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# National Bank of Ethiopia



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## MODERNIZATION OF THE NATIONAL PAYMENT SYSTEM IN ETHIOPIA

### Part 3

### Vision and Strategic Framework

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**Jan Woltjer**

Consultant on payments and securities settlement

**Leila Elmasry and Vladislav Babin** (IT-consultants)

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### **List of Abbreviations**

AACO	Addis Ababa Clearing Office
ACH	Automated Clearing House
ACSI	Amhara Credit and Saving Institution
ADB	African Development Bank
ADSL	Asymmetric Digital Subscriber Line
ATM	Automated Teller Machine
BFWA	Broad Band Fixed Wireless Access
CBE	Commercial Bank of Ethiopia
COC	Clearing Office Committee
CPI	Consumer Price Index
CPO	Cashier's Payment Order
CPSIPS	Core Principles for Systemically Important Payment Systems
CPSS	Committee for Payments and Securities Settlement
CSD	Central Securities Depository
DESCI	Dedebit Credit and Saving Institution
DVP	Delivery versus Payment
EASSy	Eastern Africa Submarine cable
ECP	Electronic Cheque Presentation
ECX	Ethiopian Commodity Exchange
EFT	Electronic Funds Transfer

EFTPOS	Electronic Funds Transfers at Point of Sale
EFY	Ethiopian Fiscal Year
EICTDA	Ethiopian Information and Telecommunication Technology Development Agency
ETA	Ethiopian Telecommunication Authority
ETC	Ethiopian Telecommunication Corporation
GDP	Gross Domestic Product
IBFEM	Inter-bank Foreign Exchange Market
ICT	Information and Communication Technology
IFAD	International Fund for Agriculture Development
IFMIS	Integrated Financial Management Information System
IMF	International Monetary Fund
IP	Internet Protocol
ISIN	Internal Security Identifying Number
MFI	Micro-Finance Institution
Mbps	Megabit per second
MICR	Magnetic Ink Character Recognition
MIS	Management Information System
MSE	Micro and Small Enterprise
MW	Megawatt
NBE	National Bank of Ethiopia
NGO	Non-Governmental Organization
NPS	National Payment System
OCR	Optical Character Recognition
OTC	Over The Counter market
PASDEP	Plan for Accelerated and Sustained Development to End Poverty
PKI	Public Key Infrastructure
POS	Point of Sale
PVP	Payment Versus Payment

RFP	Request For Proposal
RSP	Remittances Service Provider
RTGS	Real Time Gross Settlement System
RUFIP	Rural Financial Intermediation Program
SACCO	Savings and Credit Corporative Office
SEPA	Single European Payment Area
SLA	Service Level Agreement
SSS	Securities Settlement System
STP	Straight Through Processing
SWIFT	Society for Worldwide Inter-bank Financial Telecommunication
USD	United States Dollar
VPN	Virtual Private Network

## 1. Introduction

The Vision and Strategic Framework is the third report drafted within the framework of the modernization of the National Payment System in Ethiopia. The first or Inception Report was meant to lay out the project structure and project governance and define overall critical success factors for the project. In the second report a thorough and comprehensive stocktaking of the socio-economic background and the infrastructure for payments and financial markets was conducted. The stocktaking report describes the supply of key utility services as telecommunication and electricity, the existing legal framework for payments and the structure of the financial sector in Ethiopia. It analyzes the strength and weaknesses of the existing payment systems and payment instruments and the conduciveness of the external environment for the modernization of the National Payment System (NPS). A description of the different financial markets is given and the report indicates in which stage of development these markets are. Important issues for the modernization process are highlighted in the Stocktaking Report.

In this third report a vision and strategic plan is developed for top-level consultation. Based on this report the discussion will focus on:

- (i) The mission statement for the modernization process;
- (ii) The guiding principles;
- (iii) Main Strategies;
- (iv) Business process modeling and architecture of the future NPS;
- (v) The strategic plan for modernization of the NPS;
- (vi) The implementation plan.

In chapter 2 the *mission statement (chapter 2)* is defined and an overarching vision is given on the desired end state of the envisaged NPS: about what the modernization process shall achieve and when it should be completed.

*Guiding principles* are dealt with in chapter 3. Guiding principles are a prerequisite for the development, deployment and management of the NPS. Their aim is to dispel any ambiguities about the roles, responsibilities, ownership and participation of different

stakeholders in the NPS and avoid confusion about different payment system processes. Once agreed upon the principles become non-negotiable and the basis upon which disputes and conflicts will be solved.

The *main strategies* (chapter 4) form the basis for working out the strategic plan for a new NPS. In this chapter policy recommendations are made on issues as: (i) risk reduction; (ii) promotion of the access to banking and payment services; (iii) enlargement of the electronic networks of commercial banks and the interoperability of these networks.

In the *business process modeling and architecture* (chapter 5) major issues such as the role of electronic data exchange are discussed. For the settlement of retail payments the advantages and disadvantages of a centralized and decentralized clearing and settlement infrastructure are laid out. The overall architecture of the clearing and settlement infrastructure is discussed and due consideration is given to the type of network used for communication in the payments and securities settlement area.

Taking into account the mission statement and the objectives for the modernization of the NPS, as well as the strategies and proposals for the business modeling and architecture, a *strategic plan* is drafted. In the outline of the strategic plan in chapter 6 the core elements of the strategic plan are defined and worked out in more detail in chapter 7.

Since the present infrastructure for payments is in a rudimentary stage the modernization of the NPS will require a large amount of work and investments. Taking into account the scarce financial resources and available manpower, as well as the need to reduce initial losses in the infrastructure for clearing and settlement, priorities have to be set and the implementation of the strategic plan has to be carefully planned. In chapter 8 a proposal is made how to set priorities and an *implementation plan* is drafted.

If the NBE, the Steering Group and the National Payment Council agree on the vision, guiding principles, objectives, main strategies and implementation plan, they shall be put in a Memorandum of Understanding (MOU) that will be signed by all parties involved.

## 2. Mission Statement and Vision

In the inception report the objectives and expected results were defined for the Modernization of the NPS (see annex 2). Based on these objectives and expected results the mission of the National Payment System (NPS) modernization and the foundations on which it will be built can be formulized as follows:

### **Mission statement**

The mission of the modernization of the National Payment System in Ethiopia is to develop an efficient, reliable and safe infrastructure for payments and securities settlement that:

- (i) complies with international standards and best practices;
- (ii) fits into the Ethiopian environment and takes into consideration Ethiopian customs and business practices and fully supports the needs of the users;
- (iii) is cost effective and affordable for its users;
- (iv) buoys up international remittances and financial markets;
- (v) is conducive to the development of the Ethiopian Economy.

This shall lead to concrete results that are defined in the following overarching vision:

### **Vision**

*On its way to a cashless society in the Ethiopian year 2010<sup>1</sup> Ethiopia shall have in place a modern payment infrastructure that not only effectively supports the emerging financial markets and monetary policy but also forms the heart of a developed market for retail payments. The new National Payment System will cover the whole country and will offer the users a broad range of modern payment instruments. In 2010 at least two third of all households will have access to these financial services.*

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<sup>1</sup> The Ethiopian year 2010 starts mid 2018 on the Gregorian calendar

The Ethiopian fiscal year (EFY) 2010 is chosen to have a clear but realistic target that: (i) takes into account the technical skills, knowledge, and capacity in the banking industry; (ii) recognizes that non-cash payment instruments other than cheques are virtually non-existent at present; (iii) the two existing payment systems are outdated; (iv) the legal framework is inadequate and has to be updated drastically; and, (v) acknowledges that financial markets still have to be developed.

The vision makes clear that, next to the effective support of the emerging financial markets in Ethiopia, the ultimate goal of the NPS modernization project is to broaden the access of the public to financial services and gain further momentum in the development of the banking industry by, among others, developing the market for retail payments. In this context the goal is to redouble the access to payment services and at least two third of all house holds in Ethiopia shall have opened an account with a commercial bank or MFI in the EFY 2010.

### **Strategic approach**

The approach to implement the modernization project shall be *strategic* rather than *operational*. In a pure operational approach the changes targeted – in the main – are those that address clearly recognized problems whereas the strategic approach addresses such problems too but also exploits additional improvement opportunities such as those stemming from efficient use of technology and tries to develop markets and payment services.

### 3. Guiding Principles

The determination of guiding principles is a prerequisite for the development, deployment and management of the NPS. These principles cover certain areas such as cooperation, competition and access, responsibilities and risk management. They form in some sense the constitution for the NPS. Once agreed upon the principles become non-negotiable and form the basis upon which possible disputes and conflicts will be solved. The NBE shall set procedures to monitor the effects of the guiding principles and, if necessary, make proposals to update them.

#### *Cooperation*

##### **Collaborative approach**

The development of the NPS infrastructure is a co-operative responsibility and the commitment and active participation of all stakeholders should be ensured. A safe, reliable and fast NPS infrastructure is crucial for the development and smooth functioning of the economy and financial sector and the development of financial markets. All stakeholders will therefore loyally cooperate to achieve the objectives and goals of the NPS modernization project. A special role in this process will be played by the banking community. Banks are the key players in the NPS due to their central role as payment services providers.

##### **The National Bank of Ethiopia takes the lead in the modernization process**

Due to its overall responsibility for a sound currency the central bank has a central role in the development of the use of money as an effective means of payment. It will take the lead in the modernization process, establish a proper project structure and project management and ensure that all stakeholders will be involved in the project.

##### **The development of a NPS is an evolutionary process.**

The NPS has to adapt continuously to future challenges, technological developments, changing needs and possible threats. Also after the modernization project is completed and the final goals are achieved the central bank will still play a central role as overseer

of the National Payment System and as catalyst for change and development. It will establish a permanent framework for consultation, cooperation and decision taking that will ensure the awareness of stakeholders of payment issues and developments and the adequate adaptation of the NPS to a changing environment and demands.

**A right balance will be established between cooperation and competition**

Competition between banks is at the heart of the financial system. However, a good balance has to be found between competition and cooperation on the building of a commonly used infrastructure and the standardization of payment instruments.

*Competition and access*

**The access to the NPS will be open and fair**

Access criteria should encourage competition and should promote efficient and low cost payment services. However, the advantages of open access should be weighted against the need to protect systems and their participants against excessive legal, operational or financial risks brought forward by the participation of an institution or group of institutions. If for this reason it is deemed necessary to restrict the access, these restrictions should be objective, based on appropriate criteria and all access criteria should be publicly available and transparent.

**Level playing field in the NPS should be achieved**

Banks and other payment service providers allowed to participate in the infrastructure, compete on equal footing. All banks licensed by the NBE to be active in the payment area and fulfill the access criteria are eligible to clear and settle under their own name. The NBE as overseer and leader of the modernization process may also allow other institutions to participate in the systems if that is in the interest of the Ethiopian community as a whole.

**Interoperability of networks is the cornerstone of the NPS**

An infrastructure for payments is all about networks economies. By connecting the networks of individual banks optimal convenience and practicability for the users will be achieved while for the banking industry economies of scale and efficiency gains can be

realized. Therefore banks should be willing to connect their networks. No incentives should be built in that prevent customers to send payments to clients of other banks or using the ATM and POS network of other banks, for instance by charging prohibitive fees for such activities. Neither should a bank charge such prohibitive fees to another bank for inter-bank transfers.

### **Freedom of choice for customers is a keynote to the NPS**

Customers have the right to choose their bank freely or to change banks. They should be able to route all incoming and outgoing payment flows via the payment account they have with the bank of their choice. They should not be forced to open an account with the bank of their employer under a payroll scheme or with the bank chosen by the sender of the payment such as pension funds. If the beneficiaries have opened an account with another bank the payments should be distributed by the bank of the sender/payer/employer via the inter-bank clearing and settlement infrastructure.

### *Costs and sharing of investments*

#### **Investment in the common infrastructure will be shared**

Participants contribute to the investments in the common infrastructure.

#### **Recovery of costs**

Inter-bank payment and securities settlement systems should operate cost effectively and should, after the markets have reached maturity, recover all costs.

### *Responsibilities*

#### **The NBE provides settlement services to banks and the government**

The NBE acts as the banker of banks and the cashier of the government. Settlement of inter-bank payments takes place in central bank money.

#### **Banks are eligible to provide clearing and settlement services to the public**

Clearing and settlement of payments is the exclusive domain of banks and other institutions licensed by the NBE to provide payment services and to participate in the inter-bank clearing and settlement infrastructure.

## *Risks*

### **Settlement is subject to the availability of funds**

All inter-bank settlements require sufficient funds. Banks shall monitor and manage the liquidity in their settlement account closely and take appropriate actions to ensure timely settlement.

### **International standards and codes and best practices will be observed**

The payment and clearing and settlement systems for securities shall observe international standards and best practices, such as: the CPSS-Core Principles for Systemically Important Payment Systems; the CPSS-IOSCO Recommendations for Securities Settlement systems; the CPSS-IOSCO Recommendations for Central Counterparties and the CPSS-World Bank General Principles for International Remittances Services.

### **The NBE shall oversee the infrastructure and instruments**

In line with international standards and its mandate the NBE shall act as overseer of the infrastructure for payments and settlement systems and payment instruments and shall ensure compliance with international standards and codes. The infrastructure shall be under surveillance and all payment system providers, inside or outside the NBE, shall discuss possible changes in the system architecture with the NBE and report immediately possible incidents to the overseer if they may occur. Periodically, system providers shall submit a report on the turnover in their systems and on other relevant aspects. Also participants in the systems can be requested to provide information on payments and securities settlement related issues. The NBE will set up a database that will cover inter alia the turnover in the systems, incidents, use of the different payment instruments, figures on branch networks, access of the public to banking services etc. Periodically, it will publish an overview of the infrastructure and progress in the modernization project.

### **A balance is maintained between risk reduction and costs**

The cost of risk reduction strategies should be justified in terms of the potential systemic risks they aim to address.

## 4. Main Strategies

In this chapter three main strategies are presented that will highly affect the design and structure of the new NPS. The strategies are:

1. To reduce the risks in the present infrastructure and especially in the clearing of cheques;
2. To promote access to banking and payment services and double the amount of households with a payment or saving account;
3. To enlarge the electronic network of banks and ensure the interoperability of networks of individual banks.

### 4.1 Risk reduction

Due to the lack of effective risk management measures in the clearing of cheques, the present infrastructure exposes the banking industry to liquidity risk, credit risk and systemic risks. The present system is used, among others, for large value and time critical payments (average value of a cheque: Birr 87.557 or around 30 times the national income per capita) and is with a turnover of 108% of GDP systemically important. According to the Core principles for such systems the risk should be contained. To reduce the risk in the AACO there are two options:

1. Implement effective risk-management measures to contain all the risks in the present clearing of cheques;
2. Reduce the volume in the clearing and shift payments to other more safe systems.

***Option one:*** Implement effective risk management measures to contain the liquidity, credit and systemic risk in the AACO.

Explanation: The present AACO system clears and settles cheques issued in Addis Ababa on a deferred multilateral basis.<sup>2</sup> However, no risk management exists “to ensure the timely completion of daily settlement in the event of an inability to settle by the participant with the largest single settlement obligation”<sup>3</sup>. No liquidity and loss-sharing arrangements are in place to ensure timely settlement, neither are debit or credit caps set to limit the risk. Also other measures, for instance, strengthening the legal framework, dissemination of information on the risks participants are exposed to, automation of the processing etc. have to be taken to ensure compliance with the Core Principles<sup>4</sup>.

Implementation of adequate risk management measures To ensure compliance with the Core Principles for the AACO might be costly and difficult. Observance of Core Principle V on timely settlement can be very costly for any netting system (independent of the type of instruments cleared and whether it is large value or retail), when the banking sector is highly concentrated and the largest participant processes high value payments on a daily basis<sup>5</sup>, as is the case in Ethiopia.

Moreover, it is very difficult for a Clearing and Settlement System for Cheques to comply in full with the Core Principles for Systemically Important Payments Systems due to the returned cheque procedures that delays the finality<sup>6</sup> and the difficulties in this type of systems to place a limit on the maximum settlement obligation of participants<sup>7</sup>. Participants cannot manage the payment flows in a cheque system.

Special Cheque procedure Without adequate risk management measures in the AACO itself, the presenting banks should not be allowed under the present special cheque

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<sup>2</sup> The system uses no netting in the sense that the amount to be paid by a participant to all other participants and the amount to be received from all other participants are settled separately

<sup>3</sup> See Core Principle V

<sup>4</sup> See the “Assessment of observance of the AACO of the CPSS-Core Principles for Systemically Important Payment Systems”, Annex 1 of the Stocktaking report

<sup>5</sup> See IMF and the World Bank, “Guidance note for Assessing Observance with the Core Principles for Systemically Important Payment Systems (CPSIPS)”, Washington, 2001, p.17 point d

<sup>6</sup> See CPSS, Core Principle IV, “the system should provide prompt final settlement on the day of value preferable during the day and at a minimum at the end of the day”

<sup>7</sup> IMF/World Bank, 2001, p.17 point e

procedures to credit the accounts of the beneficiary prior to the moment on which the settlement of the inter-bank clearing outcome becomes irrevocable and final. Special cheques are for inter-bank clearing and settlement incorporated in the settlement matrix of the AACO via so called “vouchers”. These vouchers are normally included for settlement one or several days after the cheque is honored and the presenting bank has credited the account of the beneficiary. This brings forward that collecting banks are exposed to credit and liquidity risk during at least one and maybe several days, the period in which there is no certainty that the paying bank will be able to fulfill its obligations in the clearing, while they have already credited the cheques to the account of their customers. How large the risk is, is not known exactly, but the amount of cheques cleared via the special cheque procedure is possibly huge (in some cases up to 50% of all cheques presented by a bank). If a paying bank fails to settle, a complex legal issue will arise around the question who will bear the losses: (i) the beneficiary who in that case has to pay back the received funds; (ii) the bank of the beneficiary who has already credited the account of his client but has not receive the funds in the clearing; or, (iii) the payer who has still an payment obligations since the first transfer was not final. Both the beneficiary and the payer will claim that the payment is final and that the liability to pay is fulfilled. The problem will be even more complex when the funds are already used by the beneficiary to fulfill his own payment obligation.

However, abolition of this facility without having an alternative would deteriorate the service level and would not be in line with the needs of the users, who like to reduce the settlement time and have the funds available as fast as possible.

***Option two: Reduce the volume in the AACO by shifting payments to other systems***

Reducing the volume and value in the clearing means simply reducing the risks. There are three ways to reduce the volume and value of cheques cleared in the AACO:

1. Shifting large value payments to an efficient and safe large value payment system;

2. Introducing an on line real time express payment service for time critical payments;
3. Develop a range of modern retail payment instruments as an alternative for the use of cheques.

**Sub 1 Shifting large value payments to a large value payment system** The most effective way would be to shift large value and time critical payments to a large value payment system, preferably an RTGS system that complies in full with the Core Principles for Systemically Important Payment Systems. Large value cheques are especially initiated by the government and the banking industry itself. After the new RTGS system will be established a code of conduct could be agreed under which the National Bank of Ethiopia, Commercial Banks and the Government will not issue any longer cheques above a certain specified amount or will not issue any cheques at all. For specified categories of large value payments, for instance for transaction in the inter-bank financial markets, no cheque will be used under any circumstances. In the aforementioned situation the payments have to be settled directly in the new large value system.

**Sub 2 Express payment services for time critical payments** Time critical payments as they are now cleared and settled via the so-called “special cheque procedures” could possibly also be settled on line real time via a so called *express payment service facility*<sup>8</sup> for customers in the new large value environment. Such a facility opens the possibility to customers to request their bank to arrange an immediate final settlement of the payment with notification to the beneficiary and the payer by telephone or SMS. This kind of service makes it possible to arrange delivery versus payment in the trading sector or in the industry. Immediately, on the notification of the receipt, the goods will be released by the seller. It can even be arranged that the payer will be notified by the bank of the seller by telephone or

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<sup>8</sup> This kind of services is in place in certain countries for instance the Netherlands and in Hungary

SMS after the payment is received and providing him with a code or password that can be used to pick up the goods at the warehouse.

There are two ways to initiate the express payment: the first possibility is that it is initiated by the payer, requesting his own bank to make an express payment via the large value system with telephonic notification to the beneficiary of the receipt, for instance to release goods such as cars etc that are bought (credit push). The request could be made by using a special credit-transfer order form that is delivered to the bank, or by using telephone, SMS or internet to send in the order to the bank. The bank of the payer is obliged to execute the payment immediately and same day funds for the recipient should be ensured.

The other method is using the present debit pull. In this case the present special cheque procedure will be changed and cheques presented by the beneficiary to his bank for quick settlement shall, after being presented to the bank of the drawer/payer and after being honored by the receiving bank, be settled by the receiving bank via the express payment facility in the RTGS-system to ensure a final payment with same day funds. After having received the payment, the bank of the beneficiary will immediately credit the account of the beneficiary in his books and notify his customer. In both ways the present credit risk in the special cheque procedure is eliminated while also the turnover in the AACO will possibly decrease substantially.

**Sub 3 Developing alternative retail payment instrument** A third way to reduce the amounts of cheques is to introduce alternative retail payment instruments, such as credit transfers, payroll schemes, direct debits etc. Developing such products will not only reduce the risk in the present cheque clearing by replacing cheques but is also a goal on its own. The new payment instruments will bring down costs for the banking sector and their customers, shorten the settlement period and reduce the amount of float in the infrastructure. Due to the cumbersome clearing and settlement procedures, the cheque is for all parties involved the most time

consuming and expensive retail payment instrument to fulfill a payment obligation. The introduction of a broad range of other payment instrument will satisfy better the needs of the users due to their convenience and shorter settlement time of these instruments. Alternative retail payment instruments will also influence the attractiveness to open a bank account for special groups (see par 4.2). Last but not least, alternatives for the cheques will promote the trust of the public in non-cash payment instruments since the confidence in the cheque in Ethiopia is low due to the relatively high amount of bounced cheques.

#### **Policy recommendation on the reduction of risks**

In order to reduce the risks in the existing infrastructure it is recommended to shift all large value and time critical payments which, at present, are cleared and settled via the AACO to a new large value payment system and to develop alternatives for cheques in the retail area (option 2). The new large value payment system should clear and settle on a real time gross basis (RTGS) and should fully comply with the Core Principles for Systemically Important Payment Systems. If the volume and value of the cheques to be cleared in the AACO still remains large, measures have to be taken to reduce the risk in this system and to ensure the timely settlement.

## **4.2 Enlargement of access to banking and payment services**

Access to banking services in general and to payment services in special is an important goal. A larger access to banking services could lead to an increase in savings and internal mobilization of funds in Ethiopia. It will promote the economic development, while on the other hand it will increase the volume in the systems and makes it possible to realize economies of scale and bring down costs in the payment area. At present, only 4% of the population or around 20% of households have opened an account with a commercial bank. Ethiopia is therefore one of the most under-banked countries in the world even for Sub-Saharan standards.

However, access to payment services in rural areas is almost non-existent at the moment since most of the branches of commercial banks are established in more densely populated centers and other providers of financial services such as the MFI's are not connected to the payment infrastructure. The following measures could be taken to enlarge the access to payment services:

1. Connect the MFI's to the inter-bank payment infrastructure and promote the development of payment services in this sector that fits the need of the rural population. Connection of the MFI's and development of payment services within the MFI's would broaden the outreach of the payment system substantially. MFI's have around 2.2 million customers and that would broaden the customer base for payment services in potential from 3.4 million to 5.6 million, reaching around one third of all households. It will also bring forward that the rural area are covered by the new NPS.
2. Develop payroll schemes and start as soon as possible with payroll schemes for government employees. If government employees would open an account to receive their wages via a bank account, the customer base could grow around 10% and even more if also large government enterprises and social benefit and pension schemes are involved in the promotional action. In most western countries payroll scheme have brought forward an exponential grow in the number of bank clients and in some countries, at present, almost all households have access to banking services. However, this promotional action of payroll schemes will only be successful if banks offer terms and conditions for account holders and payment services that are attractive for the employees involved in these payroll schemes. Otherwise, there might be a tendency for the new customers to withdraw immediately the full amount of their wages, the moment they will receive it in their account. This has happened in some countries in Latin America.
3. The development of efficient bill payment facilities might be convenient and thus attractive for customers. At present, they have to go in person to the tellers of utility companies, insurance companies or the government to pay their bills or taxes. This might be a time consuming activity since long waiting queues may

exist on days when everybody has to fulfill his payment obligations. Opening of a bank account and to pay recurrent payments by using standing orders or direct debits could save a lot of time for customers. These payment instruments will reduce drastically the processing costs for banks and the collecting costs for companies receiving the payments.

4. Develop a good infrastructure for electronic funds transfers for a cost-effective distribution of remittances all over the country. Compared to other distribution methods for remittances such as the use of a local agent network this will reduce the costs for this type of cross border payments substantially. Reducing costs brings forward that the beneficiary will receive more money (higher net amount) due to lower fees and thus, encourage households receiving recurrent payments from abroad to open a bank account or an account with an MFI. Lower costs will also form an incentive for Ethiopians abroad to send more money to their friends and relatives.
5. Develop retail bank products for households such as housing loans (mortgages), consumer credits etc. In these cases the consumer will normally open a bank account or an account with an MFI on which his salary is paid in etc.
6. Broaden the existing branch network and reduce the traveling time to visit a branch of a bank or an MFI. At present in the rural area some customers have to travel more than 20 kilometers.

Comments: With respect to the linking of the MFI's to the central clearing and settlement infrastructure there are three possible solutions:

- (i) to connect the head offices of MFI's to a central inter-bank clearing and settlement system for retail payments and give the head offices the possibility to open an account with the NBE for settlement purposes;
- (ii) to establish a central service organization for MFI's that connects the MFI's to the central clearing and settlement infrastructure, routing the payments to the individual MFI's, support them with the development of in-house payments services and offers liquidity management services to the MFI's. The central

- service organization will participate in the payment infrastructure for retail and large value and opens a settlement account with the NBE;
- (iii) the implementation of a two tiered system in which the MFI's will be connected via one or more commercial banks that act as clearing member(s).

#### **Policy recommendation to enlarge the access to payment services**

In order to achieve that in EFY 2010 around two third of the households have access to payment and other banking services an active strategy should be developed that includes the connection of MFI's to the payment infrastructure.

### **4.3 Enlargement of electronic networks of individual banks and interoperability of networks**

Payment systems is all about network economies and the benefits for all parties will be the largest if the network is as large as possible and, ideally, covers the whole country. However, the present outreach of the electronic networks of individual banks is still limited since only a minor part of the branches are connected to the core banking systems of their head office<sup>9</sup>, especially outside Addis Ababa. Furthermore, at present, the payment infrastructure in Ethiopia is heavily fragmented. The networks of the different banks are not inter-connected via an efficient inter-bank clearing and settlement structure for retail payments. Although, it is possible for some customers to send a payment to a customer of another bank, this transfer is extremely cumbersome due to the paper based design of the Bankmaster system of the NBE that will be used for inter-bank settlement of the payment. Due to the design of the latter system no straight through processing (STP) is possible, even if both involved bank are able to receive and to process electronic funds transfers.

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<sup>9</sup> Core banking systems are applications responsible for processing and posting transactions in the domain of payments, current and saving accounts, loans and securities. They perform current and deposit accounting, maintaining loan accounts, holding securities positions and clearing payments. Core banking systems normally support modern payment facilities such as Electronic Funds Transfers (EFT), Automated Teller Machines (ATM), Electronic Funds Transfer at Point of Sales (EFTPOS) and e-banking and form the interface with inter-bank clearing and settlement systems outside the bank for instance a local RTGS, an Automated Clearing House (ACH) or a Central Switch for card transactions

Also the existing networks for ATM's and POS terminals are not connected and the network of an individual commercial bank cannot be used by clients of other banks.

**Policy recommendation to enlarge the electronic networks of individual banks and ensure interoperability**

To realize economies of scale, support the needs of the users, enlarge the convenience for customers and have in place a payment infrastructure that covers the whole country:

- The networks of the different banks should be improved. Banks that do not have a core banking systems should implement one. Where necessary the existing core banking systems have to be upgraded to ensure speed, quality and availability;
- The networks should be extended by connecting all the branches to the core banking systems of their head office;
- The networks of the different banks should be connected via an efficient inter-bank clearing and settlement infrastructure and the interoperability of the networks of ATM's and POS terminals should be ensured.

## 5. Business Process Modeling and Architecture in the New NPS

### 5.1 The central role of electronic data exchange in the new NPS

Data exchange between the system providers and the participants in the systems

At the moment, in Ethiopia electronic data exchange is not used in the infrastructure for clearing and settlement of inter-bank payments. The clearing of cheques is fully manual and paper-based, including the link between the AACO and the Bankmaster system, the large value payment system of the NBE. Also the NBE Bankmaster system itself is fully paper based. Participants (commercial banks and government agencies) have to send in payment orders via letter of instructions. Information on settled incoming and outgoing payments and balances in the account at the end of the day is sent by the NBE on the following morning to the participants also on paper.

In order to enhance efficiency, reduce costs and enlarge speed in modern large value payment and securities settlement systems, communication between the system provider and the participants in the system is based on electronic data interchange in standardized formats sent through public data transmission networks.

In the clearing and settlement of retail payments too, internationally electronic data exchange is used more and more to exchange information between the system provider and the participants and to send in payment orders for inter-bank clearing and settlement.

In order to speed up the clearing process electronic data exchange is also used in the clearing and settlement of cheques to exchange information on cheques presented to other banks (Electronic Cheque Presentation). Cheques but also other paper based payment orders are for that purpose captured in electronic formats via so called Optical Character Recognition (OCR) or Magnetic Ink Character Recognition (MICR) techniques. In some countries even an electronic image of the cheque is exchanged instead of the exchange of the physical cheque.

### **Policy recommendation with respect to electronic data exchange between banks and system providers in the new NPS**

Electronic data exchange should be central in the new NPS in order to:

- (i) enhance efficiency in the clearing and settlement;
- (ii) reduce the settlement period;
- (iii) promote straight through processing; and;
- (iv) allow banks to receive on line real time information.

In the large value and securities settlement area, information on balances and for reconciliation purposes should be exchanged via standardized electronic messages and the present paper based payment order in the large value system of the NBE should be fully replaced by an electronic funds transfer. Also in the retail area the exchange of paper should be reduced as much as possible for inter-bank clearing and settlement.

### **Data exchange between the commercial banks and their customers<sup>10</sup>**

In the new NPS environment customers will still be able to use paper based payment orders and cheques. They can still send in credit transfer orders or cheques by post or deliver them directly to his or her bank for processing and collecting. The bank is responsible for the conversion into electronic formats for inter-bank processing if, in case of a credit transfer order, the beneficiary has an account with another commercial bank or, in case of a cheque, the issuer of the cheque has an account with another bank.

However, customers should have also the possibility to use public telecommunication channels to send in electronically payment orders to their bank and to get electronically information on payment flows and balances in their accounts (inquiries). These communication channels will be, among others, telephone, SMS and internet. Also ATM's could be used to initiate a credit transfer by the customer. To reduce costs and to offer convenience to their customers, some banks in Ethiopia are already implementing this kind of facilities and establish electronic bank networks that make use of the aforementioned communication channels for exchange of information between

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<sup>10</sup> Or between other licensed payment service providers and their customers

themselves and their customers. At present these communication channels are not yet used for sending in payment orders but it is expected that this facility will be implemented in the near future as e-banking and e-commerce will develop.

**Policy recommendation with respect of data exchange between banks and their customers in the new NPS**

It is recommended to allow customers to use as well as paper-based as electronic funds transfers in the new NPS. Whereas paper-based documents have to be converted into an electronic format for inter-bank processing, it is recommended to standardize the paper forms used by the clients in such a way that the information can be captured easily and convert into electronic formats using Optical Character Recognizing or Magnetic Ink Character Recognition technology.

In case of electronic data exchange minimum standards should be set for authenticity, integrity and confidentiality and access controls. Fraud or other problems in an electronic network of one bank can easily deteriorate public confidence in the whole payment infrastructure even if other banks may use a far higher level of security. These so called “negative third party effects or spillovers” can be avoided by setting minimum security standards. Bank networks should also be protected adequately against unauthorized access and measures should be taken to prevent phishing<sup>11</sup>.

## **5.2 Centralized clearing and settlement of large value payments**

At present, the clearing and settlement of large value via the NBE Bankmaster system is fully centralized. Only the head offices of the different commercial banks have opened a settlement account in the books of the NBE. A centralized system supports liquidity management within a commercial bank and supports the execution of monetary policy. For that reason also in the new NPS the clearing and settlement of large value payments will be based on a centralized clearing and settlement system located at the premises of

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<sup>11</sup> Phishing is a fraudulent process of attempting to acquire sensitive information such as usernames, passwords and credit card details from the customers using different techniques, for instance using fake emails and websites to fool users/customers and give them the illusion that they communicate with their bank

the NBE in Addis Ababa. Only head offices of the commercial banks and government agencies will be connected to the new Real Time Gross Settlement-system (RTGS)<sup>12</sup>.

### **5.3 Centralized versus decentralized clearing and settlement of retail payments other than cheques**

There are two possible structures for the clearing and settlement of retail payments other than cheques:

1. A centralized clearing and settlement structure in which all head offices are connected to a central clearing and settlement system (for instance an Automated Clearing House or ACH). The Head offices collect all outgoing payments (payments to be sent to customers of other banks) and transfer them to the clearing and settlement system for retail payments. They receive back from the system all incoming payments and distribute them to their branches or update their central database to which the branches have access. The clearing and settlement system is connected to the large value payment system of the NBE for settlement purposes and settlement takes place via the settlement accounts, the head offices have opened in the books of the NBE (centralized liquidity management).
2. A decentralized clearing and settlement infrastructure in which the branches of each bank are connected to a regional ACH. The regional ACH is normally connected to a regional branch of the central bank for settlement purposes where the branches have opened a settlement account. To ensure the settlement of payments between bank customers in one region/area and customers in another region so called “regional ACH links” are established.

#### ***Advantages and disadvantages of a the different concepts***

In a centralized system the head offices have implemented a so called Core Banking System and have in place a central data-base. The branches are connected to their head office and can use the central data base and are able to update the database if necessary due to transactions at the teller of their branch (withdrawals, deposits etc).

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<sup>12</sup> Depending on the decision to be taken possibly also MFI's might be given access (see par. 4.2).

A centralized clearing and settlement infrastructure for the clearing and settlement of other retail payments than cheques is preferable since:

1. The majority of commercial banks (eight out of twelve banks) in Ethiopia has already implemented centralized internal systems by implementing a core banking system at the head offices level and is in the process to connecting the branches to the central system. Most of the other banks will follow soon;
2. A centralized structure facilitates central liquidity management. Banks can concentrate their liquidity in the settlement accounts held with the NBE and automatically liquidity shortages in some branches are compensated by surpluses in others. For an individual commercial bank a lower level of liquidity is sufficient. This will be in line with the present situation where only head offices have opened settlement accounts with the NBE;
3. In a decentralized structure the branches (or regional head offices) have to open an account with the regional branch of the central bank for settlement purposes. However, the NBE has no branch network;
4. Central liquidity management is more cumbersome for commercial banks in a decentralized design and might complicate also the execution of monetary policy;
5. A centralized design enlarges the grip of the bank management on their branches and promotes the availability of adequate and accurate management information and information for banking supervision and monetary policy;
6. Banks are connected via their core banking systems in their head office connected to SWIFT<sup>13</sup>, allowing them to receive remittances send in via the international correspondent network and distribute them to the customers of their branches via the internal network. Since branches do not have a connection to SWIFT, in a decentralized network internal payments including remittances have to be cleared and settled via regional ACH-links;

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<sup>13</sup> Only a very few specialized branches of the largest banks, normally not more than one or two, have a SWIFT connection, but this is more an exception than a rule since a SWIFT connection is costly

7. A decentralized infrastructure is more costly to implement since multiple (regional) systems have to be established. The system is also more complex due to the regional ACH links and thus more expensive to operate.

**Policy recommendation with respect to clearing and settlement structure for retail payment instruments than cheques**

A centralized clearing and settlement structure for retail payments other than cheques should be established since this fits the Ethiopian situation the best and is the most economical solution.

#### **5.4 Centralized versus decentralized clearing of cheques**

Centralized clearing and settlement of cheques is more difficult to arrange. In theory it is possible, if Electronic Cheque Presentation (ECP), and Cheque Truncation and Cheque Imaging are allowed under the legal framework and no physical exchange of cheques is prescribed any longer under the Ethiopian law. If, however, the present legal framework could not be adapted or the cheque imaging is deemed too expensive, regional clearing offices could be established for the exchange of physical cheques. These regional cheque clearing offices should calculate a matrix of incoming and outgoing payments for all banks that participate in the regional clearing via their branches in that region, according to the rules and regulations of the AACO. This matrix should be sent electronically at the same day to the AACO that is located at the premises of the NBE in Addis Ababa where it should be integrated in the clearing matrix of the head office of the AACO itself and settled at the designated time via the accounts of the commercial banks with the NBE. For returned cheque the same procedure can be used.

**Policy recommendation with respect to the clearing of cheques**

To ensure that the cheque can be used also outside Addis Ababa and can be cleared and settled efficiently within a settlement period of two or three days, it should be studied whether a centralized cheque clearing with cheque imaging is feasible or whether a network of regional cheque clearing offices should be established.

## **5.5 Overall architecture of the new NPS<sup>14</sup>**

If the financial markets emerge and the market for retail payments matures there is a need for clearing and settlement facilities for:

- Large value and time critical payments (RTGS);
- Clearing and settlement facilities for securities (SSS);
- Switching and clearing and settlement of card operations conducted in ATM's and POS-terminals (Central Switch);
- Clearing and settlement of cheques (Cheque Clearing);
- Clearing and settlement of all other retail payment instruments (ACH).

The RTGS-system settles all large value payments on a gross basis. The RTGS forms the heart of the infrastructure and all other systems settle their payment flows in this system, either on gross or on a (multilateral) net basis. The Central Switch processes card-based inter-bank operations. It is connected to all ATM's and POS-terminals of the different commercial banks and the system switches requests for authorization automatically to the core banking system of the bank where the cardholder has its account. It also calculates the commission banks owe each other for the use of the facilities of other banks and, depending on which option is valid, calculates the net balances resulting from these operations and sends this to the RTGS for settlement. The cheque system clears and settles cheques either on a centralized basis using cheque imaging or as a system in which the central cheque clearing system is linked to a set of regional clearing centers (see paragraph 5.5). The ACH clears and settles all other retail payments. Settlement normally takes place on a multilateral net basis at a designated time(s) during the day but could also be executed on a batch basis with each batch settled gross. The Securities Settlement System is connected to the RTGS to settle the cash leg on a delivery versus payment (dvp) basis in which delivery of securities occurs, if and only if a payment takes place and vice versa. Clearing and settlement can be executed on a netting basis, both on the securities side and on the cash side (net-net), on a gross basis on the securities side and on

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<sup>14</sup> This paragraph is taken over from Dr. Leila Elmasry and Eng Vladislav Babin, "Phase 2: Technological Design of the NPS", Addis Ababa, February 2009, page 6-12

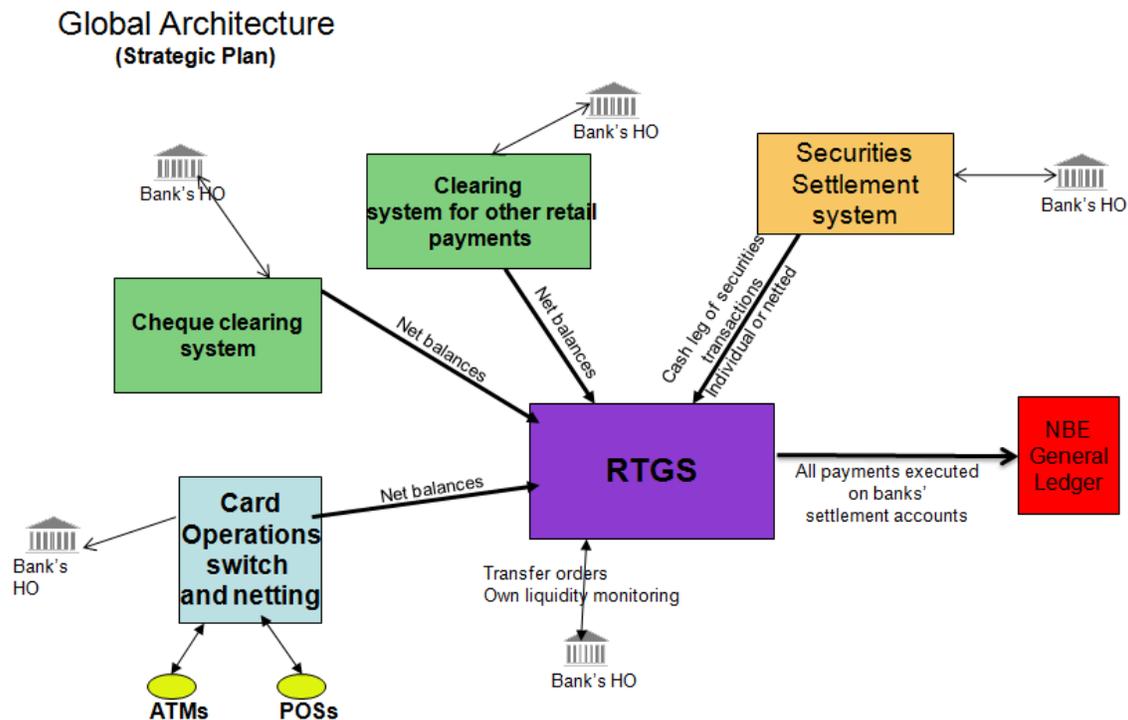
a net basis on the cash side (gross-net) and on a gross basis as well on the securities side as on the cash side (gross- gross).

There are three options to arrange these entities in the NPS:

- 1) The stand alone architecture for retail payments;
- 2) A clearing system for cards and an Automated Clearing House (ACH) for all other retail payments;
- 3) A fully integrated clearing and settlement infrastructure for retail payments.

**Option 1: The stand alone architecture for retail payments**

In the stand alone option there are specialized entities for the clearing and settlement of card payments, cheques and other retail instruments. Most European countries have adopted this option, because the volume of transactions in each system is extremely high. This results from a percentage of account holders close to 90% of the population as well as laws regarding the mandatory use of scriptural payment instruments for most transaction categories.



The advantages of this stand alone architecture for retail payments are:

- The total independence of the various modules, which facilitates their implementation in a phased way;
- This independence allows settlement of a given category of cleared payments even in case of failure of the other set-ups, provided that the settlement system (RTGS) is in operation.

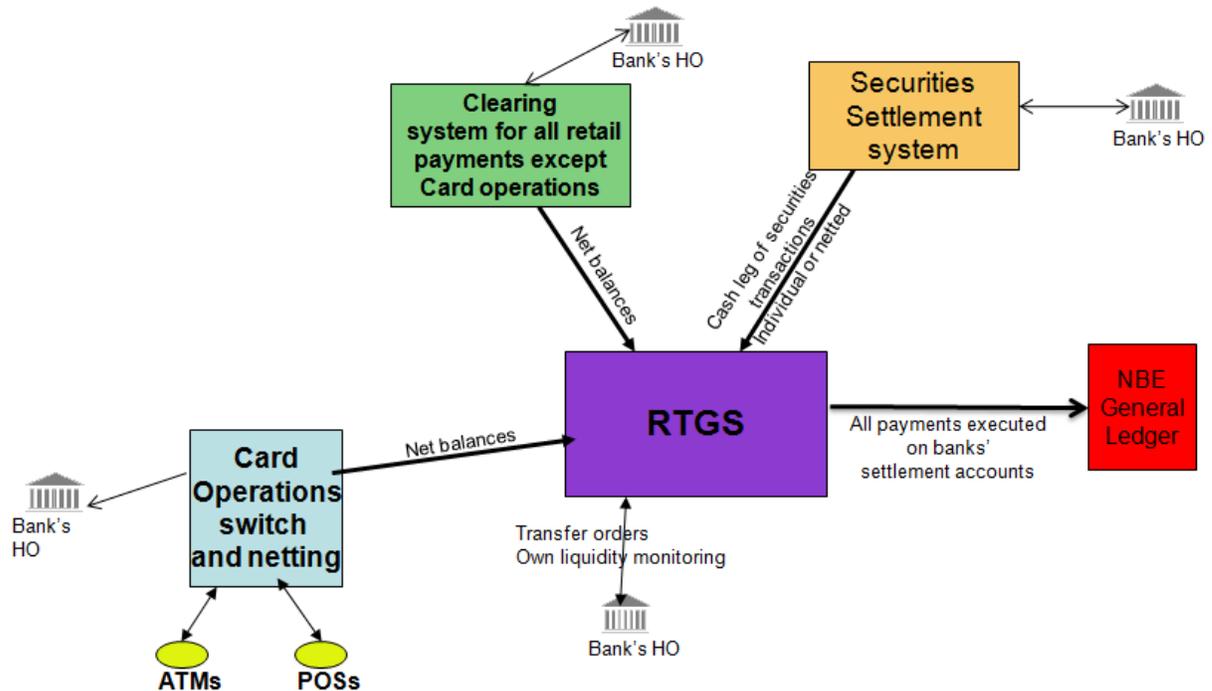
The disadvantages are:

- Cost: each module runs on a totally separate configuration even though volume of transactions in Ethiopia cannot justify this cost;
- Management effort: each system has to be operated and managed separately;
- Telecommunications requirements: in addition to the link with the RTGS and the SSS, participating banks need to have links with three different systems;
- Load on RTGS: The RTGS receives three separate lists of net balances to settle, in addition to the exchange with the SSS.

Option 2: A central Switch that clears all card payments and an integrated ACH for all other retail payments

In this option there is only a specialized clearing and settlement system for card payments while all other retail payment instruments are cleared and settled by the Automated Clearing House (ACH). In Africa, Libya and Algeria and the eight West African countries managed by BCEAO have adopted this structure. It is also in place in the United States of America and in some European countries.

## Global Architecture (One clearing system for cards and one for all others)



The advantages of this global architecture are:

- The separation of cards operations from other retail payments can be justified by the proper nature of these operations that usually need faster settlement. It is to be noted that even though clearing balances of card operations are calculated by the Switch, the operations still need to be sent to the banks in order for them to post them to their customers' accounts;
- The cost of one of the systems (that of check clearing) is eliminated, as well as its management effort;
- Banks have one less telecommunications link to set up and RTGS receives one list of net balances to settle for retail payments (except card operations) instead of two.

The disadvantages are:

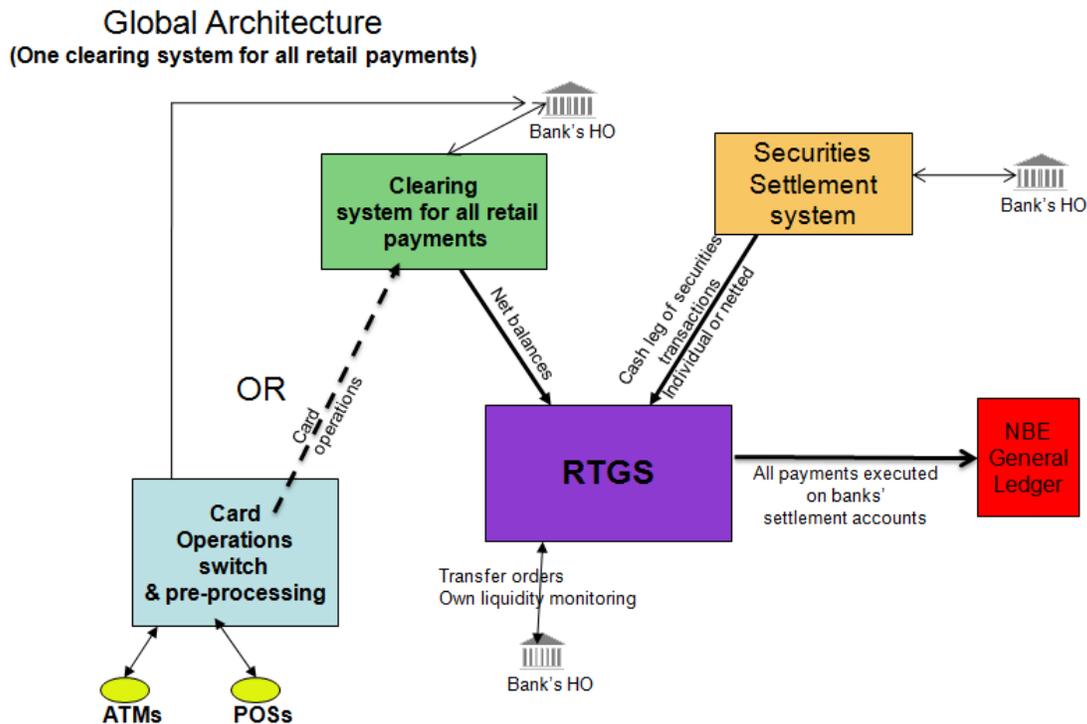
- Cost: two separate configurations (one for the cards and one for all other retail payments categories) may not be justified by the volume of transactions in Ethiopia;
- Management effort: two systems have to be operated and managed separately;

- Telecommunications requirements: in addition to the link with the RTGS and the SSS, participating banks need to have links with two different clearing systems;
- Load on RTGS: The RTGS receives two separate lists of net balances to settle, in addition to the exchange with the SSS.

The fact that check operations are combined with other retail instruments cannot be considered as a disadvantage.

**Option 3: A fully integrated clearing and settlement infrastructure for retail payments**

In this option all payment instruments are cleared by one entity that calculates a settlement matrix on a multilateral netting basis and sends the clearing results to the NBE for settlement. The Central Switch for Card payments concentrates on routing the requests for authorization and verification to the bank of the cardholder and on the calculation of the interchange fees bank owe each other for the use of ATM's of other banks. Most African countries have adopted this structure in order to reduce the cost and management effort. In addition, it represents the present trend in Payment System design.



The advantages of this architecture are:

- One single list of net balances is sent to the RTGS for settlement, which relieves the banks from having to watch their liquidity several times during the same business day and the system itself to have interfaces with several others;
- The card operations switch's functions are reduced: the system would switch request for authorization between the card processing systems of the commercial banks involved. It only calculates the interchange commissions and sends the operations and the commissions to banks' Management Information System (MIS). The card transactions can either be sent to the Clearing system directly from the card switch after pre-processing (calculation of interchange commissions) or the transactions of clients of other banks conducted in the network of a commercial bank could be sent by the owner bank itself together with other retail payments;
- In terms of cost, system management effort, telecom requirements and load as well as RTGS performance and banks' treasurer liquidity management effort, this architecture is the most optimized.

The disadvantages are:

- This architecture imposes the ACH clearing system to be implemented just after the RTGS, i.e. before all other modules dealing with retail payments. It should be functionally designed to process all types of retail operations and then each of them would be introduced/ activated when the upfront part of the process is ready;
- The capacity and operation security features are to be increased as compared to other architecture options.

**Policy recommendation with respect to the overall architecture of the new NPS**

In a mature market for retail payments a fully integrated architecture for retail payments is the most adapted to the Ethiopian environment and the most economic.

## 5.6 The communication network<sup>15</sup>

### Development of a virtual private network versus the use of SWIFT

To exchange data electronically in the new National Payment System between the system provider and the participants in the NPS there are two options: (i) to build a proprietary network or Virtual Private Network (VPN); or, (ii) to use the existing SWIFT network.

SWIFT operates a worldwide financial message network which exchanges messages in a highly secured way between banks and other financial institutions. SWIFT is also active in Ethiopia and most of the Ethiopian banks are connected to the SWIFT-network<sup>16</sup>. In the payment area SWIFT is especially used for large value payments and to exchange information on payments in the international correspondent banking network. In some of the developed countries the National Real Time Gross Settlement System (RTGS) is fully based on communication via the SWIFT-network.

A VPN can be used to separate the traffic of different user communities over an underlying network using leased lines or the public telecommunication facilities via ADSL and dialup connections. Normally, for clearing and settlement activities, a VPN uses strong security features such as restricted access, encryption and other measures to ensure integrity and authenticity. A VPN can be used for different clearing and settlement activities, such as large value payments, transactions in securities, card payments, cheques and other retail payments between banks (interbank), as within a bank (intrabank or inhouse clearing and settlement). It can also be used for other communication purposes between banks and the central bank, between commercial banks and between a head office and its branches for instance for regulatory reporting activities, inquiries and updating of central databases of the credit information bureau etc., making the initial investment more cost-effective.

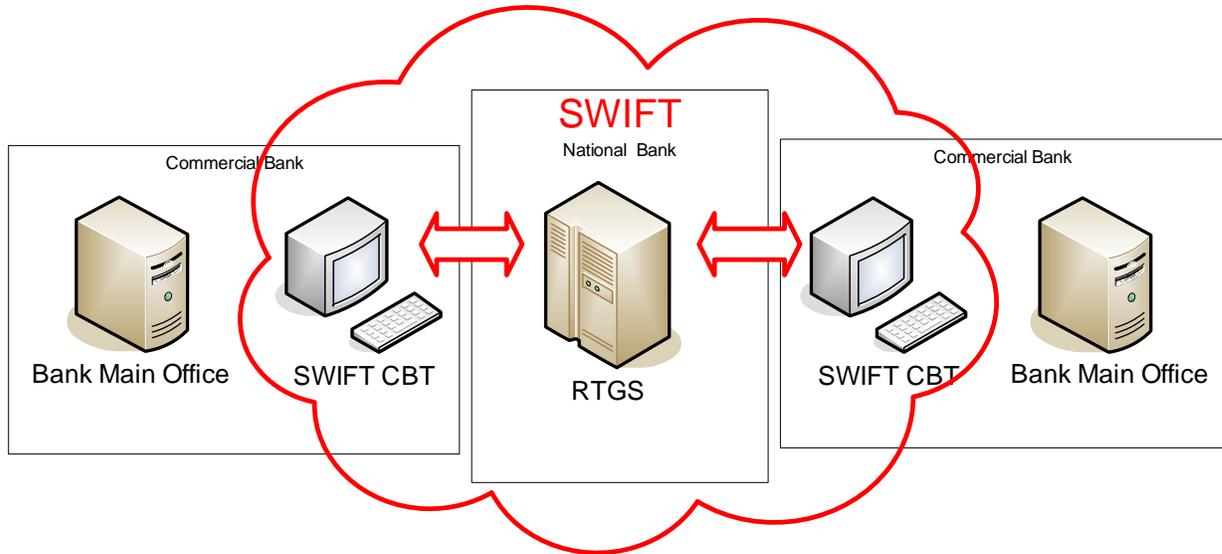
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<sup>15</sup> This paragraph is a summary of the report of Dr. Leila Elmasry and Vladislav Babin, "Phase 1, Assessment of the Technology Situation and Recommendations", p 30-44

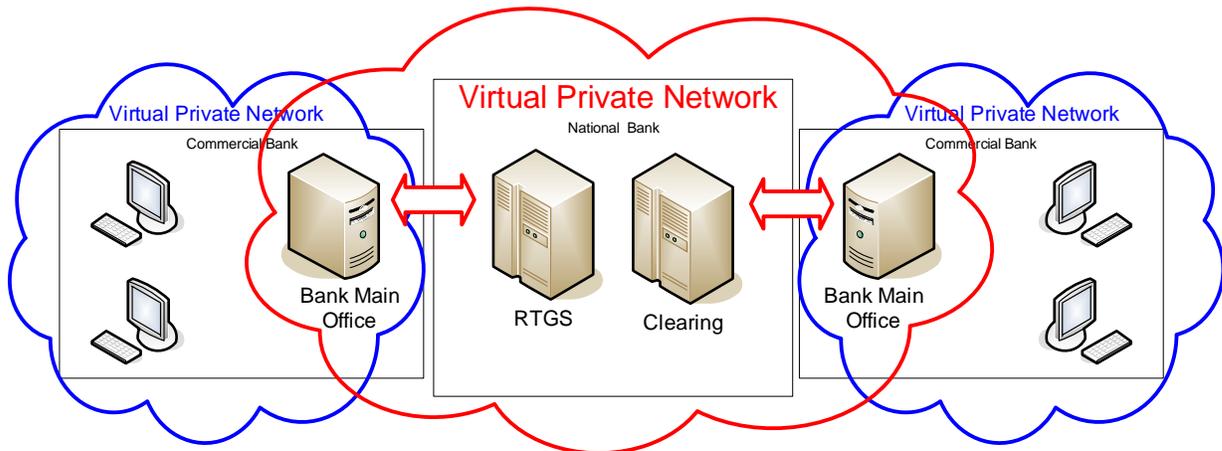
<sup>16</sup> At present two banks do not have a direct connection and make use of the SWIFT service bureau

The advantages of the SWIFT-network are that it is an existent network that is highly secure, reliable and has implemented standardized payment messages. The disadvantages are that the use of SWIFT is costly; next to a service fee, a message based fee has to be paid, whereas in case of a VPN prices can be negotiated with the telecom provider.

**RTGS using the SWIFT-network**



**Multiple clearing systems using VPN**



Especially, for retail payments where volumes are high but the average value low transaction fees forms a barrier for the use of SWIFT. The SWIFT-network is also less flexible than a VPN. A VPN can not only be used for a broad range of settlement services and other communication needs, it can also be used for a broad range of communication services such as telephone, email, video conferencing etc.

An additional complicating problem for the use of SWIFT is that government entities are not connected to SWIFT. At present around 560 government agencies have an account in the large value payment system of the NBE.

#### **Policy recommendation on the type of communication network used**

It is recommended to build a private network (VPN) and to use the SWIFT channel as a contingency facility in case the VPN is not available. Therefore NPS components should support communication with participants both through VPN and through SWIFT-net simultaneously and communication should be based on SWIFT message formats.

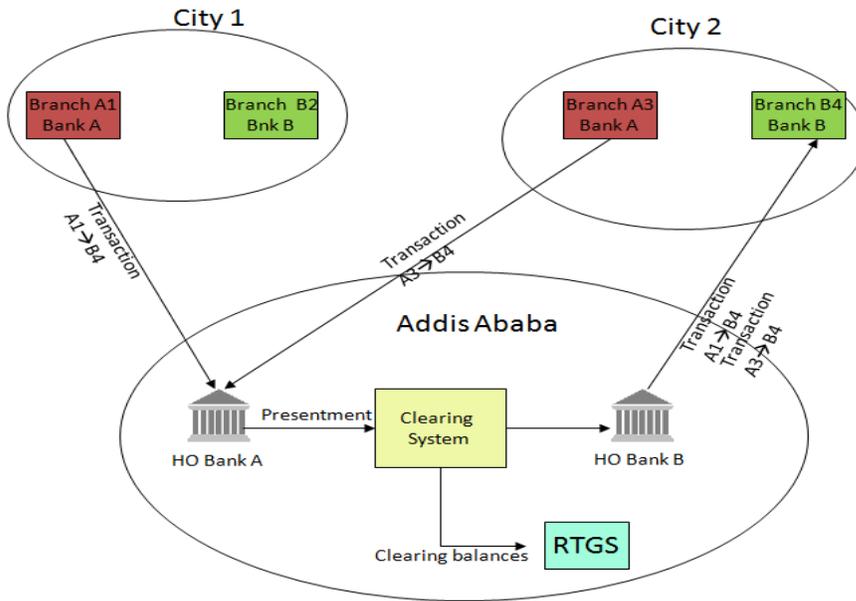
#### **Design of the private communication network**

The communication system provides connections between the different systems and between the participants and the different systems. With respect to latter the architecture of the VPN can be based on:

- Centralized access points;
- A network of decentralized access point.

#### **VPN with centralized access points and centralized communication between system providers and participants**

In the centralized access design the architecture of the VPN is characterized by the provision of one access point for each bank to each of the different systems. Normally, the head office where the central processing center is located is connected via the communication network to these systems. Branches send in their payment or securities settlement order via an intra-bank network to the head office and the head office conveyed them to the relevant system (RTGS, ACH or SSS).

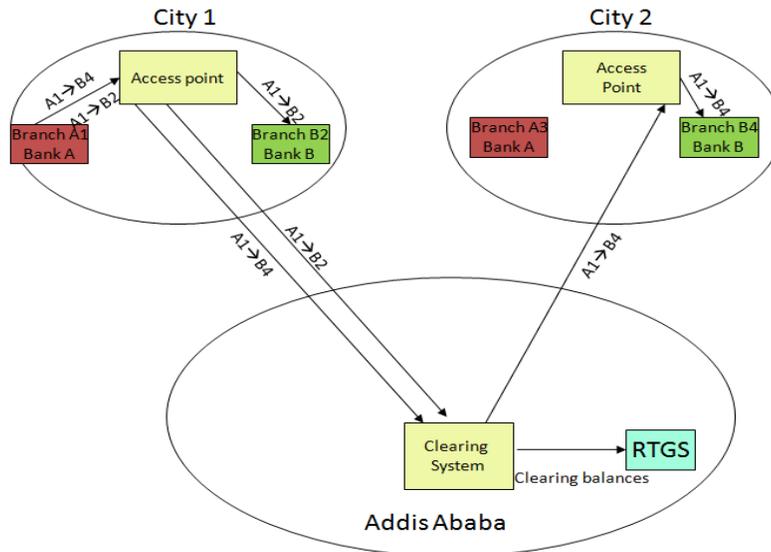


The centralized access design makes the VPN relatively easy to build since it connects only entities located in the capital and the necessary investment are relatively low. However, the effectiveness and the outreach of the NPS is in this design fully dependent on the performance of the intra-bank communication networks of the individual commercial banks (speed, number of branches connected, quality of this networks etc.) and of the quality of their core banking systems.

The centralized access architecture has been adopted by most European countries and the USA where commercial banks have advanced intra-bank networks and core banking systems.

### **Architecture of the VPN with decentralized access points and direct communication between clearing systems and branches of banks**

In the VPN design with decentralized access points there are several regional access points to the system. They can be set especially in the cities with most payment activities, but can also be located at strategic points in the rural areas to connect the MFI's. Banks head offices and branches can link to the geographically closest access point to send their



operations to the ACH. No processing occurs at the access points, which are just facilities to reach the system. For instance all retail payment transactions are sent directly by the branch to the ACH to be included in the calculation of clearing balances, which are in turn sent by the ACH to the RTGS for settlement. Although, branches can directly communicate with the ACH and maybe with the SSS if there might be a need, the settlement of their transactions will still be settled via the account of their head office with the NBE (central liquidity management).

In this design it is not mandatory that banks already have implemented an intra-bank network or having connected all their branches to their head offices. For the time being, branches, not connected to their head office, will submit their operations to the clearing system through a link established with the closest access point. If the telecom link between bank branches and the access point fails, they can present their operations for clearing on physical media at the access point. Head offices of the banks in Addis are linked to the system through Addis Access point (which is most probably located at the premises of the NBE).

The advantages of the VPN architecture with decentralized access point are:

- It reduces the requirements in terms of telecom links capacity and performance;

- It does not require that all banks have installed a VPN for intra-bank communication between branches and the head office. Therefore it creates more flexibility for the banks and takes into account that at present not all banks have an intra-bank network in place or, if there is a network, not all branches are connected;
- Banks and other payment providers can still opt for the time being for a fully decentralized organization in which their branches send the operation directly to the clearing system in stead of sending them via the head office as will be done in a centralized commercial bank organization;
- Country wide coverage can be achieved more faster if adequate and affordable telecommunication and electricity facilities are available in all parts of Ethiopia and will not be subordinate to the connection of branches to their head offices;
- If banks have an intra-bank network in place the NPS communication network can be used as a backup for the communication between the head office and the branches;
- Banks that chose for a centralized banking organization and want to install an intra-bank network or need to upgrade their existing network can opt to use this NPS-network for the communication between the branches and the head office in stead of building or upgrading their own VPN;
- It might strengthens the negotiating position of the banking industry to achieve better and affordable telecommunication services from ETC if the network is used also for internal communication between head offices and their branches;
- Bank branches or other payment providers with low volumes of operation for which a telecom link with the access point might not economical could be allowed to present their operations on physical media to the access point where they are conveyed to the clearing and settlement system.

The disadvantage of this architecture is that the network is more costly due to the costs of servers to be installed on the access points.

The VPN design with decentralized access points is especially adopted by countries where the NPS is still in a developmental stage and the telecom facilities are insufficient such as the eight BCEAO countries, Egypt and Tanzania.

**Policy recommendation on the architectural design of the communication network**

Taking into account that: (i) the telecommunication facilities are insufficient and very expensive in Ethiopia; (ii) not all banks have an intra-bank network developed for the time being and the existing intra-bank have not connected all branches; (iii) the architecture is more convenient to connect the MFI's to the NPS-infrastructure, it is recommended to build a VPN with decentralized access points and allow branches that are not connected to their head offices to send directly their operations to the ACH.

## 6. Outline of the Strategic Plan

### 6.1 Core elements of the strategic plan

Taking into account the objectives, mission statements, the overarching vision, strategies and the recommendation with respect to centralization and the architectural design the strategic plan will entail the following core elements:

1. Adaptation of the legal framework and the upgrading of the infrastructure for telecommunication and other utility services to ensure an environment that is conducive for the NPS;
2. The development of a virtual private network (VPN) for communication purposes in the banking industry, the sending in of payment orders for inter-bank or intra-bank clearing and settlement and the exchange of data between clearing and settlement systems and the participants in these systems;
3. The implementation of a Real Time Gross Settlement (RTGS) system for large value and time critical payments;
4. The introduction of a broad range of new payment instruments and the working out of a strategy to develop the market for retail payments and the development of a plan to enlarge the access to banking and payment services in Ethiopia;
5. The improvement of the management software for payment processing of commercial banks that supports straight through processing, the implementation or upgrading of core banking systems and the connections of the branches to the head offices;
6. The modernization of the clearing and settlement system for cheques by: (i) introducing standardized cheques with MICR lines; (ii) electronic cheque presentation; and, (iii) improvement of the facilities for clearing of cheques

issued outside Addis Ababa either by introducing cheque imaging or a system of regional cheque clearings;

7. The implementation of a central switch for card payments in order to ensure interoperability of the networks of ATM's and POS terminals of individual banks;
8. The implementation of an efficient inter-bank clearing and settlement infrastructure for retail payments other than cheques;
9. A feasibility study for settlement arrangements for cross border transactions;
10. The implementation of a Central Securities Depository (CSD) for central registration of securities in book-entry form and implementation of a safe and sound clearing and settlement infrastructure for securities settlement.
11. The implementation of an oversight framework.

## **6.2 Systems and facilities to be acquired**

In the strategic plan there is a need for the following systems and facilities for inter-bank clearing and settlement:

1. A safe, confidential, exclusive and reliable Virtual Private Network (VPN);
2. A Real Time Gross Settlement (RTGS) System;
3. A central switch for card transactions;
4. Facilities for cheque processing and clearing of cheques;
5. Facilities for inter-bank clearing and settlement of all other retail payment instruments;
6. A Securities Settlement System (CSD/SSS).

## **6.3 Efficient use of modern technology to reduce investment costs and to avoid possible underutilization of the new systems**

The modernization of the NPS requires large investments in inter-bank clearing and settlement facilities, building up of an infrastructure for ATMs and POS terminals, improvement of the payment processing systems within commercial banks and expansion of the branch network. Furthermore, investments (including promotional campaigns) are needed to establish a broad range of payment instruments. Given the scarce resources in terms of available staff and funds priorities have to be set and there is a need to spread out the investment over a longer period.

Another problem is how to recover costs in inter-bank clearing and settlement systems. Experiences in other countries show that it will be difficult to recover the costs in new systems in the first years and initial losses will arise. However, normally systems should reach the break-even point after three or four years and should be able to recover also the initial losses. Due to: (i) the rudimentary stage of the present infrastructure for retail payments in Ethiopia; (ii) the underdevelopment of the physical and telecommunication infrastructure; and, (iii) the small part of the population that has opened a bank account at the moment, recovering of costs will take time. Reaching the break-even point may even take the full period that is set for the modernization project.

Especially, recovering costs in the clearing and settlement facilities for the new retail payment instruments such as credit transfers, direct debit, standing orders, payroll schemes etc. will be difficult, since these products have to be developed first. In this context a chicken and egg problem may arise: the development of payment instruments and the market for retail instrument is impossible if no clearing and settlement facilities exist. However, the exploitation of the settlement facilities will be extremely costly during the developmental stage when the turnover will be very low and underutilization cannot be avoided. This brings forward a tendency to postpone the investments in clearing facilities.

The necessity to reduce or spread the investment, as well as the problem how to avoid large losses due to underutilization in the building up phase, could be tackled by making efficient use of modern technology. Modern technology makes it possible to use the same system for processing as well individual large value payments as bulk files of retail

transactions destined for the same recipient in an on-line real time mode. This would eliminate the need to develop separate Large Value and Low Value electronic solutions for credit transfers and avoid the risks that both the large value payment system and the retail payment system are potentially underutilized in the period that the new retail instruments are developed.

The large value system should for that reason be able to handle a facility like FileAct in which a file (batch) of retail payment is sent within the header the total value and the number of underlying payments. This file is attached to a (large value) payment order for the same value as in the header and, after the payment is settled, the file is forwarded by the system to the receiving bank. The receiving bank should be able to open automatically the file and process the underlying payments in his internal system. This facility was develop for the Single European Payment Area (SEPA) and is for instance internationally used for forwarding and settlement of remittance payments in the international correspondent network. The solution is also available for use in local systems. According to the World Bank a large value payment system that can also handle bulk files of low value payments is for instance in place in Turkey.

An additional advantage is that the facility will allow the integrated ACH to use the Swift-net for as a contingency facility in case the NPS communication network is down.

A disadvantage of the aforementioned procedure is that it may lead to larger liquidity needs than in case of multilateral netting of retail payments. However, modern hybrid RTGS systems have liquidity saving facilities to reduce the liquidity problem and prevent gridlocks in the system<sup>17</sup>. Commercial banks could agree also on a code of conduct with respect to the moment (s) during the day files of retail payments have to be exchange at the latest in order to prevent that one bank is waiting on payments received before sending out its own payments.

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<sup>17</sup> Hybrid systems use bilateral and multilateral netting to settle periodically payments placed in the queue of these systems due to insufficient funds in the settlement account

Another disadvantage might be that banks have to sort out the outgoing payments per receiving bank and bundle them in files for the same recipient, like it is now done for cheques. However, sorting out of the new payment instruments can be executed automatically since all payments that will be sent in for inter-bank clearing and settlement are in electronic formats. These formats can be easily sorted out and bundled by the internal systems of the commercial banks.

**Policy recommendation with respect to the use of modern technology**

In order to reduce the investment costs and avoid possible underutilization, it is recommended to combine as much as possible the systems for large value and retail payments during the first years as new payment instruments have to be established and markets for retail payments have to be developed. The business case for an integrated retail payment system or ACH could be worked out when the market for retail payments develops.

## 7. Working out of the Core Elements in the Strategic Plan

### 7.1 Development of a legal and physical infrastructure that will support the new NPS

Two environmental aspects are of utmost importance for the modernization of the payment system and the achievement of the goals set:

1. The existence of a sound legal framework;
2. The availability of reliable, adequate and affordable utility services.

#### Development of a sound legal framework

##### *Objective*

The modernization and updating of the legal framework is an essential prerequisite for the success of the whole modernization of the National Payment System. Based on a thoroughly stocktaking and gap analysis, proposals for the amendment of the present legal framework should be worked out and relevant bills of law should be drafted. Where necessary and appropriate, secondary laws, such as directives, should be enacted and contractual arrangements should be put in place to complete a sound, safe and flexible legal framework that complies with international standards.

##### *Goals for the modernization of the legal framework*

The new legal framework should:

1. Broaden the responsibilities of the NBE in the National Bank Proclamation with respect to the oversight of clearing and settlement of securities;
2. Allow for the introduction of a broad range of new and modern electronic payment instruments;

3. Endorse electronic signature for payment purposes and the use of electronic data on payments and securities settlement for evidence in courts<sup>18</sup>;
4. Introduce banking industry wide “general terms and conditions for the use of payments instruments and the offering of payment services;
5. Establish an efficient and impartial conflict resolution scheme for payments related issues;
6. Ensure a safe and sound legal basis for clearing and settlement of payments that complies with the CPSS-Core Principles for Systemically Important Payment Systems. The legal basis should encompass a finality regulation and the recognition of multilateral netting;
7. Allow for the introduction of Electronic Cheque Presentation (ECP) and cheque truncation in order to modernize the inter-bank clearing and settlement of cheques;
8. Strengthen the arrangements for collateral taking and the enforceability of contracts in order to facilitate risk management measures in payment systems;
9. Modernize the legal provisions for custody and clearing and settlement of securities by introducing legal protection of client’s securities against claims of creditors of a custodian or other third parties;
10. Introduce immobilization and/or dematerialization of securities and the legal framework to establish a Security Settlement System (SSS) with transfer of ownership of securities based on book-entry.

### ***Organization of the work***

A legal working group shall be established to draft the new legal framework and take appropriate actions to put the legal framework in place. International expertise should be acquired to speed up the process and ensure compliance with international standards and developments<sup>19</sup>.

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<sup>18</sup> Often referred to as “Cyber laws”

<sup>19</sup> Beginning of January 2009 a legal working group has been established and an international legal consultant has started work to draft a new legal framework for payments and securities settlement

### ***Critical success factor***

Timely completion of the new comprehensive legal framework is a critical success factor for the whole modernization project. The whole project for the modernization of the legal framework should not take more than one and half year since the new legal framework should be in place at the end of 2002<sup>20</sup> to support the newly established systems.

## **Development of the physical infrastructure**

Adequate, reliable and affordable utility services are a prerequisite for the development of a modern payment and clearing and settlement infrastructure. Especially, availability of affordable and fast telecommunication services in all parts of the country is crucial since electronic funds transfers will be the heart of the new NPS.

### ***Availability of utility services and the outreach of the new NPS***

The outreach of the NPS and the coverage of the whole country will be totally dependent on the outreach of the electricity and telecommunication networks.

### ***Specification of the needs and coordination of the different plans***

The telecommunication needs and the needs for other utility services for payment purposes should be specified in detail (for instance with respect to availability, facilities, speed, coverage, back up facilities etc). Coordination of the plans of the utility providers and the NPS modernization plan is necessary. Key aspects are the plans to broaden the networks in order to cover the whole country, the quality of the networks, the uninterrupted availability of telecommunication and electricity, the level of fees and the fee structure. All relevant parties should be involved in this coordination process (Utility companies, Telecommunication Authorities, The Government and the banking industry) and the ultimate goal should be to develop a roadmap to connect all branches and MFI's to the payment system network on an economical basis. If deemed necessary and productive a platform for exchange of information and consultation could be established for the telecommunication needs of the NPS in which all relevant parties participate.

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<sup>20</sup> Ethiopian calendar, 2010 in the Gregorian calendar

## **7.2 The communication network<sup>21</sup>**

As recommended by the IT consultants a Virtual Private Network (VPN) shall be developed to ensure reliable, fast and secure communication and exchange of data in the New Payment System (see par. 5.6).

### **Inter- and intra-bank wide scope**

In order to make the initial investment cost-effective the communication network should have a broad scope and be used for the clearing and settlement of (i) large value payments; (ii) card payments; (iii) cheques and other retail payments; (iv) securities; and, for (v) the connection between the central card switch and individual ATM's. Further on commercial banks should be able to use it as an alternative for the building of an own VPN for intra-bank communications (communication between head offices and branches and for in-house clearing and settlement) or use it as backup for such a network. It should also be possible to use the network for regulatory reporting activities and for communication with other inter-bank systems such as for instance the credit information bureau<sup>22</sup>. The network shall therefore have a banking industry wide character.

### **Decentralized access points**

The network should have decentralized access points. The access points should be strategically located.

### **Access for government entities**

Attention should be given to the communication with government agencies that participate in the large value payment system of the NBE and the possibilities to link the NPS-network to the WoredaNet, the special telecommunication network for government agencies.

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<sup>21</sup> This paragraph is based on the reports of the IT consultants Dr. Leila Elmasry and Vladislav Babin

<sup>22</sup> See Elmasry and Babin, "Phase 1, Assessment of the Technology Situation", page 36

## **Connectivity**

It is strongly recommended that the NPS participants have at least two independent data channels to connect to the VPN: primary and backup. Primary channel should be at least an ADSL connection (fiber is recommended for main offices and most important branches). Dialup should be used for backup only.

## **Security**

Security is of paramount importance for the national payment system. The NPS communication network should provide adequate isolation and segregation for participants. Access to the network should be restricted and the network should deny access from one host to another if not authorized by a security officer. Proper organization of IP address space in the network is important for convenient and reliable maintenance of access control lists<sup>23</sup>.

Confidentiality, integrity of messages, authentication, non-repudiability, availability and auditability in the network should be in conformity with commercial reasonable standards<sup>24</sup> and controlled by the NBE as large value payment system provider and overseer of the NPS. Encryption of messages, certificate based authentication and digital signature - all three based on a public-key (PKI) infrastructure - are important tools in this context. However, at present there are no national or private certificate issuing or registration authorities in Ethiopia that provide a PKI-infrastructure and this fundamental security services should be implemented within the modernization of the NPS.

To ensure a high level of confidentiality encryption of messages should be completed by communication line encryption as provided by ETC's VPN service.

Hosts in the network should be protected by adequate firewall software. While access restriction serves to avoid unwanted traffic in the network, shielding hosts by firewall is meant to protect the servers and workplaces against attacks from within the network.

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<sup>23</sup> For a further elaboration see Elmasry and Babin, "Phase 1" page 37-38

<sup>24</sup> Core Principles for Systemically important payment systems, page 41

### **Critical success factors**

Since it is expected that NPS-communication network will be implemented and maintained by ETC as service provider, the performance of the network should be closely monitored/ supervised by authorized personnel from NBE.

It is important that ETC as service provider ensures the service level required by the NPS and the availability of the network during 24 hours a day and seven days a week<sup>25</sup>. ETC should also maintain backup communication facilities for the NPS-network so that failure in the main line would not leave any participant disconnected from the system. Backup communication facilities should be tested regularly. The level of services such as operating hours, guaranteed bandwidth and backup facilities should be specified in a service level agreement (SLA).

## **7.3 The infrastructure for large value and time critical payments**

### ***Objective***

A modern large value payment system should be implemented. The new system should at a minimum be able to handle large value payments and time critical payments and should relieve the present cheque clearing system. The system should be based on on-line real time gross settlement (RTGS).

### ***Critical success factors***

There are several critical success factors:

1. All participants should have a clear understanding of the risks in the NPS in general and in the new large value system in special;
2. The system should have a sound legal foundation. Well established and understood rules and procedures should be drafted;
3. The system should support the needs of the users;

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<sup>25</sup> To be online 24 hours during seven days a week is necessary for card processing purposes

4. The system should at a minimum focus on inter-bank large value payments and time critical payments. An express payments facility for the private sector to replace the present special cheque clearing procedures should be studied and, if there is a business case, should be introduced. As indicated in the strategic plan, the large value system should also be able to settle batches of retail payments;
5. Transactions in the new system should be irrevocable and final under all circumstances;
6. Participants should be able to manage their liquidity effectively and sufficient sources of liquidity should be available to ensure an effective throughput in the system;
7. The system should support the execution of monetary policy and other tasks and internal functions of the NBE such as the execution of Foreign Exchange Policy, the distributions of banknotes and coins, internal accounting and general ledger etc.;
8. The operational reliability of the system should be ensured, well structured business continuity measures should be in place and effective crisis management should be implemented;
9. Audit trails should be possible for all transactions and reconciliation should take place at the end of the day;
10. Inter-operability with other payment systems for instance the clearing of retail payments should be ensured;
11. Inter-operability with the securities settlement systems (SSS) to ensure delivery versus payment should be a standard facility.

***Payment services to the government in the new large value system***

The government is one of the largest users of the present Bankmaster system. Around 560 accounts are opened by government agencies. For the design of the new large value payment system it is absolutely a prerequisite that a thorough analysis is made of the present and future needs of the government agencies (including the Ethiopian Inland Revenue Services). This study should also encompass the payment services that have to

be provided in the near future when the new Financial Management Information System (IFMIS) of the Government will be in place. A smooth transition should be supported.

***Liquidity in the large value system***

Special attention should be given to the liquidity in the system. Issues are how the throughput in the system can be endorsed by:

- (i) Liquidity saving facilities, normally available in hybrid systems;
- (ii) The introduction of a code of conduct to avoid free rider behavior of individual banks (waiting for incoming payments to finance the outgoing payments) or liquidity hoarding;
- (iii) The use of the reserve requirements during the day for settlement purposes;
- (iv) The introduction of an intraday credit facility.

If an intraday credit facility is deemed necessary to ensure a smooth turnover in the system the intraday credit should be fully collateralized in order to reduce the risks for the NBE and a collateral policy should be developed that focus on the eligibility and timely and safe delivery of the collateral. The consequences of such a facility for the execution of monetary policy have to be mapped out thoroughly.

***Connection with the general ledger system of the NBE***

The interface with the general ledger system of the NBE and the quality of the general ledger are important issues. The information to be exchanged, openings and closing procedures and times of the day information will be exchanged between the RTGS to update the general ledger, the possibilities for on-line monitoring etc. should be defined. Also the information needs of other management supporting systems for instance for monetary policy and the issuing of banknotes should be specified and the interfaces between these systems and the RTGS should be worked out.

### ***Ownership and Governance***

The large value system should be owned and operated by the NBE but a governance system should be in place that leaves room for regular consultation of the users on the functioning of the system, fees etc.

### ***Organization of the work***

A working group should be established<sup>26</sup> that should work out the design of a new large value payment system, the functioning and scope of this system, liquidity management, Based on this the technical specifications and the terms of reference for a bidding procedure should be drafted to acquire the system.

### ***Deliveries***

In first instance the working group should focus on the technical specifications of the system and the terms of reference for a bidding procedure.

After the technical specifications and the TOR for a tender procedure have been completed the working group should:

- Draft information bulletins and organize information meetings with all relevant stakeholders and the public;
- Conduct an impact analysis of the new system on the functioning of the NBE, the commercial banks and other participants;
- Coordinate the drafting of the rules and regulations of the system, agreements and all other necessary legal documents;
- Coordinate the drafting of a code of conduct for participants;
- Coordinate the adaptation of procedures and systems within the NBE;
- Coordinate the adaptation of systems and procedures of participants;
- Coordinate the training of staff;
- Coordinate the implementation, testing and the roll out of the system.

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<sup>26</sup> Beginning of January the NBE has established a NPS Technology Group

## **7.4 Payment instrument mix and access to payment services**

### *Objectives*

Broadening the range of retail payments, the development of the market for retail payments and enlarging the access of the public to payment services is of utmost importance for the success of the new NPS.

#### **New retail payment instruments**

In the new NPS electronic funds transfers should replace the cheque as the main instrument. All new payment instruments should be exchanged in electronic form between banks. New payments instruments that could be developed are:

1. Ordinary credit transfer;
2. Payroll schemes or direct credit;
3. Standing orders;
4. Direct debit;
5. Card payments.

There are already initiatives in the banking industry with respect to some of the aforementioned instruments. However, for the good functioning of the market there is a necessity to develop and to standardize the new instruments. Common products with general legal terms and conditions should be developed to enlarge transparency and to promote the confidence of the public in the new instruments. For the development of debit and credit cards operations minimum securities standards should be set.

Also new forms of payment services could be analyzed and the business case for the introduction of prepaid cards and e-cash should be studied. In this framework, especially, the use of mobile-phone money services might be of interest, if the amount of mobile phones in Ethiopia will grow from around 1.8 million to 15 million in the coming years, as expected by the Government. Mobile-phone money service allows the subscribers to use their mobile phone to manage a payment account and transfer money to other holders of mobile phones. Most often, M-banking is based on the prepaid card principle, in which e-money is stored on the mobile phone by depositing cash at an agent of the operator in

the same way as buying prepaid phone balances, or by transferring money to the bank account of the operator. The money in the bank account of the operator backs the amount of e-balances on all mobile phones. Subscribers/customers can withdrawn their e-balances by exchanging them in cash at the teller of the agents of the operator or request a transfer of the e-balance on the mobile phone to his own bank account, if any. These schemes are in place in several developing countries for instance Kenya and Pakistan<sup>27</sup>.

Development of the market for retail payments and the enlargement of the outreach of the NPS

As was already pointed out in chapter 4, there is a strong interrelation between the development of new payment instruments and the development of the market. New services could enlarge the number of customers substantially and more customers would enlarge the volume of payments and make economies of scale possible. An action plan to develop the market should be worked out taking into account the measures outlined in chapter 4. Initiatives should be worked out with respect to the awareness of the public of these new instruments. The action plan should also encompass measures to establish confidence of the public in the new payment instruments.

***Organization of the work***

An inter-bank working group shall be established to:

1. Broaden the range of payment instrument and develop standards, procedures and legal terms and conditions for at least ordinary credit transfers, payroll schemes and direct debits;
2. Standardize all payment instruments to be exchanged between banks (excl. cheques);

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<sup>27</sup> Mobile Banking known as M-banking is a term used for performing balance checks, account transactions, sending in payments orders etc. via a mobile device such a mobile-phone. In Kenya the system is called M-PESA. The system in Kenya is not linked to any clearing system. Customer can use their M-PESA account to buy goods and service from other users, but the most common use of M-PESA is for long-distance person to person remittances

3. Describe the new communication channels, such as internet, telephone, mobile phone and SMS, that can be used for exchange of information and for sending in payment orders by the customers;
4. Set minimum safety requirements for all payment products and channels used;
5. Develop common promotional actions to enlarge the awareness of the public and to promote confidence in the new instruments.

### **7.5 The upgrading of the systems for payment processing of commercial banks and connection of branches to the head office<sup>28</sup>**

Not all banks have at present state of the art core banking systems in place with automated payment processes that support modern payment instrument as card payments and e-banking, and include proper levels of control. Where necessary banks should introduce such state of the art core banking systems or upgrade their present system to be able to operate in a fully modernized NPS environment and support a broad range of payment instruments and modern payment services.

In order to achieve straight through processing and avoid re-typing of payment instruction core banking system should be closely integrated to the NPS by using one of the well-developed integration frameworks. Ideally, for the sake of maintenance and interoperability all NPS participants should use the same integrationware either provided by the NPS vendor or approved by him.

Albeit, that due to the proposed NPS communication network with decentralized access points the NPS also support a decentralized banking organization with branches that are not integrated and not linked to the centralized automated payment processes of the head office, in the longer term, banks with a decentralized organization have to switch to a centralized organization and should connect their branches. This is not only necessary to strengthen internal control and management, it is also necessary to be able to effectively support modern payment instruments and services, such as: (i) an express payment

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<sup>28</sup> This paragraph is based on Elmasry and Babin, "Phase 1, Assessment of the Technology Situation", p. 42-44

facility for time critical and large value payments (only head offices are connected to the RTGS system); (ii) card payments (an efficient interface and automated processing is a prerequisite to be connected to the switch and far too expensive to install on a branch level); (iii) an efficient in-house distributions of remittances and payments between accountholders of the same bank; and (iv) for the introduction of e-banking. Integration of the branch network will progressively lead to abandon the paper-based exchanges that cause so many delays and additional costs.

Individual bank should plan carefully how and when to introduce a state of the art core banking system or to upgrade their present system if necessary, reorganize their internal payment processes and develop a time schedule to connect their branches. For the connection of branches they can use the NPS communication network (see par. 7.2) or an own VPN.

## **7.6 The infrastructure for clearing and settlement of retail payments**

The infrastructure for retail payments can be divided into three areas:

1. The clearing and settlement of cheques;
2. The clearing and settlement of card payments;
3. The clearing and settlement of all other retail payments.

### **Clearing and settlement of cheques**

Introduction of measures to automate the present manual clearing should be studied as soon as possible and proposals should be made with respect to:

1. Standardization of the cheque to support the introduction of Magnetic Ink Character Recognition (MICR) and/or Optimal Character Recognition (OCR) technology;
2. The introduction of Electronic Cheque Presentation (ECP);
3. The business case for the introduction of cheque truncation and cheque imaging;
4. The introduction of clearing facilities for cheques issued outside Addis Ababa.

To speed up the discussions it is recommended to hire an international consultant with experiences in the modernization of cheque processing and in the introduction of cheque imaging.

Automation of the cheque processing is also important for the processing of so called “cheques on us”, cheques for which both the payer and the beneficiary have an account with the same bank. The amounts of internal cheques are not known by most of the banks and the amount of cheques cleared internally by banks might be even larger than the amounts cleared via the AACO. This leads to a substantial underestimation of the advantages of standardization and automation of cheque processing.

Within the framework of standardization of cheques the East African Cheque standards could be adopted (see also par. 7.5).

For the improvement of the clearing of cheques outside Addis Ababa a network of regional cheque clearing centers could be set up if the feasibility of cheque truncation is deemed not economically or if the legal barriers for electronic exchange of cheques could not be removed. These regional clearing centers could be located at the access points of the NPS communication network. In paragraph 5.3 of this report a possible design of a regional cheque clearing network is given.

#### Clearing and settlement of card payment

For the clearing and settlement of card payments it is necessary to put in place a central switch to organize the interoperability of the different networks of ATM's and POS terminals. Interoperability ensures that customers of one bank can use the ATM's and POS terminals of another bank. At the moment there are two networks of ATM's while one bank has a network of around 400 POS-terminals. More banks have plans to install ATM's and/or POS-terminals.

There are two options for the connection of the networks of ATM's and Pos-terminals:

1. Each bank owns his own switch and bilateral links are organized between the financial institutions;
2. A central switch is implemented to which all the ATM's and POS-networks of the individual banks are linked;

Of the two options the second option has the most advantages. Under option one a multiplicity of links would be necessary. This could lead to a complex infrastructure while it is not ensured that all banks will have access under the same conditions.

A variant on option two would be to establish an organization that is commonly owned by the banking industry. This organization will be the owner of the ATM network and the central switch and could also distribute POS-terminals to merchants and provide maintenance. However, the inter-bank service provider will have only a relation with participants in the system and does not have a direct relation with the customers. The acquiring banks will maintain the business relation with the merchants with respect to card payments and the fees to be charged.

On the short term a feasibility study should be conducted in which:

1. The products are indicated that will be handled (debit card payments, credit card payments, ATM transactions);
2. The relations with international card organizations are specified, the type of cards that can be handled are indicated and the settlement of card payment made by tourists and businessman from abroad are described. Also the clearing and settlement of transactions initiated by local accountholders and by foreign accountholders should be described including the role of the acquiring banks therein;
3. Agreement is reached on the interoperability rules;
4. The investment costs of the two options are estimated i.e. the costs of the implementation of a central switch or of a central switch in combination with a commonly owned network of ATM's;
5. A proposal is made for the governance structure in both options and the funding of the investments.

Based on this study a choice has to be made and the technical specifications and the terms of reference for a public tender procedure should be drafted to acquire the preferred system.

#### The inter-bank clearing facilities for other payment instruments

The inter-bank clearing and settlement facilities for other payment instruments are especially used for the settlement of credit transfers, payroll schemes, direct debits and other bill payment instruments. These facilities are especially meant to handle bulk payments, i.e. large amounts of low value retail payments.

Traditionally clearing and settlement of retail payments is organized by an Automated Clearing House (ACH) that sorts out the payments orders received from the participating banks per recipient bank.<sup>29</sup> Normally the ACH clears and settle the payments on a multilateral netting basis and calculates the net settlement positions for each bank. The clearing matrix that contains either a debit (the net amount to be paid) or credit position (the net amount to be received) for each individual bank is sent to the large value system of the central bank for settlement and, when the settlement is final, each bank will receive the incoming payments for his customers.

There are different divisions of tasks possible between the participating banks and the ACH. Banks can outsource quite a lot of work to the ACH for instance: the conversion of paper based payment orders into a standardized electronic format that can be processed automatically and the sorting out of payment orders per receiving bank. In some countries some categories of customers can send directly their payment orders to the ACH using special procedures agreed upon between the ACH, the customer and the bank involved. This is for instance the case for files in the framework of payroll schemes and direct debits.

In this context attention needs to be given to the business continuity and operational reliability of the ACH and the protection of the netting to ensure timely settlement even

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<sup>29</sup> The bank where the ultimate beneficiary have opened an account

in the event that one of the participants is not able to fulfill its payment obligations. Although, clearing and settlement is mostly done on an end of day multilateral netting basis, other solutions are possible for instance multiple multilateral net clearing cycles during the day or even multiple cycles with gross settlement of batches of outgoing and incoming payments of each bank.

An integrated ACH that clears all retail payments including card transactions and cheques

In chapter 5 an integrated ACH that clears and settles all retail payments including cheques and card payments was recommended. This means that as soon as the decisions have been taken about: (i) the modernization of the cheque clearing and the way the networks of ATM's and Pos-terminals will be connected; and, (ii) the processing and clearing and settlement of card payments will be organized, the bidding documents for an integrated ACH can be prepared, even if decisions about the payment instrument mix still has to be taken. The new ACH should have a modular character in which facilities for the different instruments can be activated separately. This makes it possible to develop the market for retail payments bit by bit.

The business and function specifications for an integrated ACH should encompass:

1. The types of payment instruments to be cleared and settled;
2. Life cycle of the operations (presentment, cancellations, rejections, return by the system);
3. The standardized payment formats to be used;
4. The division of tasks between the ACH and its participating banks;
5. The clearing procedures;
6. The settlement procedures;
7. The procedures for reconciliation;
8. The risk management measures;
9. The measures to ensure operation reliability and business continuity of the system;

10. The ownership, governance structure and operation of the system<sup>30</sup>;
11. The investment plan and the financing of the operational activities.

If the bidding procedure is launched:

1. Criteria for acceptance should be defined and testing of the new system organized;
2. Rules and regulations have to be formulated;
3. Administrative and internal control procedures should be put in place;
4. Training and education programs have to be set up.

## **7.7 Cross border payments**

Facilities for cross border clearing and settlement can be important, especially, if there are certain economic arrangements with countries in the region about free convertibility of the local currencies or specific treaties on free trade areas, monetary and economic unions etc. However, at the moment, the Ethiopian Birr is not freely convertible and there exist no explicit trade-arrangements with neighboring countries that need to be supported by cross border links whether retail or large value.

### **The Business case for ACH links in Ethiopia**

As long there is no free convertibility of the birr there is no business case for ACH links with neighboring countries in Ethiopia. But there are also other factors that make such cross border links for the moment not feasible. The market for retail payments in Ethiopia is still underdeveloped and non-cash instruments other than cheques that could be cleared via the aforementioned cross border links have still to be developed in Ethiopia. Furthermore, the potential amount of payments that could be settled via these links is still small, since most of the international trade of Ethiopia is with Asia (imports) or with Europe (exports). The amount of cross border payments with neighboring countries is

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<sup>30</sup> During the workshop of Mid-March the stakeholders preferred a governance structure in which the ACH should be owned and operated by the banking sector, while the new RTGS should be owned and operated by the NBE

relatively small and most of these payments will be settled via the correspondent banking network or in cash. Cross border trading with neighboring countries could be endorsed more effectively by creating the possibilities to use international debit or credit cards, for instance Visa or MasterCard. However, to keep options open some future developments could be anticipated by adopting relevant standardization for payment instruments; for instance to adopt the East-African standards for cheques and card payments.

#### Settlement arrangements for payment instruments denominated in foreign currencies

At present, it is not allowed to use foreign currency as legal tender in Ethiopia. The Foreign Exchange Policy directives of the NBE oblige residents to convert foreign currency in birr within a certain time period. Residents are not allowed to open foreign currency accounts in Ethiopia. Only Ethiopians living abroad are permitted to open such accounts. However, the number of foreign currency accounts is still limited and payments between such accounts are too low to justify clearing and settlement arrangement for payment instruments denominated in foreign currency, as is for instance the case in Kenya with respect to dollar cheques.

#### Settlement arrangements for FX trades

Clearing and settlement arrangements for inter-bank forex transactions to reduce Herstatt risk could be arranged but require concentration of correspondent banking business or settlement of forex transactions via the international Continuous Linked Settlement System (CLS). In the first option all or at least part of foreign deposits in a certain currency have to be held with an inter-bank institution in Ethiopia, for instance the NBE, that will hold the counter value on an account with a correspondent bank abroad. In that case the commercial banks have birr settlement accounts and foreign currency accounts with the NBE and copies of the large value payment systems could be used to settle transactions in foreign currencies between Ethiopian banks. By linking the different systems a payment versus payment (PVP) could be arranged to reduce Herstatt risk. These kind of arrangements are in place for instance in the Dutch Antilles where inter-bank transactions in several currencies could be cleared and settled, for instance

transactions in US dollars and in Euros. Also some economies of scale could be reached in this construction with respect to outgoing or incoming cross border payment since the concentration might enlarge the negotiating power to get better terms and conditions from foreign correspondent banks.

It is recommended to discuss the option and if found interesting to conduct feasibility study that also list the advantages and disadvantages for the different parties involved.

## **7.8 The infrastructure for the clearing and settlement of securities**

The concept of a Central Securities Depository (CSD) and the advantages for developing a market in government bills and bonds outside the banking sector should be studied and understood by the stakeholders.

A CSD is a facility or institution for holding securities which enables securities transactions to be processed by book-entry. The CSD registers the type, amounts and the ownership or co-ownership in its books. Registered securities can be transferred from one account to another account. The CSD opens accounts for every issued security that is deposited with the CSD. Normally, each security is identified by a code for which most often an International Securities Identifying Number (ISIN-code) is used.

Certain aspects of the structure and organization of the Central Security Depository and of custody arrangements have to be discussed to see what fits the Ethiopian market the best. These aspects are:

1. The structure of the CSD (centralized versus a tiered structure);
2. Immobilization or dematerialization;
3. Types of securities registered;
4. Protection of customers assets;
5. Types of transactions and third party services;
6. Collateral transactions;

7. Links with the large value payment system to ensure Delivery versus Payment (DVP);
8. The settlement model (gross-gross, gross-net or net-net);
9. Risk management;
10. Cross border links for securities transaction with other countries;
11. Governance structure and ownership of the CSD.

### ***Structure of the CSD***

In principle there are two types of systems for a CSD:

1. A fully centralized system in which all positions in all securities of every investor are registered on a central level. Normally, in such a structure the investors have no direct relationship with the CSD but use a bank as their agent/custodian to settle securities transactions on their behalf. Also interest/dividend or redemptions are paid out via a bank that also provides the customer with statements on securities owned;
2. A tiered system. In a tiered system, only custodians, normally banks, can participate directly in the system. They normally open two types of accounts. In one account their own position/investments are registered while on the other account, the so called omnibus account, the positions/investments of all their clients are booked. The positions/investments of their customers/clients are registered in their own books. Transactions between two of their own customers (in-house transactions) will not influence the total amount in the omnibus account of the bank/custodian involved.

### ***Immobilization and dematerialization***

In case of immobilization the physical certificates of securities or other financial instruments are deposited with the CSD who acts as a central custodian and keeps the certificates in his vault. The CSD registers the ownership or co-ownership of the involved securities in his books. Under certain conditions an investor can request a delivery of the certificates by the CSD.

In case of dematerialization physical certificates or documents of title which represents ownership of securities are eliminated so that securities only exist as accounting records.

### ***Types of securities registered***

Some CSDs are specialized in certain securities for instance government securities (bills and bonds), money market instruments (CDs, CPs and MTNs), and all interest bearing titles or in equities. Other CSDs register all types of securities. A CSD can start as a specialized CSD for instance for government securities and can develop into an all-round CSD.

### ***Types of transactions and third party services***

The types of transactions that should be supported by the system have to be specified, for instance individual buy and sell transactions, repurchase transactions, transfer free of payment, stock dividend, interest and dividend payments etc.

Some CSDs are allowed to act as a trusted third party. In that situation, participants allow the CSD, for instance in case of repos, to substitute collateral in the form of one security for another type of securities with the same value if the original collateral is needed for transaction purposes. The CSD will in this framework also transfer, automatically, more securities to the third party collateral account if the market value of the collateral drops below a certain value.

### ***Establishment of collateral rights***

The CSD should be able to register collateral rights and the procedure on how collateral rights on securities are established should be specified. Sometimes these procedures are specified explicitly in the law while in other countries there might be some flexibility for the CSD.

### ***Delivery versus payment (DVP)***

To be in line with international standards a DVP procedure has to be implemented. To ensure DVP the CSD can open cash accounts. Another, more preferable model for Ethiopia is to link the CSD directly to the large value payment system of the NBE to ensure delivery versus payment (DVP). In that case the payment is effected in the large

value system of the NBE via the settlement accounts the participants in the CSD hold with the NBE.

### ***The settlement model***

To realize delivery versus payment a choice has to be made which DVP model will be chosen. There are three models: gross-gross; gross-net; and, net-net. The choice between the models depends on the type of market and the amounts of transactions. Inter-bank markets often clear and settle on model 1 (gross-gross), while stock markets mostly clear on a net-net model. In model 1 the settlement takes place transaction by transaction, no netting takes place neither on the cash side nor on the securities side. In model 3 as well on the cash side as on the securities side, transactions are netted to save liquidity (less cash and amounts of securities to be exchanged between participants/custodians)

### ***Risk management***

Dependent on the choice of the settlement model adequate risk management measures should be implemented to comply with international standards.

### ***Cross border links***

Cross border links make it possible for non-residents to invest in Ethiopian securities while they can still use their own local bank as custodian. These links can be organized on a decentralized basis or on a centralized basis. In case of decentralized structure each Ethiopian custodian organized its own network of foreign agents/custodians for the safekeeping and clearing and settlement of foreign securities located in the countries where the agent/custodian has its domicile. In a centralized structure the network of foreign agents/custodians is operated by the CSD that opens next to domestic securities accounts also accounts for foreign securities. Custodians might prefer this construction to reduce the costs for holding and clearing and settlement of foreign securities. A centralized structure is for instance in place in Switzerland while also the so-called ICSD (International Central Securities Depositories) like Euroclear and Clearstream have this structure.

### ***Governance structure and ownership***

Decisions have to be made about the ownership, consultation of participants, operations of the CSD and the way costs will be recovered. Since there is no stock market and most of the securities issued in Ethiopia are government bills or bonds, the CSD could be commonly owned by the banking industry, the NBE and the Government and operated by the NBE.

### **Organization of the work**

A Securities Settlement System working group should be established that works out the design of the CSD, governance structure etc. Based on this outline the technical specifications of the system and the terms of reference for a tender procedure should be drafted.

After the terms of reference have been completed and approved the working group should:

- Draft information bulletins and organize information meetings with all relevant stakeholders and the public;
- Conduct an impact analysis of the new system on the functioning of the NBE, the commercial banks and issuers;
- Coordinate the drafting of the rules and regulations of the system and all other necessary legal documents;
- Coordinate the drafting of a code of conduct for participants;
- Coordinate the adaptation of procedures and systems within the NBE;
- Coordinate the adaptation of systems and procedures of participants;
- Coordinate the training of staff;
- Coordinate the implementation and testing of the new system and the roll out of the system.

## **7.9 The oversight framework**

This module encompasses:

1. Determination of the scope of the oversight policy and the instruments used;
2. Organization and staffing of the department/section charged with the oversight policy and training of the staff;
3. Drafting of a mandate and mission statement for the oversight task of the NBE;
4. Setting of standards or best practices for payment systems, securities settlement systems and payment instruments;
5. Organization and regulation of the supply of data by system providers and by participants in the systems and other relevant payment and securities settlement providers;
6. Arrangements for consultation of system providers, participants in the system and other relevant stakeholders;
7. Drafting of arrangements for cooperation with other relevant authorities within and outside Ethiopia in the form of Memorandums of Understanding (MOU).

## 8. Phasing and Priority Setting: the implementation plan

### 8.1 Possible constrains and the need for setting of priorities

To achieve the final goals set for the modernization of the NPS a lot of work has to be done. However, not all goals can be achieved at the same time. There will be constrains due to the available financial resources and manpower, especially in the IT sector.

The project will be financed partly under the Financial Sector Capacity Building Project of the World Bank. The available donations under these schemes will be used especially for financing international consultants. The Financial Sector Capacity Building Project will expire at the end of June 2010. To get approval for the financing of the acquisition of necessary systems, the strategic plan has to be approved first. Thereupon the technical specifications for the systems have to be worked out, a public tender procedure to be organized and a choice between the offers of different system-providers to be made, all before the expiration date of the Financial Sector Capacity Building project. In that case the systems have to be implemented tested and taken into operation before that date, since the last payment in the acquisition process is normally done after it has been proven that the system functions adequately.

However, the development of the market for retail payments will take time and the amounts of retail payments to be settled will be low during the developmental stage. For that reasons it is recommended to set priorities. Systems should not be implemented all at the same time and, as recommended in par 6.3, efficient use of technology should be made to combine the large value and retail system in order to facilitate the clearing and settlement of retail payments during the period that there is no ACH in place and to avoid large initial losses in the retail payment area. In the retail area the ACH should have a modular structure and facilities should be activated the moment a payment instrument has

been developed and launched, thus creating the possibility to develop the market for retail payments bit by bit.

## **8.2 Highest priority: implementation of an RTGS**

The highest priority should be given to acquire an RTGS system that could clear and settled the large value payments and time critical payments that are now cleared and settled in the AACO. According to strategy one (see par. 4.1) this will possibly reduce the risks in the present infrastructure substantially. In order to avoid initial losses as well in the large value as in the retail area the system should also be able to settle batches of retail payments in order to combine efficiently the large value system and the system for the settlement of retail payments in the period an integrated ACH is not yet in place.

## **8.3 Retail payments: highest priority the interoperability of ATM and POS networks**

The introduction of a card switch to connect the different networks of ATMs and POS-terminals should also be given high priority and the negotiation between banks on the interoperability rules and on the design of the switch should be started as soon as possible.

The card switch will be linked to the integrated ACH to integrate the card operation in the multilateral netting of all retail payments. However, if an agreement could be reached and the bidding procedure for the card switch will be launched and the system will be procured before the ACH is installed the Switch should be able to clear the card operations itself and send it in for settlement to the RTGS. Integration with the clearing and settlement of other retail payments will take place the moment the ACH will be taken into operation.

## **8.4 Clearing of cheques. First priority: standardization**

The modernization of the infrastructure for cheques should be started also as soon as possible. For cheques, first priority should be given to the standardization of the cheques and the introduction of MICR and/or OCR technology for capturing the information in

electronic form by the commercial banks and sorting out of the cheques. Based on the standardization, the second step would be to introduce Electronic Cheque Presentation (ECP) and to automate the calculation of the settlement matrix. In case of ECP banks exchange information electronically, either bilaterally or via the AACO, and could already check whether their clients have sufficient funds in their account to cover the cheque before the settlement takes place at that day.

Parallel to these steps the business case for the introduction of cheque truncation and cheque imaging should be analyzed. Cheque imaging could be used to facilitate the clearing and settlement of cheques issued outside Addis Ababa. If there is no business case for cheque imaging and cheques have to be exchanged physically, a decentralized system for the clearing of cheques outside Addis Ababa has to be established (see chapter five).

## **8.5 The implementation plan**

### **Implementation of the management and governance structure (January- May)**

- Convocation of the National Payment Council
- Establishment of the Steering committee
- Implementation of the project bureau<sup>31</sup>
- Implementation of the working groups<sup>32</sup>

### **Review and approval of stocktaking report and strategic plan (February – May)**

- Review and approval of the stocktaking report
- Review and approval of the strategic plan
- Review and approval of the implementation plan for the modernization of the NPS
- Drafting of a memorandum of understanding (MOU) on the NPS modernization to be signed by all stakeholders

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<sup>31</sup> A proposal for the project bureau (project coordinating office) has been drafted by the NBE

<sup>32</sup> A legal working group and a NPS technology group were established in January 2009

## Implementation of the strategic plan

### 1. Short-Term (2000 - 2003)<sup>33</sup>

- Upgrade the legal framework (for more details see the working schedule of the legal consultant)
- Develop a financial plan for the modernization of the NPS and ensure proper resource management;
- Discuss the necessary improvements in the telecom infrastructure and the electricity network and gear to another the NPS development plan and the development plans for the physical infrastructure, negotiate an affordable fee structure and service levels;
- Discuss the task and responsibilities of the different stakeholders and service providers in the new NPS and incorporate this in the strategic plan;
- Develop the business requirements for a communication infrastructure (VPN) that can be used for large value payments, the clearing and settlement of retail payments and securities and (as back up) for the communication between head offices of banks/MFI's and their branches. Define an adequate security policy and ensure access control to and confidentiality, integrity, authentication, non-repudiation, availability and auditability in the network (see the report of the IT consultants);
- Launch the RFP for the VPN network and negotiate with ETC the building of this network, the service levels and fees. Conduct a SLA and monitor/supervise the building of the network and performance thereof;
- Develop the business requirements, draft the functional specifications and procure and install the equipment for a Real Time Gross Settlement System for large value and time critical payments to replace the present Bankmaster system of the NBE. The system should be able to clear and settle also batches of retail payments;
- Develop a strategy to develop the market for retail payments and a plan to enlarge the access to payment services;
- Introduce new payment services to the government using the RTGS system;
- Develop a broad range of standardized retail payment instruments next to the cheque, introduce the possibility to exchange and clear and settle electronic fund transfer for retail payments (credit transfer orders) via batch files and marketing and implement payroll schemes starting with the government;
- Find a solution on the ownership of the ATM and POS network (making a choice between proprietary networks of individual banks or a commonly owned network) and draft the bidding documents and launch a RFP to procure the system;
- Introduce new core banking systems or upgrade the existing core banking systems of commercial banks, implement and connect at least 50% of all branches in the sector;
- Standardize the cheque and introduce MICR technology;
- Introduce electronic cheque presentation (ECP).

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<sup>33</sup> In the Ethiopian calendar

- Draft the bidding documents for the procurement of an integrate ACH.
- Implement an integrated ACH;

## **2. Medium-Term (2004 - 2007)**

- Draft the functional specifications and procure and install a Central Securities Depository and settlement system for securities;
- Develop an oversight framework
- Marketing and introduction of direct debit schemes for taxes, utility services and insurance companies etc.
- Develop the market for other new retail payment instruments.
- Develop public education-programs
- Broaden the ATM and POS network
- Connect the MFI's to the payment infrastructure and upgrade their payment services and facilities
- Connect at least 75% of all branches in the banking industry to the core banking systems in the head offices
- Conduct a feasibility study on possible cost reductions in cross border payment transfers and safer procedures for FX transactions
- Promote the access to banking service and achieve that 40% of all households have open a bank account or an account with an MFI

## **3. Long-Term (2008 - 2010)**

- Build out the branch net work of banks and MFI's
- Develop attractive saving and loan products for the house hold sector and Micro and Small Enterprises
- Connect all the branches of the commercial banks to the core banking system of their head offices
- Broaden the access of the public to banking services and achieve that 2/3 of the households have opened a bank account or an account with an MFI in EFY 2010

## ANNEX 1

### Main Shortcoming in the Present Infrastructure

The main shortcomings in the infrastructure for payments and clearing and settlement of securities are:

1. *Limited access to banking and payment services.* Although, the client base of banks and the branch-network of banks are rapidly growing, Ethiopia is still one of the most under-bank countries in the world, even for Sub-Saharan standards. Only 4.3% of the population has opened a bank account and has access to banking services. Ethiopia has only one bank branch per 140,000 inhabitants.
2. *Lack of a payments infrastructure in rural areas.* Banks concentrate their activities on densely populated areas. Most branches are located in cities, especially in Addis Ababa. In rural areas there are hardly any branches of commercial banks. In the country most often only Micro Finance Institutions (MFI's) and Savings and Credit Cooperative Offices (SACCO's) offer loans and saving facilities to the public. Till yet, these institutions provide only very basic services such as transfers to other customers of the same MFI. MFI's and SACCO's are not connected to the inter-bank payment infrastructure;
3. *Heavy use of cash for all payment purposes.* Cash is by far the most important payment instrument. The only non-cash payment instrument that is broadly used is the cheque. However, clearing facilities exist only for cheques issued in Addis Ababa. In other parts of the country the clearing and settlement of cheques is cumbersome and very time consuming;
4. *Other non-cash payment instruments exist but in a very rudimentary stage.* For instance only one percent of all accountholders is provided with a debit or credit card. Recently, individual banks have undertaken initiatives to introduce some other modern payment instruments and/or payment services, but till yet, these initiatives are not coordinated and the services and instruments used are not standardized;
5. *Obsolete infrastructure for large value payments.* The infrastructure for large value payment systems of the National Bank of Ethiopia is very basic. The system

- of the NBE is fully paper based without proper liquidity management or queuing facilities. In its present form it cannot fulfill the core function in a modern payment infrastructure as is normally the case in most other countries;
6. *Deficiencies in the AACO, the clearing and settlement system for cheques in Addis Abba.* The volume of cheques cleared in the AACO is rapidly growing. However, the processing of cheques in the AACO is still fully manual and may reach in the near future its capacity boundaries. The system is used for large value and time critical payments and is systemically important but does not comply with the CPSS-Core Principles for Systemically Important Payment Systems;
  7. *No efficient inter-bank infrastructure for clearing and settlement of other retail payment instruments.* Payments, for instance credit transfers, from a bank account in one commercial bank to an account in another bank have to be cleared and settled via the system of the NBE which is not designed to handle these payment flows efficiently, bringing forward long delays and high costs. This forms a major barrier for development of the retail market and the introduction of electronic funds transfers for retail purposes;
  8. *No interoperability of ATM and POS networks.* Some banks have installed Automated Teller Machines (ATM's) and Point of Sales (POS) terminals and others have plans to do so. At present, the number of ATM's and POS terminals is still limited and most of the facilities are located in the capital. The networks of the different banks are not linked via a central switch and thus cannot be used by customers of other banks;
  9. *Limited outreach of the electronic payment networks of banks.* Banks have connected only one third of their branches to their core banking system<sup>34</sup> and four banks do not have installed such a system till yet. Only clients of a branch connected to a core banking system can be provided with modern payment instruments;

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<sup>34</sup> A core banking system facilitates transfer of money between branches and between accountholders of different banks. It supports various payment activities such as electronic funds transfers (EFT), the collection of cheques, cash withdrawals via Automated Teller Machines (ATM's) and card transactions via Point of Sales (POS) terminals.

10. *Insufficient support of the legal and physical infrastructure.* Last but not least, the legal framework, the information and telecommunication (ICT) infrastructure and the electricity network are not conducive for modernization of the National Payment System (NPS). The legal infrastructure does not support the introduction of a broad range of payment instruments, the modernization of the cheque clearing and the introduction of electronic clearing and settlement systems. The physical infrastructure for electricity and for ICT-services do not cover the whole country and the fees for telecommunication services are relatively high and do not encourage the introduction of modern banking methods such as inter-bank electronic funds transfers, e-banking and e-commerce. The present fees form a barrier for banks to connect their branch network to their core banking systems and for customers to use e-banking devices.

## ANNEX 2

# Objectives and expected results of the modernization of the National Payment system

## Objectives

The modernization project should achieve at least the following primary objectives:

- 1) To provide a variety of payment instruments;
- 2) To put in place mechanisms and processes that can safely and cost-effectively support the transfer of money from payer to payee;
- 3) To manage and minimize risks inherent in clearing and settlement systems in a cost-effective manner;
- 4) To put in place an adequate legal and regulatory framework that effectively support modern payment and securities settlement systems and modern payment instruments such as electronic funds transfers, card payments etc;
- 5) To establish an effective oversight framework for payment systems.

## Expected results

Within this framework of objectives the ultimate goals of the project could be set as:

- 1) To establish a good balance between co-operation and competition in the banking industry and allow private customers and enterprises the freedom to choose and to use their own bank for all their payment activities;
- 2) To broaden the access of the public to banking services and especially to payment services;
- 3) To introduce a broad range of standardized, safe and efficient payment instruments that are up to the need of the users and takes into account Ethiopian specific socio-economic aspects. The instrument mix should include at least: credit transfers, direct credits for payroll schemes, direct debits for bill payments, standing orders and card payments;

- 4) To implement a modern system for large value and time critical payments, preferable on a Real Time Gross Settlement (RTGS) basis, that relieves the present cheque clearing. The large value payment system should comply with the Core Principles for Systemically Important Payment Systems, support the execution of monetary policy and allow participants to manage the liquidity in their account efficiently and to use telecommunication channels for the exchange of information and sending in of payment orders;
- 5) To automate the processing of cheques by introducing MICR technology and broaden the scope of the clearing facilities to ensure country wide coverage;
- 6) To implement an efficient and safe infrastructure for inter-bank clearing and settlement of all other retail payment instruments;
- 7) To achieve inter-operability of the different networks for ATMs and POS-terminals of individual banks or to put in place a network of ATM's, commonly owned by the banking industry with open access for all financial institutions that are allowed to offer payment services;
- 8) To broaden the outreach of the electronic networks of individual banks. To achieve a payment infrastructure for electronic funds transfers that cover the whole country, the range and the operational reliability of the electronic networks of individual banks should be extended and improved. Where necessary core banking systems should be introduced or the existing core banking systems of individual commercial banks should be upgraded. The branches all over the country should be connected and the availability, capacity and business continuity procedures and facilities should be improved.
- 9) To put in place a new comprehensive and consolidated legislation that supports modern payment practices and instruments.

## Annex 3. Project Management and Governance

The governance and management structure should ensure involvement of all relevant stakeholders and well structured discussions on the present and future needs, goals, objectives, principles and measures to be taken. It should ensure adequate decision taking on the appropriate level and commitment of all involved parties for the execution thereof.

The proposed project management structure encompasses:

- The National Payment Council;
- The NPS Steering Committee;
- The Project Director;
- The Project Team;
- A Project Bureau;
- Working groups.

### **The National Payment council**

#### ***Role and tasks***

The National Payment Council should give guidance to the National Payment System (NPS) reform, discuss the needs for payment services in Ethiopia, develop the vision and future characteristics, set the goals and objectives, discuss the leading principles and critical success factors and approve the strategic plan to align the current NPS with the envisaged NPS and the priorities set.

#### ***Constitution***

The National Payment Council consists of:

1. The Governor of the NBE, chairman;
2. Vice Governor, vice chairman;
3. The NPS project director;
4. Chairman of Ethiopian Bankers Association;
5. Chairman, Association of Micro Finance Institutions;
6. Chairman of Ethiopian Insurers Association

7. A representative of the Remittance Service Providers;
8. The chief Clearing and Settlement Officer of the Ethiopian Commodity Exchange;
9. A high ranking official of the Ministry of Finance & Economic Development (MoFED);
10. A high ranking official of the Federal Inland Revenue and Custom Authority;
11. A high ranking official of the Ethiopian Postal Service;
12. A high ranking official of the Ethiopian Telecommunication Agency;
13. A high ranking official of the Ethiopian Telecommunications Corporation;
14. The General Director of the Ethiopian Information Technology Development Agency;
15. General Manger Ethiopian Electric Power Corporation;
16. Chairman of Ethiopian Chamber of Commerce;
17. A high ranking official from Pension and Social Security Authority.

### ***Chairman***

In line with international practices the National Payment Council should be chaired by the Governor of the NBE.

## **The Steering committee**

### ***Role and task***

The Steering Committee is responsible for the progress of the modernization project and adequate implementation of the strategic plan as approved by the Council, takes the decisions on the ownership and governance structure for the different payment systems and on arrangements for inter-bank co-operation with respect to payment instruments, secures the commitment of the main stakeholders and ensures the availability of sufficient resources for the project.

### ***Constitution***

The Steering committee should be formed by:

- The Governor of the NBE, chairman;
- Vice Governor of the NBE, vice chairman;
- The project director of the NPS modernization project;
- the presidents or high ranking executives responsible for the payment activities of all commercial bank;
- Chairman of the Association of Micro Finance Institutions
- Executive Director of the Association of Micro Finance Institutions
- A high ranking official from Ministry of Finance and Economic Development;

### ***Chairman***

The Steering Committee should be chaired by the Governor of the NBE.

### ***Conflict resolution***

In case of difference of opinions on critical issues with respect to the reform process, which could not be solved by consensus building, the decision shall be made by voting.

### **The Project Director**

The project director, who will be part of internal structure of National Bank of Ethiopia, initiates and champions the modernization project and takes full responsibility for the project. He/she ensures that the project receives the necessary resources for investment, makes proposals for the contributions of different stakeholders and organizes adequate and skilled manpower to staff the different working groups. He brings about loyal cooperation of all stakeholders within and outside the central bank and makes a push for timely delivery. He maintains the momentum of the project by highlighting important achievements and drawing attention to areas of difficulties. He ensures that stakeholders and the public are informed about pending changes and developments. He chairs the project team.

### **The Project team**

The project team could be formed by the NBE that consists of senior staff members of the Bank, completed with the different chairman/women of the expert or working groups.

## **The Project Bureau**

The project bureau should support the project director and the project team, is charged with all the administrative tasks as filing, reporting, organizing meetings, workshops, providing background information, conduct analysis, build a database on the infrastructure etc. and the head of the project Bureau will join the meetings of the different working groups.

## **Expert teams or working groups**

The following expert teams or working groups could be established:

- I. Technology Working Group;
- II. Policy, Standardization and Bancarization Working Group
- III. Operations Working Group
- IV. A Legal Working group (LWG).

The *Technology Working group* should (i) work out the business requirements and technical specifications for the systems for large value and retail payments and the settlement of securities, in which the interoperability and connectivity of these systems to achieve settlement in central bank money is ensured and (ii) draft the technical specifications of the communication network. It shall organize (iii) the public tender procedure to acquire these systems, (iv) define the selection criteria and the selection of the provider(s); (v) organize the implementation and roll out of the new infrastructure (including coordination of the adaptation of procedures and systems of the NBE and of participants and the reorganization of the IT –infrastructure within the NBE if necessary) and (vi) formulate the procedures for acceptance of the systems to be delivered and the testing thereof and organize, in cooperation with the system provider(s), the training of staff to operate these systems. The working group should pay special attention to (vii) risk management and liquidity management in the infrastructure; and should (viii) carry out impact analysis for the different stakeholders. Finally the working group should draft (ix) clear descriptions of the functioning of the different systems including a stylish diagram of the lifecycle of payments, the, message processing, validation and checks to which messages are subjected, risks participants are exposed to and should give a

overview of the risk management in the systems, crisis management etc and organize the dissemination of information among participants and the public. .

The *Policy, Standardization and Bancarization Working Group* should: (i) develop the policy for retail payments in Ethiopia, (ii) make proposals to enlarge the access to banking services in general and to payment services in particular; (iii) develop new payment instruments taking into account the business needs and requirements in the market; (iv) set inter-bank standards; and, (v) make proposals to development the market for these instruments (banking industry-wide marketing actions, programs to enlarge the awareness of and confidence of the public in the new payment instruments etc.). The instrument mix should encompass at least ordinary credit transfers, payroll schemes, direct debits and card payments.

The *Operation Working group* should focus on: (i) the modernization of the AACO and a country wide coverage of the cheque clearing; (ii) inter-bank clearing and settlement arrangements for other payments instruments such as credit transfers, payroll schemes and direct debits etc.; (iii) clearing and settlement of card payments and the implementation of an automated switch for ATM and POS-transactions; (iv) the integration of the different clearing and settlement arrangements for retail payments into one overarching entity or ACH; (v) the functioning and scope of this system; (vi) the infrastructure for registry and clearing and settlement of securities; (vii) the need for and structuring of cross border arrangements for payments and securities settlement; work out (viii) the roles and responsibilities of the different stakeholders in the payment reform; make proposals for: (ix) the governance structure for the different systems; fee structures etc.; (x) the development of a money market and (xi) achieve inter-bank agreements on codes of conduct and settlement times.

The *Legal Working group* should focus on the necessary adaptation in the legal framework to accommodate the modernization process and in working out of rules and regulations and all other necessary legal documents for the systems to be developed.

### ***Constitution***

Since the NPS is a national asset the members serving on the various teams should be recruited from all key stakeholders. Also the chairman/woman could be recruited from outside the NBE. Good team selection and continuity is critical for the success of the project.

### **Monitoring, Reporting and evaluation**

The working groups should set a time table for their activities and report regularly to the project team on their activities, issues raised and progress. If decisions are necessary for the further progress this should be flagged and submitted to the project team. The project team should closely monitor the progress of the project and evaluate regularly the feasibility of the objectives and goals set. Within this context clear milestones should be set for the different parts of the project. The evaluations should be sent to the Steering Committee and the National Payment Council should be informed.

## ANNEX 4

### Glossary

<b><i>Term</i></b>	<b><i>Definition</i></b>
Acceptor	any trading or service establishment that accepts, on its own behalf or on behalf of its network, the payments of goods or services via an electronic money instrument.
Access	the right of or opportunity for an institution to use the services of a particular payment system to settle payments on its own account or or customers.
Acquirer	the entity or entities that hold(s) deposit accounts for card acceptors (merchants) and to which the card acceptor transmits the data relating to the transactions. The acquirer is responsible for the collection of transaction information and settlement with the acceptors.
Automated clearinghouse (ACH)	an electronic clearing system in which payment orders are exchanged among financial institutions, primarily via magnetic media or telecommunications networks, and handled by a data processing centre. See also <i>clearing/clearance</i> .
Automated Teller machine (ATM)	an electromechanical device that permits authorised users, typically using machine-readable plastic cards, to withdraw cash from their accounts and/or access other services, such as balance enquiries, transfer of funds or acceptance of deposits. ATMs may be operated either online with real-time access to an authorisation database or offline.
Authentication	the methods used to verify the origin of a message or to verify the identity of a participant connected to a system and to confirm that a message has not been modified or replaced in transit.
Banking system	all financial institutions that in particular accept deposits, provide credit and/or offer payment services directly to users as one of their core business functions. This includes the central bank.
Batch	the transmission or processing of a group of payment orders and/or securities transfer instructions as a set at discrete time intervals.
Bill of exchange	a written order from one party (the drawer) to another (the drawee) to pay a specified sum on demand or on a specified date to the drawer. Widely used to finance trade and when discounted with a financial institution, to obtain credit.
Business continuity	a payment system's arrangements which aim to ensure that it meets agreed service levels even if one or more components of the system fail or if it is affected by an abnormal external event. Include both preventative measures and arrangements to deal with contingencies.
Central bank credit (liquidity) facility	a standing credit facility that can be drawn upon by certain designated account holders (eg banks) at the central bank. In some cases the facility can be used automatically on the initiative of the account holder, while in other cases the central bank may retain degree of discretion. The loans

	typically take the form either of advances or overdrafts on an account holder's current account which may be secured by a pledge of securities (also known as lombard loans in some European countries), or of traditional rediscounting of bills.
Central counterparty	an entity that is the buyer to every seller and seller to every buyer of a specified set of contracts, eg those executed on a particular exchange or exchanges.
Central Security depository	a facility (or an institution) for holding securities, which enables securities transactions to be processed by book entry. Physical securities may be immobilised by the depository or securities may be dematerialised (ie so that they exist only as electronic records). In addition to safekeeping, a CSD may incorporate comparison, clearing and settlement functions.
Certificate	physical document which evidences an ownership claim in, indebtedness of, or other outstanding financial obligations of the issuer.
Cheque	a written order from one party (the drawer) to another (the drawee, normally a bank) requiring the drawee to pay a specified sum on demand to the drawer or to a third party specified by the drawer. Cheques may be used for settling debts and withdrawing money from banks. See also bill of exchange.
Clearing/clearance	the process of transmitting, reconciling and, in some cases, confirming payment orders or security transfer instructions prior settlement, possibly including the netting of instructions and establishment of final positions for settlement. Sometimes the term is used (imprecisely) to include settlement.
Collateral	an asset or third-party commitment that is accepted by the collateral taker to secure an obligation of the collateral provider vis-à-vis the collateral taker.
Confidentiality	the quality of being protected against unauthorized disclosure
Confirmation	a process whereby a market participant notifies its counterparties or customers of the details of a trade and, typically, allows them time to affirm or to question the trade.
Core banking systems	applications responsible for processing and posting transactions in the domain of payments, current and savings accounts, loans and securities. They perform current and deposit accounting, maintaining loans accounts, holding securities positions and clearing payments. Core banking systems normally support modern payment facilities such as Electronic Funds Transfers (EFT), Automated Teller Machines (ATMs), Electronic Funds transfers at Point of Sales (EFTPOS) and E-banking and form the interface with inter-bank clearing and settlement systems outside the bank.
Corresponding banking	an arrangement under which one bank (correspondent) holds deposits owned by other banks (respondents) and provides payment and other services to those respondent banks. Such arrangements may also be known as agency relationships in some domestic contexts. In international banking, balances held for a foreign respondent bank may be used to settle foreign exchange transactions. Reciprocal correspondent banking relationships may involve the use of so-called nostro and vostro accounts to settle foreign exchange transactions.

Counterparty	the opposite party to a financial transaction such as a securities trade or swap agreement.
Credit risk	the risk that a counterparty will not settle an obligation for full value, either when due or at any time thereafter. In exchange-for-value systems, the risk is generally defined to include replacement cost risk and principal risk.
Credit transfer	a payment order or possibly a sequence of payment orders made for the purpose of placing funds at the disposal of the beneficiary. Both the payment instructions and the funds described therein move from the bank of the payer/originator to the bank of the beneficiary, possibly via several other banks or intermediaries and/or more than one credit transfer system.
Custodian	an entity, often a bank, that safe keeps and administers securities for its customers and that may provide various other services, including clearance and settlement, cash management, foreign exchange and securities lending.
Custody	the safekeeping and administration of securities and financial instruments on behalf of others.
Delivery versus payments	a link between a securities transfer system and a funds transfer system that ensures that delivery occurs if, and only if, payment occurs.
Dematerialization	the elimination of physical certificates or documents of title which represent ownership of securities so that securities exist only as accounting records.
Depository	an agent with the primary role of recording securities either physically or electronically and keeping records of the ownership of these securities.
Direct debit	preauthorised debit on the payer's bank account initiated by the payee.
Electronic data interchange (EDI)	the electronic exchange between commercial entities (in some cases also public administrations), in a standard format, of data relating to a number of message categories, such as orders, invoices, custom documents, remittances advices and payments. EDI messages are sent through public data transmission networks or banking system channels. Any movement of funds initiated by EDI is reflected in payment instructions flowing through the banking system.
End user	a customer of a financial institution to which the financial institution provides payment instruments and services to facilitate the completion of their commercial or financial transactions.
Encryption	the use of cryptographic algorithms to encode clear text data (plaintext) into chiphertext to prevent unauthorised observation.
Finality	irrevocable and unconditional.
Gross settlement system	a transfer system in which the settlement of funds or securities transfer instructions occurs individually (on an instruction-by-instruction basis).
Immobilization	placement of physical certificates of securities and financial instruments in a central securities depository so that subsequent transfers can be made by book entry.

Institutional arrangements	practices and organisational arrangements to provide various types of payment services from financial institutions and other organisations to users. They include market arrangements, the legal and regulatory framework, and mechanisms for consultation and coordination among stakeholders in the national payment system.
Interoperability	a situation in which payment instruments belonging to a given scheme may be used in systems installed by other schemes. Interoperability requires technical compatibility between systems, but can only take effect where commercial agreements have been concluded between the schemes concerned.
Integrity	the quality of being protected against accidental or fraudulent alteration or of indicating whether or not alteration has occurred.
Intraday credit	credit extended for a period of less than one business day; in a credit transfer system with end-of-day final settlement, intraday credit is tacitly extended by a receiving institution if it accepts and acts on a payment order even though it will not receive final funds until the end of the business day. Also called daylight overdraft, daylight exposure and daylight credit.
Intraday liquidity	funds which can be accessed during the business day, usually to enable financial institutions to make payments in real time.
Large-value payment	a payment, generally involving a very large amount, which is mainly exchanged between banks or between participants in the financial markets and usually requires urgent and timely settlement. They are often related to important financial market transactions such as money market or foreign exchange transactions as well as many commercial transactions.
Large-value payment system	a system which processes mainly large-value payments.
Legal risk	the risk of loss because of the unexpected application of a law or regulation or because a contract cannot be enforced.
Liquidity risk	the risk that a counterparty (or participant in a settlement system) will not settle an obligation for full value when due. Liquidity risk does not imply that a counterparty or participant is insolvent since it may be able to settle the required debt obligations at some unspecified time thereafter.
Loss-sharing (or loss allocation) agreement	an agreement among participants in a clearing or settlement system regarding the allocation of any losses arising from the default of a participant in the system or of the system itself.
National payment system	the institutional and infrastructure arrangements in a financial system for initiating and transferring monetary claims in the form of commercial bank and central bank liabilities.
Net settlement system	a settlement system in which final inter-bank settlement of individual transfer instructions occurs on a net basis at one or more discrete, specified times during the processing day.
Netting	an agreed offsetting of positions or obligations by trading partners or participants. The netting reduces a large number of individual positions or obligations to a smaller number of obligations or positions. Netting may take several forms, which have varying degrees of legal enforceability in the event of default of one of the participants

Network operations	all the processes and arrangements related to the functioning of a network (such as those related to operating hours, fees, sanctions, delivery of items, formats, etc).
Non- Repudiation	the ability to prevent denial or repudiation by the sender or receiver of a payment message.
Novation	the replacement of existing obligations by new obligations between the existing or substitute parties that satisfactorily and legally discharges the original obligation.
Operational risk	the risk that deficiencies in information systems or internal controls could result in unexpected losses.
Oversight	a central bank function whereby the objectives of safety and efficiency in payment and settlement systems are promoted by monitoring existing and planned systems, assessing them against these objectives and, where necessary, inducing change.
Payment	the payer's transfer of a monetary claim on a party acceptable to the payee. Typically, monetary claims take the form of banknotes or deposit balances held at a financial institution or at a central bank.
Payment instruction	the entirety of network facilities, technologies and procedures for accessing and transacting payment instruments and for processing, clearing and settling related payments.
Payment infrastructure services	services provided through the payment infrastructure for accessing and transacting payment instruments and for processing, clearing and settling the related payments.
Payment order (instruction)	an order or message requesting the transfer of funds (in the form of a monetary claim on a party) to the order of the payee. The order may relate either to a credit transfer or to a debit transfer. Also called payment instruction.
Payment service markets	arrangements that coordinate the production and pricing of payment instruments and services and their delivery from payment service providers to users. Particular markets are characterised by their specific market practices, service providers and users, and factors influencing the demand for and supply of that specific service.
Payment system	a specific set of instruments, banking procedures and inter-bank funds transfer (eg clearing and settlement) systems that ensures the circulation of money.
Point of Sale	this term refers to the use of payment cards at a retail location (point of sale) The payment information is captured either by paper vouchers or by electronic terminals, which in some cases are designed also to transmit the information. Where this is the case, the arrangements may be referred to as “ electronic funds transfers at the point of sales” EFTPOS).
Principal risk	the risk that the seller of a security delivers a security but does not receive payment or that the buyer of a security makes payment but does not receive delivery. In this event, the full principal value of the securities or funds transferred is at risk.
Real-time transfer	the transmission, processing and settlement of a funds or securities transfer instruction at the time that it is initiated.
Retail payment	a payment between various consumers, businesses and governments of relatively low value and urgency. It is a payment

	which is not captured in the definition of a large-value payment (see large-value payment)
Retail payment infrastructure	mechanisms used for transaction, clearing and settlement of relatively low-value non-urgent payments initiated through payment instruments such as cheques, credit transfers, direct debits and payment cards.
Securities infrastructures	full set of arrangements for the trading, registration and custody of securities and for the confirmation, clearance and settlement of securities transactions.
Securities systems	the institutional arrangements and infrastructures for issuing and administering securities liabilities, administering and safekeeping holdings of securities issues, and initiating, confirming, matching, transferring and settling securities transactions.
Settlement	an act that discharges obligations in respect of funds or securities transfers between two or more parties.
Settlement risk	general term used to designate the risk that settlement in a transfer system will not take place as expected. This risk may comprise both credit risk and liquidity risk.
Stakeholder	in a payment system, stakeholders are those parties whose interests are affected by the operation of the system.
Straight through processing (STP)	the automated end-to-end processing of trades/payment transfers including the automated completion of confirmation, matching, generation, clearing and settlement orders.
Standing order	an instruction from a customer to his bank to make a regular payment of a fixed amount to a named creditor.
Systemic risk	the risk that the failure of one participant in a transfer system, or in financial markets generally, to meet its required obligations will cause other participants or financial institutions to be unable to meet their obligations (including settlement obligations in a transfer system) when due. Such a failure may cause significant liquidity or credit problems and, as a result, might threaten the stability of financial markets.
Systemically important payment systems	a payment system is systemically important where, if the system were insufficiently protected against risk, disruption within it could trigger or transmit further disruptions amongst participants or systemic disruptions in the financial area more widely.
SWIFT	Society for World wide Inter-bank Financial Telecommunication: a cooperative organisation created and owned by banks that operates a network which facilitates the exchange of payments and other financial messages between financial institutions (including inter-bank system providers) throughout the World. A SWIFT payment message is an instruction to transfer funds: the exchange of funds (settlement) takes place over a payment system or through corresponding banking relationships.
User	payment system users are entities, comprised of both institutional participants in infrastructure networks and their customers in end user markets that acquire and use various payment services.