Functions of accounting work of banks are excluded. Processing provided b means of this system he specific objectives but accounting work is not one of them.

(8) Crossborder Payment System

What Kyrgyz needs now is clarification of the procedures for making payments in its own currency. This can be accomplished by the efforts of the people of Kyrgyz.

Improvement of the crossborder payment system is also indispensable, to contribute to the nation's economic vitality and to increase earnings of foreign currency. But the counterpart in this case is another country (or entities in it) and arrangements must be acceptable to the counterpart.

6. Forecasts of the Varieties and Number of Payment Transactions

(1) Basic Concepts

1) The Object of Forecasts

In some forecasts concerning the nature and number of payment transactions expected in a given country attention to the theory and models underlying such forecasts is sometimes insufficient. The economic and financial environment and the level of technology in an individual country, and consideration of what policies have been formulated concerning these have a significant influence on the kind of forecasts which arise.

The method chosen here is to postulate a scenario for the supporting technology on the basis of and analysis of the present situation of the economy, finances and technology and on the economic and financial policies which have already been examined. Forecasts are made on the basis of predictions of future circumstances based on the above scenario.

(2) The Two Plans

Two main plans were postulated for the scenarios when forecasting frameworks for both the macroeconomic situation and for payment systems as follows;

Plan A; The economy of the Kyrgyz Republic will continue to be dull and while gradually moving towards recovery there will be no dramatic surge towards economic recovery.

Plan B; The economy of the Kyrgyz Republic will show signs of recovery and this will develop into a period of brisk economic activity.

The forecast of number of transaction related to inter-bank market are based on the same concept of both Plan A and Plan B.

(3) Actual Forecasts Made

- Immediate initiation of measures to provide independent supporting systems in connection with the nurture of the inter-bank market, with an estimated 10 transactions daily.

- Expansion of the volume of such supporting transactions with the provision of supporting systems for inter-bank payments. Volume is estimated to expand to a level of 1 to 2 transactions for each bank daily.

- By the target year of 2000 the following volume of daily transactions for each bank is expected.

1) Payment Transactions carried out for Customers

Payment transactions carried out in response to requests received from customers are expected to form the main sector concerned by the present project.

The volume of transactions has declined from 1988 to one fifth of the level for that year. This is mainly based on the fact that corporations and individuals hesitate to depend on banks, and they prefer cash settlement. With these background, payment transactions volume decrease much more than the decrease of fund transfer needs.

Further, sometime between the end of 1994 and the beginning of 1995 implementation is expected to get underway of the Clearing House concept

evolved after careful evaluation by the NBK and the commercial banks working together. This implementation is expected to vastly improve the financial environment for payment transactions. Processing operations will initially be manual but sometime in mid 1995 a basic computer network will be introduced and this is expected to further improve conditions. Therefore an expansion in the volume of payment transactions is expected to arise between 1995 and 1996.

2) Introduction and Expansion of Payment Transfer Systems for Wages and Pensions (Retirement Schemes)

In order to reinforce functions which create customer confidence in banking services there are two services which it is desirable to render an integrated part of the banking functions available. First deposits must be reinforced and it is important to make active provisions for the reception of deposits from private individuals. Secondly, transfer payment provisions must be strengthened and expanded. The switch from cash payments to transfer payments must be made actively and it is advisable to maximize the credit multiplier.

To this end the introduction of systems for the payment of wages (including pensions) by bank transfer and systems for automatic transfer of public utility charge payments are important measures and their early introduction is most desirable.

3) Use of CD/ATM

- It is expected that individual banks moving quickly will be able to introduce these systems independently in a matter of one to two years.
- Assuming that wage transfer systems are introduced in 1998 use of these services is expected to expand rapidly.

  Each bank provides its own exclusive service and provision of payment functions to other accounts of other banks is not considered.
- In 2000 a network for mutual linking of CD/ATM services will be provided making it possible to make payments and deposits in accounts of other banks.

4) Use of Credit Cards

The introduction of credit card systems to the Kyrgyz Republic is expected to occur in the relatively near future since this will satisfy the needs of both foreigners visiting the country who are already familiar with credit card usage and of those companies dealing with such foreign customers for whom credit cards represent an effective means of securing foreign currency income. On the other hand the use of credit cards by Kyrgyz Republic nationals is not expected to develop rapidly since their diffusion is not expected to take place until after customers have become familiar with the use of such settlement procedures as wage transfers, automatic transfers and ATM, and when there is a general acceptance of cashless and credit transactions.

(4) Summary

Estimating the volume of settlement transactions as set out above gives the following forecasts for the target year of 2000.

Type of Settlement Transaction	Plan A	Plan B
Inter-bank market transactions	2.4	2.4
customer requested remittances	1,031	2,460
wage transfers	192	480
automatic transfers	360	900
CD/ATM debit transactions	455	872
CD/ATM credit transactions	52	78
Credit card transactions	9	99
Total	2,101.4	4,891.4

(See Figure 7-18 in Annex Version of the Main Report.)

7. Basic Requirements Regarding the Development Plan

It is necessary that the plan for development of a computer-based payment system prepared on the basis of the framework for Kyrgyz's financial system in the target year, and on the basic policy for the program for improvement of the payment system, meet the following requirements.

(1) It must solve the problem of delays during the payment process at the earliest time possible.

1) Priority is to be given to domestic remission of funds.

2) Efficiency is to be promoted by a concentration of correspondent account deposits and functions such as netting.

3) From the viewpoint of fairness, the payment system must have the entire nation and all commercial banks as its objective.

(2) It must contribute to financial policy including the development of the financial market.

1) In connection with inter-bank market which has the mutual dependency relations with the payment system, development of a system that will enable financial transactions to be smoothly made.

2) On the basis of experience accumulated with payment systems in market economies, to choose from among development plans that not only offer an effective payment system but also are predicated on finality of the NBK so as to reduce system risk.

(3) The development objective must contribute to the overall development of commercial banking.

1) Internal systems of the commercial banks are to be developed at the initiative of each bank. Priority is to be given to improvement of the common infrastructure for banking.

2) At the time of the design of the system, issues for which it is difficult for the entire banking community to reach a decision are to be excluded.

3) Business operations and development that may impart unusually high profit to only some banks, or that may tend to reduce individual banks' eagerness to improve systems at the banks themselves, are to be excluded.

(4) It must give consideration to restrictions related to telecommunications and to development capability.

1) The development must give consideration to phased development in light of the status of the telecommunications network and shortage of personnel who can work on the development.

2) There must be system development that makes the maximum possible use of general-purpose software, in light of the restrictions of available funds for development and systems development personnel.

8. Outline of the Optimum System

(1) Objective of the New System

(a) Swift, safe processing of remission of payment on behalf of customers

Swift, certain domestic payments are to be realized by use of computer processing for inter-bank and intra-bank transfers.

(b) Creation of a payment system having finality

Through linkage with the NBK deposit account system, real-time settlement of inter-bank payments becomes possible. Moreover, gross settlement of financial transactions contributes to the smooth functioning of the financial market in addition to reducing the payment risk to banks.

(c) Supply of system infrastructure for development of banking operations

Connection of the banks' internal processing system to the new system will make it possible to operate cash dispensers, handle automatic wage and salary transfers, and automatic payments such as of utility charges, as well as transfers to other banks and expansion of automatic services.

(2) Nature of Services To Be Supplied

The national payment system, that is to have the head offices and branches of all the nation's commercial banks, as well as the central bank, as its participating entities, should be placed in operation in the following two phases, in light of the importance of quickly solving the problem of delays in the payment process.

(a) Phase One: To 1998

The government telecommunications network (Iskla) is to be used.

a) Financial payment services between banks
   * Remission to other banks (on behalf of customers), and transfer of funds between banks in large-scale.
   * Real-time gross settlement through use of deposit accounts at the central bank.
   * Monitoring service for balances in deposit accounts at the central bank.

b) Fund transfer services to other banks (on behalf of customers)

* Using the military telecommunications lines, receipt of computer-readable information at each regional center RCC.
* For the time being, data entry equipment are to be used at banks for links to RCCs.
* If telecommunications conditions so require, input for remission of funds and reception of messages may be done by the RCCs on behalf of those banks needing such services.
* Monitoring services related to remission and receipt of funds (gross settlements itemized).

c) Services for remission of funds to/from head offices and branch banks.

* Same services as when funds are remitted to other banks (on behalf of customers).
* Monitoring services for head office and branch accounts (confirmation of transfer).

d) Automatic transfer service for wages and salary payments

* Network transmission service by floppy disks.

(b) Phase Two: As of Year 2000

Using digital lines for telecommunications, in addition to review of the adequacy of the backup lines, and to improvement of the reliability and capability of the network through increasing line capacity and other measures, the following services are to be offered.

a) Netting of transfers of large volume payment data

* From the viewpoints of the increase in the quantities of data to be processed as well as improvement of business efficiency, netting of large volume payment data is to be done for payments.

b) Coordinated processing of funds transfer and deposit operations

* By connecting bank deposit terminals to the new system, automatic deposit of funds that have been transferred, and automatic remission of funds from deposit terminals, becomes possible.

c) Services through links to banks' CPUs

* Batch process of send-in and send-out services of data between bank CPUs.
* Cash dispenser and automatic teller machine operation at the head office and branches.

d) Automatic transfer of wages and salary payments

* Exchange of magnetic tape within the region.
* Processing of transfers by means of transmitting files through the network.

e) Automatic payment of utility and credit card charges etc. by withdrawals from deposit accounts

* Exchange of magnetic tape within the region.
* Processing of transfers by means of transmitting files through the network.

f) Services related to transmission of accounting records and other information

* Transmission of branch balances, reports etc.
* Transmission of foreign exchange messages (define message format).

(3) Outline of Business Processing

1) Inter-bank Transfers: NBK-Net

(a) Business processing at branches

a) Set up following accounting upon sending

Payer's account 300	Head office/branch account 300 (Remit to other bank)

b) Set up following account upon receiving

Head office/branch account 500 (Remit to other bank)	Recipient's account 500

c) To match account of head office and branches after confirmation of send-in and send-out records at closing time of banks

d) Report the matched records to the head office

(b) Business processing at head office

a) As required, the head office makes an inquiry via a terminal to the computer center after checking summary conditions of remittance and receipts.

b) At the day's deadline, on the basis of a report from the network, the following accounts are to be established.

<Remit>

Head office/branch account 300 (Remit to other bank)	NBK deposit 300

<Receive>

NBK deposit	500	Head office/branch account	500
		(Remit to other bank)	

c) Report from the branch is checked.

d) When a call loan is obtained from another bank, at the same time as the money is remitted inter-bank, the following account is to be established.

Call loan	200	NBK deposit	200

(C) Function of the computer center

a) When a withdrawal is made from a deposit account at NBK, the center informs the sending bank of confirmation.

b) The center responds by informing of net position to requests from bank's head office.

c) A comprehensive report on messages is sent to every bank's head office at the close of operations daily.

d) The center responds to inquires from head offices of banks regarding the bank's balance in NBK deposit accounts.

(D) The function of deposit accounts at NBK

a) Transfers to and from accounts held by banks are made in accordance with messages from the computer center.

b) Results of transfers are communicated to banks' head offices by use of terminals exclusively maintained for NBK communications.

2) Intra-bank Transfers

(a) Processing at branches

a) When funds are transferred, the following is posted.

Payer account 200	Head office / branch account 200 (Internal transfer)

b) When funds are received, the following is posted.

Head office / branch account 400 (Internal transfer)	Recipient account 400

c) At the end of the day's business activities, after monitoring payment messages, the each amount in the head office and branch accounts are checked.

d) Only checked amount is reported to the head office.

(b) Head office processing

a) As required, the head office checks payment messages at the Computer Center by means of a terminal.

b) On the basis of messages from the network, the amount sent from branches are checked.

Chapter 6 Computer System and Preliminary Design of Network

Chapter 6 Computer System and Preliminary Design of Network

1. Designing Policy

The design techniques require certain consideration. It is important to select development techniques which do not presuppose specific systems or environments for development and implementation. The works include followings:

- Decision of system structure
- Preliminary design of software
- Preliminary design of hardware
- Preliminary design of network structure

For the purpose of enabling long-term use, this system is divided into the independent subsystem for optimum design.

Host Computer Subsystem:	Data Processing
Network-related Subsystems:	Data Transfer
Terminal Subsystem:	Data Input

2. Preliminary Design of Software

(1) Preliminary design of application system

1) Approach to dividing into subsystems

In developing a large system, the entire system, as yet not clearly defined, is divided into several subsystems based on selected criteria. Then, details of each subsystem such as functions are defined.

(a) a set of functions and a series of processes from the user's viewpoint
(b) organizational structures of system users and operating entities and their scope of authority
(c) efficiency and ease of key data handling required for a certain operation

2) Dividing the new payment system for Kyrgyz into subsystems

The basic guidelines for building the new payment system in Kyrgyz calls for the following components:

(a) prompt and reliable customer-remittance transactions

- computerized transactions for inter-bank transfers (computer network)
- computerized transactions for intra-bank transfers (computer network)

(b) payment systems with finality

- immediate processing of inter-bank settlements linked with the current deposit accounts maintained by different banks in the NBK (National Bank of Kyrgyzstan)
- settling fund transactions by the immediate gross settlement method

(c) system infrastructures for advanced banking operations

- inter-office (or inter-bank) CD/ATM (cash dispenser/automatic teller machine) services
- intra- and inter-bank automatic payroll services
- intra- and inter-bank automatic transfer services
- shared use of networks which support internal processing systems of individual banks

Based on the above requirements and considering the flow of fund-transfer data and operations, the new payment system for Kyrgyz would be divided into the following subsystems.

(a) Terminal Subsystem

This is the data entry subsystem which accepts fund-transfer and other data inputs at bank offices. The new payment system would develop a dedicated transfer system as well as a data-conversion

interface to link currently used Operation Day intra-office PC applications software with the new payment system.

The Terminal Subsystem would also include the data entry service provided at RCCs (Regional Clearing Centers) and payroll and automatic transfer services. The RCCs would be based on the existing RKC to provide a variety of services and network node functions for the banks in the region,. The payroll and automatic transfer services consist mainly of preparing and transferring necessary data.

(b) Host Computer Subsystem

a) Fund-Transfer (intra- and inter-bank) Processing System

The Fund-Transfer Processing System would request the fund transfers among the current deposit accounts and netting process for funds transfer as a result of CD/ATM handling service which are maintained in the NBK for inter-bank settlements, net the fund transfers to settle accounts, and sort and calculate the intra-bank fund transfers to settle inter-office accounts. The Fund-Transfer Processing System is an integral component of all applications systems of the new payment system and is responsible for controls and management of entire transfer operations.

b) NBK-net System

This system offers a mechanism for deposits and withdrawals and transfer operations between current deposit accounts in the NBK in response to instructions from terminals for inter-bank settlement of fund transfers and for inter-bank fund settlement. This is an independent NBK system that deals exclusively with central bank current deposit accounts.

(c) Network Subsystem

This is a communication system which transfers remittance data to designated destinations and consists of the local node system implemented at RCCs, and the message switching system implemented at the communications center (Bishkek) which controls message transmissions among subsystems.

This subsystem also supports and implements shared use of a network which includes inter-office (and inter-bank) CD/ATM services and internal processing systems of individual banks, through its message switching capability. (See Figure 6-1.)

3) Functional requirements for applications systems

This section breaks down the functions that each subsystem should provide or the functions that need to be developed under Phase I and Phase II.

[Phase I]

(a) Terminal Subsystem

The Terminal Subsystem consists of a) the dedicated transfer system, b) the RCC data entry system, and c) the Operation Day interface. The system functions of systems a) and b) are basically the same.

a) Functions of dedicated transfer and RCC data entry systems

The dedicated transfer system would be newly implemented under the new payment system at the headquarters and branch offices of commercial banks. In response to payment orders from customers, these systems offer transfer-related services such as transfer data entry, input data verification, authorization and transmission, and receiving messages dealing with fund transfers.

The RCC data entry system is implemented at regional clearing centers and provides the services of dedicated transfer systems

based on the payment order slips for those banks that cannot afford the system.

The two systems offer the following major functions:

- Entry of transfer data for customer-remittance transactions and fund transactions
- Verification, change and cancellation of input data
- Authorization of input data and transmission of transfer messages
- Printing received messages such as transfer data and responses to inquiries to receiving printer.
- Transmitting notifications of receipt of fund transfers to the sending bank upon reception of transfer messages
- Transmitting messages to related subsystems (broadcast function)

b) Functions of Operation Day interface

The Operation Day interface allows existing Operations Day (fund transfer related functions) to use the functions of the new payment system. Thus the scope of services that the new payment system provides will be limited to converting the transmission files so that the new payment system can accept and forward the files to the new payment system.

The Operation Day interface would have such functions as:

- Converting transmission files from the format of Operation Day to that of the new payment system
- Forwarding transmission files to the new networked payment system

(b) Host Computer Subsystem

a) Fund-Transfer Processing System

This system forms the central part of application functions of the new payment system. All the data relating to fund-transfer

operations would be centrally processed in this system for both inter-bank and intra-bank settlements. This system would also be responsible for the overall operations of the new payment system such as start-up and shut-down. The (inter- and intra-bank) Fund-Transfer Processing System offers the following major functions:

[Fund transfer Processing functions]

- Checking the contents of messages (inter-bank and intra-bank settlement)
- Updating common files such as journals
- Requesting message transmissions such as requests for forwarding fund-transfer messages to destination bank offices
- Error handling

[Inter-bank settlement functions]

- Account management such as number and amount of inter-bank transfers and fund transactions
- Requests for transfers among NBK current deposit accounts for inter-bank fund settlements
- Transmitting notification of NBK current deposit account transfers to sending banks in the case of fund transactions.

[Intra-bank settlement functions]

- Account management such as number and amount of intra-bank transfers
- Sorting the inter-office accounts upon transmission and receipt of intra-bank fund-transfer messages

[Inquiry-answering and document-return functions]

- Inquiry on Remittance/Receipt List: Answer inquiries for outgoing and incoming transmission lists, providing detailed summaries, and the total number and total amount of fund transfers for each fund-transfer message going out of and coming into the inquiring headquarters/branch

- Inquiry on Summary of Remittance and Receipt: Answer inquiries for outgoing and incoming transmission summaries, providing the total number and total amount of fund transfers for each fund-transfer message going out of and coming into each headquarters/branch, and the total number and total amount of fund transfers for all fund-transfer messages going out of and coming into all headquarters/branches of the inquiring bank (these inquiries normally come from bank headquarters)
- Other inquiry-answering functions
- Preparing and returning fund-transfer documents in batches

[System operation functions]

- Forward summary of Remittance and Receipt outgoing and incoming transmission summaries to each bank headquarters upon closing of on-line communication hours
- Create transmission files upon closing of on-line operation hours that are carried forward to the next operating day
- Start up and shut down the system and reject inputs of transfers
- Security management functions
- Registration management for files and databases
- Management for the Recover of failures

b) NBK-net System

This is the on-line system for NBK current deposit accounts and has two major functions.

- In response to instructions from the current deposit account terminals connected to NBK-net, executes deposits, withdrawals, and transfers on funds in NBK current deposit accounts for inter-bank fund settlement
- Accept the transmission message of inter-bank fund-transfer (transaction data) from the Fund-Transfer Processing System and transfer funds between the NBK current deposit accounts

for inter-bank settlement as immediate gross settlements with finality

The major functions of this system are as follows:

[NBK current deposit account functions]

- Provides interfaces with the current deposit account terminals and provides such features as input screens and printouts
- Provides interfaces with the Fund-Transfer Processing System such as input and output of fund-transfer transaction data
- Checks the contents of incoming transaction data such as inputs from the current deposit account terminals and fund-transfer transaction data
- Provides daily deficit-limit management
- Updates current deposit account balances at the time of deposit, withdrawal or transfer
- Error handling

[Inquiry answering and document-return functions]

- Inquiry on Post-settlement balance of current deposit account
- Inquiry on balance of current deposit account by bank
- Answers other inquiries
- Prepares and returns transfer documents in batches

[System operation functions]

- Starts up and shuts down the system and rejects illegal inputs
- Provides registration management for files and databases
- Management for the recovery of failures

(c) Automatic Payroll service (gross settlement)

This is offered as an extension of the RCC data entry service. Bank offices would collect payroll data stored on floppy discs from firms and deliver them to the nearest regional clearing center. The payroll

data will be converted into transfer messages by the RCC data entry system and forwarded to the Fund-Transfer Processing System through the Network Subsystem during on-line communication hours.

- Accept payroll data on floppy discs, and create related messages (Payroll transfer messages)
- Transmit payroll transfer messages

(d) Automatic transfer service (gross settlement)

This is also offered as an extension of the RCC data entry service. Automatic transfer service is essentially fund collection when, normally, collecting banks transmit messages to the banks from which funds are to be deducted from designated accounts (so-called "backward procedure"). In Phase I, however, we would use forward procedures as in the case of scheduled transfers currently practiced in Kyrgyz.

The following functions will be developed to provide automatic transfer service:

- Accept transfer data on floppy discs, transfer funds and create related messages (funds transfer messages)
- Transmit funds transfer messages

[Phase II]

(e) Linking remittances and deposits

Linking remittances and deposits means that the system confirms the balance in the deposit account specified for payment by the remitting customer and the specified amount is deducted from the customer's account only if there is sufficient balance in the account, and deposit the amount of the funds to the destination deposit account of the receiver upon receiving the transfer message. New developments needed to provide these functions are as follows:

a) If a bank keeps a central deposit ledger in its internal system:

- the new payment system would transmit fund-transfer messages to banks' internal systems to have them check the balance in the specified accounts and withdraw specified amount of funds from the accounts
- the system would transmit fund-transfer messages to banks' internal systems to have them deposit the specified amount of funds in the specified accounts

The above two functions are offered by the Network Subsystems by registering message routes to pass the fund-transfer messages to banks' internal systems.

b) If a bank maintains deposit operations on Operation Day (i.e. if the dedicated fund-transfer system can share the bank's deposit ledger):

- The dedicated transfer system would share the Operation Day deposit ledger to confirm balances with the deposit ledger when it issues transfer messages (if the balance is insufficient to execute the transfer, the system would abort the process and conduct error processing), and
- In a similar manner, the system would update the Operation Day deposit ledger when it receives transfer messages

(f) Connecting bank computers to the network

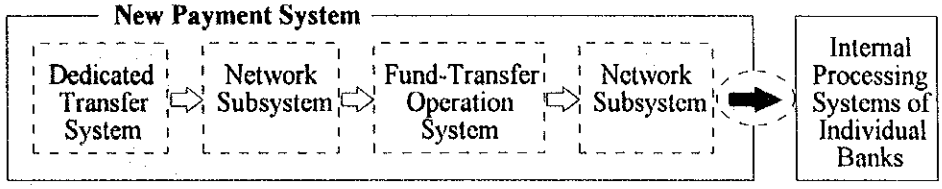
In order to cross transfer funds between banks that operate on their own internal system (self-sufficient for intra-bank settlements) and those that rely on the new payment system, the new system would connect bank computers to the network using the following two processes:

- When banks that rely on the new payment system transfer funds to those that rely on their own systems, this function would transmit fund-transfer messages to those using internal systems.

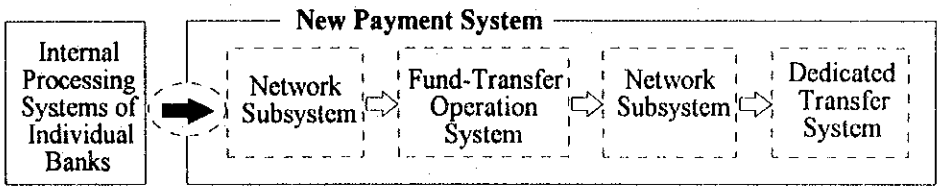
- When banks that rely on their own systems transfer funds to those that rely on the new payment system, this function would pass the fund-transfer messages from those using internal systems to the new payment system.

Preliminary of the developments as follows:

- Setting up (registering) routes to pass fund-transfer messages to internal systems of banks (offered by the Network Subsystems)



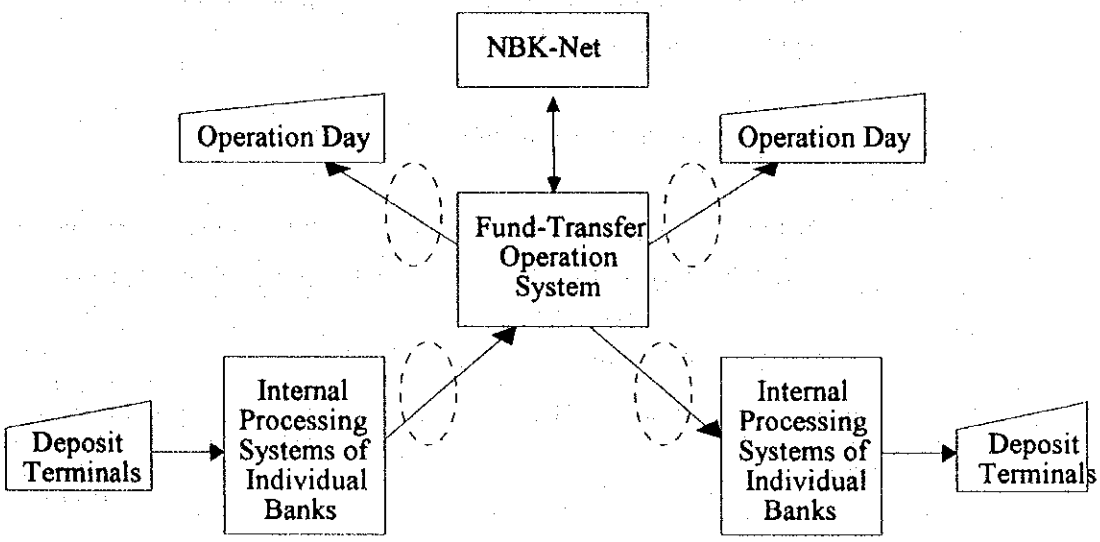
- Setting up (registering) routes to receive fund-transfer messages from internal systems of banks (offered by the Network Subsystems)



(g) CD/ATM services (Central netting)

- Intra-office, intra-bank and inter-bank deposit and withdrawal services from any CD/ATM in any branch
- Inter-bank debits and credits produced by CD/ATM services would be settled by transferring the total balance through the Fund-Transfer Processing System between the current deposit accounts maintained by the relevant banks in the NBK after calculating the net positions among banks after on-line operation hours of the day. Apart from intra-office deposits and withdrawals, these functions are offered through the Network Subsystem.

For both functions, deposit and withdrawal services will be provided by banks' own internal systems or Operation Day.



The following is an outline of applications systems to be developed:

a) Functional expansion of the Fund-Transfer Processing System

- Calculating net positions of debits and credits among banks by the type of deposit/withdrawal messages for inter-bank deposits and withdrawals
- Requesting fund transfers among the NBK current deposit accounts according to the total balance of the net positions after on-line communications of the day
- Calculating the number and amounts of inter-office and inter-bank deposits and withdrawals
- Create and return documents (account data) in batches

(h) Functional expansion of the NBK-net System

- Transferring the funds between NBK current deposit accounts according to the total balance of inter-bank net positions in response to a request from the Fund-Transfer Processing System
- Create and return documents (account data) in batches

(i) Account information service

The new payment system's network system would provide account information service in which the dedicated transfer system of a bank office could forward such account data as office balances to the internal system or other offices (specifically to the dedicated transfer system of the other offices) of the bank. This service would be offered using the broadcast function of the dedicated transfer system. The Network Subsystem would need new message routes to pass transmission messages such as account information to the Fund-Transfer Processing System and banks' internal systems.

The following is an outline of applications systems to be developed:

a) Functional expansion of the dedicated fund-transfer system

The system would provide a screen interface for entering data in a free format because the contents and formats of messages that users need to transmit vary greatly among different banks (individual banks must establish their own rules on the contents of messages and use of formats)

b) Functional expansion of the Fund-Transfer Processing System

Typing fund-transfer messages such as account information

(j) Message transmission service to settle Som in foreign exchange

Message transmission service to settle Som in foreign exchange is a service offered by the Network Subsystem of the new payment system to transmit foreign exchange settlement messages from the dedicated fund-transfer systems to their internal systems or to the dedicated fund-transfer systems of other banks/branches. This service is essentially the same as the account information service but it would also support a formatted input screen and remittance processing as well as check, correct, authorize and transmit input data.

Outline of application developments are followings:

a) Functional expansion of the dedicated fund-transfer system

- Enter data for foreign exchange settlement of Som
- Check, change and cancel input data
- Authorize input data and transmit them in the form of messages

b) Functional expansion of the Fund-Transfer Processing System

- Request fund transfers among the NBK current deposit accounts by typing the Som settlement messages
- Create and return documents (account data) in batches

c) Functional expansion of the NBK-net System

- Execute fund transfers among the NBK current deposit accounts by typing the Som settlement messages
- Create and return documents (account data) in batches

In addition, this service would require that routes be set up (registered) to pass foreign exchange settlement messages to the Fund-Transfer Processing System, banks' internal systems.

(k) Functional expansion of payroll service (process after on-line operation hours of a day)

In Phase II, a full scale service would be needed to accommodate a large quantity of data for payroll service. The following service will replace the one offered in Phase I. a) Exchange data among banks/branches in a region at the regional clearing center level if possible, b) Calculate the net positions by bank for all payroll data brought into the RCC, c) Forward fund-transfer messages to the Fund-Transfer Processing System at the communication center for inter-regional fund transfers (Unlike normal bank-transfer operations,

immediate gross settlement will not be used. The system only transmits fund-transfer messages.), d) Transmit fund-transfer messages to the Fund-Transfer Processing System to transfer net positions and settle the results of netting

Outline of developments as follows:

a) Functional expansion of the RCC data entry service system

- Floppy disc exchange function
- Calculate the inter-bank net positions among banks by value date (for all payroll data)
- Transmit fund-transfer messages to the Fund-Transfer Processing System to transfer net positions
- Forward inter-regional fund-transfer data to the Fund-Transfer Processing System
- Prepare and return documents in batches

b) Functional expansion of the Fund-Transfer Processing System

- Add fund-transfer messages to carry-over Q file for processing after on-line operation hours
- Prepare and return documents in batches

(l) Expanding automatic transfer service (processing after on-line operation hours and backward processing)

As in the case of payroll service, a full scale service would be offered. The specific services are:

a) Exchange data among banks/branches in a region at the RCC.

b) Calculate the net positions by bank for all payroll data brought into the RCC

c) Forward fund-transfer messages to the Fund-Transfer Processing System at the communication center for inter-regional fund transfers (unlike normal bank-transfer operations,

immediate gross settlement will not be used. The system only transmits fund-transfer messages.)

d) Transmit fund-transfer messages to the Fund-Transfer Processing System to transfer net positions and settle the results of netting

Especially in backward transfer message, including NBK-net system, it is required to forward transfer funds against backward transfer.

Outline of developments as follows:

a) Functional expansion of the RCC data entry service

- Floppy disc exchange function
- Calculate net positions among banks by value date (for all automatic transfer data)
- Transmit fund-transfer messages to the Fund-Transfer Processing System to transfer net positions
- Forward inter-regional fund-transfer data to the Fund-Transfer Processing System
- Prepare and return documents in batches

b) Functional expansion of the Fund-Transfer Processing System

- Add fund-transfer messages to carry-over Q file for processing after on-line operation hours
- Transfer request of NBK current deposit account by backward message
- Prepare and return documents in batches

c) Functional expansion of the NBK-net system

- Transfer function of NBK current deposit account by backward message (transfer funds versus forward transfer)
- Prepare and return documents in batches

(2) Preliminary design of network software

There are two alternative ways in establishing computer network systems.

1) Co-use network for inter- and intra-bank
2) Independent network which separates both intra-bank and inter-bank

The network which meets the requirements indicated above covers between Bishkek and other regions call the "trunk line."

1) Inter/Intra-bank co-use of network

It is a network which emphasizes both settlement and transfer message by receiving payment order from the head/branch offices of the commercial banks, then enter in the payment process by differentiating either inter- or intra-bank payment selection.

2) Inter/Intra-bank independent network

In this network it makes possible for cooperative use of internal network. As being used in other foreign countries' financial institutions, the payment orders which are sent from each branches are once stored in either host systems or intra-bank cooperative system via trunk line network. Then the payment orders are to be separated in inter/intra-bank transfer and intra-bank payment are instantly processed in its own internal system. Payment orders which are completed the settlement are to be transferred to the branches of receiving banks through host system or intra-bank cooperative system. Since intra-bank process can be easily processed within the network, it can say contractual type of network within the bank.

3) Selection

From the view of contrast of both current situations of financial systems and the objectives of the Project, followings are pointed out:

- Internal network in each bank is not sufficiently established
- Host computer systems are not sufficiently established

- Easy to get acquainted in mixed type of inter/intra-bank processing
- Should be emphasized on inter-bank payment process

In this Project co-operative use of inter/intra-bank network systems are considered due to the indication described above.

4) Functions of the Network System

The systems of the overall network which are concerned here are the regional node systems to be introduced in each of the regional areas concerned together with the message switching system which is to be set up at the center of the system. The basic functions of these systems are as follows;

- the provision of communication channels linking the systems of the settlement center and the head branches of the commercial banks.
- reception of messages from the sub-systems of the network
- inspection of messages (principally of the header sections)
- cumulative exchange (switching) of the messages received
- status control of messages being exchanged
- response to inquiries and request for information

In order to permit the operation of the basic functions outlined above to be implemented the following auxiliary functions will be needed;

- approval and supervision of terminals and user access
- management of messages according to category
- coding of the messages being transmitted
- supervision of systems and devices which are linked to the network

5) Interface with other systems

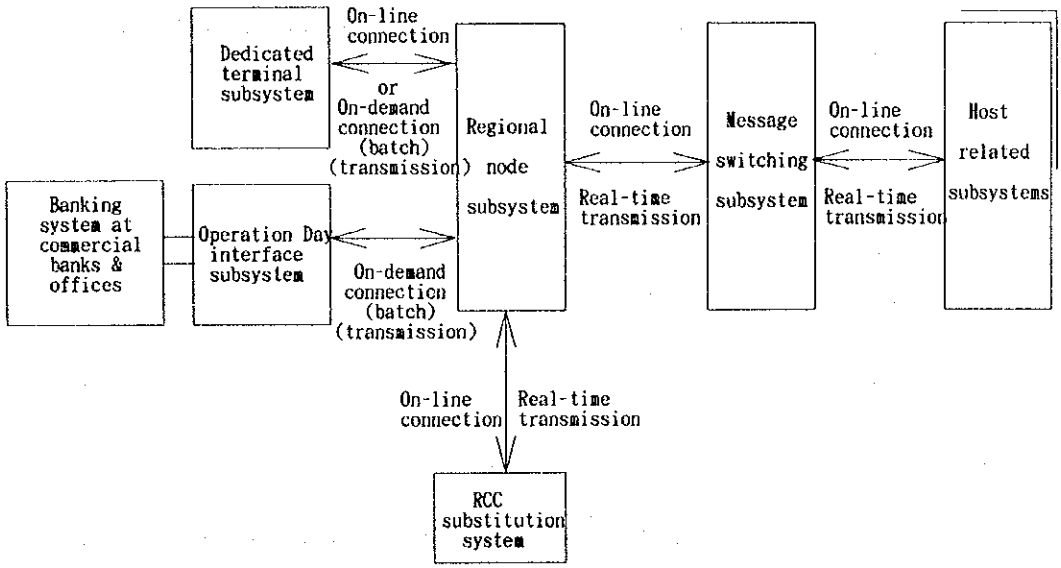
To implement actual communication between terminal subsystems and host systems, network systems supply various kinds of interface. One of the most important functions of subsystems which connect to the network is to select the interface that satisfies its own conditions.

Interface can be responded to the following:

- Instantaneous communication with precondition of host-stand-by connection (instantaneous transfer upon the happening of events)
- Batch type communication of transfer waiting data by connecting with user's judgment
- Combination of above: all-time connection · batch communication

There are selected depending on the conditions of subsystems. Following figure shows its overall process.

Overview on interfaces among subsystems



The unit of transfer which responds to the communication structure are followings.

- Instantaneous communication: by message unit
- Batch type communication: by file unit (see figures below)

File transfer format

file header				
1 in each file	start marker	sender	terminal ID	security code
	date file made	time file made	file length	# of message
file body	(message record)			
multiple accep.	message header	message body		message trailer
	••••	••••		••••
	••••	••••		••••
	••••	••••		••••
file trailer				
1 in each file	inspection code	end marker		

Regarding physical connection, as shown in the communication route in above figures, followings are to be selected depending on the locations.

- LAN connection
- LAN bridge connection
- Leased line connection
- Public line connection
- Telegraph line connection

3. Preliminary Design of Hardware

(1) Assignment of hardware in a computer system

Here, based on the conditions, the arrangement of a computer system, i.e., the assignment of its hardware to each subsystem is examined.

1) Host subsystems

As there is less data in the first phase, all the above subsystems are installed in one set of computer systems. (The backup system should be considered separately.)

In the second phase, it is proposed to operate NBK-net by means of an isolated computer system.

2) Network related subsystems

In this group, all subsystems are installed since the different size and the location of installation on each isolated computer system.

3) Terminal related subsystems

RCC substituted input system is installed on node subsystems in the same area. For other subsystems, a computer system is arranged in each bank & branch office which requests connection to the network.

Hardware and subsystems are installed on the following points or in the organizations.

–	Payment system operation center in Bishkek	: NBK–net, Remittance operation system, Message switching system
–	Regional payment center in Bishkek	: Regional node system and RCC substituted input system
–	Regional payment center in Osh	: Regional node system and RCC substituted input system
–	Regional payment center in Jalal–abad	: Regional node system and RCC substituted input system
–	Regional payment center in Karakol	: Regional node system and RCC substituted input system
–	Regional payment center in Naryn	: Regional node system and RCC substituted input system
–	Regional payment center in Talas	: Regional node system and RCC substituted input system
–	Each head and branch office of commercial banks	: Dedicated terminal system or Operation Day interface

(2) Required level for hardware

1) Performance conditions of each subsystem

This is to clarify the performance conditions of subsystems as the data for deciding the specifications of each component of hardware. Here, based on the macroeconomic plans A and B shown below, the loads in the years 1998 and 2000 are estimated. The system is expected to enter operation in 1998, and the year 2000 is the targeted year for this survey.

(a) Memory capacity

The first item to be examined is the data capacity of each subsystem required for normal operation. According to our calculation, the amount of business data to be provided by each subsystem is as follows.

		Plan A		Plan B	
		1998	2000	1998	2000
- NBK-net		237	262	483	810
- Fund-transfer processing subsystem		660	774	1,325	1,712
- Message switching subsystem		288	386	556	853
- Regional node subsystem	Bishkek	125	167	241	369
	Osh	62	83	120	185
	Jalal-abad	23	32	45	70
	Karakol	39	52	75	115
	Naryn	28	37	54	82
	Talas	11	15	21	33
- RCC substituted input system	Bishkek	62	131	130	320
	Osh	31	66	65	160
	Jalal-abad	12	25	25	60
	Karakol	19	41	75	99
	Naryn	14	29	53	71
	Talas	11	15	21	28
- Remittance dedicated terminal system	Maximum	13.5	13.5	13.5	13.5
	Minimum	0.3	0.3	0.3	0.3

– "Operation Day"	Maximum	13.5	13.5	13.5	13.5
interface subsystem	Minimum	0.3	0.3	0.3	0.3

(Unit: MB)

(b) Response time

The response time of each system is targeted as follows.

– NBK–net	3 seconds per transaction
– Fund–transfer processing system	3 seconds per transaction
– Message switching subsystem	2 seconds per transaction
– Regional node subsystem	3 seconds per transaction
– RCC substituted input system	5 seconds per input
– Remittance dedicated terminal system	5 seconds per input
– Interface subsystem "Operation Day"	N.A. (responses made by "Operation Day")

(c) Throughput

Peak amount of processing per minute required for each subsystem is estimated as shown below.

		Plan A		Plan B	
		1998	2000	1998	2000
– NBK–net		162	199	322	463
– Fund–transfer processing subsystem		399	531	771	1,178
– Message switching subsystem		798	1,062	1,542	2,356
– Regional node subsystem	Bishkek	192	257	370	568
	Osh	96	128	185	284
	Jalal–abad	36	48	70	107
	Karakol	60	80	115	177
	Naryn	43	57	82	126
	Talas	17	23	33	51
– RCC substituted input system	Bishkek	67	90	129	199
	Osh	34	45	65	99
	Jalal–abad	13	17	24	38

	Karakol	21	28	40	62
	Naryn	15	20	29	44
	Talas	6	8	12	18
– Remittance dedicated	Maximum	25	25	25	25
terminal system	Minimum	1	1	1	1
– "Operation Day"	Maximum	25	25	25	25
interface subsystem	Minimum	1	1	1	1

2) Reliability conditions for each subsystem

(a) Reliability conditions for each subsystem

- NBK-net : Any trouble occurring during transaction processing is critical. System obstacles occurred in on-line time zones require immediate restoration.
- Fund-transfer processing system : same as above
- Message switching subsystem : same as above
- Regional node subsystem : System breakdowns in on-line time zones require immediate restoration within the same day. During breakdown, replacement by other node systems should be examined.
- RCC substituted input system : same as above
- Remittance dedicated terminal system : Circumvention of obstacles should be carried out by each bank bearing responsibility for such circumvention. Replacing this system with the substituted input system and other terminals is possible.
- Interface subsystem "Operation Day" : same as above

(b) Normal methods for improving reliability

One of the most popular methods to maintain reliability is to prepare duplex devices. In general, the following devices can be duplexed.

- Direct access storage devices
- Input/output controllers
- Communication controllers
- Communication lines
- LAN facilities(in case of client/server architecture)

If any one of the systems positioned at the center of the network such as NBK-net, the Fund-transfer processing system, or the message switching system invites a system breakdown, it seriously affects the entire payment system. Therefore, it is recommendable that such systems be equipped with fault tolerance capabilities. In addition to the methods of improving reliability by means of hardware and basic software, there is a method of improving availability using application software. However, this method requires correspondences from persons, so it would be reasonable to regard it as a secondary method in the payment system, as the payment system essentially needs promptness.

(c) Operation supporting functions

According to the results of the survey implemented so far, this country is in need of the persons experienced in the operation of computer networks that covers wide areas of this country. Particularly, system operators and operation controllers are needed.

It is desirable that the central operation division will have the capacity to control the computer systems. To put it concretely, the following functions are expected.

- Remote maintenance
- Remote log-in
- Shut down of system operation by command scripts

- Start up and shut down of system operation by remote commands

(3) Hardware conditions for each subsystem

Hardware conditions for each subsystem are as follows.

1) NBK-net (second phase)

It is anticipated that the required processing ability at a similar level of the TPC-A benchmark tests will be 2.7 cases per second and 3.4 cases per second in 1998 and 2000, respectively. (These figures correspond to Plan A. According to Plan B, the required processing ability will reach 5.4 cases per second and 7.7 cases per second in 1998 and 2000, respectively.) However, as the number of banks is limited up to approx. 20, it is predicted that large-capacity databases will not be necessary. It will be enough to provide processing capacities to update the balance in two accounts and make journal records within a certain period of time without fail. In addition to the areas related to systems, sufficient space is required also for business systems, databases, log information, backup areas, archive areas, etc. Duplex devices are desirable for secured data.

2) Fund-transfer processing system

This subsystem receives at maximum 20 messages per second from the message switching subsystem, and requests NBK-net for processing or update of inter-office accounts. In the first phase, NBK-net processes at maximum 8 transactions per second on the same computer. In all cases, the communication capacity must be twice as large in order to return messages after completing processing. Therefore, it would be desirable if the primary system could be linked with the message switching subsystem in the local network. In addition, as the in case of NBK-net inter-bank processing, it is necessary to arrange a set of processors, main memory devices and direct access storage devices which is able to process inter-office accounts or accounts of participant banks within a certain period of time.

3) Message switching subsystem

This subsystem needs close conversations with two host systems and six Regional node subsystems, as well as with the systems which are expected to be added in the future. This means that prompt responses to received messages and transfer of such messages is required. For this reason, this subsystem requires high-speed and stable communication devices and processors. Functions and performance to make conversations are necessary, connecting up to 15 high-speed lines, including backup channels. By 2000, it will be necessary for the system to receive at maximum 20 messages per second from the node side and to transmit them to host subsystems.

4) Regional node subsystem

This subsystem must satisfy two different performance conditions. They are, batch type transfer and input processing performance(throughput) such as RCC substituted input and the interface Operation Day, and the responses to the interactive communication with the message switching subsystem and other node subsystems. In particular, in the second phase, where inputs in lump form increase and net positions in the area are calculated, the introduction of auxiliary processors for batch processing should be examined. In addition to the message switching system and trunk lines, telephone line interfaces and telex interfaces are also necessary for communication with tape devices, diskette devices, local terminals and printers are necessary.

5) Remittance dedicated terminal system

This subsystem receives source remittance information from the Regional node subsystem and advises the staff accordingly. Therefore, reliable input, printing and communication functions are required. As user interfaces are positioned as the core of the system, performance conditions required for on-line processing as required in other systems are not deeded in this system. Local response within 3 to 5 seconds to catch individual remittance transaction input is satisfactory.

6) "Operation Day" Interface subsystem

As this subsystem mainly processes batch data conversion and batch file transfer, it does not require high-speed transaction processing ability. However, from the viewpoint of operation efficiency, the ability to convert remittance data per branch office per day(maximum 5,000 cases) is necessary. In addition, the requirements of the hardware depends on whether the banking system and the interface subsystem are installed in the same hardware, or they are installed in different type of hardware.

4. Preliminary Design of the Network Systems

(1) Structure of Network Systems

Total network systems, from its view of locations, can be divided by 5 major centers.

- Bishkek Center (Center Station)
- Talas Regional Center
- Jalal-abad Regional Center
- Osh Regional Center
- Karakol Regional Center
- Naryn Regional Center

1) Bishkek Center (Center Station)

This center has very important functions from its view of the total systems structure.

(a) Centralized monitoring function of the total computer system
(b) Network control function

2) Regional Center

(a) Function of each 5 regional center
(b) Network control function of each region

(2) Iskla-I

All centers including Bishkek Center Station and regional centers of each major cities are connected by Iskla-I. This network has relatively higher quality and is planned to be used with duplex method in the Project. (Please refer to Figure 6-2.)

Figure 6-1

Structure of the New Payment System

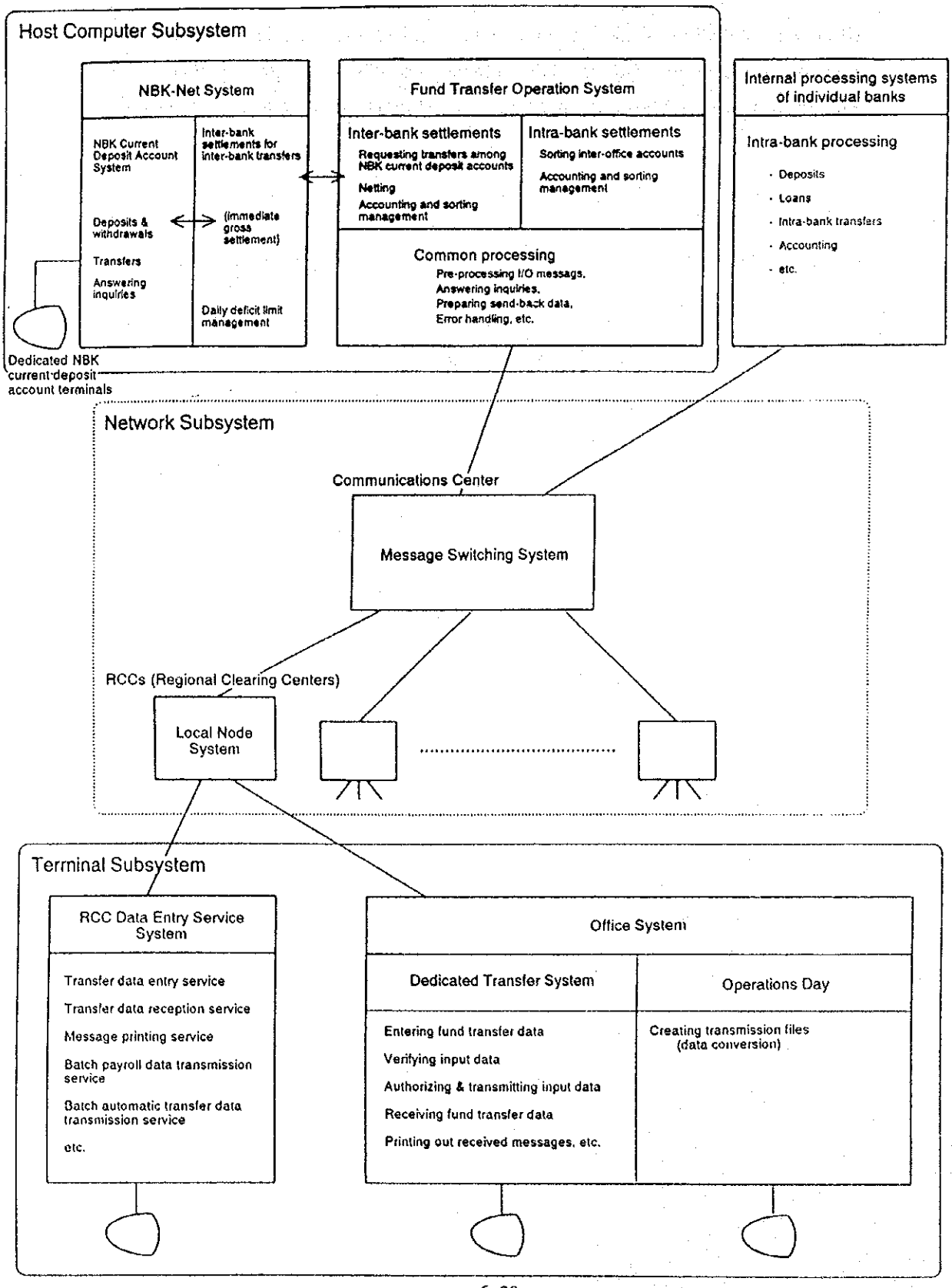
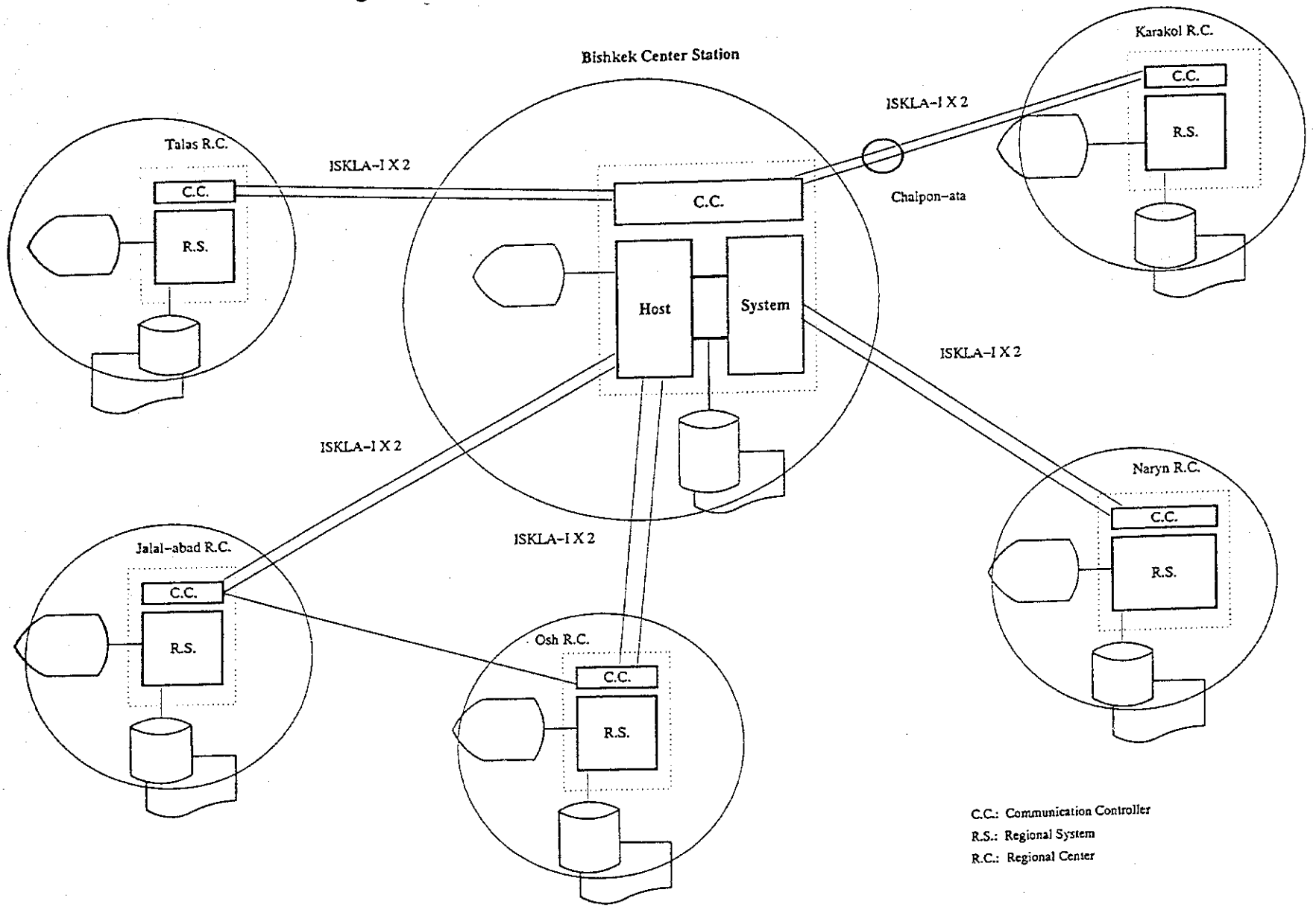


Figure 6-2 PRELIMINARY DESIGN OF THE NETWORK SYSTEMS



Chapter 7 Plan of Installation, Maintenance and Management Plan

Chapter 7 Plan of Installation, Maintenance and Management Plan

1. Policy for Procuring Hardware and Software Products

The products to be procured for this payment system are classified as follows:

1) Computer platform (hardware and operating system)

2) Resource manager not contained in the above-mentioned platform

- Database management system
- Network-related software
- Presentation manager
- Spool manager

3) Programming language

4) Middle ware products

(1) Policy of Procurement Fit to the Strategy for Developing the Financial and Payment System

1) In 2000, there will be a difference of a little less than 30 million remittance transactions, equivalent to approx. 2.2 times, in the number of remittance transactions between Plans A and B. Software is little affected by the number of transactions, however, hardware configured to be expected to achieve the required number of transactions should be procured.

2) There may be increases of the number of transactions. In that case, it is desired to be possible to add the required units estimated in the required places.

3) If the speed of increase of transactions is slower than estimated, phased expansion of the capacity should be accepted.

4) When the most of the commercial banks have their own networks, the volume of transactions of the network in this system may decrease. In

consideration of this, a product which can be used for other purpose or sold is desired.

2. Items to be Considered in Software Development

(1) Choice of a Language for Users

1) To develop application program based upon English. This selection is appropriate in consideration of possibility of system development by developers overseas.

2) The input part of the system, that is, the keyboards should be able to flexibly input in an arbitrary language; i.e., not be dedicated to any specific language. The basic software must correspond to Russian and input devices such as keyboards must be able to input and process English, Russian and Kyrgyz.

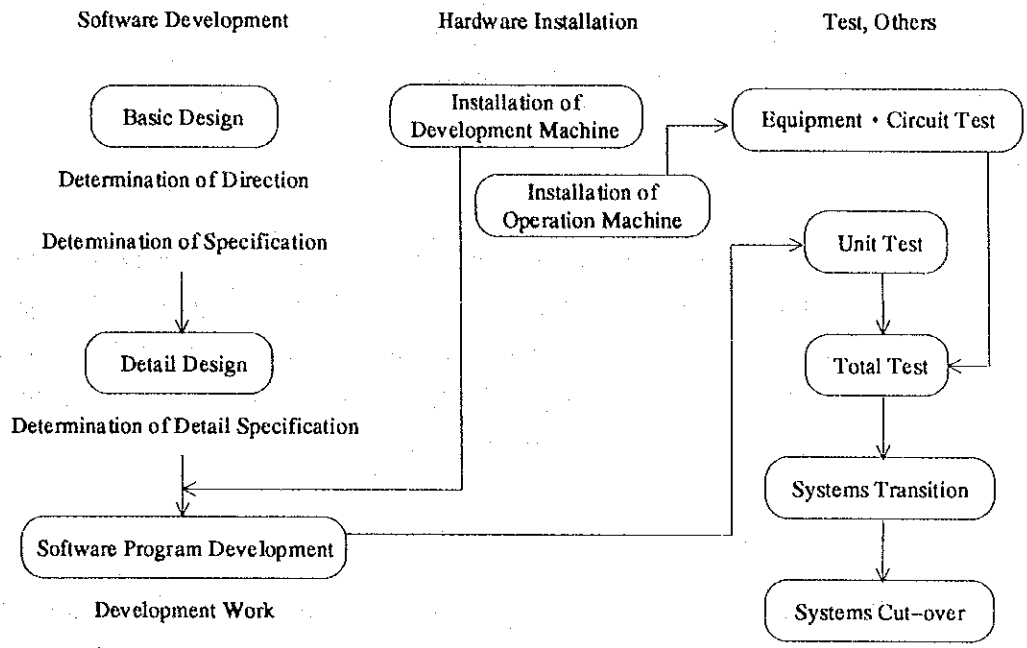
3) The output part of the system (the part of which the system displays) should be systematized by data and setup to be able to use Kyrgyz, Russian, and English languages.

3. Plan for Installation, Maintenance and Management of the Systems

(1) Procedure for Installation

The procedure from development of the computer system and network for the electronic payment system up to the installation and operation are shown below.

Systems Installation Plan



1) Designing work in this project

In designing for the project, the following work is performed without establishing a premises for the specific computing environment:

- Analyzing the model of a system
- Providing requirements of a system
- Functional design of application system
- Structural analysis
- Analysis of software structure for a subsystem
- Conceptual design of hardware for a subsystem
- Conceptual design of a network

2) Implementation plan and selection of computing environment

As a process of the systems development, there are formulations of the implementation plan and selection of the real computing environment which are comprised from hardware and basic software products. For example, the following choices are anticipated:

- Large-scaled mainframe
- Minicomputer proprietary to a manufacturer
- Open & standard RISC workstation
- Open CISC small-sized unit
- Others

When the platform is decided, the premise conditions of system configuration and operations are clarified and the ordering conditions can be decided. At the same time, decisions are also made on the resources required for detailed design of the system such as database products, developing tools, and user interface.

3) Ordering and composition of the project

It consists of software development work and the ordering hardware. The group in charge of software development composes the organization for the project. To enhance the efficiency of the project in the downsized management unit, a composition comprising the following three development groups is thought to be efficient in this payment system:

- Development group of host related subsystems
- Development group of network related subsystems
- Development group of terminal related subsystems

In addition to the above-mentioned three groups, a staff to manage the overall project, make arrangements for procuring products and perform general affairs is also required.

4) Detailed design

The detailed design is made when the composition of the project is completed. At the same time, arrangement and ordering of hardware and communication lines are made.

In the detailed design, concrete and detailed design for the application software in the real environment is made based upon the results of the rough design. The detailed design is comprised of:

- Detailed database design
- Detailed input design
- Detailed output design
- Process design including design of process-to-process communication
- Operation design

5) Programming

6) Test and acceptance of hardware

7) Installation

8) Operation

Operations are started through the above-mentioned process.

(2) Maintenance and Management Plans

Networks and systems of the following two groups are managed and maintained:

- The purchased group: Hardware and software products, Network related components and units
- The developed group: Application software

1) Maintenance and management of the purchased hardware and software

For managing purchased hardware products, software products, and network-related components and units, the user is required to decide their layout and configuration and understand the status of operations.

(a) Understanding the configuration of the network

To understand the above-mentioned configuration and the status of operations, information must be collected using a management tool. The outline of the procedure for collecting information is as follows:

a) Obtaining information on the configuration from the network administrator:

Device number, Device name, Specification, Network address, Connection method, Communication method

b) Collecting information on the layout of devices at each site

Installed location of every device number, User name, User telephone number

c) Addition of inventory information

Manufacturer of every device number, Deliverer, Name of a person in charge, Telephone number, Obtained date, Life

(b) Understanding events on a network

If the configuration of the system, units/devices and components of a network has been understood, the next step is to understand the operating status of each component. For the management system, a ready-made system on the market can be used, depending upon the platform.

- Monitor of targets to be monitored. (Or a product provided with a monitoring function is selected.)
- Installation of a management system in an operation center.
- Registration of the configuration information of targets to be monitored to the management system. (The configuration data can be converted.)

- Setup of necessary information such as the block diagram of the network and alarm generation rules in the management system.

- Actuation of all components covered by the management system.

(c) Maintenance contract and execution of maintenance

Actual maintenance work for purchased units and devices is classified into the following types of work by the vendors. In the case of software products, a vendor sometimes requests a user to maintain a product with maintenance tools sent by the vendor, but the manufacturer of the software product upgrades or revises the product.

a) Regular inspection: Units or devices are inspected and if there are any worn parts, they are replaced according to a predetermined schedule. Replacement is sometimes performed by a remote operation.

b) On-demand maintenance: When the possibility of a failure is found or a failure actually occurs, maintenance is generally performed according to a report by a user.

2) Maintenance and management of the developed software

(a) Software maintenance system

For this payment system, the following classifications of expert areas are anticipated:

a) An expert in charge of the platform for subsystems of the host: System configuration, Setup of communication software or database, Setup of middle ware

b) An expert in charge of the platform for subsystems for a network:

c) An expert in charge of the platform for terminal subsystems

d) An expert in charge of applications for subsystems of the host: Mainly a group of data processing programs

e) An expert in charge of applications for subsystems for a network: Mainly a group of message handling programs

f) An expert in charge of applications for terminal subsystems: Mainly a group of user interface programs

(b) Software maintenance method in a remote site via a network

The following considerations are required for software maintenance of a center in a region with no software experts usually, particularly if there are several of such regions:

a) Sometimes, different versions in different regions may be maintained.

b) A schedule must be adjusted to allow for replacement with a new version.

c) During replacement of versions, it must be judged whether communication between a system in which the program of a new version is running and another system in which the program of an old version is running should be allowed.

d) The method of installing a new version must be reviewed.

(3) Required Technical Capabilities of the Staff

The type of the staff required for development, operations and maintenance of this payment system and their corresponding capabilities are as follows:

1) Staff in charge of system planning

Ascertains the needs of users, estimates required resources and plans a project after the payment system is operated.

2) Software administrator

Manages the procedure and method for software development, instructs and manages development work.

3) System engineer (SE) of platform

System configuration, Setup of communication software and database, Setup of middle ware

4) SE of application

Develops and maintains data processing programs.

5) SE in charge of communication

Develops and maintains message handling programs.

6) SE in charge of GUI

Develops and maintains user interface programs.

7) Operation administrator

Trains operators and manages the schedule of operations.

8) Network administrator

Manages the configuration of a network and information of the components.

9) Operator

Operates a computer system.

Chapter 8 Plan for Action Program, Organization and Management for Implementation Works

Chapter 8 Plan for Action Program, Organization and Management for Implementation Works

1. Plan for Implementation Program

(1) Basic Thinking for the Implementation Program

1) Staged Development

(a) In order to resolve the problem of delay involved in present payment systems the first phase of the new system is to be in operation in 1998. The first phase system will make use of an Iskla line with the aim of constructing a payment system which can handle rapid and safe transfer transactions and carry out immediate gross settlement procedures.

(b) In 2000 a digital network will be employed in order to reorganize backup lines and increase the volume of lines available so as to run the second phase system with the aim of providing the systems basis for development of banking activities.

2) Development Systems

(a) Development on commission

The level of technical expertise of local development engineers is high but development of the new system will involve more than 400 manpower months and expertise in creation of new systems on a very large scale for which local engineers have little experience. Moreover the number of local engineers is insufficient in absolute terms. It will therefore be necessary to commission a foreign software supplier to carry out systems development work.

(b) Development Abroad

a) In view of the socio-cultural differences (eating habits, accommodation available, etc.) it is envisaged that there will be difficulties involved in creating an adequate context for

development locally in view of the import of hardware devices and equipment.

b) In particular for development of new systems which will require more than one year it is considered more realistic to have the main stages of development carried out abroad with the exception of the review of the overall outline design, overall testing and the systems transfer period.

(c) Participation of Users and Local Technicians

a) Users are expected to play the central role in defining the functional details of the new systems, in drawing up the work procedures of the new systems and in establishing the transfer procedures to be followed. Since the overall outline design has been established as part of the study mission the functional details of the system which will be required have not been rigorously defined. In view of the communication gap which will exist if development is carried out abroad it will be necessary for one or two representatives of the users to participate in overseas development activities.

b) In order to ensure that technology transfer after the development stages is smooth and efficient it will be necessary for local technicians to participate in development. The problem of the shortage of systems engineers was voiced in hearings with local commercial banks.

(d) Creation of Development Supporting Organizations in the Kyrgyz Republic

a) If this option of systems development overseas is adopted it will be necessary to consider measures to ensure that the needs of users are reflected in a timely and efficient way despite the possible problems of physical distance and communication gap. Such problems can not be entirely resolved simply through the participation of the users in systems development.

b) Therefore it is essential that an organization be set up in the Kyrgyz Republic which will be based in the NBK to support development works. This body will be responsible for formulating the opinions and views of the NBK and commercial banks, carrying out adjustments and making a timely response to inquiries, etc. received from the software supplier. The success of overall development will depend on the effective operation of this body.

3) Transfer to Specific Sites

(a) The system to be developed is to be of a fully national nature in its coverage. However, in view of the limits of availability relating to required personnel and translator/interpreters, the geographical conditions of the Kyrgyz Republic, and the nature of the transfer works (mostly for remittance systems), it is considered appropriate to stage implementation in three distinct steps corresponding to certain regions.

(b) A final conclusion cannot be given here but in view of the fact that the new system involves the development of the NBK Net and that the aim of improvement is to resolve the problem of settlement delay as soon as possible it would seem reasonable to consider the option to transfer first to Chui region.

4) Documentation Aspects of Works to be Undertaken

(a) Among the written documents (such as systems specifications, operational manuals, transfer procedure guidelines, office working manuals etc,) to be handed over to the Kyrgyz counterparts it will be necessary to provide editions in the Kyrgyz language as well in Russian in some cases as for the transfer guidelines and office working manuals. It will be necessary to consider this aspect of the program since there are many personnel in the provinces who can not read Russian.

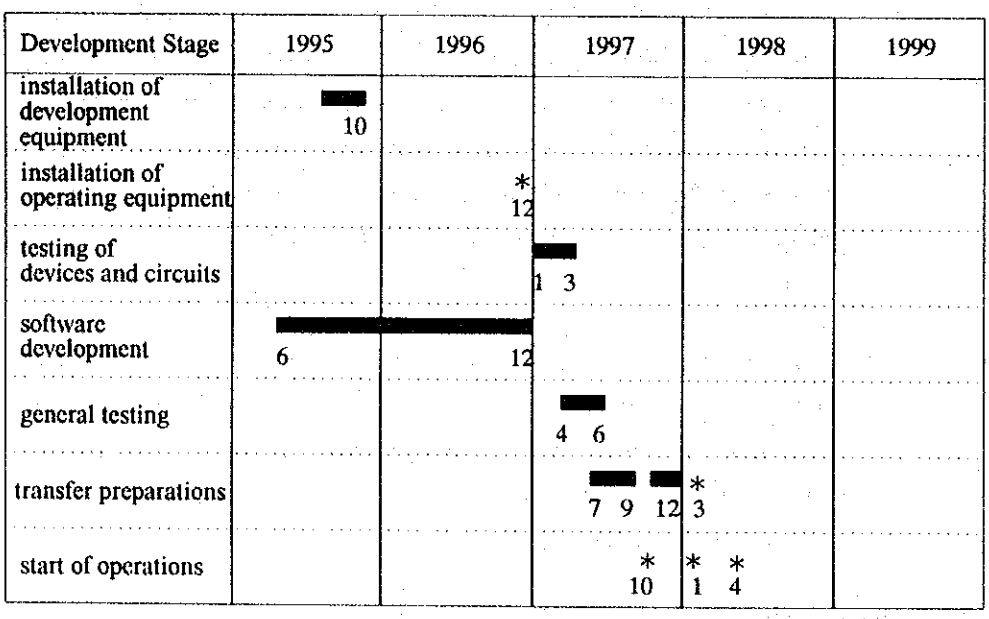
(b) If development is carried out abroad then the costs relating to software development will be included but it will be necessary to promptly

secure excellent translation staff, local users and technicians competent in handling Russian and Kyrgyz. It is also important to minimalist the effect which these works and burdens will have on the duration of development.

(2) Outline of the Implementation Program for Works

1) Phase 1 Development of the System

Development scheduled to start in June, 1996 and operations to commence between October, 1997 and April, 1998 (refer to Table below).



(Numbers in the table indicate month).

(2) Phase II Development

Development works are planned to start as of June, 1998 and will be in operation sometime between January and May of 2000.

Development Stage	1998	1999	2000
installation of operating equipment		* 3	
upgrading network lines		7 9	
software development	6	9	
general testing		10 12	
transfer preparations		10 12	* 2 * 4
start of operations			* 1 * 3 * 5

(Numbers in the table indicate month.)

2. Plan for Organization and Management

(1) Participants in and Owners of the Payment System

1) Participants

(a) Roughly speaking activities and works concerned in the new systems can be divided into those relating to the sector of inter-bank transfers, those concerning intra-bank transfers and business operations involved by the current deposit account system of the NBK (the NBK Net).

(b) The NBK which is responsible for running of the NBK Net is to be a participant of the new system.

(c) The participation of all of the commercial banks (including the savings banks) is desirable in connection with inter-bank transfers in view of the importance of developing new systems aimed at establishing settlement procedures which are speedy, safe and have finality.

(d) By 2000 it is possible that some more progressive banks will have already set up their own intra-bank transfer systems which enable them to provide safe and speedy remittance services to their customers.

To force such banks to participate in the new system is not considered appropriate.

2) Owners

(a) In terms of duties and responsibilities it is beyond doubt that the NBK is the legitimate body to own the NBK current deposit accounts system (i.e. the NBK network). Since the intra-bank transfer system is not directly related to the interests of the NBK the commercial banks should be made owner of this. With regard to inter-bank transfers both the NBK and the commercial banks have vested interests and so ownership should be divided between these parties. However it is anticipated that it will be extremely difficult to decide which sections of the system are to be allocated to the NBK and which not.

(b) In terms of cost burden the party which undertakes to meet the cost of investment in the new system is, in principle, taken to be the owner.

(c) Ownership rights can also be considered in relation to the third factor of financial policy. In these terms for the period of the shift over to a market economy the role of the NBK in assuring the improvement of the payment system is central and the commercial banks keenly hope that the NBK will meet expectations placed on the NBK in this direction. In this context one possible approach to ownership is to have the NBK retain ownership rights for the time being and then pass part of these on to the commercial banks at a future date.

(d) Even if the NBK is accorded ownership for the sake of capital supply and financial policy reasons it is vital to harness the creative commitment and practical contribution of the commercial banks if the system is to be developed and managed successfully.

3) Systems Operation Organization

Although actual operation organization varies depending on the size and operating hours of the systems, following example can be considered.

(a) Integrated operation and management center in Bishkek

Plan, network operation, software management, other functions

(b) Operation in each RCC

Site operation and hardware management at each site

(2) Setting Charges in the event of a Pay as Use System being Adopted

1) Basic Thinking

(a) As is evident from the analysis of the economic benefits of the envisaged new systems, and on the assumption that the financial and economic benefits of the system are sufficient to justify the required investment then development should take place in view of the contribution to shared social infrastructure provision which will result even if the system participants are not able to fully meet the investment burdens involved.

(b) Thinking along these lines if it is possible to cover the running costs and grant loans then there should be no problem. However, the view that parties benefiting from the system should bear the burden of running costs is very strong.

2) Examples of Charge Setting under the New System

(a) Remittance or Transfer Services

The following transfer services can be provided to clients;

type of transfer	details of the service
customer requested transfer: urgent	* given high priority rating for transfer; * confirmation notice sent to sending bank of arrival of the transfer to receiving bank (automatically issued) * confirmation notice that transferred money has been deposited in payee account (issued by receiving bank)
customer requested transfer: normal	* given low priority rating for transfer
inter-bank funds transfer: urgent	* given high priority rating for transfer; * confirmation notice sent to sending bank of arrival of the transfer to receiving bank (automatically issued) * confirmation notice that transferred money has been deposited in payee account (issued by receiving bank)

(b) Examples of Charges set for Transfer Services

	sent to main branch	sent to another branch
customer requested transfer;		
urgent	6 Som (4)	8 Som (6)
normal	4 Som (3)	5 Som (4)
inter-bank funds transfer;		
urgent	–	10 Som (10)

(Note) Figures marked in ( ) show the income of the body responsible for running the new system. Wage payments, automatic transfers, CD, etc. are not included .for policy reasons in the income of the body managing the new system.

(c) Estimate of Annual Income of the Organization running the New System (for 1998 assuming that one year of operations has been completed already)

customer requested	annual volume	charge/transfer	annual transfers income
urgent (10%)	935,309	4.9 Som	4,583,014 Som
normal (90%)	8,417,785	3.4 Som	28,620,469 Som
sub total	9,353,094	–	33,203,483 Som
inter-bank funds transfer	7,125	10 Som	71,250 Som
Grand total	9,360,219		33,274,733 Som

3) Setting of Actual Charges

(a) Even if it is decided that charges are to be set on the basis of having the final beneficiary bear the burden there will still remain a variety of opinions on what extent of the costs involved should be covered.

(b) If all of the costs involved are to be borne by the final beneficiary there is a possibility that this will impede or discourage use of the new system.

(c) In the final analysis it is necessary to make a decision on the basis of a comprehensive view embracing aspects of the capital supply methods, fee policies of the clearing house, and the capital burden which the banks are able and prepared to bear.

(3) Organization and Systems for Running and Supervision

1) Organizational Structures

(a) For efficient running and management a joint stock company with a self supporting payment system is generally considered the best organizational structure. If too much importance is given to profitability then there may be difficulties in balancing this with system safety and there is a danger of clients being saddled with excessive burdens. If such a joint stock company with self supporting payment system is adopted then in addition to the NBK and banks providing personnel and capital outlay to establish the budgetary foundations it will be necessary to ensure that the resulting organization sufficiently reflects the views of both the NBK and the banks.

(b) If emphasis is given to the public nature of the system and it is decided to have the NBK administer the system directly then a consultatory body consisting of members from the NBK, commercial banks and financial advisors will need to be set up so that the views of both industry and the banking spheres are adequately represented and reflected in running of the system. Moreover it will be necessary for the NBK to set up a special body to be responsible for planning and promotion activities to ensure the efficient running of the system.

(c) Supervision and running could also be carried out by a body such as an Association of Banks. Alternatively, it would be possible to have the NBK responsible for planning department activities, the software supplier carry out development and then delegate the actual running of the system to a third party such as a company set up especially for this purpose.

(d) Whatever the managerial system which is eventually adopted, it is important that the NBK play the leading role for some time after operations commence, in order to ensure the public nature, safety and efficacy of the system.

2) Establishment of Training System

(a) To have a smooth operation of the center, it is planned that both users and information processing engineers from Kyrgyz are to participate in the project. And at the time of new systems transfer, by preparing both operation manuals and office processing manuals, education and training for the systems operators and transfer processing personnel are to be implemented along with the systems transfer process.

(b) In Kyrgyz, there exists lack of experiences in large systems development, and lack of information systems engineers in banking business is quite serious. For example, even bank head offices planned sending engineers to their branches could not meet the requirement because of aforementioned reasons.

(c) For a certain period of time, by commissioning new systems operation to foreign engineers and promote technology transfer to local engineers, it will not be the problem solution of the scarcity of the engineers in Kyrgyz.

(d) It is highly beneficial for Kyrgyz to improve financial systems by recognizing existence of banks under free economy, company evaluation methodology, collateral, bank accounting processing, knowledge on new financial products, international financial business, and introduction of computers in banking business.

In addition to operation education in the new systems, it is highly desired to establish training centers with the objectives of educating broad knowledge of finance and education of information processing engineers.

Chapter 9 Calculation of Project Costs

Chapter 9 Calculation of Project Costs

1. Basis of Calculation

(1) Since domestically produced hardware are not available, hardware needs will be met by overseas supplies.

(2) Since the development of the related software involves a large scale of works, it will be necessary to commission the works to foreign software companies.

(3) Both hardware and software components are to be costed at purchase price.

(4) In all calculations, US dollars will be used at the following exchange rates which are averages during June 1994:

US$ 1.00= 10.0 Som
US$ 1.00= 100.0 Yen
1.0 Som = 10.0 Yen

2. Cost of Hardware and Software and Initial One-time Cost

At the present stage of preliminary project planning the total investment cost for hardware and software works including initial one-time cost has been estimated at about 28.7 million US dollars. However, the costs of systems development may be found to be considerably under or above this figure as a result of the review at the detailed design and as a result of decisions made by purchasing manufacturers.

3. Cost Estimates (Grand Total: US$ 28,742,000)

(1) Hardware purchase costs

Phase I:	U.S.$ 7,487,900
Phase II:	U.S.$ 295,000
Total:	U.S.$ 7,782,900

(2) Software purchase costs

Phase I:	U.S.$ 2,643,600
Phase II:	U.S.$ 128,700
Total:	U.S.$ 2,772,300

(3) Software development expenses

(a) Foreign engineer absence fee

Phase I:	U.S.$ 4,980,000
Phase II:	U.S.$ 1,152,000
Total:	U.S.$ 6,132,000

(b) Foreign specialist passage expenses

Phase I:	U.S.$ 48,000
Phase II:	U.S.$ 36,000
Total:	U.S.$ 84,000

(c) Foreign specialist living expenses

Phase I:	U.S.$ 11,000
Phase II:	U.S.$ 9,000
Total:	U.S.$ 20,000

(d) System transition expenses

Phase I:	US$ 1,113,000
Phase II:	US$ 740,000
Total:	US$ 1,853,000

(e) Testing personnel costs

Phase I:	US$ 1,113,000
Phase II:	US$ 740,000
Total:	US$ 1,853,000

(f) Interpreters Fee

Phase I :	US$ 1,489,000
Phase II	US$ 816,000
Total	US$ 2,305,000

(4) Auxiliary equipment expenses

Total: U.S.$400,400

(5) Transportation and cargo handling expenses

Phase I	U.S.$ 176,000
Phase II	U.S.$ 20,000
Total	U.S.$ 196,600

(6) Installation work expenses

Phase I:	U.S.$ 145,000
Phase II:	U.S.$ 16,000
Total	U.S.$ 161,000

(7) NBK Project Team expenses

Phase I:	U.S.$ 792,600
Phase II:	U.S.$ 84,600
Total	U.S.$ 877,200

(8) Estimated contingencies

Total (Phase I & II):U.S.$ 4,005,000

4. Maintenance, Administration and Operating Expenses

(unit: US$1,000)

	Phase I	Phase II
Total maintenance, administration and operating expenses	2,680	2,977

Note: The total maintenance, administration and operating expenses were estimated as 10–15% of hardware and software costs on the basis of past experience.

Chapter 10 Economic and Financial Analysis

Chapter 10 Economic and Financial Analysis

1. Economic Analysis

(1) Direct economic effects

This payment system promises extensive convenience for the whole economy. Its direct effects which can be quantitatively analyzed have been taken up as the objectives of this project.

(a) Application of floating funds
(b) Abolishment of avizos (payment instructions)
(c) Decreased volume of work for checking final payment accounts

1) Reduced floating funds

(a) Basic approaches

a) The new payment system would transfer money essentially in a day whereas the current system requires one week or even one month. Thus, under the new system, there would theoretically be no difference in balances in unsettled "903" inter-bank and "890" inter-bank accounts. The difference in the debit and credit balances in the "903" inter-bank accounts may be regarded as the float.

b) The total float is the sum of funds floating during inter-bank and inter-bank transfers. Since the "890" inter-bank account includes both inter-bank and inter-bank transactions, however, it is impossible to derive the float during inter-bank transfers directly from the "890" inter-bank account figures. Thus, we will estimate the total float by multiplying the float during inter-bank transfers by the ratio of the total number of transactions to the number of inter-bank transactions.

c) Introduction of a new payment system will make it possible to promptly use almost all of the uncollected funds (floating funds).

The floating funds will thus become a capital resource that can be invested in new economic activities and thus contribute to increasing production. The average incremental increase in production value that will result from investing floating funds is considered as the direct benefit of this project. On the other hand, the data necessary to estimate the incremental increase in production value, such as the capital coefficients and capital productivity of the main industries, do not exist. Therefore, in postulating an evaluation rate, the opportunity cost of general capital is considered the minimum level of capital productivity.

d) The cost of opportunity loss can be estimated from the size of the float. From the standpoint of recipients, the benefit of the new system can be regarded as the product of multiplying the float by the valuation rate.

e) It is reasonably understood that the float fund released as a result of improvement of payment system will be utilized as working fund for economic activities through financial system, fund being multiplied by credit multiplier effect. As mentioned in "4-7-4 Credit Creation Capability" in Chapter 4 of the Main Report, 1) the deposits received by banks in cash are mainly used as bank loans, 2) A portion of its loan proceeds remain as a derivative deposit at banks, 3) Banks can use it for additional loan, 4) As this process is repeated, the banks can create derivative deposits to an amount that reaches to the equivalent to a several times as much as original deposits. The above money creation effects are defined as Credit Multiplier. Credit multiplier is calculated as follows:

$$\text{Money multiplier} = \frac{C+1}{C+\beta}$$

c = Ratio of Cash to deposit

β = Central Bank's deposit reserve ratio

The forecast figures of credit multiplier are mentioned in the Table 7-7-A of the Main Report.

(b) Estimating conservation of floating funds

The conservation of floating funds under the new system is estimated at 147 million Som or about 1.5 billion yen in 2000 as shown below.

Estimated Conservation of Floating Funds

		1994	1995	1996	1997
Unsettled Amounts	(000 Som)	167,777	218,110	283,543	326,074
Growth Rate	(%)		30	30	15
Credit Multipliers		1.24	1.30	1.34	1.40
Appraisal Value	(000 Som)	208,043	283,543	379,947	456,503
Valuation Rate	(%)	20	20	20	20
Loss of Annual opportunity Cost (Effectiveness)	(000 Som)	41,608	56,708	75,983	91,300

Note: Numbers up to 1997 are only reference due to un-effectiveness.

		(Phase I)		(Phase II)	
		1998	1999	2000	2001
Unsettled Amounts	(000 Som)	358,681	380,202	395,410	411,227
Growth Rate	(%)	10	6	4	4
Credit Multipliers		1.59	1.72	1.86	1.86
Appraisal Value	(000 Som)	570,302	653,947	735,462	761,882
Valuation Rate	(%)	20	20	20	20
Loss of Annual Opportunity Cost (Effectiveness)	(000 Som)	114,060	130,789	147,092	152,976

		2002	2003	2004	2005
Unsettled Amounts	(000 Som)	427,676	444,783	462,574	481,077
Growth Rate	(%)	4	4	4	4
Credit Multipliers		1.86	1.86	1.86	0.86
Appraisal Value	(000 Som)	792,477	827,296	860,387	894,803
Valuation Rate	(%)	20	20	20	20
Loss of Annual Opportunity Cost (Effectiveness)	(000 Som)	159,095	165,459	172,077	178,960

2) Reduced proving and checking work

(a) Introducing a computer network will make it possible to eliminate payment classification tables and reduce the personnel involved in such activities as remitted payment confirmations. On the other hand, new employee will also be required. Some will be absorbed into the banks. In calculating the production opportunity cost for these employees, GDP estimates per capita of 1994 are applied.

(b) Under the current system, the work load for settlement proving increases in proportion to the amount of the balance outstanding in unsettled accounts. Under the new system, in which there would be no outstanding balance in unsettled accounts, such burdens would be greatly reduced.

(c) Under the current system, banks prepare and mail the sum total of transferred funds (avizo) for each receiving office in addition to payment orders. The new system eliminates the need for these documents. Such reduction in labor time has been included as a benefit of the new system.

3) Observations on the result of financial benefits

(a) The following table shows the estimated financial benefits of the new payment system from 1998 to 2005. As shown in the table, financial benefits amount to 115 million Som in 1998 when the first phase of the new system would become operative, and to 148 million Som in 2000 when the second phase launches.

(b) The initial investment required for the new payment system is estimated at about 28 million US dollars. However, from the standpoint of monetary economy, the initial cost can be recovered in three years after the system becomes operative through its financial benefits

(c) Thus, as already pointed out, Kyrgyz should promptly construct its new payment system.

		(1st Phase)		(2nd Phase)	
		1998	1999	2000	2001
Decrease of Float	(000 Som)	114,060	130,789	147,092	152,976
Abolition of Avizo	(000 Som)	184	202	217	243
(Manpower Savings)	(man)	17.8	18.9	19.6	21.2
Decrease of Confirmation Work	(000 Som)	920	1,009	1,086	1,169
(Manpower Savings)	(man)	89.0	94.4	98.1	102.1
Total Monetary Effect	(000 Som)	115,164	132,000	148,395	154,388
(Manpower Savings)	(man)	106.8	113.3	117.7	123.3

		2002	2003	2004	2005	2006	2007
Decrease of Float	(000 Som)	159,095	165,459	172,077	178,960	186,119	193,564
Abolition of Avizo	(000 Som)	262	282	303	326	351	378
(Manpower Savings)	(man)	22.1	23.0	23.9	24.9	25.8	26.9
Decrease of Confirmation Work	(000 Som)	11,840	12,253	12,679	131,121	13,578	14,051
(Manpower Savings)	(man)	106.1	110.4	114.8	119.4	124.0	129.0
Total Monetary Effect	(000 Som)	171,197	177,994	185,059	192,407	200,048	207,993
(Manpower Savings)	(man)	128.2	133.4	138.7	144.3	149.8	155.9

4) Economic Cost

By classifying into local and foreign currencies, the shadow price has been applied to both investment costs and operational costs. (See Table 10-8 for details) On calculation of economic internal rate of return (EIRR), 12 % of annual cut-off price has been applied to the investment costs.

5) Results of Economic Analysis

Economic internal return rate (EIRR) was found by discount cash flow method, comparing the above said economic costs to economic benefits (Table 10-1). EIRR calculated on the basis of these presuppositions is 31.66%.

A sensitivity analysis was implemented in order to clarify how the economic internal return rated as described above is influenced by the fluctuation of investments and benefits. The results are as follows. Also a detailed sensitivity analysis has been shown in Table 10-2.

Item	-30	-20	-10	0	+10	+20
Fluctuating investments	42.38	38.16	34.65	31.66	29.08	26.81
Benefits variation	-	24.32	28.13	31.66	34.97	38.09

Figure 10-1 indicates the above said results in a diagram.

In addition to above, a sensitivity analysis has been done under the assumption of the worst case of increse/decrease variation of benefits and investment had been occurred. Table 10-3 shows the result of simultaneous analysis by combining of both cases, variation of investment cost increase from +10 to + 30 %, and variation of benefits increase from -10 to -30 %.

(2) Indirect effect

The payment system is expected to play an important role in the market economy, and the market economy can be considered to function as the payment system's infrastructure. Therefore, the improvement of the payment system will produce a wide range of effects to realize the economy.

The following chapter analyzes the effects of an improvement in the system, and divided them into the categories of inflation control effects, management control effects, and other effect.

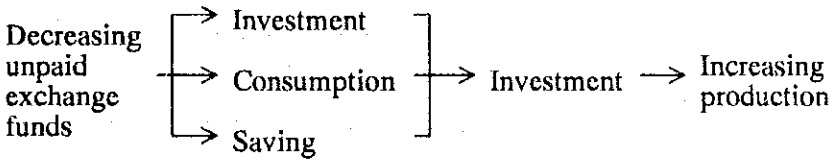
1) Measures against inflation

The effects of the improved payment system on the suppression of inflation covers a wide range of the whole economy as mentioned below.

(a) Due to present delayed payment, each bank is forced to manage a considerable amount of fixed funds or arrears as unpaid exchange funds. Simultaneously, this constitutes a factor of short liquidity with the same amount on the side of customers and companies.

By improvement of the payment system, the rotation of funds is expedited in proportion to the hastened flow of funds, and effective fund distribution is promoted.

Consequently, released funds function as follows.



Thus, increased production inevitably functions as a factor suppressing inflation.

(b) The improved payment system reduces payment risks.

Reduced payment risks contribute to safe and smooth transactions, and further act as a factor for increasing production and suppressing inflation. Reduced payment risks are not always limited to reduced credit risks. Shortened payment terms reduce risks due to interest fluctuations, exchange fluctuations, liquidity risks, and further decreases hedges against inflation, and contribute to the improvement of the profitability of companies. Finally, the improved payment system constitutes a factor for increasing production → suppressing inflation.

2) The improved payment system is designed to hasten and secure payment. Thus, this system itself will contribute to the recovery of credit to banks mediating payment by general clients and companies.

The recovery of credit to banks generally promotes transactions with banks and forms an important factor for suppressing inflation via the flow, as shown below.

Increased saving → Enlarged investment → Increased production

3) The improved payment system facilitates deposit and withdrawal activity, irrespective of time and place.

This enhances the reliability for financial systems. Particularly, for deposit currencies, and promotes absorption of surplus liquidity. Consequently, this system will constitute a factor for suppressing inflation via the above said flow, increased saving → enlarged investment → increased production.

4) The next point is that the improved payment system is an indispensable factor for developing financial markets.

(3) Effects on improving company management

The effects of the improved payment system on improving company management can be considered to cover a remarkably wide and multilateral range.

This is because one of the major purposes of the improved payment system is to solve the problems which companies are facing at present, and such solutions can be expected to support the development through the improved convenience for the companies.

The following are the analyses of such effects.

1) The improved payment system realizes prompt payment, releases the funds and areas fixed in banks earlier, and in particular, contributes to assisting financing on the side of remittance recipients.

2) The improved payment system alleviates payment risks, smoothes and expands business transactions.

3) The improved payment system enhances the reliability of companies on banks. This is a factor for increasing the number of opened deposit accounts on the side of banks. On the side of companies, this fosters close relationships with banks for transactions, expands the range of transactions, including credit transactions, and helps to stabilize management.

4) The improved payment system enables diversified supply of financial services and contributes to rationalizing company operation.

5) The payment system using computer networks promotes computerization not only in banks, but also in each transaction company, and helps these companies promote rationalization.

6) This safe and prompt payment system lowers the preference of companies to cash payment, and contributes to stabilizing companies, providing them with effective fund operations and decreased payment risks.

7) The improved payment system promises the development not only for banks, but also for the business related to payment, as computer hardware and software, credit cards and credit sales as well as tertiary industries including stores.

8) This safe and prompt payment system not only constitutes a factor for decreasing credit among companies, but also invites improved awareness of self-responsibility by company management, and contributes to improving company operations.

9) To conclude, the improved payment system contributes to the preparation of software infrastructures which is indispensable not only for financial markets, in particular, short-term financial markets, but also for capital markets.

As a matter of course, developed financial markets facilitate short-term and long-term fund procurement for companies, and produce substantial effects on improving company operations.

2. Financial Analysis

(1) Total necessary working fund

The execution of this project is divided into Phase I (to be operated in 1998) and Phase II (to be operated in 2000), considering the period of the installation of machinery equipment, the introduction and development of software, and its operations, according to the following schedules:

Plans	Implementation period	Actual operation
Phase I	1995 - 1997	1988
Phase II	1998 - 1999	2000

(2) Financing

Should this project be financed by an interest-bearing loan, all interest payable during the project period should in principle be included in the capital. The amount can vary depending on alternative financing cases. Here, we will consider the following two alternative financing cases:

Case I: Equity financing

Case II: Financing by a long-term soft loan

Conditions:

Amount:	70% of total funds required
Grace Period:	10 years
Repayment Conditions:	30 years including the grace period; repayment in equal installments
Interest Rate:	3% per year

(3) Business operation costs

(a) Maintenance and support cost

These costs will be appropriated for the payment for computer hardware manufacturers and software development companies as maintenance and operation costs of the whole computer system including hardware and software. Generally these costs are fixed after

the consultation between a manufacturer and a user. From the experience in Japan, from 10% to 15% of the total expenses, including costs for the introduction of hardware at the early stage, purchase costs of software and costs for the development of software, is appropriated for the annual maintenance and operation costs. Therefore, calculation of the costs for this project applying the same percentage. The Study Team appropriated 2,680 thousand US dollars in Phase I and 2,977 thousand dollars respectively.

(4) Depreciation expenses

The total investment funds will be depreciated in the following manner:

(a) Tangible properties (hardware costs, etc.)

Period:	10 years
Method:	fixed installment
Residual book value:	0

(b) Intangible properties (basic software and software development costs)

Period:	10 years
Method:	fixed installment
Residual book value:	0

(c) Other properties

The depreciation of pre-operation cost and interest during construction is 5 years constant.

(5) Operational revenue

Financial revenue in this project is based on the presupposition that the commissions arising from the inter-bank transactions which shall be paid to the organization which controls the new system for its operation. Remittance commissions are divided into two i.e. one is the commissions arising from

remittance by customers, and the other is the commissions arising from inter-bank funds transfer transactions. The former shall be further divided into urgent processing and normal processing, while all the latter cases shall be processed as urgent. The contents of commissions are as follows.

Remittance by customers		
Commission per case	Urgent	4.9 Som
	Normal	3.4 Som
Inter-bank funds transfer	Urgent, only	10.0 Som

Paid amount of remittance occurring in each year multiplied by these commissions makes the total revenue for this planned system.

(6) Method of analysis

(a) This project has been planned based on the assumption that the system shall be operated and managed as an organization incorporated in NBK. However, the financial analyses of this system will be carried out on the assumption that the system according to this project shall be tentatively operated as an independent cooperation running for its own profitability. Therefore, estimated revenue and expenditure as well as financing have been counted and analyzed only based on the data proper to this project, apart from those in connection with other divisions of NBK.

(b) The period of analysis is ten years counting from 1998 when the first phase begins with the start of investments and receiving commissions until 2007 when it is completed.

(7) Results of financial analysis

The following financial statements have been prepared on the basis of the above said presuppositions.

Table 10-4 & 10-5: Income statements
Table 10-6 & 10-7: Funds flow statements

(a) In the instance of Case I, where the amount of the initial investment is procured through equity, it is expected that before depreciation profit will be recorded throughout the period of the project (1998–2007), so that there will be no cash–flow problems. With regard to financial profitability: at the end of 2007, the non–depreciated assets will be no greater than 6% of the total depreciable assets, the accumulated loss will remain 42% of equity, and net assets will amount to $16 million. Moreover, if, at the end of the project period, Kyrgyz can develop the software unassisted, it will be possible, it is believed, to reduce the amount of the reinvestment necessary for renewing the project to half or less of the original investment, so that, after 2007, it will be possible to continue the project nearly without any additional investment.

(b) In Case II, where 30% of the initial investment is procured through equity and 70% through long–term loans from abroad, it is forecast that maintaining financial profitability will be difficult even with a favorable loan interest rate (3%). Accordingly, it was necessary to study overall profitability – that is, to take into account the second and third investments, whose loan periods will extend from 2007 through 2027. When this was done, it is expected that, starting from the second investment, profitability can be expected to improve, provided that commission income continues to increase and Kyrgyz can develop the software unassisted.

Table 10-1 ECONOMIC RATE OF RETURN (BASE CASE)

(UNIT: 1,000 US$)

	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
ECONOMIC COST	5157	13302	3855	4741	6320	3589	2968	2968	2968	2968	2968	2968	2968
1.Investment Cost	5157	13302	3855	2087	3666	621	0	0	0	0	0	0	0
(1)Facilities	1905	7081	0	0	687	0	0	0	0	0	0	0	0
Hardware purchase	1272	6216	0	0	295	0	0	0	0	0	0	0	0
Auxiliary facilities	400	0	0	0	0	0	0	0	0	0	0	0	0
Transport Expenses	37	137	0	0	20	0	0	0	0	0	0	0	0
Installation costs	23	84	0	0	12	0	0	0	0	0	0	0	0
Contingencies	173	644	0	0	360	0	0	0	0	0	0	0	0
(2)Software	3211	6151	3785	2045	2948	608	0	0	0	0	0	0	0
Basic software purchase	873	1771	0	0	129	0	0	0	0	0	0	0	0
Software development	1356	2652	972	432	720	0	0	0	0	0	0	0	0
System transition	0	0	576	288	240	336	0	0	0	0	0	0	0
Testing	0	0	576	288	576	0	0	0	0	0	0	0	0
Translators fee	256	384	544	384	448	96	0	0	0	0	0	0	0
International travel	38	36	115	76	86	35	0	0	0	0	0	0	0
Lodging/perdiem allowance	88	146	437	293	317	86	0	0	0	0	0	0	0
Contingencies	600	1162	565	284	432	55	0	0	0	0	0	0	0
(3)Other Expenses	41	70	70	42	31	13	0	0	0	0	0	0	0
Preoperating expneses	37	64	64	38	28	12	0	0	0	0	0	0	0
Contingencies	4	6	6	4	3	1	0	0	0	0	0	0	0
2.Operating Costs	0	0	0	2654	2654	2968	2968	2968	2968	2968	2968	2968	2968
(1)Variable Costs	0	0	0	26	26	43	43	43	43	43	43	43	43
Electric power charge	0	0	0	13	13	14	14	14	14	14	14	14	14
Telecom. line charge	0	0	0	13	13	29	29	29	29	29	29	29	29
(2)Fixed Costs	0	0	0	2628	2628	2925	2925	2925	2925	2925	2925	2925	2925
Direct labor costs	0	0	0	49	49	49	49	49	49	49	49	49	49
General overhead	0	0	0	31	31	31	31	31	31	31	31	31	31
Maintenance cost	0	0	0	2528	2528	2825	2825	2825	2825	2825	2825	2825	2825
Office rental	0	0	0	20	20	20	20	20	20	20	20	20	20
ECONOMIC BENEFIT	0	0	0	11516	13200	14840	15439	16062	16709	17384	18086	18816	19576
(1)Decrease of Float	0	0	0	11406	13079	14709	15298	15910	16546	17208	17896	18612	19356
(2)Abolition of Aviso	0	0	0	18	20	22	24	26	28	30	33	35	38
(3)Decrease of Manpower	0	0	0	92	101	109	117	126	135	146	157	169	182
NET BENEFIT FLOW	-5157	-13302	-3855	6775	6880	11251	12471	13094	13741	14416	15118	15848	16608

NPV AT CUT-OFF RATE OF 12% : 32148 B/C RATIO: 1.86 EIRR = 31.66%

Table 10-2 ECONOMIC RATE OF RETURN: SUMMARY OF SENSITIVITY ANALYSIS

		-30 %	-20 %	-10 %	Base (0 %)	+10 %	+20 %
Investment							
	EIRR(%)	42.38	38.16	34.65	31.66	29.08	26.81
	NPV($000)	39,430	37,003	34,575	32,148	29,720	27,293
	B/C Ratio	2.32	2.14	1.99	1.86	1.75	1.65
Net Benefit							
	EIRR(%)		24.32	28.13	31.66	34.97	38.09
	NPV($000)		18,409	25,278	32,148	39,017	45,886
	B/C Ratio		1.49	1.68	1.86	2.05	2.23

Note: 12 % of Net Present Value (NPV) cut-off rate has been applied.

Table 10-3 RESULT OF INVESTMENT AND BENEFIT COMBINED ANALYSIS

	INVESTMENT	+10%	+20%	+30%
BENEFIT				
-10%	EIRR(%)	25.70%	23.55%	21.65%
	NPV(1000$)	22,851	20,424	17,996
	B/C RATIO	1.58	1.49	1.40
-20%	EIRR(%)	22.04%	20.04%	18.25%
	NPV(1000$)	15,982	13,554	11,127
	B/C RATIO	1.40	1.32	1.25
-30%	EIRR(%)	18.05%	16.18%	14.52%
	NPV(1000$)	9,112	6,695	4,258
	B/C RATIO	1.23	1.16	1.10

Table 10–4 INCOME STATEMENTS (1/2): CASE I

*** PAYMENT SYSTEM PROJECT IN KYRGYSTAN *** PAGE 1
INCOME STATEMENTS
- BASE CASE (1) - (US$ 1000)

YEAR	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
OPERATING INCOME	0.	0.	0.	3535.	3796.	4016.	4177.	4344.	4517.	4698.
TRANSFER REVENUE	0.	0.	0.	3327.	3534.	3684.	3832.	3985.	4144.	4310.
PROFIT FROM NBK	0.	0.	0.	208.	262.	332.	345.	359.	373.	388.
OPERATING COST	0.	0.	0.	4987.	4987.	5301.	5934.	5934.	5880.	5880.
VARIABLE COST	0.	0.	0.	26.	26.	43.	43.	43.	43.	43.
DIRECT FIXED COST	0.	0.	0.	2680.	2680.	2977.	2977.	2977.	2977.	2977.
DEPRECIATION AND AMORTIZATION	0.	0.	0.	2281.	2281.	2281.	2914.	2914.	2860.	2860.
OPERATING PROFIT	0.	0.	0.	-1452.	-1192.	-1285.	-1757.	-1590.	-1363.	-1182.
NON-OPERATING EXPENSES	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
INTEREST ON LONG TERM DEBT	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
INTEREST ON SHORT TERM DEBT	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NET PROFIT OR (LOSS) BEFORE TAX	0.	0.	0.	-1452.	-1192.	-1285.	-1757.	-1590.	-1363.	-1182.
INCOME TAX	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NET PROFIT OR (LOSS) AFTER TAX	0.	0.	0.	-1452.	-1192.	-1285.	-1757.	-1590.	-1363.	-1182.
DIVIDENDS	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RETAINED EARNINGS	0.	0.	0.	-1452.	-1192.	-1285.	-1757.	-1590.	-1363.	-1182.

Table 10-4 INCOME STATEMENTS (2/2): CASE I

INCOME STATEMENTS
- BASE CASE (1) - (US$ 1000)

YEAR	2005	2006	2007
OPERATING INCOME	4886.	5082.	5285.
TRANSFER REVENUE	4482.	4662.	4848.
PROFIT FROM NBK	404.	420.	437.
OPERATING COST	5880.	5854.	5854.
VARIABLE COST	43.	43.	43.
DIRECT FIXED COST	2977.	2977.	2977.
DEPRECIATION AND AMORTIZATION	2860.	2834.	2834.
OPERATING PROFIT	-994.	-773.	-570.
NON-OPERATING EXPENSES (-)	0.	0.	0.
INTEREST ON LONG TERM DEBT	0.	0.	0.
INTEREST ON SHORT TERM DEBT	0.	0.	0.
NET PROFIT OR (LOSS) BEFORE TAX	-994.	-773.	-570.
INCOME TAX	0.	0.	0.
NET PROFIT OR (LOSS) AFTER TAX	-994.	-773.	-570.
DIVIDENDS	0.	0.	0.
RETAINED EARNINGS	-994.	-773.	-570.

Table 10-5 INCOME STATEMENTS (1/2): CASE II

*** PAYMENT SYSTEM PROJECT IN KYRGYSTAN *** PAGE 1
INCOME STATEMENTS
- BASE CASE (II) - (US$ 1000)

YEAR	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
OPERATING INCOME	0.	0.	0.	3535.	3796.	4016.	4177.	4344.	4517.	4698.
TRANSFER REVENUE	0.	0.	0.	3327.	3534.	3684.	3832.	3985.	4144.	4310.
PROFIT FROM NBK	0.	0.	0.	208.	262.	332.	345.	359.	373.	388.
OPERATING COST	0.	0.	0.	5135.	5135.	5449.	6127.	6127.	5926.	5926.
VARIABLE COST	0.	0.	0.	26.	26.	43.	43.	43.	43.	43.
DIRECT FIXED COST	0.	0.	0.	2680.	2680.	2977.	2977.	2977.	2977.	2977.
DEPRECIATION AND AMORTIZATION	0.	0.	0.	2429.	2429.	2429.	3107.	3107.	2906.	2906.
OPERATING PROFIT	0.	0.	0.	-1599.	-1339.	-1433.	-1950.	-1783.	-1408.	-1228.
NON-OPERATING EXPENSES[1]	0.	0.	0.	489.	489.	489.	624.	624.	624.	624.
INTEREST ON LONG TERM DEBT	0.	0.	0.	489.	489.	489.	624.	624.	624.	624.
INTEREST ON SHORT TERM DEBT	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NET PROFIT OR (LOSS) BEFORE TAX	0.	0.	0.	-2088.	-1828.	-1922.	-2574.	-2407.	-2032.	-1852.
INCOME TAX	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NET PROFIT OR (LOSS) AFTER TAX	0.	0.	0.	-2088.	-1828.	-1922.	-2574.	-2407.	-2032.	-1852.
DIVIDENDS	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RETAINED EARNINGS	0.	0.	0.	-2088.	-1828.	-1922.	-2574.	-2407.	-2032.	-1852.

Table 10-5 INCOME STATEMENTS (2/2): CASE II

*** PAYMENT SYSTEM PROJECT IN KYRGYSTAN *** PAGE 2
INCOME STATEMENTS
- BASE CASE (1) - (US$ 1000)

YEAR	2005	2006	2007
OPERATING INCOME	4886.	5082.	5285.
TRANSFER REVENUE	4482.	4662.	4848.
PROFIT FROM NBK	404.	420.	437.
OPERATING COST	5926.	5854.	5854.
VARIABLE COST	43.	43.	43.
DIRECT FIXED COST	2977.	2977.	2977.
DEPRECIATION AND AMORTIZATION	2906.	2834.	2834.
OPERATING PROFIT	-1039.	-773.	-570.
NON-OPERATING EXPENSES	624.	599.	575.
INTEREST ON LONG TERM DEBT	624.	599.	575.
INTEREST ON SHORT TERM DEBT	0.	0.	0.
NET PROFIT OR (LOSS) BEFORE TAX	-1663.	-1372.	-1145.
INCOME TAX	0.	0.	0.
NET PROFIT OR (LOSS) AFTER TAX	-1663.	-1372.	-1145.
DIVIDENDS	0.	0.	0.
RETAINED EARNINGS	-1663.	-1372.	-1145.

Table 10-6 FUNDS FLOW STATEMENTS (1/2): CASE I

*** PAYMENT SYSTEM PROJECT IN KYRGYSTAN *** PAGE 1
FUNDS FLOW STATEMENTS
- BASE CASE (1) - (US$ 1000)

YEAR	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
SOURCE OF FUNDS	5199.	13392.	3954.	2980.	4494.	1638.	1157.	1324.	1497.	1678.
CASH GENERATED FROM OPERATION	0.	0.	0.	829.	1090.	996.	1157.	1324.	1497.	1678.
PROFIT AFT. TAX. BFR INT.	0.	0.	0.	-1452.	-1192.	-1285.	-1757.	-1590.	-1363.	-1182.
DEPRECIATION AND AMORTIZATION	0.	0.	0.	2281.	2281.	2281.	2914.	2914.	2860.	2860.
FINANCIAL RESOURCES	5199.	13392.	3954.	2151.	3404.	642.	0.	0.	0.	0.
SHARE CAPITAL	5199.	13392.	3954.	2151.	3404.	642.	0.	0.	0.	0.
LONG TERM DEBT	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SHORT TERM DEBT	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
USES OF FUNDS	5199.	13392.	3954.	2151.	3404.	642.	0.	0.	0.	0.
FIXED CAPITAL EXPENDITURE	5199.	13392.	3954.	2151.	3404.	642.	0.	0.	0.	0.
NON-DEPRECIABLE ASSETS	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
DEPRECIABLE FIXED ASSETS	5199.	13392.	3954.	2151.	3404.	642.	0.	0.	0.	0.
INTEREST DURING CONSTRUCTION	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CHANGE IN WORKING CAPITAL	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
DEBT SERVICES	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
REPAYMENT OF LONG TERM DEBT	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
REPAYMENT OF SHORT TERM DEBT	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
INTEREST ON LONG TERM DEBT	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
INTEREST ON SHORT TERM DEBT	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
DIVIDENDS	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CASH INCREASE OR (DECREASE)	0.	-0.	-0.	829.	1090.	996.	1157.	1324.	1497.	1678.
BEGINNING CASH BALANCE	0.	0.	0.	0.	829.	1919.	2915.	4072.	5396.	6894.
ENDING CASH BALANCE	0.	0.	0.	829.	1919.	2915.	4072.	5396.	6894.	8572.

Table 10-6 FUNDS FLOW STATEMENTS (2/2): CASE I

*** PAYMENT SYSTEM PROJECT IN KYRGYSTAN *** PAGE 2
FUNDS FLOW STATEMENTS
- BASE CASE (I) - (US$ 1000)

YEAR	2005	2006	2007
SOURCE OF FUNDS	1866.	2062.	2265.
CASH GENERATED FROM OPERATION	1866.	2062.	2265.
PROFIT AFT. TAX, BFR INT.	-994.	-773.	-570.
DEPRECIATION AND AMORTIZATION	2860.	2834.	2834.
FINANCIAL RESOURCES	0.	0.	0.
SHARE CAPITAL	0.	0.	0.
LONG TERM DEBT	0.	0.	0.
SHORT TERM DEBT	0.	0.	0.
USES OF FUNDS	0.	0.	0.
FIXED CAPITAL EXPENDITURE	0.	0.	0.
NON-DEPRECIABLE ASSETS	0.	0.	0.
DEPRECIABLE FIXED ASSETS	0.	0.	0.
INTEREST DURING CONSTRUCTION	0.	0.	0.
CHANGE IN WORKING CAPITAL	0.	0.	0.
DEBT SERVICES	0.	0.	0.
REPAYMENT OF LONG TERM DEBT	0.	0.	0.
REPAYMENT OF SHORT TERM DEBT	0.	0.	0.
INTEREST ON LONG TERM DEBT	0.	0.	0.
INTEREST ON SHORT TERM DEBT	0.	0.	0.
DIVIDENDS	0.	0.	0.
CASH INCREASE OR (DECREASE)	1866.	2062.	2265.
BEGINNING CASH BALANCE	8572.	10438.	12500.
ENDING CASH BALANCE	10438.	12500.	14764.

Table 10-7 FUNDS FLOW STATEMENTS (1/2): CASE II

*** PAYMENT SYSTEM PROJECT IN KYRGYSTAN *** PAGE 1
FUNDS FLOW STATEMENTS
- BASE CASE (II) - (US$ 1000)

YEAR	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
SOURCE OF FUNDS	5254.	13642.	4386.	3004.	4575.	1762.	1157.	1324.	1497.	1678.
CASH GENERATED FROM OPERATION	0.	0.	0.	829.	1090.	996.	1157.	1324.	1497.	1678.
PROFIT AFT. TAX, BFR INT.	0.	0.	0.	-1599.	-1339.	-1433.	-1950.	-1783.	-1408.	-1228.
DEPRECIATION AND AMORTIZATION	0.	0.	0.	2429.	2429.	2429.	3107.	3107.	2906.	2906.
FINANCIAL RESOURCES	5254.	13642.	4386.	2174.	3485.	766.	0.	0.	0.	0.
SHARE CAPITAL	1576.	4093.	1316.	652.	1045.	230.	0.	0.	0.	0.
LONG TERM DEBT	3678.	9549.	3070.	1522.	2439.	536.	0.	0.	0.	0.
SHORT TERM DEBT	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
USES OF FUNDS	5254.	13642.	4386.	2663.	3974.	1255.	624.	624.	624.	624.
FIXED CAPITAL EXPENDITURE	5254.	13642.	4386.	2174.	3485.	766.	0.	0.	0.	0.
NON-DEPRECIABLE ASSETS	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
DEPRECIABLE FIXED ASSETS	5199.	13392.	3954.	2151.	3404.	642.	0.	0.	0.	0.
INTEREST DURING CONSTRUCTION	55.	250.	432.	23.	81.	124.	0.	0.	0.	0.
CHANGE IN WORKING CAPITAL	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
DEBT SERVICES	0.	0.	0.	489.	489.	489.	624.	624.	624.	624.
REPAYMENT OF LONG TERM DEBT	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
REPAYMENT OF SHORT TERM DEBT	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
INTEREST ON LONG TERM DEBT	0.	0.	0.	489.	489.	489.	624.	624.	624.	624.
INTEREST ON SHORT TERM DEBT	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
DIVIDENDS	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CASH INCREASE OR (DECREASE)	0.	0.	-0.	341.	601.	507.	533.	700.	874.	1054.
BEGINNING CASH BALANCE	0.	0.	0.	-0.	341.	941.	1449.	1982.	2682.	3555.
ENDING CASH BALANCE	0.	0.	-0.	341.	941.	1449.	1982.	2682.	3555.	4610.

Table 10-7 FUNDS FLOW STATEMENTS (2/2): CASE II

FUNDS FLOW STATEMENTS
- BASE CASE (II) - (US$ 1000)

YEAR	2005	2006	2007
SOURCE OF FUNDS	1866.	2062.	2265.
CASH GENERATED FROM OPERATION	1866.	2062.	2265.
PROFIT AFT. TAX. BFR INT.	-1039.	-773.	-570.
DEPRECIATION AND AMORTIZATION	2906.	2834.	2834.
FINANCIAL RESOURCES	0.	0.	0.
SHARE CAPITAL	0.	0.	0.
LONG TERM DEBT	0.	0.	0.
SHORT TERM DEBT	0.	0.	0.
USES OF FUNDS	1439.	1414.	1390.
FIXED CAPITAL EXPENDITURE	0.	0.	0.
NON-DEPRECIABLE ASSETS	0.	0.	0.
DEPRECIABLE FIXED ASSETS	0.	0.	0.
INTEREST DURING CONSTRUCTION	0.	0.	0.
CHANGE IN WORKING CAPITAL	0.	0.	0.
DEBT SERVICES	1439.	1414.	1390.
REPAYMENT OF LONG TERM DEBT	815.	815.	815.
REPAYMENT OF SHORT TERM DEBT	0.	0.	0.
INTEREST ON LONG TERM DEBT	624.	599.	575.
INTEREST ON SHORT TERM DEBT	0.	0.	0.
DIVIDENDS	0.	0.	0.
CASH INCREASE OR (DECREASE)	428.	647.	875.
BEGINNING CASH BALANCE	4610.	5037.	5684.
ENDING CASH BALANCE	5037.	5684.	6559.

Table 10-8 CONSOLIDATED PROJECT BUDGET DISBURSEMENT SCHEDULE (1/2)

(UNIT:1000 US$)

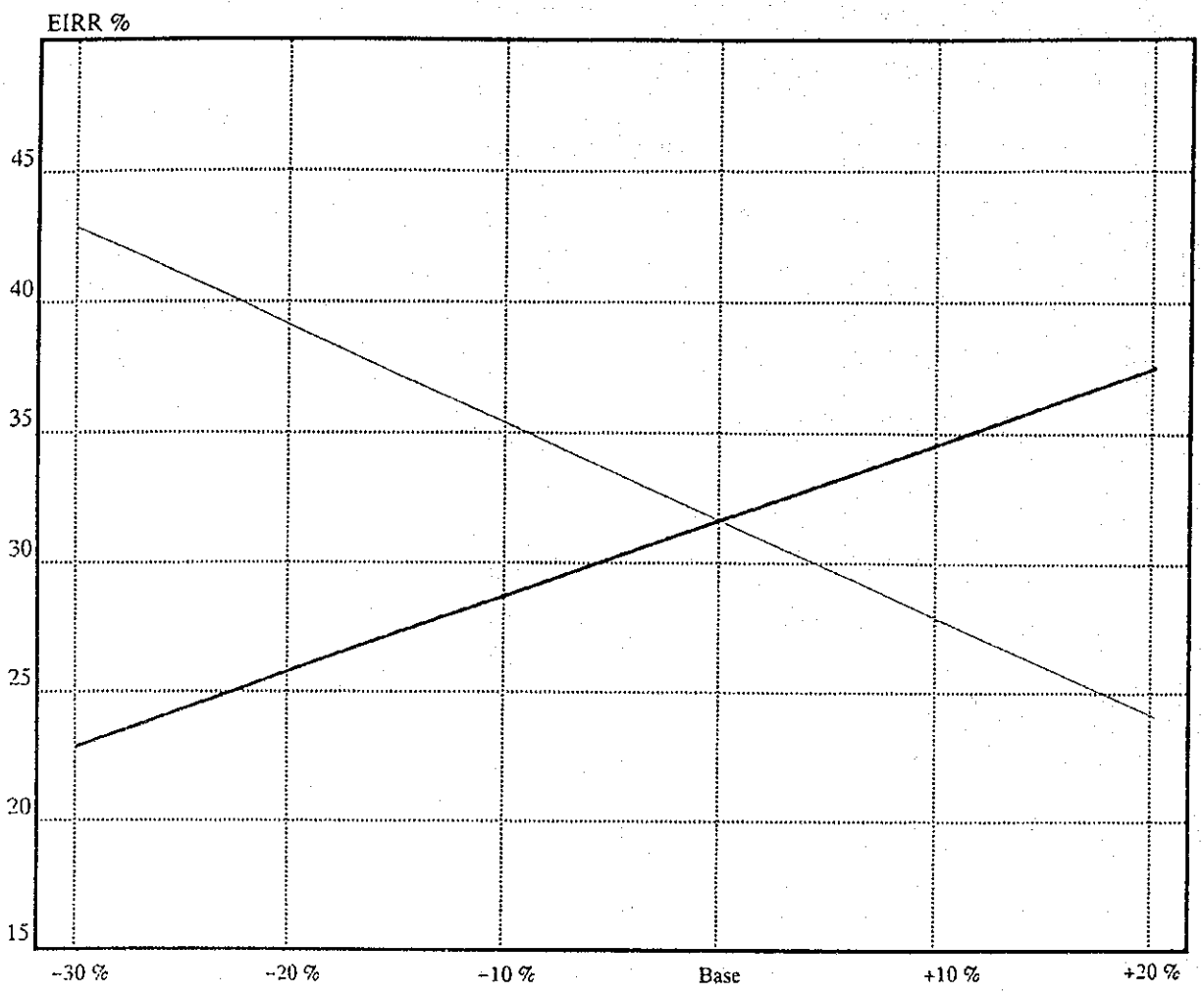
	1995			1996			1997			1998			1999			2000			TOTAL		
	F	L	TOTAL	F	L	TOTAL	F	L	TOTAL	F	L	TOTAL	F	L	TOTAL	F	L	TOTAL	F	L	TOTAL
I. MAN-MONTH ALLOCATION																					
1. SYSTEM ENGINEERS																					
(1) BASIC SOFTWARE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
(2) SOFTWARE DEVELOPMENT	113	0	113	221	0	221	81	0	81	36	0	36	60	0	60	0	0	0	511	0	511
(3) SYSTEM TRANSITION	0	0	0	0	0	0	0	48	48	0	24	24	0	20	20	0	28	28	0	120	120
(4) TEST	0	0	0	0	0	0	0	48	48	0	24	24	0	48	48	0	0	0	0	120	120
(SUB TOTAL)	113	0	113	221	0	221	81	96	177	36	48	84	60	68	128	0	28	28	511	240	751
2. INTERPLETER	16	0	16	24	0	24	12	22	34	12	12	24	12	16	28	0	6	6	76	56	132
3. NBK ENGINEERS	21	0	21	36	0	36	36	0	36	36	0	36	27	0	27	0	0	0	156	0	156
TOTAL	150	0	150	281	0	281	129	118	247	84	60	144	99	84	183	0	34	34	743	296	1039
II. ABSENCE FEE																					
1. SYSTEM ENGINEERS																					
(1) SOFTWARE DEVELOPMENT	1356	0	1356	2652	0	2652	972	0	972	432	0	432	720	0	720	0	0	0	6132	0	6132
(2) SYSTEM TRANSITION	0	0	0	0	0	0	576	0	576	288	0	288	240	0	240	336	0	336	1440	0	1440
(3) TEST	0	0	0	0	0	0	576	0	576	288	0	288	576	0	576	0	0	0	1440	0	1440
(SUB TOTAL)	1356	0	1356	2652	0	2652	2124	0	2124	1008	0	1008	1536	0	1536	336	0	336	9012	0	9012
2. INTERPLETER	256	0	256	384	0	384	544	0	544	384	0	384	448	0	448	96	0	96	2112	0	2112
3. NBK ENGINEERS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	1612	0	1612	3036	0	3036	2668	0	2668	1392	0	1392	1984	0	1984	432	0	432	11124	0	11124
III. TRAVEL EXPENSES																					
1. SYSTEM ENGINEERS																					
(1) SOFTWARE DEVELOPMENT	24	0	24	12	0	12	12	0	12	12	0	12	12	0	12	12	0	12	84	0	84
(2) SYSTEM TRANSITION	0	0	0	0	0	0	32	0	32	16	0	16	13	0	13	19	0	19	80	0	80
(3) TEST	0	0	0	0	0	0	32	0	32	16	0	16	32	0	32	0	0	0	80	0	80
(SUB TOTAL)	24	0	24	12	0	12	76	0	76	44	0	44	57	0	57	31	0	31	244	0	244
2. INTERPLETER	0	0	0	0	0	0	15	0	15	8	0	8	11	0	11	4	0	4	37	0	37
3. NBK ENGINEERS	14	0	14	24	0	24	24	0	24	24	0	24	18	0	18	0	0	0	104	0	104
TOTAL	38	0	38	36	0	36	115	0	115	76	0	76	86	0	86	35	0	35	385	0	385
IV. LODGING/PERDIEM ALLWCE																					
1. SYSTEM ENGINEERS																					
(1) SOFTWARE DEVELOPMENT	2	3	6	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	7	14	21
(2) SYSTEM TRANSITION	0	0	0	0	0	0	55	79	134	28	39	67	23	33	56	32	46	78	138	197	335
(3) TEST	0	0	0	0	0	0	55	79	134	28	39	67	55	79	134	0	0	0	138	197	335
(SUB TOTAL)	2	3	6	1	2	3	112	160	271	56	81	137	79	114	193	33	48	81	283	409	692
2. INTERPLETER	0	0	0	0	0	0	25	36	61	14	20	34	18	26	45	7	10	17	64	92	157
3. NBK ENGINEERS	95	0	95	162	0	162	162	0	162	162	0	162	122	0	122	0	0	0	702	0	702
TOTAL	97	3	100	163	2	165	299	196	495	232	100	332	219	140	359	40	58	98	1049	501	1550

Table 10-8 CONSOLIDATED PROJECT BUDGET DISBURSEMENT SCHEDULE (2/2)

(UNIT:1000 US$)

	1995			1996			1997			1998			1999			2000			TOTAL		
	F	L	TOTAL	F	L	TOTAL	F	L	TOTAL	F	L	TOTAL	F	L	TOTAL	F	L	TOTAL	F	L	TOTAL
V. CONTINGENCIES																					
1. SYSTEM ENGINEERS																					
(1) SOFTWARE DEVELOPMENT	477	0	478	930	0	930	342	0	342	153	0	153	253	0	253	1	0	1	2155	1	2157
(2) SYSTEM TRANSITION	0	0	0	0	0	0	66	8	74	33	4	37	28	3	31	39	5	43	166	20	186
(3) TEST	0	0	0	0	0	0	66	8	74	33	4	37	66	8	74	0	0	0	166	20	186
(SUB TOTAL)	477	0	478	930	0	930	474	16	490	219	8	227	347	11	359	40	5	45	2487	41	2528
2. INTERPLETER	26	0	26	38	0	38	58	4	62	41	2	43	48	3	50	11	1	12	221	9	231
3. NBK ENGINEERS	11	0	11	19	0	19	19	0	19	19	0	19	14	0	14	0	0	0	81	0	81
TOTAL	514	0	514	987	0	987	551	20	571	278	10	288	409	14	423	51	6	56	2789	50	2839
VI FACILITY INVESTMENT																					
(1) BASIC SOFTWARE	873	0	873	1771	0	1771	0	0	0	0	0	0	129	0	129	0	0	0	2773	0	2773
(2) HARDWARE	1272	0	1272	6216	0	6216	0	0	0	0	0	0	295	0	295	0	0	0	7783	0	7783
(3) AUXLIARY EQUIPMENT	398	2	400	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	398	2	400
(4) TRANSPRTN & HANDLING	36	2	38	134	5	139	0	0	0	19	1	20	19	1	20	0	0	0	189	8	197
(5) INSTALLATION	11	20	31	41	73	114	0	0	0	0	0	0	6	10	16	0	0	0	58	103	161
(6) CONTINGENCIES	259	2	261	816	8	824	0	0	0	2	0	2	45	1	46	0	0	0	1120	11	1131
TOTAL	2849	26	2875	8978	86	9064	0	0	0	21	1	22	494	12	506	0	0	0	12321	124	12445
VII OTHER INVESTMENT COSTS																					
(1) PREOPERATIONAL EXPCS	11	44	55	20	75	95	20	75	95	12	45	57	9	33	42	4	14	18	76	286	362
(2) CONTINGENCIES	1	4	6	2	8	10	2	8	10	1	5	6	1	3	4	0	1	2	8	29	36
TOTAL	12	48	61	22	83	105	22	83	105	13	50	63	10	36	46	4	15	20	84	315	398
VIII GRAND TOTAL	5122	78	5200	13222	170	13392	3655	298	3952	2012	161	2173	3202	202	3404	562	79	641	27752	990	28742

Figure 10-1 SENSITIVITY ANALYSIS OF EIRR



Chapter 11 Overall Evaluation and Proposals

Chapter 11 Overall Evaluation and Proposals

1. Overall Evaluation

(1) Economic Evaluation

The new payment system will make it possible, by means of a computer network with on-line, real-time communication, to accomplish settlement the same day or immediately. Therefore not only will settlement, be speeded up to settlement the same day, but the system will have a big impact in terms of vitalization not only of industry but of the entire national economy, including avoidance of the various kinds of settlement risk of up to now accompanying delay in settlement since settlement, which has been uncertain, will be made safe and certain.

1) Direct Effect

The biggest economic effect will be the effect of utilization of floating funds, the direct effect analyzed in the preceding chapter. In addition, the fact that in the new system settlement is accomplished by electronic message will make it possible to dispense with the making out of letters of advice, and the computerization characterizing the system will make it possible to substantially reduce the labor force presently engaged in settlement desk work. In view of such direct effects, the EIRR for the 10-year period from 1998, when the first phase will be implemented, to 2007 is calculated in terms of present prices as 32% in connection with the amount of investment, which is a very high internal rate of return, indeed. Additionally applying +/- 10% and +/- 20% sensitivity analyses, one still gets an EIRR of at least 24% and as high as 38% (including -30% of investments), and hence our evaluation of the project as one capable of having an extremely high direct economic effect.

2) Indirect Effect

(a) Implementation of the new payment system will also have a far-reaching indirect effect on the economy as a whole. Besides the effect of holding down inflation and the effect of improving enterprise management mentioned in the preceding chapter, it will have a

noteworthy effect on fostering and development of financial markets because financial markets cannot function properly without rapid, sure and safe settlement of payment of funds.

(b) Next, it can be said that development of the payment system will promote recovery of confidence on the part of enterprises and the people in financing and in financial institutions. It will be particularly helpful in terms of boosting savings.

(c) Development of the payment system will not only speed up settlement but also alleviate the various kinds of risk associated with retardation in settlement. Settlement of payments and receipt of remittances the same day will enhance awareness of fund management on the part of those who manage enterprises, thereby raising fund efficiency and will help to enhance the sense of responsibility on the part of managers for their actions.

(2) Financial Evaluation

1) Case I (See Tables 14-7 to 14-10 in the Main Report)

(a) System profit and loss status

Analysis forecasts that the operating loss would persist throughout the system life of ten years after implementation of Phase I of this project in 1998, or until 2007. The primary cause of loss would be large depreciation expenses. As of the end of 2007 when system life ends:

a) Ninety-four (94) percent of US$26,922,000 of applicable properties would have been depreciated, leaving undepreciated properties equivalent to US$1,820,000.

b) The net properties after deducting cumulative deficits of US$12,157,000 which are 42% of the equity, would be US$16,585,000.

c) Thus, if the system requires reinvestments for system renewal by 2007, additional funds need to be obtained. However, if the local software development capabilities can be established by that time, the additional funds required could be minimal or null.

(b) Cash Flow Situation

When income from fees starts coming in with implementation of the first phase of the new system in 1998, there will be realization of a profit before depreciation after deduction of the expenses that will occur in operation of the system. That will constitute a surplus cash balance, and each year thereafter the surplus cash balance will grow as a result of carrying forward of the profits before depreciation. Accordingly, as far as financing is concerned, no major problem is expected under Case I.

2) Case II (See Table 14-11 to 14-13 in the Main Report)

(a) System profit and loss status

a) As in the case of Case I, analysis forecasts that the operating loss would persist throughout the system life of ten years after implementation of Phase I of this project in 1998, or until 2007, but the loss would be much larger.

b) As of the end of 2007:

i) US$27,887,000 of applicable properties would have been depreciated, leaving undepreciated properties equivalent to US$1,820,000.

ii) The net properties after deducting cumulative deficits of US$18,883,000, would be US$9,970,000 in deficits.

iii The balance of un-paid long term debt will be US$ 18,350 (12% of the total paid amount)

c) Thus, up to 2007 when the system life ends, the project would not be financially viable as a private enterprise under Case II. However, this project is continuous and the deadline for repayment for loans should be extended up to 2027. Should the

second and third round investments be made to renew the system, steadily increasing fees from its beneficiaries and curtailing system re-investment costs through increased local software development capabilities could substantially improve the financial profitability of the project.

(b) Cash flow status

By 2007, as in the case of Case I, this project would produce profits before depreciation and a surplus cash flow position. No major cash flow issue would be expected under Case II.

3) Summary

(a) Under Case I in which all the funds required would be obtained through equity finance, no cash flow issue is expected because this project would produce profits before depreciation throughout the period from the implementation of Phase I of this project until 2007 when the system life of initial investments ends. In terms of financial profitability, undepreciated properties would reduce to as low as 6% at the end of 2007 and cumulative deficits would have decreased to 42% of the equity by that time, yielding a net property equivalent to US$16 million. Should Kyrgyz develop computer software locally, the cost for re-investment could be reduced by more than 50% and this project could be continued after 2007 without major re-investments.

(b) Under Case II in which 30% of funds required would be obtained through equity finance and 70% by long-term soft loans from international organizations, even a long-term (30 year), low-interest (3% per year) loan would not make this project financially profitable. After 2007 when the initial system must be replaced and before 2027 when loans have to be repaid, the profitability of this project would need to be thoroughly reconsidered including the second and third financing. After the second financing, however, the profitability

could be improved by steadily increasing fees from beneficiaries and local development of computer software.

By 2007, as in the case of Case I, this project would produce profits before depreciation and no major cash flow issue would be expected under Case II.

(c) Upon reviewing a preliminary report, the NBK pointed out that the costs of purchased hardware was sharply declining since the initial estimate was made. The NBK also requested that computer software be developed as a joint effort between local and foreign software developers. In response to this, we have prepared a new Case in addition to Cases I and II with revised cost estimates and financial analysis. The additional Case has been included as the supplement to this report.

(3) Social Evaluation

1) Effect of Implementation of the Project

(a) Closer Relations Between Banks and Enterprises and Other Bank Customers

(b) Increase in Deposits and Elimination of the Problem of Shortage of Funds

Development of infrastructure on the money side in the form of the financial and payment system is also necessary for recovery of confidence in financing and fostering of active interest on the part of the general public in savings as preparation for the future. Enterprises will have an easier time of it procuring funds invigorating their business activities.

(c) With development of the payment system, it will be possible for commercial banks to provide all sorts of financial services, such benefit will be enjoyed not only by enterprises but also by people in

general, and the standard of living will rise through savings of time and labor, creating leisure time by greater rationalization.

(d) Stimulation of Development of Computerization

It is to be expected that this project will be instrumental in making people in all walks of life aware of the usefulness and importance of computerization and how convenient, simple and easy use of computers really is, thereby stimulating development of computerization in various facets of life.

(e) Awareness of the Importance of Service Industries

With development and improvement of that system, understanding and recognition of the need for and importance of services in general will increase among people which could trigger development and growth of service industries.

(f) Development of Telecommunications Network

If Kyrgyz's telecommunications infrastructure is improved as a derived effect of development of the payment system, there will be an enormous impact in many respects, that can be expected to contribute as well to remolding of the country's industrial structure, giving birth to the kind of new information industry.

(g) Impact of the Surveys

In the seminars held and visits made to commercial banks and enterprises during the two field studies carried out in this study, the importance and necessity of development of the financial and payment system was well understood and appreciated to everyone interested and concerned and particularly people at financial institutions and enterprises.

(4) Technical Evaluation

In the computer hardware systems, software structure, telecommunications network system field, and peripheral area, it is expected to provide development personnel on the Kyrgyz side with educational and training opportunities through their participation that will result in further enhancement of their capacities.

1) Accumulation of systems operation and management know-how
2) Technical evaluation as a result of the Study
   (a) Inducement of computerization among commercial banks
   (b) Inducement of computerization among public corporations

(5) Overall Evaluation

As we have seen, not only is the new payment system project judged to be more than feasible financially, but the economic benefit of implementation of the new payment system will be enormous in view of the fact that settlement the same day on an on-line, real-time basis will set free large amounts of floating funds that have been held up to now because of retardation of settlement, as reflected by the extremely high calculated EIRR: 32%. In other words, it is considered that the direct economic effect of speeding up of settlement will be very great indeed.

Furthermore, reduction of settlement risk, coupled with such speeding up of settlement, is expected to have a very great far-reaching and ramified indirect effect on the economy as a whole in terms of control of inflation, improvement of enterprise management, etc. Additionally, development and improvement of the financial and payment system will help to restore the general public's confidence in financing and financial institutions and make banks seem closer and friendlier, which in turn will have a salutary effect on inclination to save and lead to larger savings deposits in banks.

Boosting of savings is the most important national task for economic development as the first link in the chain "more savings --> more investment --> expansion of consumption --> expansion of production." Moreover, development of the payment system will make diversification of financial services possible, thereby contributing to raising of the standard of living by increasing convenience, creating more leisure time and so on.

Finally, as for the technological aspect, the computer network of this project represents a network system on a scale not yet experienced in Kyrgyz. As a system making use of the latest technology, it will not only contribute to raising of the technical level of the technical personnel and others directly and indirectly involved in the project but will also promote rationalization and greater efficiency of work processing by stimulating computerization of the whole economy. Furthermore, it is expected to contribute to the fostering of related branches, including the computer hardware and software industries, and to creation of more new employment opportunities.

2. Proposals

The improved payment system will have a broad and inestimable impact on the activation of Kyrgyz economy. So to speak, the improved payment system is important for shifting to a market economy.

In order to materialize the improved payment system toward the year 2000, we would like to make the following proposals.

(1) Construction of a new payment system through computer networks and its materialization

1) Necessity of cooperation by all the persons involved in the improvement of payment systems including commercial banks

2) Preparation of telecommunication circuits and preferential use

3) Legal preparation relevant to electronic documents

4) Positive participation in payment system by the Central Bank

5) Establishment of promotion organization in the Central Bank

6) Organization of the "Improved Payment System Committee" (tentative name)

7) Establishment of a training center

8) Cooperation from commercial banks

9) Operation through self-help efforts by charging commissions from beneficiaries through operation and management after installation

10) Procurement of introduction funds

(2) Subjects concerned with the Government

1) Preparation of basic laws

2) Preparation of various relevant laws

3) Establishment of special governmental financial organizations (for development, long-term financing and financing for small and medium-sized companies)

4) Establishment of organizations for promoting preparation of improved financial systems

(3) Subjects of the Central Bank

1) Firm maintenance of independency and neutrality

2) Supervision of commercial banks

3) Effective implementation of financial policy and encouragement of money markets

4) Positive participation to the improved payment system

5) Reinforced internal system

(4) Supervision and guidance by the Central Bank, and subject of commercial banks

1) First of all, it is necessary for them to attempt reinforcing deposit in the sector of fund procurement and to be released from excessive dependence of the Central Bank.

2) Commercial banks are requested to decrease bad loans as soon as possible through enhancing their ability to screen and supervise borrowers' creditability.

3) To discourage the relationship with specific companies, in particular, with national enterprises for mutual sharing of stocks.

4) Securing thoroughgoing principles as commercial banks and to complete the awareness of the management on their own responsibility.

5) Systematization, rationalization through computerization and standardization of internal business work

6) Reorganization of branch networks mainly targeting deposit increase

7) Encouragement of level-up of human resources

8) Promotion of free competition among banks

9) Application to diversified financial services

10) Application to internationalization

11) Establishment of Medium and Long-term Finance Institutions