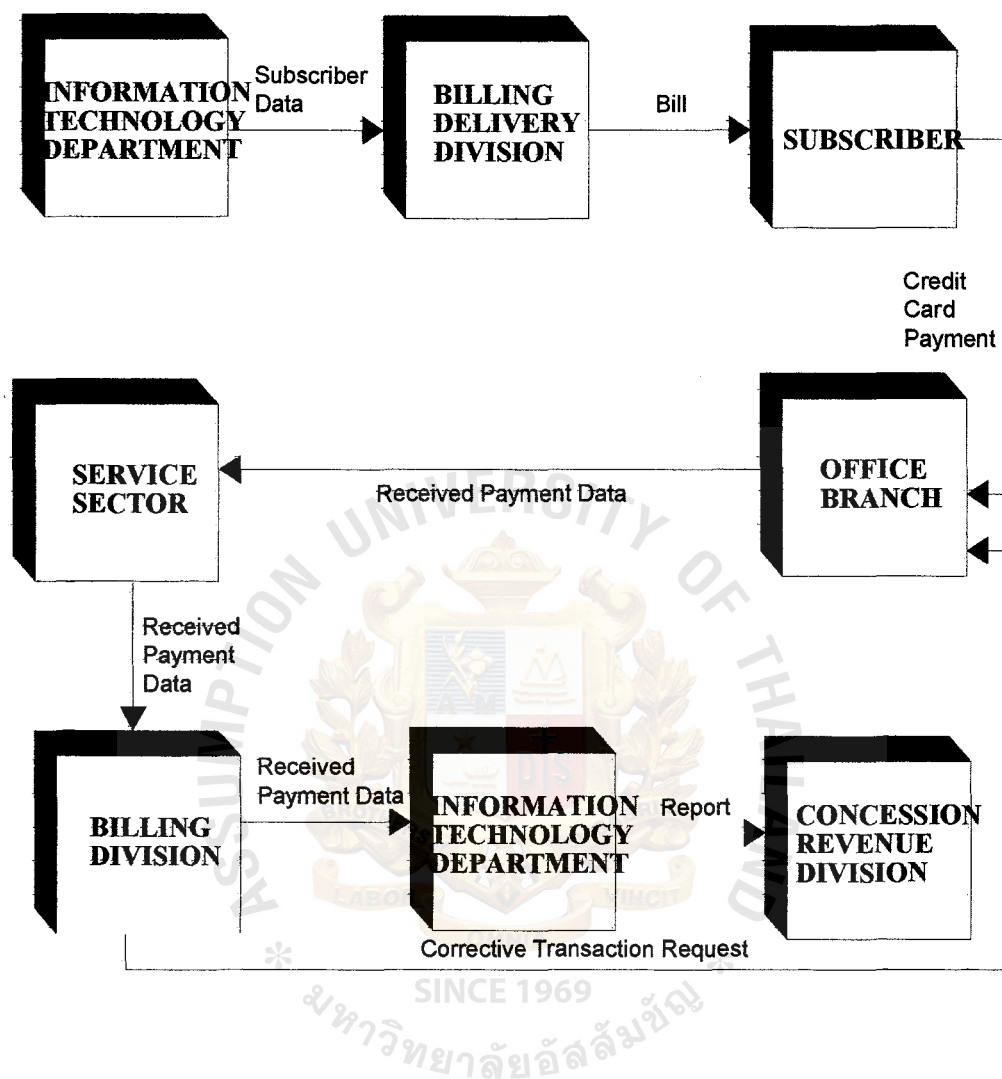


Figure D.1. Existing Process Flow for Metropolitans.

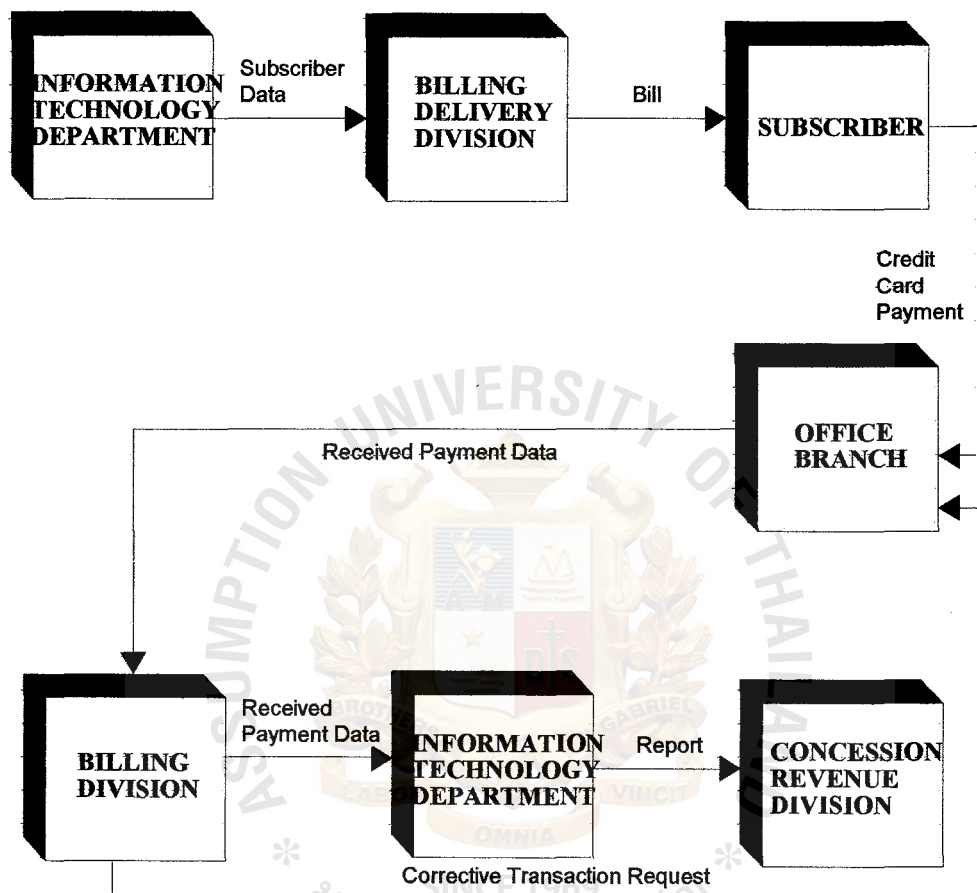


Figure D.2. Proposed Process Flow for Regions and Metropolitans.

Organization Chart

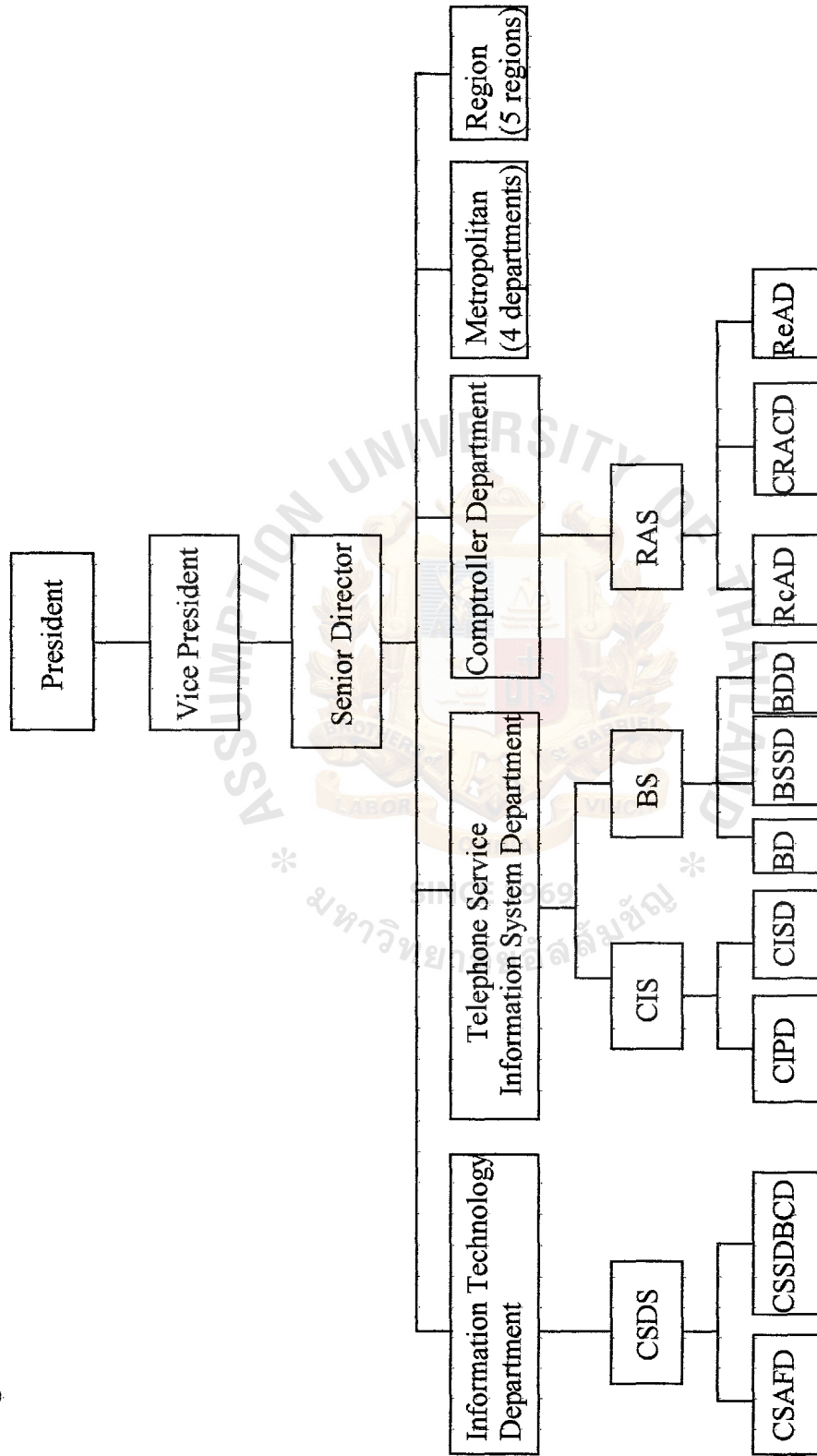


Figure D.3. Organization Chart.

| | | |
|---------|---|--|
| CIS | = | Customer Information Sector |
| BS | = | Billing Sector |
| RAS | = | Revenue Accounting Sector |
| CSAFD | = | Computer System for Accounting and Finance Division |
| CSSDBCD | = | Computer System for Subscribers Data and Bills Collection Division |
| CIPD | = | Customer Information Planning Division |
| CISD | = | Customer Information System Division |
| BD | = | Billing Division |
| BSSD | = | Billing System Standard Division |
| BDD | = | Billing Delivery Division |
| RcAD | = | Receivable Accounting Division |
| CRACD | = | Concession Revenue Accounting Control |
| ReAD | = | Revenue Accounting Division |

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