Application for SMS in Mobile Commerce (A Study on Building Mortgage for Bank)

Li-Jiuan Shiau

Huei-Huang Chen

Application for SMS in Mobile Commerce
(A Study on Building Mortgage for Bank)

Li-Jiuan Shiau   Huei-Huang Chen
Department of Computer Science and Engineering
Tatung University
Taipei, Taiwan
shiau@ms1.chb.com.tw   hhchen@ttu.edu.tw

Abstract

The financing field of Taiwan facing a violent variation t in the recent years, a series of financing revolution and of lifting the ban of laws and decrees has brought forth a turning point of the existence for the line of finance. Only the financing unit may properly use the high-tech data, can an effective benefit be obtained, especially, the merger between financing units as well as crisscross sales, that reduce unnecessary expenditures of overhead for traders, and that transfer the saving cost and manpower into the product service corresponding with the demand of customer's design to enhance the clients satisfaction and loyalty.

In the year of Internet, CRM is the lifeblood to maintain the resource of customers for enterprises in the future; if an excellent relationship can be established with the customer, it shall be won their loyalties. The mobile communication with unlimited time and space, such a characteristic may develop the customer service into a maximum extent and let the users obtain the service easily.

A mobile bank cooperated by each bank to promote the value-added service may provide with an intelligent mobile-phone system for transfers, inquiries, and payment. Through the cellular phone, it can be directly to contact with the bank to proceed with the balance inquiry, checking the particulars of transaction and the payment and transfers, as if it has a potable, private, confidential, and secure ATM.

Research and development of the application with respect to the news flash provided by mobile bank, and taking the banking house loan as a topic to combine with wireless Internet tech, dealers and housing demanders are establishing a "Housing Loan Based upon the Protocol of Wireless Application", of which the specific researching content is comprised of wireless transmission protocol, instant order to buy a house on-line, transacting the trade on-line, and integrating the system of house loan on-line.

In conclusion, look forward to provide more conveniences of instant order to purchase a house through the substantial practice, and provide the service to transact the trade on-line to decrease enterprise's time and manpower's cost, combining with new high-tech development to enhance the service quality and competitiveness of the enterprise.

1. Introduction

The financing field of Taiwan facing a violent variation in the recent years, a series of financing revolution and of lifting the ban of laws and decrees has brought forth a turning point of the existence for the line of finance. Only the financing unit may properly use the Information, can an effective benefit be obtained, and that transfer the saving cost and manpower into the product service corresponding with the demand of customer's design to enhance the clients satisfaction and loyalty. [1]

The service quality is the hinge to determine if the financing service on-line is successful, so it has further to analysis it to enhance the industrial competitiveness with the relative contending superiority. The boundary of the network media in the future will be increasingly blurred, hence, developing the mechanism of various trading platform shall be the key-point for the future. The relevant dealer engaged in e-commerce has to orient toward easy use and compatibilities with the past habit for future development.

Following with the rise of e-commerce, the role acted by the bank of the cash-flow network becomes increasingly important, in which the network bank has to consider the issues of the enterprise demand. There is a obviously positive influence that the useful property for customer's perception to the innovating service versus the relationship for enterprise's client to an intimating extent. Provide an empirical research for mobile banks to reconsider their orientations, the function of which is not only a promoting web page of the substantial bank, but also a vital part of the e-commerce.

In the era of Internet, CRM is the lifeblood to maintain the resource of customers for enterprises in the future; if an excellent relationship can be established with the customer, it shall be won their loyalties. They are enthusiastically combining with communication dealers to provide an integral service recently, and helping the bank to provide more diversities and conveniences for clients.

In terms of the financing service, the promoted range may provide with a SMS of the payment in each current business for the bank and mobile bank, coordinated with the program of industrial automation advocated by the finance bureau of the Ministry of Finance and the Executive Yuan, reached to the target of a safe network, ensured the issues of consumer's privilege and verification in financing system, and controlled and administrated the trading risk by network.

Targeting at mobile communicating industries, a derivative issue caused by the competitions between that telecom operators acted as the communicating portal and that bankers held the status of transaction and liquidation in the e-commerce payment. The optimum model is to integrate most of telecom operators, banks and account-clearance centers, forming a MCSP (Mobile Commerce Service Provider) to provide the open and diverse mobile-commerce for traders and banks.

In conclusion, look forward to provide more conveniences of instant order to purchase a building through the substantial practice, and provide the service to transact the trade on-line to decrease enterprise's time and manpower's cost, combining with new high-tech development to enhance the service quality and competitiveness of the enterprise.

2. Related Works

In a score and half years, the social wealth is rapidly accumulated due to the incessant changes of industry and commerce, in which the level of nationals' income has substantially been increased as well as the money-managing movements are frequently operated in investment for various ranks in the society.

The operation of conventional bank is personally transacting the business through the banking staff, substantial shop-front, and counters, etc. The banking business is acting an important role in the cash-flow system of the service operation.

2.1 Information Technology Impacts on Banks

The financing environment of Taiwan in recent years has been transformed into liberalization and internationalization, which results in banking business getting more drastic competitions as well as the business of traditional bank becoming more and more difficult in operation. The banking business shall apply the characteristic of the network market to enhance the self-substantiality responding to environmental challenge and using the wisdom system to analysis the client behavior and the new benefit excavated by correlative data.

In the financial business, from ATM to unmanned bank as well as the network bank, the customer service is unceasingly enhanced by marketing conception of the network personalization. Only proceed with the one-to-one contact constantly with the consumer, can consumers' various demands and preferences be mastered further to provide individual service and client's satisfaction; the computerized "Call Center" may duly resolve customer's complains and telephoned promotion.

The large-scale mainframe may correctly record and transact the daily trading data; ATM is allowed the customer to engage in basic transaction during the off-duty; e-disbursement system can facilitate the customer having more payment modes besides the cash, check, and credit card; Internet is even expanded the trading range, with which clients may transfer his account, remit money, order on line, and purchase insurances.

The financing units use the Information that many risks, hackers, or viruses will simultaneously be invaded, but it is only a small part among the multitudinous risks. A qualitative change will be produced by the data application to the floating risks. Only reduce the risk in the process of policy-decision, can the correct content be enhanced, and will the integral efficacy be increased in applications.[4]

Security Hole in WAP Legacy Stack:
1. At WAP gateway switching the WTLS to TLS, there is a loophole in safety due to the data is temporarily unencrypted.
2. It is incapable of reaching to a end-to-end security.

2.2 Mobile Banking Services

The tidal wave of Internet is still on its upward surge in recent years, how to reap profits and to enhance CRM's efficiency in the promotional operating movements is the most imperative and important target of the perspective for each enterprise.

Mobile Internet and Internet are blessed by network, communication and Information, achieving e-commerce to be developed prosperously, and subverting behavioral pattern of the traditional commerce. In the Internet world, despite the B2B, B2C, or multiple operating models, the network-foam is approved that genuine market value is based on the sufficient combination of the profitable business model and networking effect.

With the mobile communicating techniques getting mature day-by-day, the mobile commerce becomes another newly prosperous industry after the e-commerce. The development of mobile commerce, however, still not grows substantially as expectation to date. From the viewpoint of the practice to explore accepted behaviors of the consumer to mobile commerce is because the value of Information is derived from user's practicability.

Wireless communicating development has been changed the communicating model; by means of wireless communicating device. the needful data can be secured when we communicate with others from time to time [5] [10] [11] [12] .The network of marketing operation is not only provided with the promotion, advertisement, correct labor service, assisting merchandise confirmation, and orientation for Enterprise's runner, but also needed to seek out a distributing channel for consumers.

STK is a group of the mandate to develop the value-added business, as well as a small-scale programming languish software, solidifying in the SIM card to receive and send the data of GSM's SMS. SIM may use its own application software.

Mobile banking system of the STK at present time is mutually cooperated by each telecommunicating dealer and the financing unit, or by overseas dealer; all of the STK they established is adopted the One-to-One model, and its systematic frame is shown as Figure 1

Systematic Frame shown in Figure 1 specifies briefly process as follows:
➢ Users first must have the mobile phone with the STK

functions, simultaneously, apply the SIM card with the function of mobile bank to the telecommunicating dealer or the financing unit.

➢ Through the pre-recorded Applet in SIM card, users may browse and choose the financing service items of mobile phone to enter the necessary trading data.

➢ Through a dedicated line, the mobile banking system will be obtained the data by TCP/IP with interfaces, formatted by mainframe and transmitted the data to mainframe.

➢ After the disposition of mainframe either by this bank or by other banks, the trading result will fax back to the mobile banking system as a result to follow the original route fax back to users.

Figure 1. STK Mobile Banking Systematic Frame

The WAP mobile bank so far cooperated by domestic telecom operators and financing unit, and the functions of each components [13] and the process of integral transaction is specified as follows [14] [15]:

➢ Users use the WAP function of the mobile phone to connect with Internet access, entering the WAP website of the financing unit.

➢ The trading service content in WAP website of the financing units is using WML form through HTTP protocol being transmitted to WAP gateway.

➢ Received the WML, WAP gateway r uses WML encoder to shift it into binary code. If the WML received contains Script, use the WML script compiler to transfer it into executable code, and then transmit it to user's WAP mobile phone trough the GSM network by WSP (wireless session protocol) /WTP (wireless transaction protocol).

➢ Users browse and choose the financing service item at WAP website, and key in the necessary trading data through the key of mobile phone; the WAP web gateway then will transmit the trading data to web server of the financing unit.

➢ By CGI program or other techniques, the transaction server obtains the trading data from web server, and processes the operations of transferring the form of trading data and record with its transaction process modules, then, by mainframe connected with the interface to transmit the formed data to mainframe.

After the disposition of mainframe either by this bank or by other banks, the trading result will fax back to the mobile banking system as a result to follow the original route fax back to users.

In accordance with knowledge, Master Card, a heavyweight-financing unit, and its subordinate unit---Europe International, as well as the mobile phone makers, intelligent card makers, and the application software company proceed with a strategic alliance. They present a wireless payment mechanism that users may use the WAP mobile phone to start up the SET [16] payment operation at the WAP-end of proxy server and remote wallet server, with which the existed Internet network trader and the payment gateway may continuously use this system. The payment mechanism, according to developing status of the market, identifies users' ID including:

➢ Dual-slot phone with full size chip Card : Use the intelligent card at once to identify the status and to provide the functions of basic code, certificates, and ciphers, which are necessary in the process of transaction.

➢ Multi-application SIM : Integrate the functions of basic code, certificates, and ciphers, into the SIM Card of mobile phone; it can be directly identifying users' ID in transaction, no need to insert the additional intelligence-card.

➢ ID-Password: Use the code name (e.g. MSISDN) and the code to identify user's ID, no need to provide the intelligent car; its security level is poor, not but that it is direct, convenient, and available to all.

STK (SIM Toolkit), the full-name read as "Subscriber Identity Module Application Toolkit", cooperates with SIM card maker through mobile phone company, recording or infilling the value-added servicing software into the microprocessor on user's ID card, select the value-added service he wants from the menu on the phone directly.

Only the banking business keeps continuously introducing the new service, can the predicament be settled, in which the wireless Internet and mobile commerce is a direction that banks, and that also is a successful operating model and key factor.

3. The Framework of the SMS Service

Domestic private-telecommunicating dealers recently are promoting in droves the service of wireless online, cellular phone with camera, and PDA, etc. Although it can be using the encrypted algorithms to protect the message transmitted, the operation ability and electric power of the cellular phone instead is only suitable for the symmetric-key algorithm of Symmetric-key to achieve the confidentiality and security rather than the complex and public one.

Hence, researching on the application development of the wireless Internet shall take the banking building loan as a subject to combine with the network technique of wireless Internet, traders, and building demanders to set up the "Housing Loan System Based on Wireless Application Protocol". With regard to its contents, it is comprised of wireless communication protocol, buying building with an instant order online, trading process online, and integration of housing-loan system.

In conclusion, look forward to providing more conveniences of the instant order to purchase a building, transacting the trade on-line and the data service,

decreasing the time and manpower's cost, combining with new high-tech development to enhance the service quality and competitiveness.

3.1 Characteristics of the SMS Service

Short Message Service (SMS): The bank currently provides the service of account management with an integral money-administration, with which it can cope with the integrated issues of different financing products. So, taken XML as a common standard for data exchange, the integrating issue may be avoided while the system data are involved with different forms.

Take the XML as a standard word for account data, further to set up an account platform frame to integrate individual money-management. Take the XML as a standard for documented data form in favor of the data exchange and transmission, so that target of the data integration can be reached. Based on the frame of individual money-management to integrate the account, achieving the purpose of the administration of individual money-management, and centralizing the asset to manage from time to time, and to dispatch nimbly the fund to procure the maximum profit.

3.2 Security Mechanism of the SMS Service

Common system of the STK mobile bank according to the transmitting feature to divide the trading message into two sections; the one is intervened between mobile phone users and common Center, and the other between common Center and financial units. The projected safety control mechanism, through the encryption and password, produce symmetric-key diversification, which may prevent the SMS cent or the message in transmitting process from encountering any security threat.

Table 1 Security Control Processes for Trading Message

Message Unit	Transmitting Process of the Message
Mobile Phone Users	Step 1: Select the trading item through the menu. Step 2: Input the data through the mobile phone Step 3: Enter user's cipher for the account transaction
Common Center	Step 4: Accept message of mobile phone users to decrypt and verify the password, transferring the cipher, and then shifting the message form.
Financial Unit	Step 5: The message received from common center, the password will be engraved transaction will be processed. Step 6: Responding disposition to the message.
Common Center	Step 7: Respond to the message of financing unit, verify the engraved code, and transfer the message form.
Mobile Phone User	Sept 8: Message of the common center, through mobile phone, prompts the user to read the result Step 9: Users of mobile phone read result through menu.

The message's security control measures, processes, and steps in transaction are specified as Table 1. The trading message transmitted by mobile phone will be transferred through common center, and this message will be sent back pursuant to the user of mobile phone after the financing unit has processed the message.

These trading messages are marked with account number, amount, and ciphers, the integrity of sequence, identification of the resources, and privacies of the message and cipher.

Another message of the account announcement is specified the security control measures and steps. Discovering user's account having inward remittance (I/R), not sufficient funds (n.s.f.), and expiry of C/D, etc. the system of financing unit will send the noticing message to the user of mobile phone through common center.

These notifying messages are likely carrying with data of the account number, amount, and etc. Therefore, the strictness in the security control has to be deliberately considered to protect the integrity of users' financial account, the integrity of sequence, the resources identification, and the message privacies.

It may decrypt the sensitive data due to the important data in storage protected effectively. The code system is the Symmetric-Key, e.g. DES (Data Encryption Standard), which is often used in decrypting algorithms with a considerable volume, exceeding the capability of the traditional chips---CPU can be loaded---thus the ALU has to be used for auxiliary purpose. Algorithms of the symmetric key is simpler, as same as the SIM and WIM , as the mobile station also used it.

3.2 Benefits of the SMS Mobile Banking Service

Anticipating to use the mobile banking service, the consumer primarily want to have the services of inquiries and transfer; and they have a positive relationship to the "Service Attitude of the SMS" and the "Service of Practical Using SMS". A convenience is the most noticeable factor to affect consumer's attitude to the service attitude of the SMS.

Scholar Brown (1989) had divided the convenient attribute into five formations as time dimension, place dimension, acquisition dimension, use dimension, and execution dimension. Functional Formation Conveniences in Mobile Phone Service) The mobile phone with the service of SMS has the merit of these five conveniences, and its servicing function is consistent with consumer's demand.

The banks have mostly adopted the specialized commissioner system to promote enterprise's financing business since a long time; the customer's commissioner runs the whole show of client's problem resolved and client's relationship maintained. Whether client's commissioner may properly arrange his working contents, and bring the benefit into a full play has become an important issue in banking operation.

4. A Case of SMS Mobile Banking Service

Bank is an important chain linked within the financing mechanism, dominating the indirect finance to act as an intervening role in funds. The resource of the bank deposit is to absorb the public unused-fund loaning to the demander, creating a revolving credit as the primary operating target to form a capital circulation, which is to play a decisive role in the trading behaviors of economies.

Banking business is a service business; in order to procure the optimum benefit of economic scale, the product is normally having the identical quality, traditionally; it is a blurred distinction between the different banks, so the service's convenience and security becomes the major variable of bank's distinction.

A mobile bank cooperated by each bank to promote the value-added service may provide with an intelligent mobile-phone system for transfers, inquiries, and payment. Through the cellular phone, it can be directly to contact with the bank to proceed with the balance inquiry, checking the particulars of transaction and the payment and transfers, as if it has a potable, private, confidential, and secure ATM. SIM card to collocate with STK cellular phone shall be having a higher security in confidentialities and verifications. Users may have the STK function if they own the SIM card issued by mobile bank.

The Internet application may help the bank to enhance the competitive superiority [6]. By means of the hyper-link feature of Internet, different industries have formed a strategic alliance such as the telecommunications, network communications, computers, securities, and insurances. Emome, as "e" is digital; "mobile" is action; and "me" is in the life, signifies the electronic and the mobile. Personalization is collective title of the value-added service of the mobile phone provided by the China Telecommunication Company. Emome website is a wireless portal. In order to procure the best profits of economic scale, the added value may provide more services, which is one of the important promoting strategies for banking business.

4.1 Alternative Operating Modes

The credit given is a major system of the commercial bank. The loan procedure for traditionally existed building made by banks is comprised of: client's negotiation, conditions discussion, acceptance of the application, collaterals appraisement, credits investigation, analysis, and audits, etc. Should it be consistent with the bank would sign the contract with them, the mortgage arrangement of the collateral, and then the fund will be deposited into debtor's account [7] by transfers.

Internet's development signifies a breakthrough in the realm of information; the data can be received in any time and locations through the voice and words to make the communicating reciprocation, with which the commercial opportunity brought is immeasurable.

Owing to the Internet frequently being used, the computer becomes an indispensable partner in daily living. The Process Step Drawing of the Building Loan mad with the SMS of Mobile Phone as shown in Table 2.

Table 2. Process Schedule for Mobile Building Loan.

Step	Process Schedule for Operation Building Loan Cellular Phone
1	Consumers use cellular phone to inquire the building type he likes.
2	Consumers use the cellular phone to order the building, and inquire the possible loan conditions.
3	The bank inquires the credit data by integrated database. A. If the client is having an account at this bank, investigate the credit grade and financial status data, and review his credit degree. B. If he is not, then, notify online and wish the client might visit the counter for negotiation.
4	When consumers inquire the possible preferential interest rate, the system will instantly inspect: A. If there is the data of credit's degree, give the good customer a preferential interest rate in accordance with the credit degree B. If not, the interest shall be in accordance with the normal loan condition.
5	Consumers based on the preferential interest rate provided by banks place directly an application for building loan [confirm]
6	A. Clients have to visit the counter to seal and affirm the identification, and both parties sign the contract of building loan. B. Banks will provide the league accountant to ensure the privilege for both parties. C. Banks will provide the league insurance company because their premium is absolutely reasonable
7	After banks and clients signed the contract, the sum can be deposited into consumer's account within 2~3 working days.
8	Deduct the principal and interest by the contract signed by both parties in accordance with terms.
9	When the building loan is expired, the client may apply to postpone the loan
10	When the building loan is expired, the client would not be continuously this loan; system will automatically cancel the debts.
11	If the building loan is not expired, this building loan shall be transferred into receivables on demand when the client failed to pay the interest with the demand many a time
12	If it is unable to communicate online, invite the client to pay a visit to the counter for negotiation.

The mobile bank cooperated with the telecom operator promotes the STK mobile bank service, adopting the GSM mobile phone with STK function to proceed with the order, transfers, and payment, etc of the financing service all year round through the service of SMS in SMS mode with the

menu function displaying on the screen of cellular phone. The features of STK mobile bank are specified as follows: 1). Adopt the menu function displaying on the screen, easy learning, and easy use. 2). 3DES is added the protections of decryptions and multiple ciphers. 3). Expandable, allow to deal simultaneously with many a security companies, and differ from WAP.

Financial card issued by mobile bank & emome money-managing card issued by the China Telecommunication Cellular-phone's function of the mobile bank, regardless of the where and the when, can use the cellular phone to accomplish lightly the transfer, payment, and inquiries of personal account data. In order to coordinate with various money-managing demand requested by clients, this card is integrated the service with the financing card of the mobile bank, or emome money-managing card of the China Telecommunication.

Building load of the mobile SMS, through the emome money-managing card of the China Telecommunication, is provided the menu function with a rapid operating mode. Emome is provided with the following functions except the normal conversation used by mobile phone, mobile online, and SMS.

➢ Mobile Bank – Clients may register maximum six banking accounts to provide the balance check, instant transfer, and free transaction service projected by each bank.

➢ Mobile Payment – Joining the emome money managing system and selected the merchandise at the contracted store, the client only needs to advise the store dealer of the payment number of the mobile phone issued by the China Telecommunication, then, the e-bill will be sent to the cellular phone with the SMS mode for client's reconfirmation while the financial card is processed the consuming transfer, or the credit card is signed for payment.

➢ Mobile Securities Firm – Clients may register maximum three securities accounts to provide the functions of orders (included stock buying, stock selling, loan purchase, loan selling, stock loan indent, stock loan venture, cancel the inquiry commitment, today's bargain status, inquire the stock inventory, free inquiries), profiles settings, profiles inquiries, and warming price setting, etc.

➢ Mobile Building Loan – Clients may, through the inquiry of SMS, determine the functions of building loan with cellular phone, which provides with inquiry to various types of building, and to the services of loan conditions, preferential interest rate, confirming the order to apply the building loan, account deposit, deducting principal and interests each term, and applying loan postponed online, etc.

The memory capacity of SIM card of the cellular phone helped with STK tech may expand the normal 2K to 32K, recording many executing program directly on the card, so consumers through STK of the cellular phone to place an order, the SIM card of which has the programming design. Set up directly on the screen, select and input the trading data, and exempt from the repeat listen and input while the

cellular phone is used as a voice order, enhancing the operating convenience and having an apparent improvement in efficiency.

Operate and input directly in accordance with the menu on screen, with which the correction and flexibility is better than voice order. The message is transmitted by the mode of SMS, and the charge is calculated by calls instead of by time.

The screen will be displaying the service of SMS and the normal communication; when the former is used, the keystroke on cellular phone will progressively select the necessary trading function according to the menu on screen, inputting various trading data, and pressing the confirm key to transmit with the SMS.

4.2 An Application Example

Use the cellular phone to determine the building loan, and place an order to operate the functions through the inquiry of SMS; the illustrative process of the cellular phone is simplified as follows:
Individual Inquiry to Buy Building:

➢ Step 1 first select [   ] item
➢ Step 2 Select the existed building located at County or City, which is distinguished by letters of the alphabet, e.g. Taipei County or City is A; Taoyuan City is B. When the selective items are more than one page, "next" shall be selected.
➢ Step 3 "previous" or "next" shall be selected.
➢ Step 4 Select the existed building located at County or City, distinguished by letters of the alphabet, e.g. Taipei County or City is A; Taoyuan City is B.
➢ Step 5 Select the existed building located at County or City, which is distinguished by figures, e.g. Hsinyi District of Taipei City is A1; Peitou District is A5. When the selective items are more than one page, "previous" or "next" shall be selected.
➢ Step 6 The inquiry of individual particulars has to input the inquired housing code (e.g. 1; 2; 3;…), inputting 1 means the individual case of code No.A51, Peitou District of Taipei City, irregularly updated by banking control center.
➢ Step 7 Pressing the [confirmed] key, it will show the "transacting is proceeded, please wait for responds", waiting for the center to respond the particulars data to each case.
➢ Step 8 Center responds the particulars to each case with following data; A51 Yu-Chuan Villa with Hot Spring, including the sector of the area, unit price, certificate, public facilities, available loan, and building-age.

Inquiries of Preferential Interest Rate:

➢ Step 1 first select [   ] item
➢ Step 2 Input the ID number to audit if it is the good customer of the bank.
➢ Step 3 Clients input the amount of loan, e.g. 130000000 signifies 13 millions.
➢ Step 4 Clients input the term of the loan (by year), e.g.

20 means 20 years.

➢ Step 5 Pressing the [confirmed] key, it will show the "transacting is proceeded, please wait for responds", waiting for the center to respond the particulars data to each case.

➢ Step 6 Center responds particulars of the individual case with the following data: Building loan amount: 13,000,000; term: 20 years; preferential interest rate: 5.7%.

Applying an order for building loan:

➢ Step 1 first select [   ] item

➢ Step 2 Input the ID number to audit if it is the good customer of the bank.

➢ Step 3 Placing an order is client's personal money management, so it has to input the personal cipher to audit if the client has the authorization.

➢ Step 4 Clients input the amount of loan, e.g. 130000000 means 13 millions

➢ Step 5 Clients input the term of the loan (by year), e.g. 20 means 20 years.

➢ Step 6 Clients input the account number, e.g. 518551123451 signifies 5185-51-12345-1

➢ Step 7 Pressing the [confirmed] key, it will show the "transacting is proceeded, please wait for responds", waiting for the center to respond the particulars data to each case.

➢ Step 8 Center responds particulars of the individual case with the following data: Building loan amount: 13,000,000; term: 20 years; preferential interest rate: 5.7%   A/C   5185-51-12345-1.

4.3 Integrating with the Data Warehouse

To hold each customer is not a simple thing. Client's data may be collectible through questionnaires or telephoned investigation though, the diversity of information resource and the increase of data volume are undeniable. Will a smooth operating mode be maintained, the demand of each customer shall be comprehended, and it shall be increasingly difficult on the merchandise and service.

Targeting information and data, different analyzing tools will produce various simple and complex analyzing outcome. Generally speaking, the functions of data all have the analyzing tools such as query and reporting, producing different analyzing report (shown as Table 3). Front Tools Including mainly various tools of reporting forms, data analysis, data development, develop tools based on the Data Warehouse.

In the process of a bank loan to the consumer, it is more valuing the various conditions at the consumer himself, banks, and external environment, as well as the factor research, loan-authorized contract, loan's amount, and the reimbursing capability, than valuing the other request or restriction in the contract therein. As to the credit-authorized contract, manifest that bank often request the clause, which is neither agreeable nor incapable of scrutinizing the content of the contract, e.g.

the currently practical operating situation of immoveable collateral loan, immoveable evaluation, loan percentage, overdue loan, and bad debts, etc.

Table 3. Process Credit Control via Data Warehouse.

Step	Process of the Data Disposition
1	Providing user's interface with a high affinity, the single window will be used for handling and integrating the storage function, control, and management to set up and maintain entire Data Warehouse.
2	Use unitary platform to control all accessing data of the inventory on entire network, and allow the manager of the Data Warehouse to manage easily the establishing program of Data Warehouse.
3	In the selective process, produce and manage relevant inventory frame and the metadata will automatically produce another metadata; vital data shall not be affected the inventory frame by the personnel variation
4	Provide interface to connect with OS, and time the scheduling software at a specific timing to execute the program automatically.

The commercial analyzing personnel in bank are exclusively using the tools of online analysis and multi-dimensional analysis, with which they might have the capability to analysis the original data, and to drill to understand the correlation among the different parameters in data[8].

Such analyzing report are mostly belonged to the property of system mode, that functional manager in relevant department is normally in charge, and that general analyzing subject is building loan in different phase, and the interest rated, etc.

Data mining is also having the preceding characteristic, the main discrimination of which is the data mining targeting at mass data to analysis and locate the hidden patterns in data. [9] Data mining is substantially differ from the statistic analysis and the online analyzing techniques; the former is only available for analyzing the minority of the data correlation or the different subject in statistics, while the latter is adopted to analysis the report for normal Data Warehouse, aiming at the system mode and the data with lower correlation in analysis.

Credit-authorization is one of the principle businesses, the quality of which is thus related to bank's existence and development, especially within recent years, domestic economy was influenced by global depressions, the ratio of overdue loan has yearly been on the rise, further to stress on the importance that risk of the credit authorization shall be properly processed and managed from time to time. Nevertheless, owing to consumers' building loan having

the features of small amount and high cost as per unit, it will be accept or not, and reaching the target to win the identical credit amount by quantities. Hence, to avoid of drawbacks, it is essential to reduce the audit time, decrease the risk of credit authorization, and establish a set of assessing model and system to measure the credit authorization.

5. Conclusions and Future Works

Succeeded by the upsurge of the network bank and the e-commerce, the wireless Internet access and finance has been becoming a newly bourgeoning tropic. Developing the mobile bank may provide another sales channel and a more convenient service. As far as the service time is concerned, the mobile bank is 24 hours a day, and 365 days a year in operation, having no restrictions of traditional branches or ATM geographic influence, nor confining the customer to this bank, of which the service range may be included all network participants. Use the mobile phone and wireless transmitting tech to develop e-commerce to go across into a new realm. Promoting the mobile commerce, the banking dealer shall spare no efforts and walk towards the direction of easy use and the compatibility with old users habit in development.

The greatest contribution made by STK tech is to have provided an exploitable environment for the SIM card in value-added business as simply using easy operating and developing platform. Users exploit the SIM card through the coordination of server, with which it may present diversely rich and splendid business. SIM card may accomplish a given mission and the data storage, but its processing ability is inferior to that of computers. However, because it belongs to microcomputer system, it can be stored in the wallet or mobile phone, so SIM card also has an extensive application space. As far as the world scope is concerned, the application of Japan and Europe has gotten higher as well as the intelligent car is widely and rapidly spread out in US.

Devoting to develop the SMS service of the mobile bank, banks may effectively reduce the ratio of clients transact the business on counter. The employee of the bank would have more time to complete the higher value-added business (e.g. money-management projected, financing products promoted, and financing business process improved, etc.), further to benefit and enhance the banking competitiveness.

STK tech allows us directly to use cellular phone to place an order on stock and enjoy the financing service, it is, indeed, satisfied with modern's demands on pursuits of fast speed and on convenience as well as an extremely high security. So the entire transaction process is being protected as the relevant data is encrypted, from which we may see that securities of the data in the transmitting process is considerably conscientious and careful.

The SMS service combined with STK, it will be becoming a path to allow the system dealer to enhance individual service. STK tech is mainly being applied to the realms of mobile bank, stock transaction, foreign exchange buying/selling, and money-management, etc. Although its service for is unitary, a considerable demand is requested to the use. For STK, it is still having a given technical defect such as the high difficulties in development, non-unified technical norm, confined to processor's tech development, narrowly technical developing space, etc. So it is still waiting for our unceasingly endeavors.

6. Appendices

Figure A. Mobile Building Loan SMS Processes.

References – Chinese

 [1]   2002/11/29
http://www.twngsm.com.tw/activities/telecom/News-200211/88
  112904.htm
[2]
                    1999   8
[3]
    2000   10
[4]   -Lect-04
    2003/04
[5]   The development of mobile internet technology
                    --   1999
    11
[6]
                2002   8
[7]   1981
[8]   1999/08

[9]   CRM Data Mining
            .   2001   5

References – English

 [10] ETSI web site, (URL: http://www.etsi.org/)
[11] GSM web site, (URL: http://www.gsm.org/)
[12] Durlacher Research, "Mobile commerce report," 2002
(URL: http://www.durlacher.com/)
[13] WAP forum, "Wireless Application Protocol Architecture
    Specification," (URL: http://www.wapforum.org/)
[14] WAP forum, "Wireless transport layer security
    specification," (URL: http://www.wapforum.org/)
[15] WAP forum, "WAP architecture specification," (URL:
    http://www.wapforum.org/)
[16] Secure Electronic Transaction Specification, (URL:
    http://www.setco.org/)