IMPROVEMENT OF PAYMENT POSTING FOR CONVERGENCE PRODUCT

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Thematic Paper
entitled

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ABSTRACT

In the fast growing mobile communication industry in Thailand, True Corporation Company Limited plays an important role as a major service provider, which offers a great deal of mobile and telecommunication services. To achieve a high level of service experience, the payment process, in charges by the Revenue Receiving Management (RRM) department, act as a significant part. In general, there are 2 categories of payments, namely online and offline payments. Based on the online mechanism, a payment can be processed immediately after the real-time verification. In the case of offline, a payment is pushed and suspended in the system to wait for processing. This increases the work load of the RRM department as well as a delay in the process. Furthermore, the error on the key-in process (by customers) is the major drawback because payments cannot be real-time verified in the offline process. To overcome afore mentioned problems, we developed the Payment Online system to push all payments to online process. The system is on the Payment Online platform and is compatible to other existing systems. Thanks to our system, the average delay in the payment process reduces by 19%, the error rate is down to 6% and the work load decreases by 5%.

KEY WORDS: ONLINE PLATFORM/PAYMENT ONLINE SYSTEM/
ONLINE PROCESS/OFFLINE PAYMENT/PAYMENT PROCESS

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บทคัดย่อ

ที่เติบโตอย่างรวดเร็วในอุตสาหกรรมการสื่อสารเคลื่อนที่ในประเทศไทย บริษัท ทรูคอร์ปอเรชั่น จำกัด มีบทบาทสำคัญเป็นผู้ให้บริการรายใหญ่ที่มีการบริการโทรศัพท์มือถือและการสื่อสารโทรคมนาคมที่ดี เพื่อให้บรรลุวัตถุประสงค์สูงสุดของการบริการ ขั้นตอนการชำระเงินค่าใช้จ่าย ถูกจัดการบริหารด้วยหน่วยงาน Revenue Receiving Management (RRM) ซึ่งทำหน้าที่เป็นส่วนหนึ่งที่สำคัญ รูปแบบการชำระค่าบริการสามารถแบ่งประเภทการชำระออกเป็น 2 ประเภท คืออการชำระเงินแบบออฟไลน์และการชำระเงินแบบออนไลด์ กรณีการชำระแบบออฟไลน์ การชำระเงินค่าบริการจะต้องรอในวันถัดไป ซึ่งทำโดยหน่วยงาน RRM หากมีข้อมูลการชำระค่าบริการเป็นปริมาณมากจะเพิ่มภาระการทำงานของหน่วยงาน RRM ในการจัดการซึ่งจะทำให้เกิดความล่าช้ากับกระบวนการชำระเงินและการปรับปรุงหนี้ให้ลูกค้า นอกจากนี้ข้อผิดพลาดที่สำคัญในกระบวนการชำระเงิน (ข้อผิดพลาดที่เกิดจากลูกค้า) เป็นอุปสรรคสำคัญ เนื่องจากการชำระเงินไม่สามารถตรวจสอบข้อมูลของลูกค้าได้ทันที กรณีการชำระเงินแบบออนไลด์ หลังจากชำระเงินสามารถปรับปรุงยอดการชำระค่าบริการได้ทันที เพื่อเอาชนะปัญหาดังกล่าวเราจึงพัฒนาระบบการชำระเงินออนไลน์กับช่องทางการชำระเงินทั้งหมดของบริษัท ระบบนี้เป็นระบบบนแพลตฟอร์มการชำระเงินออนไลน์ที่ดีและเข้ากันได้กับระบบเดิมที่มีอยู่แล้ว เป้าหมายเพื่อทำให้ปัญหาในขั้นตอนการชำระเงินลดลง 19%, อัตราความผิดพลาดในกระบวนการลดลง 6% และภาระหน้าที่ของพนักงานงานในการจัดการกรณีเกิดปัญหาให้ลดลง 5%

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CHAPTER I
INTRODUCTION

The Communications services are essential for people today. The quality of services, promotions of services, payment channels and after sales services are the critical components of providing communication services. The third party is alternative payment channel service for customer such as supermarket, bank, department store, etc. There are differences in nature, the locations, service durations, types of services, speed and accuracy of the payments. The channels of service have been reliable channels and appropriately services for customers. The fallibility payments are the causes of damages to billing issues, payment issues, complains issues and company's image. Speed and accuracy ensure good services for customers.

TRUE are the official provider of telecommunications and the creator of the convergence products and communications services. The services communicate classified as 2 types are prepaid services and postpaid services. TRUE prepares service channels to many customers channel. Each service channel has different standards and can be classified three types as follows.

1) Offline payment means that there are some non real-time payments which need to transfer payment data between third party and text file to pay for expenses the transaction. However this model found some mistake in the process of liquidation.

2) Nearly online payment means that there are some non-real time payments which need to wait at least 2 hours to transfer payment data between third party and API. This model has to wait for interval of the API.

3) Online payment means there are some payments in real-time process which there is no need to wait any process to transfer payment data between 3rd party and True Group with API in liquidation.

The major objective of this work is to make the payment posting for convergence products to be online payment. Hint that almost customers prefer this payment method because it can be checked online whether correct or incorrect.

1.1 Problem Statement

Regarding to the existing payment process, the causes of problem can happen from 2 parts. First, the internal system work is incorrect. Second, customer key in their transaction is incorrect or misunderstanding of wrong information. The causes impact when generating wrong invoices or incorrect liquidation. These problems impact to call center, which leads to the increase of number of complains and over workload to operation users. Almost complaints can happen when customers pay their billing completely but still get follow up about their debt. It is hard situation to find the root cause. Moreover, the public confidence always is the most important thing in the advantage or competitive in market as well. Finally, this case study can solve these problems as below.

1. Offline payment channel.
2. Nearly real time payment with batch payment posting.

However, work procedure is in adopting guideline to improve existing process both offline payment and nearly real time payment (which will be online payment).

1.2 Objectives

The main of this case study is the “Improvement of Payment Posting for Convergence Product” in online payment model that impacts by direct and indirect process to the company. Finally the main objectives can be concluded:

1. Increase customer satisfaction for payment.
2. Increase performance of billing system.
3. Increase performance of operation.
4. Reduce posting process.
5. Increase the payment channels for services provided to customers.

6. Increase a good image of the company.

1.3 Scope of work

To improve the way of work or some work procedures, the case study has main factors for consideration such as limitation of time and resources. Finally the case study defines framework and improvement process by the following steps:

1.3.1 Studying and preparing improvement process for offline payment.

1.3.2 Timeline setting has to on due 6 months

1.3.3 Improving the following channels:

- Tesco Lotus
- Bank List
    - Kasikorn Bank (KBANK)
    - Bangkok Bank (BBL)
    - Krung Thai Bank (KTB)
    - Thai Military Bank (TMB)
    - Bank of Ayudhya (BAY)
    - Siam Commercial Bank (SCB)
- Post Office

1.3.4 All process should be tested and evaluated in every step. Due to the fact that each payment channel works almost the same manner, there are different conditions that impact to some partial processes.

1.3.5 After implementation is complete, it needs to compare in reconciliation data performed by customers and requires to measure any changes.

1.3.6 Reducing obligations to the operation.

1.3.7 Easing to long-term maintenance process.

1.3.8 Planning for unexpected events.

1.4 Work Plan

From this study, the channel development starts from the beginning until the end of implementation. The modification can be summarized as follows in table 1.1 work plan.

Table 1.1 Work plan

No.	Task	Start Date	Duration	END	Jun-13	Jul-13	Aug-13	Sep-13	Oct-13	Nov-13	Dec-13	Jan-14	Feb-14	Mar-14	Apr-14	May-14
1	Feasibility study and summarize current data available.	01/05/2013	60	30/06/2013												
2	Analyst and design	01/06/2013	4	05/06/2013												
3	Priority setting of channels	06/06/2013	6	12/06/2013												
4	Summry problem and solution	13/06/2013	5	18/06/2013												
5	Improvement of plan	19/06/2013	5	24/06/2013												
6	Implementation	25/06/2013	128	31/10/2013												
7	Estimate after implement	01/11/2013	29	30/11/2013												
8	Thematic draft	01/12/2013	61	31/01/2014												
9	Summary of thematic	01/02/2014	88	30/04/2014												
10	Summary and Guidance from advisor again	01/05/2014	30	31/05/2014												

From table 1.1, the actual total work expands over 12 months with 6 months of implementation for change process from offline payment process to online payment process.

1.5 Expected Results

The problem is alleviated from offline payment process to be online payment process. The expected results is

1. Reduce errors case of payment posting process.
2. Reduce change internal process.
3. Reduce operation investigation posting process.
4. Reduce the payment files post to billing systems.
5. Reduce the problem from activity's customer.

CHAPTER II
ENTERPRISE ARCHITECTURE ANALYSIS

2.1 Organization/Enterprise Background

True Corporation Public Limited Company is Thailand's convergence lifestyle leader; offer an unrivalled selection of integrated communications services and solutions.

Our core business segments are: True Mobile Group, which includes TrueMove, Thailand's third-largest mobile operator, TrueMove H, our 3G brand which in conjunction with CAT Telecom Public Co., Ltd. ("CAT") provides nationwide commercial 3G+ services via HSPA technology on the 850 MHz spectrum, and Hutch, which provides CDMA services; TrueOnline, the largest fixed-line phone provider in the Bangkok Metropolitan Area ("BMA") and the Broadband and WiFi operator with the most comprehensive nationwide network use ADSL, DOCSIS 3.0 cable modem and FTTx (fiber to the home/building) technologies; and TrueVisions, the only nationwide pay-TV company and high-definition ("HD") TV operator. Meanwhile, our payment gateway under TrueMoney and digital content services such as online games, content downloads and web portals under TrueLife foster subscriber loyalty and help drive non-voice revenue growth, while our lifestyle venture, True Coffee provides a key touch point with customers and acts as a forum for showcasing our premium products and services.

True Group is one of the strongest and most recognizable brands in Thailand and was backed by Asia's largest agro-conglomerate, the Charoen Pokphand Group (CP) with a shareholding of 64.7 percent of the total registered and paid-up capital of Baht 145,032 million as of December 31, 2011.

At the end of 2011, True Group had an annual turnover of Baht 71.9 billion (include interconnection revenue), infrastructure investments of Baht 225.6 billion, and employed 18,702 permanent staff.

2.2 Organization/Enterprise Goals

Vision and Mission of TRUE are:

Vision:

"True is firmly established as Thailand's convergence lifestyle leader with successful mobile, Broadband, fixed-line, pay TV and Wi-Fi platforms complemented by a wide range of e-commerce and digital content services."

Mission:

Our vision is to bring knowledge, information, entertainment and convenience to every household as well as the youth of Thailand. At the same time, we aim to enhance value for our shareholders, customers, organization and employees.

At the heart of our vision are four key brand values which guide the way we work.

Creative: We continually search for new ideas and innovative ways to bring quality products and services to our customers.

Caring: We are dedicated to do what's right for our customers, colleagues and partners.

Courageous: We take decisive action, calculate our risks, and learn from our failures.

Credible: We are committed to the highest levels of corporate governance, are honest, communicate with integrity and are accountable for our actions.

True's convergence lifestyle strategy is unique within the Thai market. It focuses on provide customers with their preferred combinations of content and services from our integrated platform. It also helps us to differentiate ourselves from the competition, drive subscriber growth and customer loyalty as well as maximize the full potential of our services. We firmly believe that convergence will continue to

enhance value for our customers and deliver significant benefits in the medium and long term.

The convergence lifestyle has been embraced by Thai households with the numbers use multiple True products grow rapidly as shown in the graph below.

2.3 True Corporation Organization

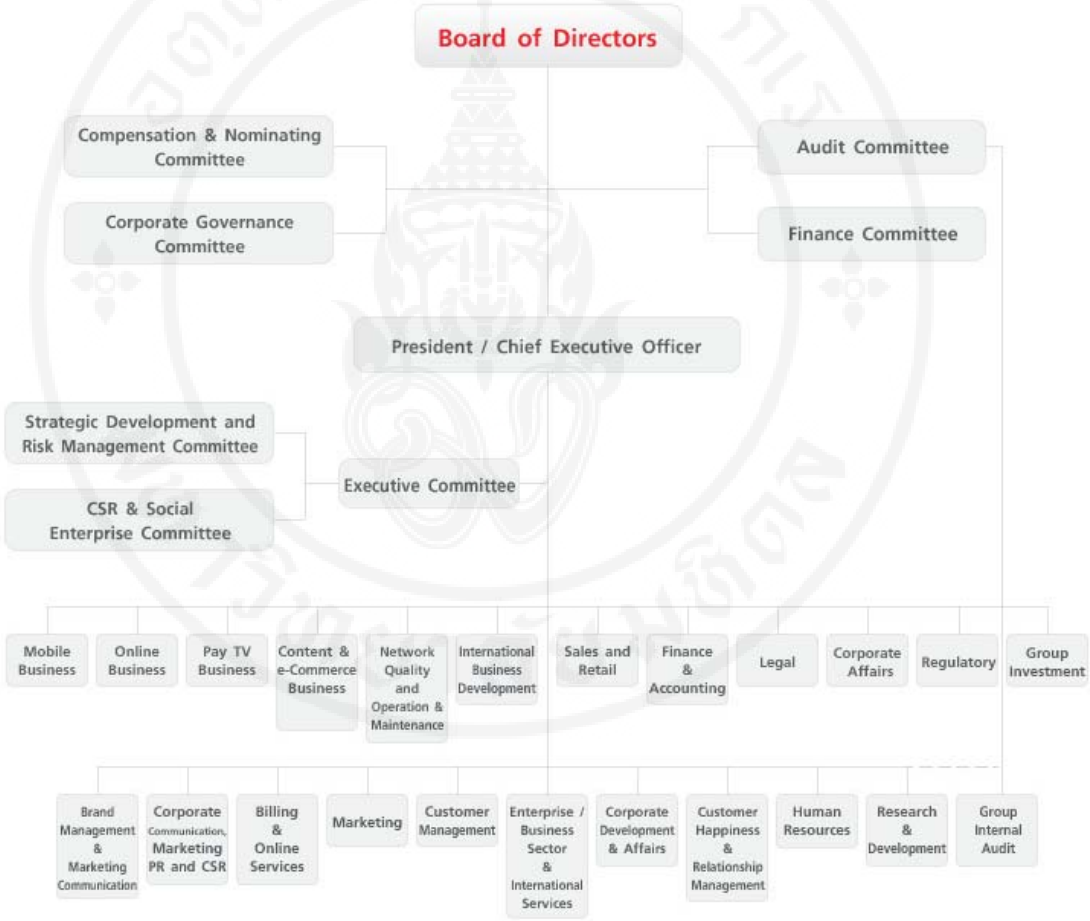

Figure 2.1 True Corporation Organizations

True group is a large enterprise and have product to customers service. So the structure organization was divided into a group of internal divisions and groups of products such as, mobile, online, TV, content business group, sale group etc. From the business model of TRUE can divide the organization structure as follow figure 2.1.

2.4 Business/Organization Goals of Finance Operation

Finance Operation department is responsible for money management, while Revenue Receiving Management team is under the Finance Operation. The missions of Finance Operation are;

Mission:

"Best quality of charging and receiving service delivery with proper revenue and cost control"

Target:

Additional task delivery highlight of improvement project success

1. The best Project & LDL do train session improvement Leader attitude
2. The process extend all receive channel for Real Future company
3. The process expand online real time connection with 3rd party channels
4. The process open interim direct debit receive option to Corporate customers
5. The process improve Mobile cancel process with end bill cycle reinforcement
6. The staff donation and contribute to achieve 8 CSR programs

Responsible:

1. Charging assurance
2. Billing final inspection & problem resolution
3. Receiving management & Outsource channel management
4. Customers account management & Problem resolution

Business Goal:

1. To sustain leader position in customers payment satisfaction

a. Provide convenience and efficient receive channels

b. Minimize error of charge and receive

c. Quick corrective resolution and coordinate for preventive actions

2. Assure proper control of revenue leakage and receive cost

3. Continue improving team capability & productivity

2.5 Organization of Finance Operation and background

The organizations of Finance Operation have many sections as follow:

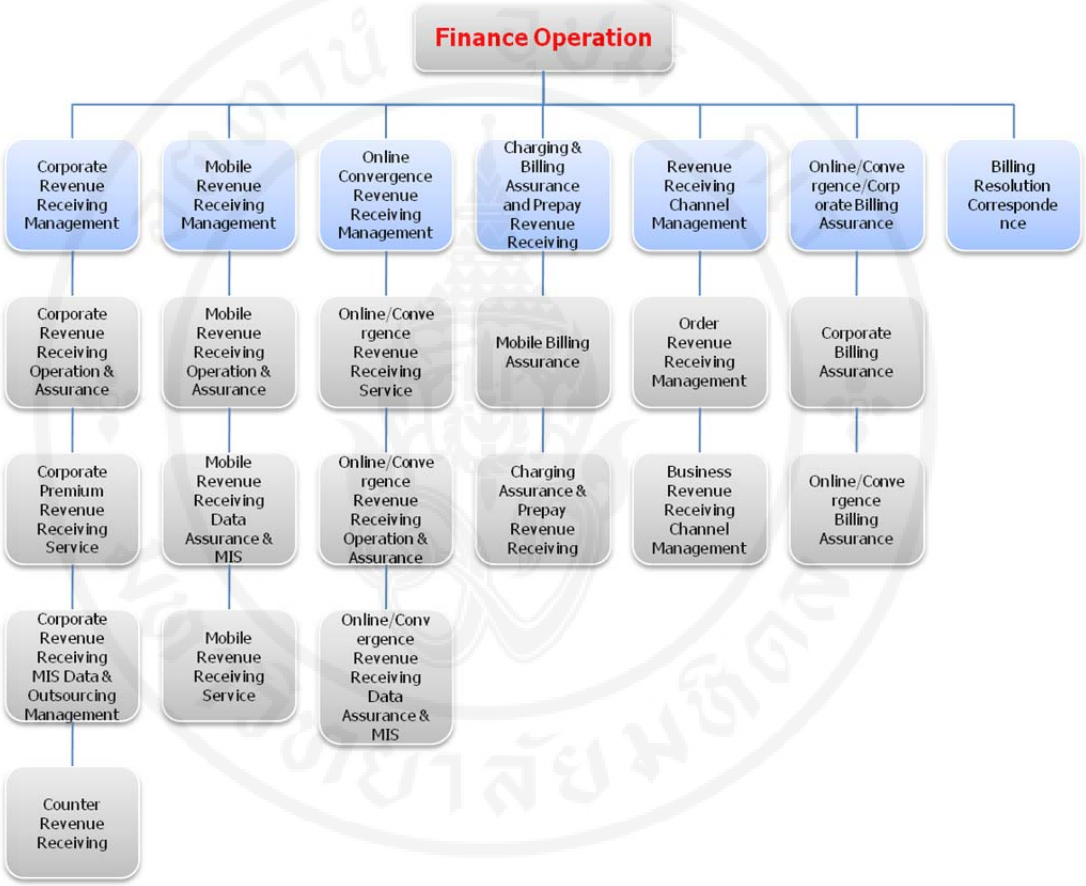

Figure 2.2 Finance Operation Organization Structure

The Finance Operation is set up for the finance management of company. Revenue Receiving Management is department of Finance Operation and The RRM is management about to finance' customers and companies. The RRM manage customers of prepaid and customers of post paid about to payment of TRUE product such as mobile of nation service, mobile international service, fixed line base service, High speed internet broadband, games online, satellite television, agency of payment, etc. TRUE provide service to customers that customer difference require service such as single product and convergence product. Therefore TRUE provide payment channel

for customers from service charge of product. The most purpose for accuracy and fairness to customers.

The RRM control payment activity from service charge of product and The RRM separate group of service 2 type. That is prepaid service and postpaid service. TRUE is grouping service for difference customers because the customers difference behavior of demand. The prepaid of customers want freedom to payment before use service. They use the most mobile service. The payment channels have to accuracy and high speed. So the objective of RRM prepaid is improve payment channel to the good service and they create sufficiently new channels for customers to pay but they have problem of service that they will resolve the problem and sent service mind to customers. For postpaid customers difference prepaid customers that they want to convenience. Namely they use service before they paid service. So TRUE summarize usage of customers and his sent invoice to customers by cycle. The customers have to pay at payment channel before next cycle. So the objective of RRM postpaid is accuracy of bill create in order to pay and take service to customers offer. So they provide a good channel for customers and resolve bill error

2.6 Analysis Organization/Enterprise Architecture

Today business process of the organization need to relies on information technology (IT) to be effective. Enterprise Architecture (EA) is the blueprint of the organization by integrating IT into the business as a system, from the architecture to the roadmap of the organization. EA helps the development and improvement of organization work to fit organization vision, mission and objective by using information technology to increase work efficiency. EA does not involve only technology department but it involves every department, i.e. the executive, business unit, operation unit and technology department. EA includes 4 main factors as shown in Figure 2.3

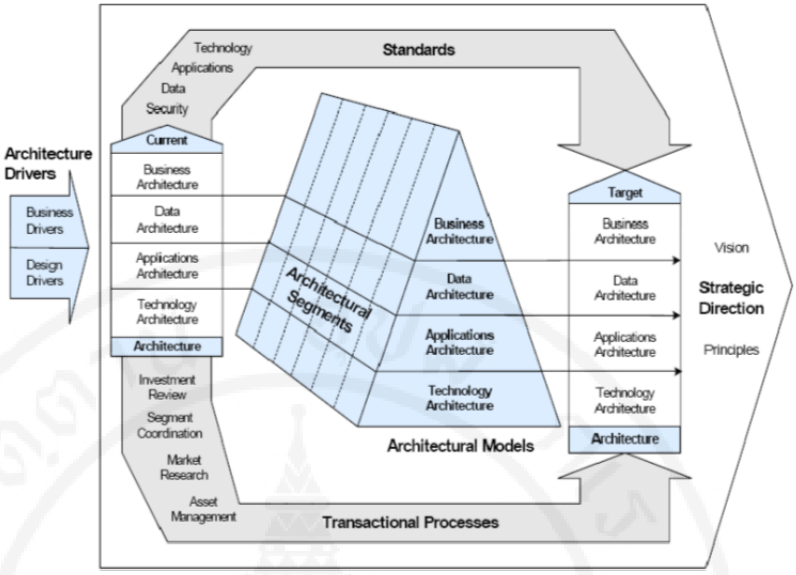

Figure 2.3 Presents the 4 perspectives of Enterprise Architecture Framework

Business Architecture: presents warehouse process of organization and warehouse flowchart.

Information Architecture: explains information of organization and data warehouse.

Application Architecture: illustrates the organization system or information technology systems are required to respond business issues.

Technology Architecture: depicts the architecture of hardware, software and network in the organization.

To create EA, 4 main factors are used as a blueprint to analyze the existing and future target and improvement plan to meet organization vision, mission and objective.

Therefore, this study employs all 4 main factors of EA Framework to analyze and solve issues of warehouse management. It is to help the organization to compete with opponents and to respond employees' requirements as well as cost reductions.

2.7 Business Architecture

Today, customers' requirements have a big influence on running business. Nowadays, customers know more about technology. They require quality and service speed relative to the previous requirements. In the past, the customers accessed technology lesser relative to the current customers. In addition, the service speed was not important for the customers. The previous business had many errors for the payment service begin with the receive process until adjust process. By these reasons, the business process is analyzed to evaluate the error reasons of each process. The analysis is as follows.

2.7.1 Baseline Business Architecture

For the existing business format, the service payments by the customers do not decrease the customer's amount immediately (offline payment). Rather than reduce accounts receivable immediately, the process takes 1-2 working days to adjust the balance of receivable. It results in a delay of balance adjustment (SLA). It means that the daily payment made by the customers in each payment method does not adjust all receivable balance. The customers bring question about the unadjusted balance. The current process is shown in Figure 2.4 Baseline business process.

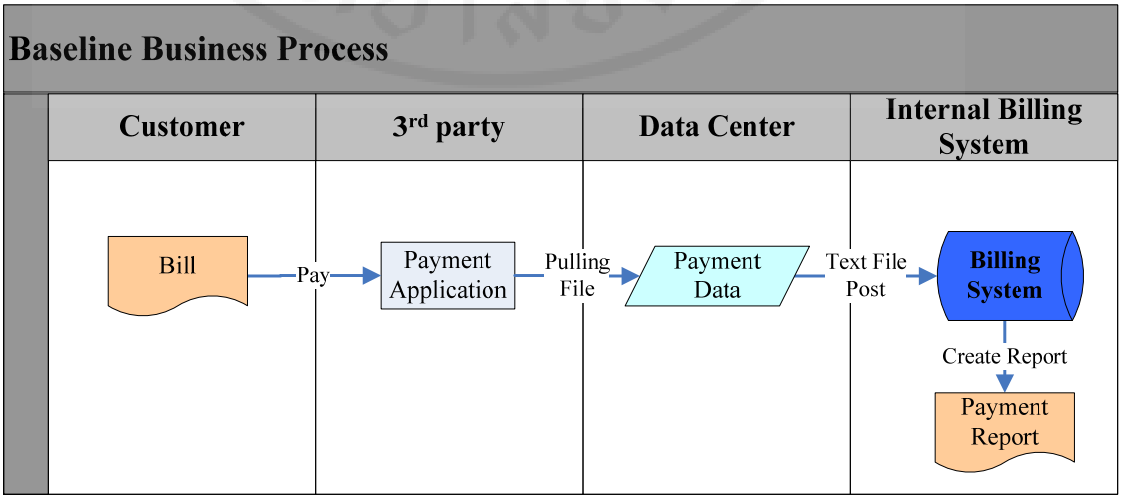

Figure 2.4 Baseline Business Process

From the Figure 2.4, baseline business process shows the payment process until the balances adjust process. It is from receive payment until payment channels

application. To adjust the customer's balance, the process has to be passed through many units manually. It takes time for each process and has human errors, results in the wrong or delay adjustments indicated in SLA.

2.7.2 GAB Analysis of Business Architecture

From the baseline business process, there is a gap for customer services as shown in Table 2.1. Gab Analysis of Business Architecture

Table 2.1 Gab Analysis of Business Architecture

Dept./Task	What is current done	Action	Where we need to do	What we need to do/Involved Dept.(s)
Payment Channel	Offline payment	Update	The network are setting between payment channel and internal TRUE IT with Application Programming Interface (API).	They are setting online payment by Internal IT.
Internal IT	Manual post to billing	New	Internal IT provide data to payment channel before pay.	Internal IT Provide data and modify data before sent.

2.7.3 Target Business Architecture

From Table 2.1, it concludes that there are two sections to be added for respond the online payment process. 1. Payment channels can check the customer information before the customers make payments and 2. Information is prepared for the payment channel. The target business process is presented in Figure 2.5.

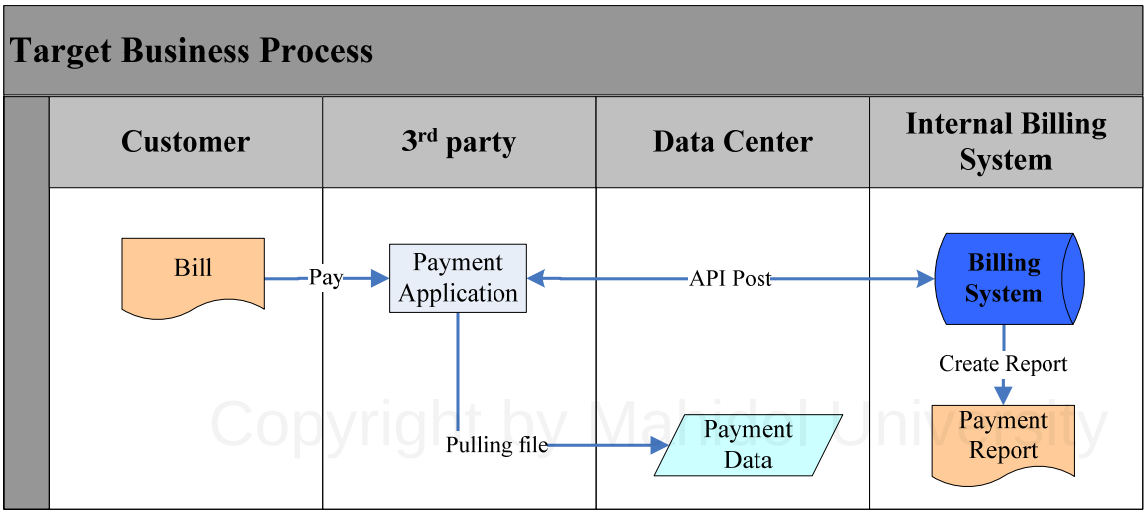

Figure 2.5 Target Business Process

From Figure 2.5, the process has been changed. All new processes are performed by the system include the information check, customer payment and balance adjustment. The new process reduces potential errors in the baseline business process.

2.8 Information Architecture

From the baseline business process, payment and balance adjustment information can be analyzed as follows.

2.8.1. Baseline Information Architecture

The current payment process is that the customers can bring their invoice to make payment. The summary of payment is prepared at the end of each day and submitted to TRUE on the next day. TRUE brings the payment information to adjust the customer's balance. However, the payment information has to be put in the billing system. The billing system may not receive these transactions because of the limitation of the billing system itself. Therefore, information must be reformatted before adjust the account balance as presented in Figure 2.6 Baseline Information Architecture.

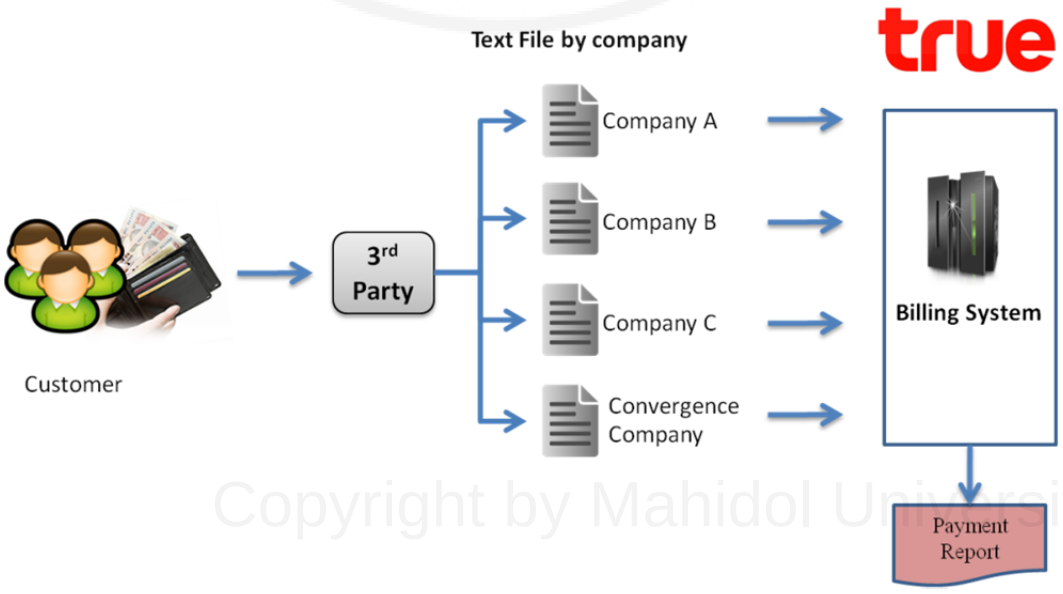

Figure 2.6: Baseline Information Architecture

Figure 2.6 presents the payment channels and the TRUE's internal processes that are complicated. More errors occur when there are many payment channels. More errors depend on the account balance adjustment or the customers make wrong transaction. The customers may get confused because TRUE has many products (Convergence products).

2.8.2. GAB Analysis of Information Architecture

From the baseline information architecture, Table 2.2 presents new processes to reduce gap and errors.

Table 2.2 Gab Analysis of information Architecture

Dept./Task	What is current done	Action	Where we need to do	What we need to do/Involved Dept.(s)
Verify customer data before pay	-	New	Internal IT provide data to payment channel before pay	Internal IT provide data to payment channel.
Online payment	Offline Payment	Update	Internal IT support online payment to billing system.	Internal IT provide data and sent payment data to billing system.
Convergence payment files	-	New	Payment channel has been new code setting for convergence payment.	Internal IT is setting new code support convergence payment.

2.8.3. Target Information Architecture

From Table 2.2, the existing process that the channel payment summarizes the payment transaction every day is maintained. The customer information must be checked before make payments and the balance is calculated immediately after the payment. The information from each payment channel can be passed to other processes without adjust balances as in the baseline information architecture. Figure 2.7 presents the new process – target data and information.

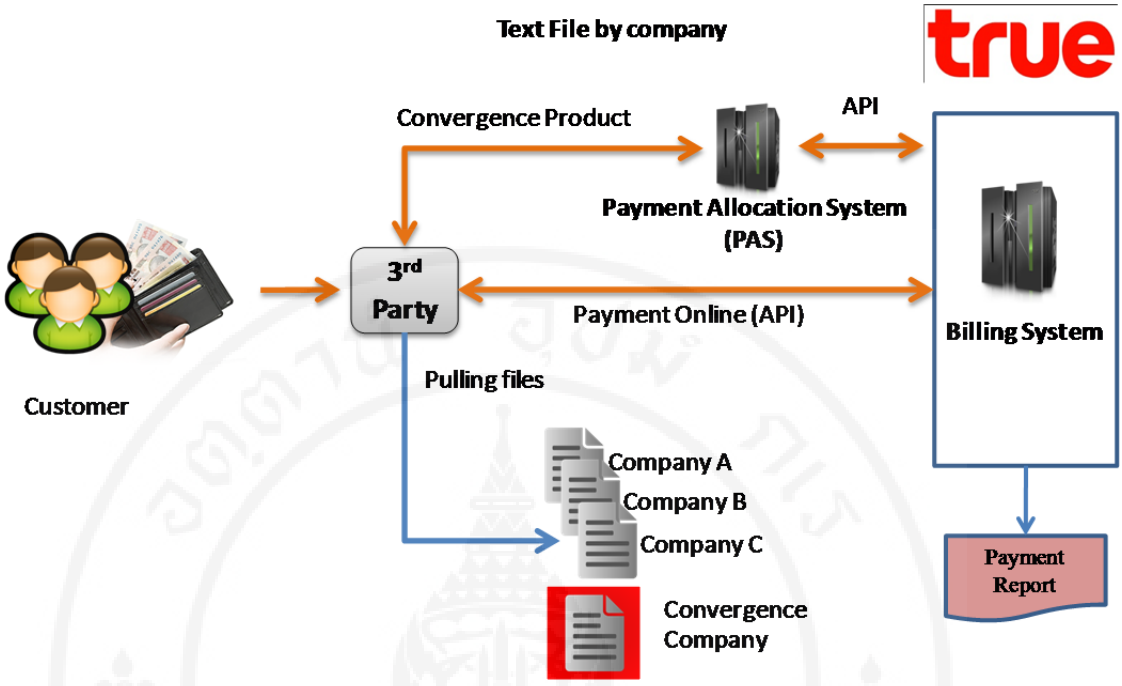

Figure 2.7: Target Data and Information

From Figure 2.7, the additional process is the information check process before make payment. The payment information is sent to TRUE to adjust the account balance. The customers can check their account balance immediately after make payment. It reduces errors. This supports convergence products that the online payment can adjust the customer account balance correctly.

2.9 Application Architecture

From the business process of making payments, the customer's information requirement is increase and the ability to access the technology increases. The application development to respond the customer's requirements is important for business development. Therefore, the existing application is analyzed to be replaced by new application. This can be concluded as follows.

2.9.1 Baseline Application Architecture

The existing business process is offline payment and there are three sections.

1. Payment channel application
2. Transfer data application such as FTP, Bill payment web site, etc.
3. Billing system application

These processes are sufficient for the existing business model as presented in Figure 2.8 Baseline Application Architecture

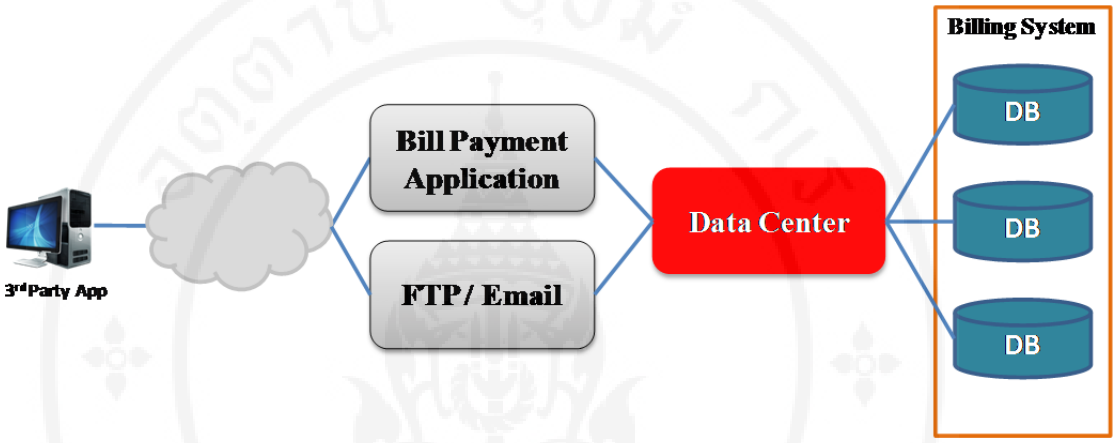

Figure 2.8: Baseline Application Architecture

From Figure 2.8, the use of application leads the business process. It does not focus of the speed that each process flows from the beginning until the balance adjustment (end to end payment posting process).

2.9.2 Gab Analysis of Application Architecture

From Figure 2.8, the baseline application architecture is analyzed to determine problems occurred from the existing application as shown in Table 2.2 Gab Analysis of Application Architecture.

Table 2.3 Gab Analysis of Application Architecture

Dept./Task	What is current done	Action	Where we need to do	What we need to do/Involved Dept.(s)
Download payment files	Download payment data from email, website, FTP	Update	Change channel download payment file to bill payment on web site only	Data center download payment file from web site only.
Online payment with API	-	New	API connect between payment channel and TRUE IT	Set core network for API payment.

2.9.3 Target Application Architecture

From the business process, the additional application is to include the payment information transfer device. This device helps to adjust the account balance more quickly and correctly. Application programming interface (API) is applied for customers information check, confirms payment, and account balance adjustment processes as explained in Figure 2.9 Target Application Architecture.

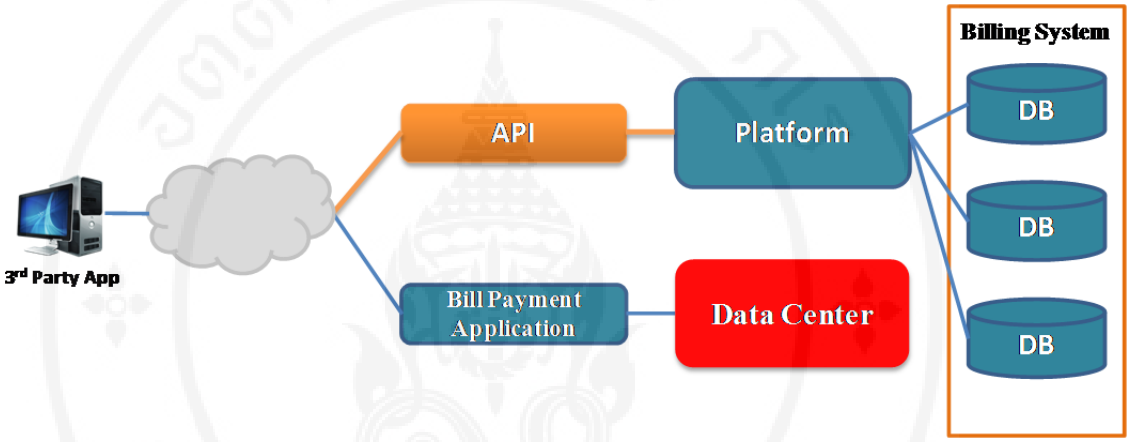

Figure 2.9: Target Application Architecture

Form the new processes; it changes from offline channel to online channel. The API facilitates the payment speed and correctness. Therefore, the original technology download file from multiple channels to a single channel by web site only. For the business ensure efficient operation and management in the future.

2.10 Technology Architecture

The technology of making payment has many technologies to support different formats. The analysis of payment technology is as follows

2.10.1 Baseline Technology Architecture

The existing technology is to support the payment including barcode scanner, ATM, True shop counter and etc. These channels are offline channels as shown in Figure 2.10 Baseline Technology Architecture.

Figure 2.10: Baseline Technology Architecture

The existing technology does not respond the customer requirements and satisfactions. It has limitation to respond the customer requirement. Since there are increase customers and convergence products of TRUR, payment channels must be developed.

2.10.2 Gab Analysis Technology Architecture

The existing technology can be summarized and analyzed the potential technology relative to the existing technology. It is shown in Table 2.4 GAB Analysis of Technology Architecture.

Table 2.4 GAB Analysis of Technology Architecture

Dept./Task	What is current done	Action	Where we need to do	What we need to do/Involved Dept.(s)
Create New channel support online payment	Shop, scan barcode, Kiosk, 3rd party channel (offline payment)	Update	Technology support new online payment channel	Business and internal IT create new channels.
QR code Technology	Barcode technology	New	Support new channel in the future.	Business and internal IT create new channels.
Upgrade shop to one stop service	Shop online non one stop service	Update	New shop support new online payment technology	True innovation

2.10.3 Target Technology Architecture

From Table 2.4, there are many technologies to support online payment. Now, TRUE uses many technologies to support the customer payment to make the customer more conveniently, such as payment through bank account, TRUE money account. For the third party channel, it changes from offline payment to online payment through network by use API. API is the medium device for data transfer. It also includes QR code development to support future payment channel that it is the business opportunity. It is for the shops that are developed to one stop service. Since TRUE has many products, one stop service should satisfy the customers. The new technology for the payment is presented in Figure 2.11 Target Technology Architecture.

Figure 2.11: Target Technology Architecture

From Figure 2.11, the new technology is a part to support the business services to be more efficiently. It also helps extending the business opportunity and opens to perform other business areas.

CHAPTER III
LITERATURE REVIEW

The customer's behavior has been changed. The communication and technology are more developed and advanced. The communication business development in Thailand is one example of the improvement of both voice and data communication service efficiency. Now, the business focuses on service quality, speed, and accuracy. Overall, these are known as good service efficiency. Good service is not only the above mentioned but also the speed of payment process and verifiable. By these reasons, this work is to study the potentiality of different payment methods.

3.1 What is quality of payment?

From the current business competition, the consumer requirement has been increased. Because the technology has been developed and the consumers can increasingly access the technology. There are many verification channels for service quality. There are many verification channels used to support processes and future changes and improve efficiency. Therefore, quick, accurate and verifiable payment process qualities are important for now and in the future. Nowadays, the change in technology is to support future expansion and there are many technologies for uses depend on the decision of organizations. The organizations select the technology fit and support their business. They concern the service quality. Therefore, the study focuses of the improvement possibility of payment channels. The prior literature presents different aspects about the payment method between organization and service fees. These can be applied to the communication business or other relating business in terms of payment methods. Details of payment methods in the literature are explained in the following topics.

1. What is online payment?

2. Technology related to cash online payment.

3. Improvement of billing system

The above mentioned are factors affecting the change in cash payment channel as targeted in the previous explanation.

3.2. What is online payment system?

Presently, there are many payment methods and channels to be used. Whose payment channels to choose from multiple channels? From these questions, payment channels can be separated into three groups.

3.2.1. Cash Payment

Cash payment channel is very popular to the customers. It is counted as a main portion for payment methods in Thailand. Cash payment is not complicated relative to other payment methods. The customers only need to know where to make the cash payment and for what products and services. If the customers know where to make cash payment but no cash payment can be made through those channels, those channels will not be able to take the payment. The customers have to study what channels accept cash payment and it takes one day for adjust the balance after the payment or the balance is adjusted immediately after the payment. However, the customers do not know about the adjustment. The customer knows only payment channels. The customers may be confused if they know this information. Therefore, no information is passed to the customer. The customers only know where to pay and what time period the balance will be adjusted. From the above mentions, there are two channels for cash payment.

1. Cash offline payment

The balance is not adjusted immediately after the payment. The customers know only the payment items. The balance adjustment is performed on the next day. The customers know that it takes 24 working hours that their balance is adjusted. There is a cash offline payment channel that takes 3-5 hours to adjust the customer balance.

2. Cash online payment

The balance is adjusted immediately after the payment. When the customers make a payment, customer information will be verified before the money is taken. The information is obtained from the customers through TRUE and payment channel system. After the verification, the customers can make the payment. This is to make sure that the customer information is correct before adjust account balance. After the payment, the billing system of service providers can adjust the customer balance immediately. This system satisfies the customer because nowadays the customers can access more technologies include checking their status through application provided by the service provider. The customers can check when the payment is done. This improves customer satisfaction and pursues them to return to this payment channel in the payment.

3.2.2. Direct Debit or Direct Credit

Direct debit or credit card is electronic payment for general and business customers. It is convenient for the customer to pay for products and services. There are two payment service types.

1. Customer bank account

Presently, the banking transaction is widely used because it is very convenient to pay for products and services. There are two methods to perform banking transaction include banking direct and ATM issued by the bank. Customers pay for products and services by their own ATM cards.

For the first method, customers can pay for products and services and do their own transactions directly to their correspond bank accounts. The business supports the customers to use this channel especially to pay through direct debit accord to the bill cycle. The business receives money on time as agreed by the customers. By this way, the business can get the money quickly.

For the second method, ATM, it is a technology that the bank uses to comfort their customers. ATM is easy to be used for payment as required by the customers. The condition of use ATM is accord to each bank regulation. For example, ATM can be used through the ATM machine indicated by each bank. By this method, customers hold their own bank accounts and can perform financial transactions any time.

2. Credit card

Now, the use of credit card to pay for products and services is widely used by the customers who can access to the credit card technology. The payment is just like to use bank account but the difference is that credit card cannot be used directly through the bank. The credit card has to be used through online payment of service providers. Therefore, the use of credit cards has two methods as follows.

First, the payment by credit card is to debit the customer account accord to the bill cycle at a curtained amount of money. This payment type must be agreed by the account owner before making the transaction; the customers have to send consent to make this transaction.

Second, the payment through credit card can be done by the customers at the self service pay point. The system deducts the money from the customer's credit card when the credit card payment transaction is authorized by the credit card service provider. The customers must have sufficient credit amount to make the payment.

3.2.3. Cheque Payment

There are many steps for the cheque payment because the cheque must be approved by the bank only. Cheque payment is exposed to the insufficient amount of money in the bank account connected to the cheque or so-called bounce cheque. This study does not focus on the cheque payment.

From the above explanation, the payment process can be improved from cash offline payment to cash online payment. This facilitates the customers to make payments and supports the business expansion in the future. Also, the customers can access to various technologies in the future easily and there are more customers' requirements. Therefore, to take care of the customers before and after sales is to be the service leader in the future.

3.3 Technology related to online payment

From the target of modified payment process of each channel, the existing payment service can adjust the customer account balance after the payment is

successful. Therefore, this topic explains the technology used to improve the existing process as targeted.

The online payment technology can be separated into three sections that must be developed together simultaneously.

1. The third party channel
2. TRUE connection system and technology
3. TRUE internal system connected to the billing system

All above sections support the change in existing processes to meet the target.

3.3.1 Third Party Channels

Technology and condition related to the process improvement to meet the target can be summarized as follows.

1. Summary with the business – payment channels and TRUE have agreed the potentiality to change the third party services, ability of the service about data transfer, possibility to have this service, communication methods, and repairs. It is also about the management and information for the customers about the change and the beginning of new services.

2. In the case that the third party and TRUE contract are not flexibility which it revise the contract for support in future.

3. In the case that third party technology does not support the online payment, it could take a long time to modify the technology to match the payment.

3.3.2 TRUE connection system and technology

Where the agreement between the third party and TRUE has been made, it must study what technology can support the new process. Issues obtained from the existing technology relate to the interview and data transfers are as follows.

1. Application Program Interface (API)

API is a specific method to use operation system, applications or computer codes. It is connected between application and operating system (OS). The connection between application and operating system is by IP. Without the IP of OS, the programmer cannot develop application to fully work with OS. However, API is

an interface to connect programs that it is different from user interface both graphical user interfaces: GUI or command line interface with the computer and user.

The benefits of application programming interface are as follows.

1. It supports data transfer across server.

2. The main webpage is not required. There is the content of the main webpage from the webpage retrieve API.

Application programming interface (API) has two types.

1. Language dependent API – it is the API work with only one language.
2. Language independent API – it is the API work with many languages.

API is a group of functions, steps or classes that the operating system or service providers create to support the data retrieval from other programs. API can work with the programming language that supports the API in syntax or element formats that can be used conveniently.

3.3.3 TRUE internal system connected to the billing system

There are two concerns for TRUE in terms of any applications connects between inside and outside organization, include security from attackers and data accuracy flowing into the organization. The accuracy must be 100 percent. Therefore, the development of online payment process has the following relate technologies.

1. Web Services

Application or program for one service job is called by other applications in form of RPC (Remote procedure call). For the service, there is document explain the service characteristics. The language used for exchange is XML. Components can be performed on any platforms on HTTP protocol, World Wide Web protocol. This channel is currently worldwide accepted for the communication between application and application.

Web service can be called within internal or outside the organization through firewall. Therefore, many large organizations are developing their systems to be performed on the web service. The investment is worth because the web service can improve the organization potentiality and reduce the organization resource management.

The web service can work along with web application through the internet. This is an efficient method to communicate between customers and partners. Although it must concern the security system and data management, the web service is general internet standard. It is normal for the communication through electronic.

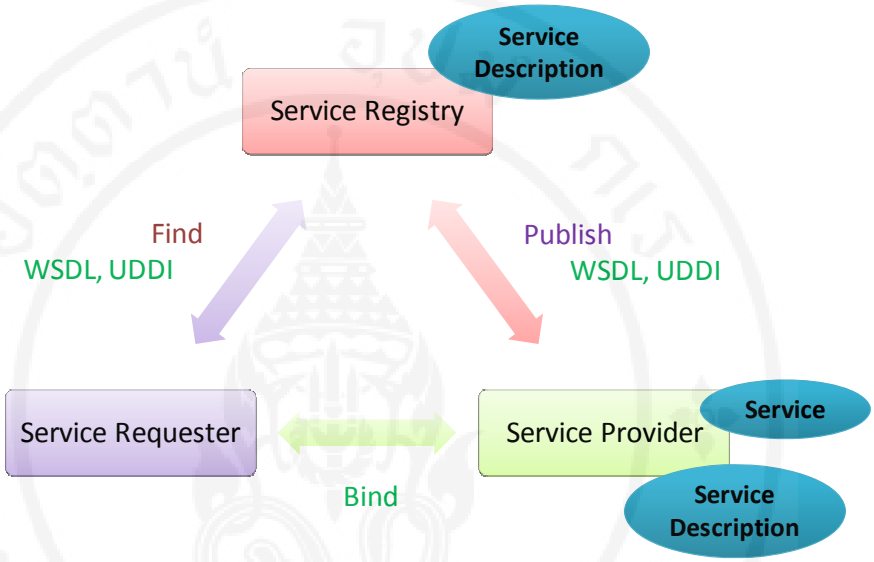

Figure 3.1 Web Services Model

From Figure 3.1, the explanation is as follows.

Requestors are any people who would like to use service from the service provider. Services can be searched through UDDI registry or service registry or contact directly to the service provider.

Registry is a medium for the registration made by the service provider used WSDL files. It shows company and service details that may or may not be used.

Provider is the service provider who provides services to requestors when services are requested.

2. Simple Object Access Protocol (SOAP)

It is XML-based protocol (lightweight protocol) use HTTP as a joint protocol for data exchange in decentralized and distributed environment. SOAP

indicates message protocol between requestors and providers. For example, the requestor can contact to exchange data with provider by use RMI (Remote method invocation). Based on object programming of Microsoft, IBM, Lotus, User Land and Developer Mentor, the standard of SOAP has been set out and later there are more than thirty companies come to join. W3C XML Protocol Workgroup has been established. SOAP specifies the basic format of distributed communication by develop SOA. Although SOA does not specify message protocol, SOA is set as Services-Oriented Architecture Protocol because SOA has been used to widely develop SOA. The prominent point of SOAP is that it is a neutral protocol without owners and it works together with many other protocols. The development can be made freely accord to the platform, object model and programming language of the developer.

3. Billing System

Other than the technology and application affecting the payment process, billing system cannot be neglected. Whether or not the readiness of billing system can support the work process? How many users can be supported by the online payment technology? These limitations must be summarized clearly because the solution can be performed under the critical circumstance.

From the above reasons, it shows that technology and application generally found in the market can help and drive the business ‘s customer service because technology has been developed for the business to use and develop by itself. Therefore, the existing technology sold in the market should be selected to fit the business. From this study, technology is the only part of the existing technology in the market. The selected technology by this study is appropriate to the modification of cash payment process. It is not only changing the technology but the breakeven point must be concerned.

CHAPTER IV
RESEARCH METHODOLOGY

This chapter explains components and processes relating the data management. The new process is integrated with the existing process under the development standard.

From the explanation in the previous chapter, there are many factors to be changed for the adjustment of the cash payment process. Many departments in the organization and outside parties involve the process. In addition, we apply the new technology, namely API, Web server, starting from the preparation, test, and implement. To gain the success of the implementation, the payment channel must to improvement payment process. Therefore, this study focuses on the development model to make sure that the new process can be implemented successfully. Details are described as follows.

4.1 Research Tools

4.1.1 Hardware

- Web server
  - CPUs : Intel Pentium 4 3.0E Bus 800
  - Memory : DDR Ram 2048 MB PC 3200
  - Hard Disk : 500 GB S-ATA II
- Data Base server
  - CPUs : Intel Pentium 4 3.0E Bus 800
  - Memory : DDR Ram 2048 MB PC 3200
  - Hard Disk : 1 TB S-ATA II
- Monitor
- Mouse

- Keyboard

4.1.2 Software

- Operation System : Linux Fedora Core 6
- Control Panel : Plesk 8.2 Control panel
- Web Application Server :Apache 2.0 Web Server
- Database Application Server :Oracle Application Server 10g
- Mail server :POP3, SMTP, IMAP, Webmail
- Mail Scanner / Virus Scanner
- Spam Filtering

4.2 Methodology

This study uses software life cycle model for the development and management. The model used in this study is Waterfall model. Since the development process of each step is clear, the cash payment process can be presented in Figure 4.1.Show the adapted Waterfall model.

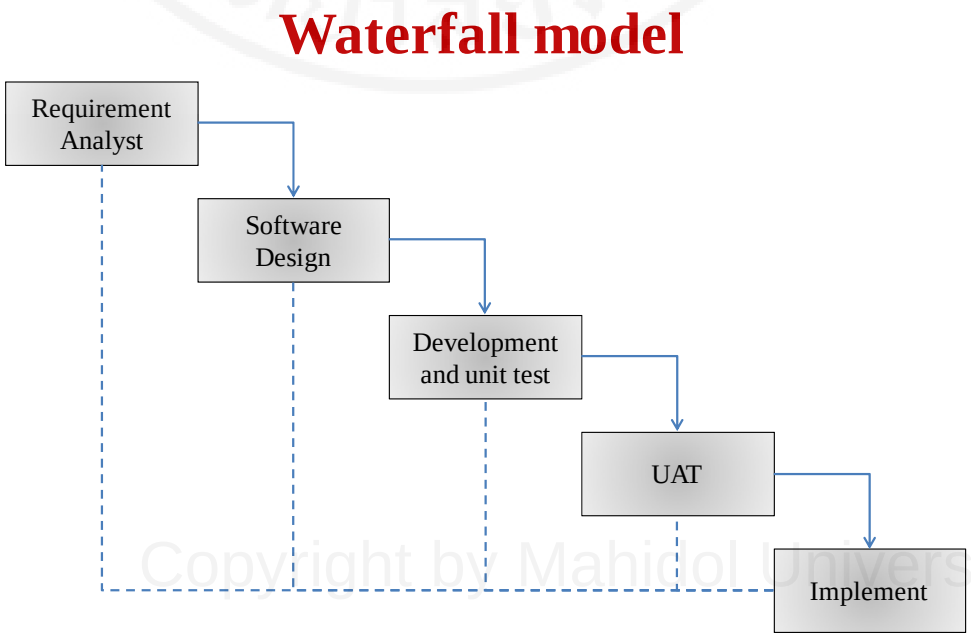

Figure 4.1 Show the adapted Waterfall model

From Figure 4.1, it presents the step of development of Waterfall model. Details are as follows.

4.2.1 Requirement analyst

For this step, during the requirement collection, the payment process and TRUE's third party contract from offline to online services must be reformed as follows.

1. TRUE has to study payment channels whether which channel can be modified by summarizing how many payment channels. The most used channel by customers must be selected and the numbers of customers are used to order the channel.

2. After the summary, TRUE has a meeting with all channels to determine the potential of new payment process performed by each channel. Each channel has different conditions.

3. TRUE prepares reports after the meeting and orders what channels have to modify each month.

4. Business has a meeting with IT to summarize potential risks and potentiality of each payment channel.

5. IT team informs the system implement to the business team.

4.2.2 Software design

Steps of software design to transfer information are as follows

1. IT team designs the information transfer system between TRUE and payment channels.

2. IT team summarizes the details of development and limitations of each channel.

3. IT team summarizes the technology used for the process development.

4. IT team plans about the customer information for checking before the customer makes payments.

5. The payment channel has to inform IP for information transfer and conditions to access the information of both parties.

6. TRUE and payment channels confirm the information transfer format and submit reports daily payment transactions what format of information transfer have to make.

7. Test case is developed for information transfer between TRUE and payment channels.

4.2.3 Development and unit test

The development step is responsible by IT team. Details are as follows.

1. IT team prepares customer information for checking before making payments.

2. IT team develops system to fit the condition and limitation of each channel.

3. IT team brings file formats concluded by both business and channels and requirements of information transfer. The information is set to the system prepared by the above processes.

4. IT team has to test the new system about connection and information transfer. The test result is submitted to the business for reviews.

4.2.4 User acceptant test (UAT)

There are three units relating this process both inside and outside parties. Details are as follows.

1. Business team informs the schedule to other teams who affect the system changes.

2. After finishing the development process as indicated in the schedule of software design, these following units corporate UAT and online payment relates the following units.

- TRUE business team
- TRUE IT team
- Payment channel business team
- Payment channel IT team

After the tests, the implementation is rolled out in the following steps.

4.2.5 Implementation

The system implementation is to use the new system at the specified date and time. Steps are as follows.

1. Business team informs all relating units about date and time of cash payment system implementation.

2. Business team announces to stop the existing cash payment on the implementation date to reduce errors of payment.

3. The business and IT team have a meeting to find solutions when problems occur. If the payment cannot be made after the implementation, TRUE or any channels can handle the customer payment and decrease accounts receivable balance.

4. The last process to check the correctness is the reconciliation payment information between the original and destination of data transfer.

4.3 Deliverables

From the above software development life cycle, the development process can be summarized by connecting with enterprise architecture. The new process is online payment as described below.

4.3.1 Business Architecture

From the business analysis, the clear requirement is important for the new process. The business knows what details needed and what should be modified. The modification can be summarized as follows.

The step to develop from offline to online payments is as follows.

Summary requirements

As explained in 2.8, the requirements are summarized in Table 4.1

Table 4.1 Summary requirements

Baseline Requirements	KPI	Target Requirements	KPI	Action
Offline payment	24 hour	Offline payment	24 hour	On payment reports on tomorrow
-	-	Online payment	Real-time	Payment with API online
Post to Billing system	24 hour	Online payment post to Billing System	Real-time	Post to Billing system after payment successes
-	-	Payment post delay	3-5 hour	RRM support payment post to Billing system
Payment convergence product	24 hour	Payment convergence product	Real-time	Customer Account mapping real – time
-	-	Data Enquiry online	Real-time	Set API online
Customer account	Fixed	Verify customer account before payment	Real-time	Return customer profile with API online
Print deposit payment	Support	Print deposit payment	Support	On payment reports on tomorrow

Table 4.1 Summary requirements (cont.)

Baseline Requirements	KPI	Target Requirements	KPI	Action
-	-	Print receipt/TAX to customer	Real-time	Return receipt/TAX with API online
Payment date and time at payment reports	Support	Return payment date and time to TRUE	Real-time	Return payment date and time with API online
Friendly input data(Customer account, Telephone number and other)	Support	Friendly input data(Customer account, Telephone number and other)	Support	Return real Customer account mapping to payment channel
Error payment massage	Payment channel error massage	Error payment massage	Real-time	Return error payment massage to payment channels
Success massage	On payment channel machine	Success massage	Real-time	Return success massage after post to Billing system
Manpower	1 person	Manpower	1 person	-
Payment amount	Support	Payment amount	Real-time	Online update by API online

From Table 4.1, it shows that before and after the process development as required by the business makes changes in work processes but the payment channels

remain unchanged. Additional process is the verification process of the information before making payments. It means that the verification process may be interrupted, such as the network lost or no power supply. The system provides a massage of payment error. However, the payment system still runs as usual unless there are limitations that the offline payment cannot be done. With these reasons, there are risks to use online payments.

4.3.2 Information Architecture

From 2.9 showing the overview of data and information, to obtain data, those data must be passed different processes both existing and new processes. However, the customer still makes the payment by existing channels. The other difference is that the customer balance is adjusted immediately after the payment. The difference is presented in Table 4.2 Transfer data and information summary.

Table4.2. Transfer data and information summary

Baseline Requirements	KPI	Target Requirements	KPI	Action
Number of file payment	1 file	Number of file payment	1 file	Keep at report server
-	-	Data enquiry from payment channel	1:1	Data enquiry by customer account
-	-	Payment error massage	1:1	1 error massage : 1 return error massage

Table4.2. Transfer data and information summary (cont.)

Baseline Requirements	KPI	Target Requirements	KPI	Action
-	-	Payment successes massage	1:1	1 successes massage : 1 payment activity
Payment posting to Billing system	24 hour	Online payment post to Billing system	Real-time	Post to Billing system after payment successes
-	-	Update customer payment activity	Real-time	Update customer payment activity after payment successes
Customer account	Fixed	Customer account	Real-time	Customer profile up to date real-time
Payment amount	On demand	Payment amount	Real-time	Payment activity amount up to date real-time

From Table 4.2, it concludes that information from the first step of the existing payment process has to wait for the balance adjustment to the customers. After the payment improvement, the payment information from the beginning until the end of account balance adjustment is transferred between the payment channel and TRUE all the time. It happens until adjusting the balance.

Risk may be come from the data transfer between TRUE and payment channels that there may be errors. Then, the payment cannot be performed or the

customer can make payments but the bill system does not adjust the customer balance. This means that there is problem of payment transaction.

4.3.3 Application Architecture

From 2.10 presenting the changes of application process, it is to support the payment process and meet customer's satisfactions because the existing process does not respond the customer's requirement and satisfaction. The customer now can access applications and like to get more news and information the payment is one issue that the customer like to know the change. Thus, to respond the customer requirement, the modification of payment channel is to provide high quality and support the business expansion in the future.

From the above mentioned the difference of payment applications before and after modification is presented in table 4.3 Application summary.

Table4.3. Application Summary

Baseline Requirements	**KPI**	**Target Requirements**	**KPI**	**Action**
Offline Payment Application	Offline Support	Offline payment application	Offline Support	Application support to text file to TRUE on tomorrow
-	-	Online payment application	Online support	IT develop inter connection between 3rd party and TRUE with API Application

Table4.3. Application Summary (cont.)

Baseline Requirements	KPI	Target Requirements	KPI	Action
-	-	Web Server	Online support	Transfer data between channel application and TRUE Application
Database Server	Offline support	Database Server	Online support	Transfer payment activity between channel application and TRUE Application
Billing Application (CRM)	Offline support	Online Billing Application (CRM)	Online Support	Data update after customer payment successes
-	-	Mobile payment application	Online Support	Transfer data with API

From Table 4.3, the use of technology depends on many factors. The customer's behavior has been changed. The customer requires more information about payment. The expansion of business takes significantly forward. The advanced technology and high quality applications has been developed. Thus, it is appropriate to use application to support the business. However, it depends on the necessary for the company by comparing the investment of each channel.

4.3.4 Technology Architecture

From 2.11, there are many technologies that the business can use. Presently, there are many new, advanced and high quality technologies. They are easy to use. Thus, the modification of payment system to support new and various technologies increases competitive opportunities. Nowadays, the customer accesses more new technologies. They learn by themselves or from the advertisement to understand new technology. These bring to the use of many new technologies. Thus, Table 4.4 presents information before and after the system has been changed by the technology.

Table4.4. Technology Summary

Baseline Requirements	KPI	Target Requirements	KPI	Action
Barcode	Support	Barcode	Online support	-
-	-	QR code	Online support	IT develop support business
Kiosk	Online support	Kiosk	Online support	IT develop support business
ATM	Offline support	Offline ATM	Offline support	-
-	-	Online ATM	Online support	IT develop support business
-	-	Bank Mobile payment	Online support	IT develop support business
-	-	Smart mobile payment	Online support	IT develop support business

Table4.4. Technology Summary (cont.)

Baseline Requirements	KPI	Target Requirements	KPI	Action
-	-	Electronic bill	Online support	IT develop support business
-	-	Virtual Private Network (VPN)	Online support	IT Configuration support business
Shop and Bank counter	Offline support	Shop and Bank counter	Offline support	-
		Shop and Bank counter	Online support	IT develop support business

From Table 4.4, it shows that the use of technology before and after changing the new payment process does not change many formats. After changing technology, the customer receives more convenient payment channels. New technology increases payment channels. Thus, technology selection is important for today business. If the technology has been use appropriately, business will gain more benefits from its. However, the use of technology must be with care since it may harm overall business.

From the analysis of the source of process modifications about payment system, there are many details and steps, i.e. data transfer between TRUE and third parties and new application to fit the business. It is important for the business expansion. The selection of technology is important. It has to concern the user friendly to customers and technology accessible. Therefore, the process development must concern 4 issues including business architecture, information architecture, application architecture and technology architecture. From these four issues, the different architectures bring different management methods. The process modification affects some work processes. Therefore, to analyze the process separated in each topic is more appropriate that holistic analysis that there may be some errors – sources of problems to be solved in the future.

CHAPTER V
RESULT AND DISCUSSIONS

From the improvement of payment process to be more efficiency, the process is improved accord to the enterprise architecture in four domains – enterprise architecture, business architecture, information architecture, application architecture and technology architecture. Each domain provides different views and details for the development to improve payment process. The existing process is offline payment channel and it is transformed to be online payment channel. The payment process is not only improved to support convergence products of TRUE but also to respond the business expansions include services, after sales services and payment channel services. By these reasons, the improvement of payment process is to respond the customer requirement.

5.1. Expected results

1. To reduce the problem of payment process
2. To reduce the problem of customer's balance adjustment
3. To reduce the change in internal structure process relate to the repeated customer's balance adjustment
4. To reduce the problem of operation staff's problem check process that the problem is come from the customer's balance adjustment
5. To reduce a number of files generated by the exist process
6. To reduce the problem of the customer's error from self-generated transaction or error transaction made by the customers from any channels

5.2. Implementation

After the implementation of new payment system, there are many controllable and uncontrollable problems. There must be solutions to respond those problems as summarized in 4.2, such as the new system cannot handle the payment or the customer's balance is not adjusted.

5.2.1. Problems after the implementation

There are two sections of problems as follows

1. Problems from Internal

- Internal system cannot adjust the account balance.
- When the payment and billing systems are down, the online payment is not active. In contrast, the offline payment is still functional.
- The ability level of internal system for the exits payment process is low because the internal system is only for the exist process. There is no problem of the exist process. However, the customer's balance cannot be adjusted sometime
- The central system connected to the third party and billing system is delayed post result in the delayed balance adjustment process.

2. Problems from External

- From the agreement of requirements explained in 4.2, the agreement is not met after implementation the new system. Erroneous information is transferred to the new system result in be unable to make the balance adjustment.
- From the agreement mentioned in 4.2 about change to the online payment channel, after the implement the new system, some channels cannot be turned online. When the offline payment is still employed, the customer's balance cannot be adjusted.
- From the agreement in 4.2, the payment channel is used for data transfer in the new system. After the implementation, the agreement is not met. Therefore, there is problem about check the correctness of payment and balance adjustment. This process is known as reconciliation process.

- The change in the payment internal system affects the payment process. There are some errors when the summaries of the payment balance and cash transfer between units are not correct.
- From the agreement in 4.2 about software design that the channel has to inform IP, the channel neither gives wrong IP result that the channel cannot handle the payment nor receives the customer's transaction. The customer's balance is not adjusted.

5.2.2. Solutions after the new system implementation

From the problem raised in 5.1, there are many errors in related units. Solutions must be prepared before change the offline to online payment processes. The solution for the problem mentioned in 4.2 is presented in Table 5.1 Problem solutions

Table 5.1 Problem solutions

Problem	Solution and action plan
1. The channel processes the payment transaction but TRUE cannot adjust the customer's balance.	The problem is internal system of TRUE. The connection between the payment and billing does not work result that the customer's balance remained unchanged after the payment. There are two solutions. For only one product, IT billing system takes all summarized pending balances to adjust the customer's balance until the online payment system is back for normal operation.

Table 5.1 Problem solutions (cont.)

Problem	Solution and action plan
2. The channel of data transfer to TRUE is as agreed. The customer's balance cannot be adjusted.	A solution can be explained as; When the payment channel sends error data, wrong customer information, billing system stores errors, irregularity payment transaction, and waits the user to manage the transaction for the customer later.
3. Payment channel summarizes payment information of the customers that is not followed the agreement result in the wrong reconciliation.	This problem does not affect the balance adjustment directly but the verification of the payment to reduce the customer balance. Therefore, the payment transaction must be reconciled manually that takes times. If there are some balances remained unchanged result in delay balance adjustment. Thus, if the balance remains unchanged, the operation has to reduce the balance.
4. The balance adjustment is delay because of the billing system problem.	A solution can be explained as; The customer relation has to activate signal to the customer because some customers make payment because their accounts are suspended. The temporary signal for the customers must be performed until the billing system works.
5. Some channels of third party do not support online payment.	The solution is that the channel has to prepare customers payment report submitted to TRUE and the payment will be brought to reduce the customer balance.

Table 5.1 Problem solutions (cont.)

Problem	Solution and action plan
6. The problem of IP set for data transfer that the customer can make payments but the balance remains unchanged.	The solution is that the payment transaction is gathered and sent to IT billing to reduce the customer balance. This process is performed manually until the problem has been solved.

5.2.3. Results after the implementation

From the changing payment channel process from offline to online payment, many processes also have been changed result in more efficiency of the payment quality and customer balance adjustment. The comparative result before and after the implementation is as follows.

1. File quantity

Overall, the balance adjustment file of payment from offline to online payment can be viewed as in Figure 5.1 number of file summary reports.

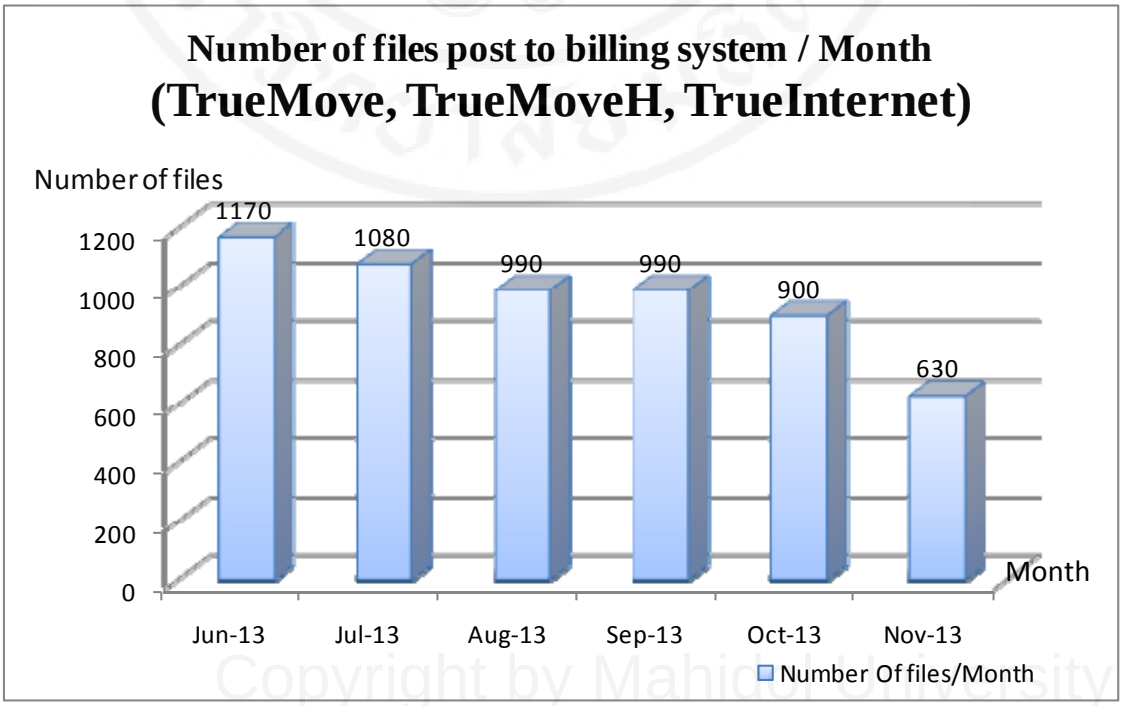

Figure 5.1 Number of files summary reports

From Figure 5.1, it begins with the improvement of payment channels due the first month. There are large numbers of payment files to be used for balance adjustment in a month. However, the numbers of files are reduced after use the online payment. The study performs due 3-5months of use new process. In November 2013, the numbers of files are reduced to 630files per month or about 50percent decrease of the third party's files.

2. Successful payment but no balance adjustment

Figure 5.2and 5.3summarize the number of error cases occurred in the channel by use the existing and new process.

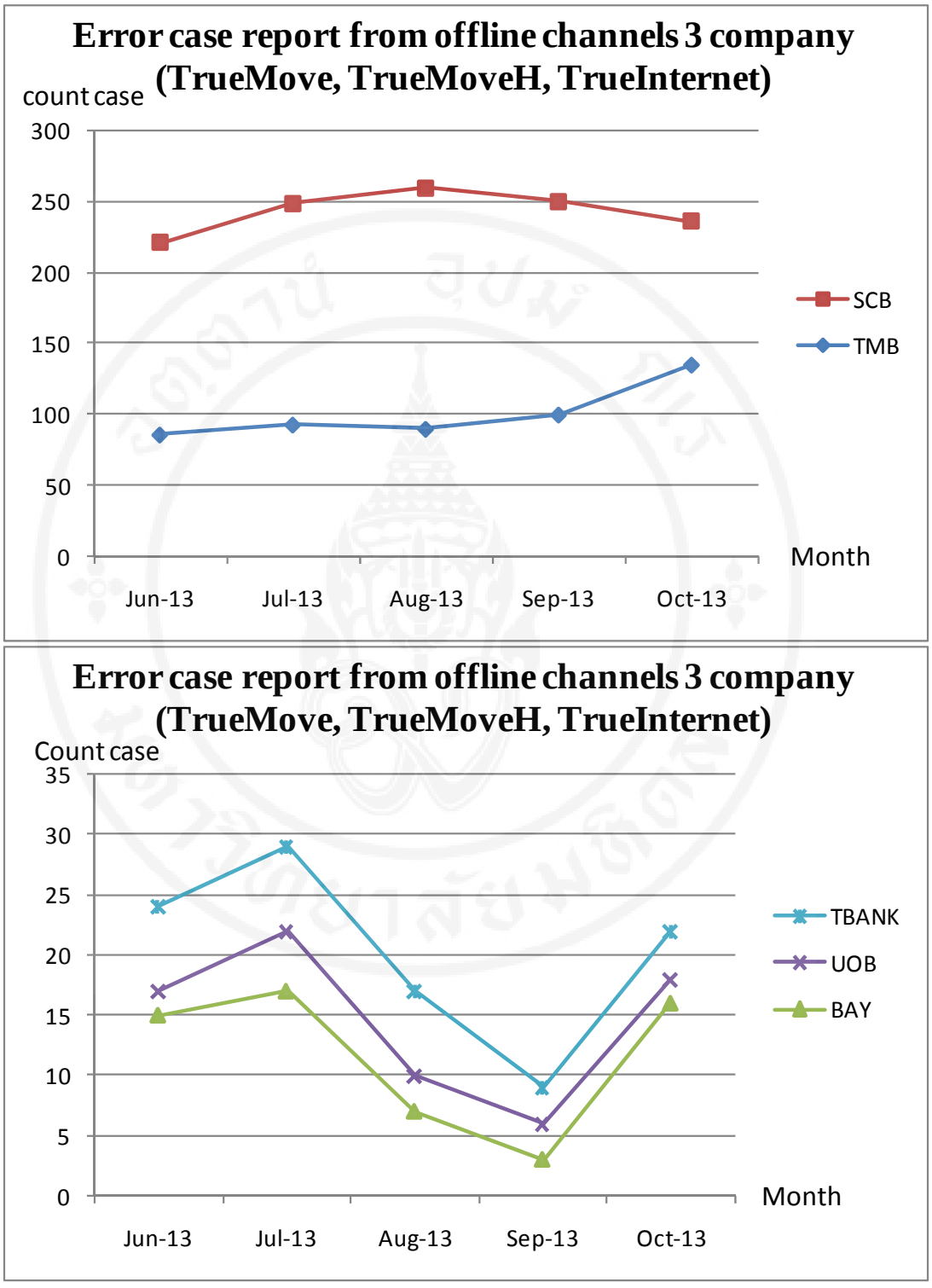

Figure 5.2 Offline channel error summary reports

From 5.2, it shows that the number of problems when use offline payment depend on the number of customers. There are more problems in the channel take

many customers. Figure 5.3 presents the number of problems after use the new process.

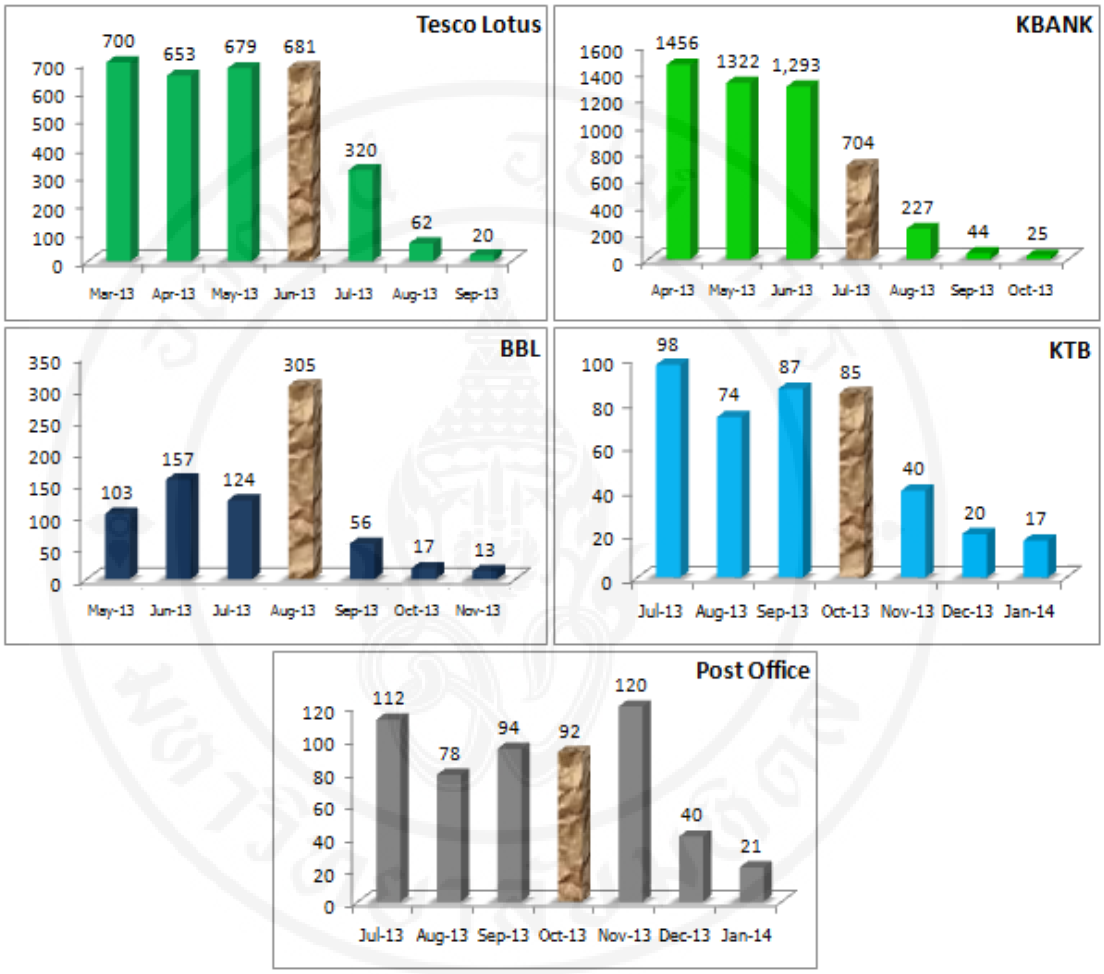

Figure 5.3 Error rate before and after implement online payment channels

From Figure 5.3, it shows that after use the new process until October 2013, the numbers of error cases have been declined. For example, the numbers of problems reduce dramatically by 53% for Tesco channel, 67% for KBank, 81% for BBL, and 52% for KTB. We do expect that the number of problems becomes near zero and zero in the follow months due to no batch left in the system. However, in the case of Post office, the number of the month after implementation is higher than the previous one. This is because Post office could not roll out the system at due day. The number of problem thus does not decrease.

In summary, the improvements of the existing process meet the objective and solve real problems result in a higher quality of services.

3. KPI of customer balance adjustment

From the step use to modify new process and reflect the process before and after modification, Table 5.2 presents payment posting.

Table5.2. KPI of payment posting

No	Subject	Current	Target	Result
1	Posting timeliness: Offline	1-24 hr.	1-24 hr.	1-24 hr.
2	Posting timeliness: Online	Real-time	Real-time	Real-time
3	Posting timeliness: Online near real-time	3-5 hr.	3-5 hr.	3-5 hr.

No	Subject	Current	Target	Result
1	Error rate : IT internal error	36.30 %	7 %	5.20 %
2	Error rate : 3rd party error	16 %	5 %	4.42 %
4	Error rate : Operation error	25 %	7 %	4.75 %
3	Change internal process IT	23 %	7 %	12 %

From the above information, it presents the statistic due the modification of the payment channel process. The new process reduces problems of a large number of files.

It can be seen that the error rates of every category significantly reduce. For instance, the error rate of IT internal error is down from 36.3% to 7%, 3rd party error from 16% to 5%, operation error 25% to 7% and change internal process from 23% to 5%. Nonetheless, there is still some percentage values of errors left in each category owing to the impact of human error.

5.2.4. Barriers of Implementations

From the implementation, the target is not always met because of some reasons result in low work efficiency. These barriers induce problems and they can be summarized as follows.

1. RRM team who takes care of the balance adjustment to be 100 percent of adjustment does not work every day. When there is problem in any new implemented channel on Saturday, Sunday or holidays, cases are not supported in time as scheduled. Those cases are sent to RRM only but the problems can be solved only on the working days.

2. The reconciliation process is done after the implementation. After the implementation, the reconciliation can be made within two days after the customers make payments. The reconciliation depends on the balance adjustment process whether the billing system is successful. It takes two days to post into the billing system. This is a condition for reconciliation. By this barrier, the problem if occurred cannot be solved in time.

3. The information after the customer balance adjustment every day has to be gathered by data warehouse and submitted to RRM for reconciliation on the next day. If the information retrieved is not completed, the reconciliation will be delayed.

From those barriers, unexpected event can be occurred. However, there must be methods to reduce or delete barrier to provide the customers with quick, accurate and fair services.

CHAPTER VI
CONCLUSION AND FUTURE WORK

6.1. Conclusions

This chapter concludes the work in the previous chapters on the improvement of payment channels.

To cope with the variety of products and services, we can improve the payment channel by transferring offline to online manner. This suits the trends of marketing in which customers have the knowledge and realize the significance of information technology (IT).

In terms of business sectors, they provide their customers with more intelligent IT related systems, e.g. online payment channels. With online payment method, customers can perform their purchases and/or banking transactions themselves. Therefore, the quality of services from online payment channels-- including purchasing, banking transactions, and adjusting account balance-- should be concerned.

Therefore, the plan improve process from TRUE provide services to customers, as well as the system plan within a company. It is important as well because in the current competitive business. The process and the company's internal systems must be flexible to change. Therefore, the improvement systems prepare the maintenance procedure. From the payment channels to pay for goods and services from online payment channel to offline payment channels to be finalized after the update process is shown in Table 6.1 Result of payment improvement.

Refer to our company, namely True Corporation; there is a plan to improve the payment channel to compete with other operators in such competitive markets. To achieve the goal, the company’s internal systems should be flexible for changes. The change of payment methods into online is a good measure to show the flexibility of the company. In this work, we focus on the online payment. Throughout

these months, we implement the system on the real environment and yield the good results as in Figure 6.1.

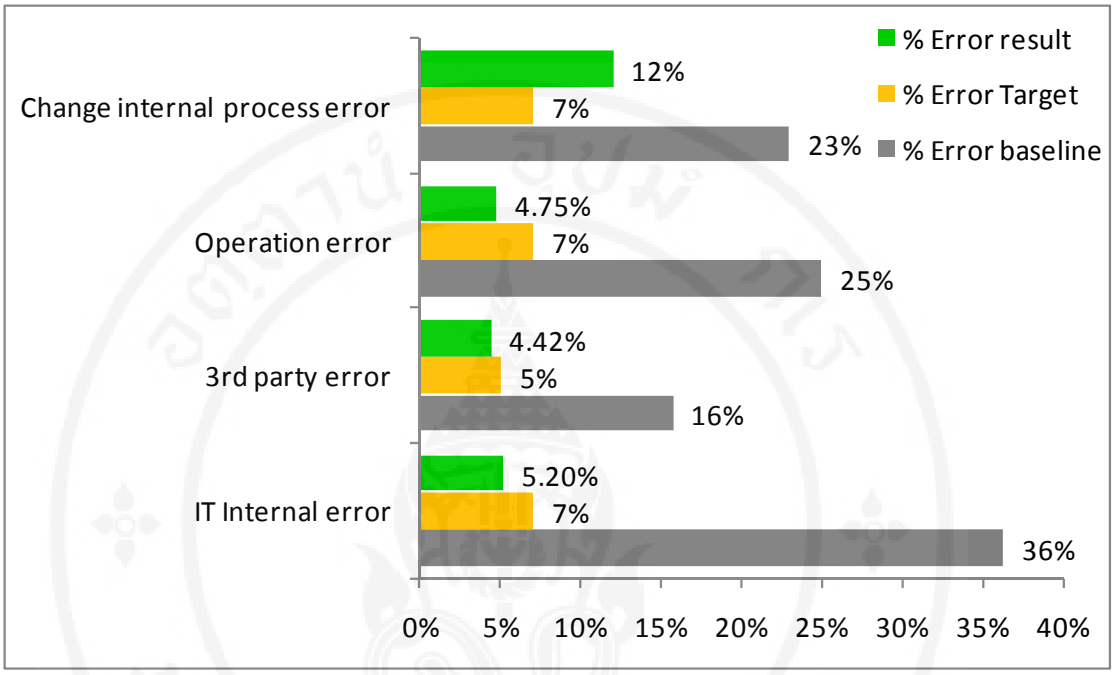

Figure 6.1 The result percentage after implementations

From Figure 6.1; it can be seen that the error rates of every category significantly reduce. For illustrate, the error rate of IT internal error result down from 36.3% to 5.2%, 3rd party error fructify from 16% to 4.42%, operation error produce from 25% to 4.75% and change internal process error generate from 23% to 12%. However, if the adjustment payment channels have reached the target, the error percentage will be reduced respectively in the future.

6.2 Future Work

From the improving paid for goods and services from offline payment channel to online payment channel is mentioned in the beginning, it was just part of the adjustment process all payment channels of the company. TRUE agree with the payment channel about improved from the old payment channels to online payments system. Moreover, those processes may affect some processes. Also, this is a

limitation of the channel adjustment to payment channels that it could not be made all at once.

Based on the work that we have done throughout this thematic paper, online payment is only the beginning phase of the whole payment improvement road map of True Corporation (see Figure 6.1). Due to that fact that there are many payment channels, the company cannot switch the payment method at once. To solve this, they categorize and prioritize the work into phases. In this case, there are 3 phases, namely payment improvement (our work), billing improvement and migration of billing improvement. In terms of the priority on implementation, the most readiness channels are the first to switch into the new system. Moreover, the number of payments per month is also used as the second criteria for the priority management.

Refer to Figure 6.4; it is known that phase 1, payment improvement, is the transformation of offline to online. Then, in phase 2, the company completes the transformation of each individual channels. Within this phase, the billing systems of every channel are configured to online systems and are initially integrated. Lastly, in phase 3, we will see the migration of billing systems in which every channel shares the same single billing system, so called One Billing System. It is noted that the durations of individual phases to complete the roadmap are as follows; 1 year for phase 1, 2 years for phase 2 and 1 year for phase 3.

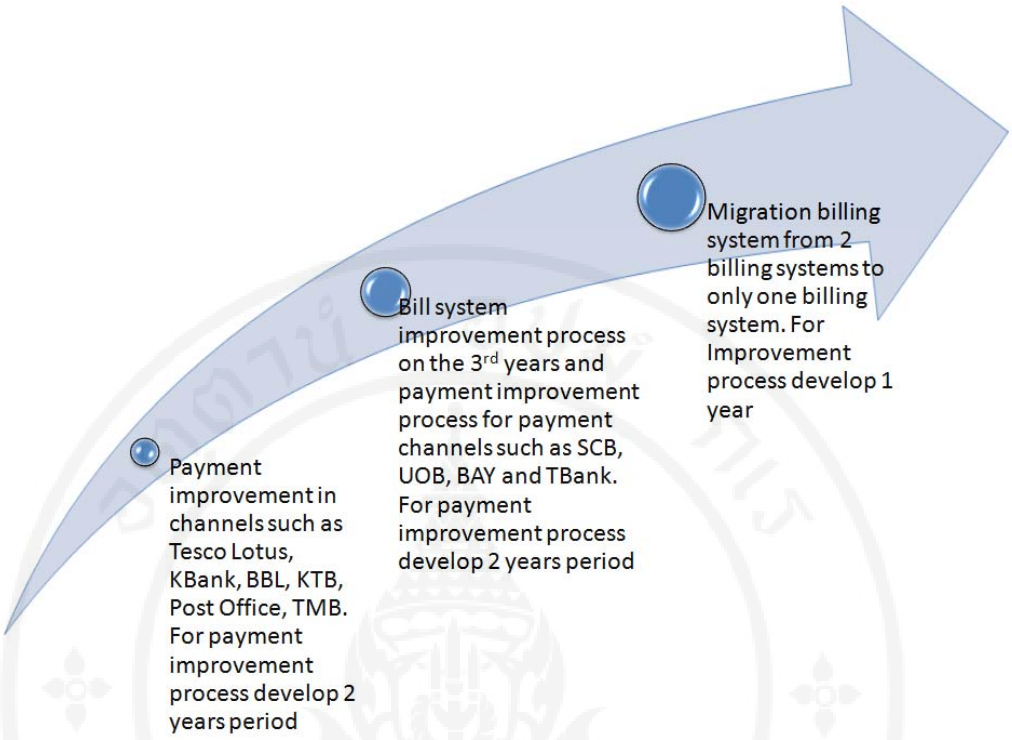

Figure 6.2 Payment Improvement Road Map

Let's consider into deeper detail. We have transformed 5 channels of the total 10 channels in the first 6 months of phase 1. As a result, the improvement of payment channel has been obviously seen. Within 18 months, all channels will be switched into online and prepared for the migration of billing system. At the end of phase 3, migration of all billing systems will be finished. Ultimately, True Corporation operates under the concept of One Bill for all which is perfectly matched to the vision of the company, i.e. True Convergence.

REFERENCES

1. Sayan Pariwat and Rungsun Hataiseree, (January 2003). Risk reduction in The Payment System and The Role of the Central Bank: Thailand's recent Experience, From: http://dric.nrct.go.th/landing.php [Accessed March 19, 2014]
2. Sayan Pariwat and Rungsun Hataiseree, (September 2003). Managing Payment and settlement System Reform: A Thai Perspective, From: http://dric.nrct.go.th/landing.php, [Accessed March 19, 2014]
3. Sani Ananrattanachot, 2010. The Acceptance of Web Payment Technology, From: Thammasat University, [Accessed March 25, 2014]
4. Rungsun Hataiseree and Wachirawat Banchuen, 2010. The Effects of E-payment Instruments on Cash Usage: Thailand's Recent Evidence and Policy Implications, From Thammasat University, [Accessed March 27, 2010]

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