AUTOMATION OF THE MANUAL E-PAYMENT SYSTEM IN THE PUBLIC SERVICE

by

OJEONU, Magnus Uarevuegbe

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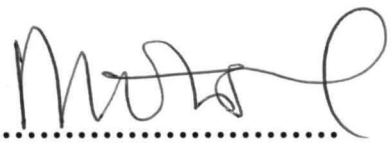
CERTIFICATION

This project titled: "Automation of the Manual E-Payment System in the Public Service"; by Ojeonu, Magnus Uarevuegbe (PGD/MCS/2008/1255) meets the regulations governing the award of Postgraduate Diploma in Computer Science of Federal University of Technology, Minna.



20/01/2011

Dr. Jiya, M **Date**

Supervisor

....

Dr. U. Y. Abubakar **Date**

Head of Department

....

External Examiner **Date**

DEDICATION

In recognition of the Grace and Ability God gave me to successfully carry out this project work, I hereby dedicate this project to my wife: Mrs Caroline Magnus Ojeonu; my daughter: Love Magnus Ojeonu and my son: Diamond Magnus Ojeonu.

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To God be the glory for His grace and mercies. His ability has made this project possible.

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ABSTRACT

Payment system involves the processes through which the Federal Government pays for goods and services provided by contractors as well as employees emoluments. However, the implementation of the Manual E-Payment System is fraught with complaints of delay in payments and has not curbed the problems with the manual systems of payment that was in place. This is due to processes involved in the manual E-payment system. This project is designed to automate a system that will enhance the manual E-payment by allowing timely and easy entry of all government expenditures for payment, creation of bank schedules / Mandate Instruction to pay; as well as provide useful reports that will enhance accountability of public expenditure.

TABLE OF CONTENT

Pages

CHAPTER TWO: LITERATURE REVIEW

CHAPTER THREE: MATERIALS AND METHODS

CHAPTER ONE

1.1 Background

Successive Governments have consistently identified low productivity and inefficiency in the Public sector and Corruption has been largely responsible. Given the high level of fraud and corrupt practices in Government and in order to tackle it and ensure accountability, the then President, Late Umaru Musa Yar'dua directed that all financial transactions being made by the Federal Government must be done electronically.

Announcing the new measures at one of the Federal Executive Council meetings at the Council Chambers of the Presidential Villa, Abuja; and also at the 2009 budget presentation, at the joint session of the National House Assembly, Late President Umaru Musa Yar'Adua told the gathering that: "There will no longer be cash payments with regards to recurrent expenditure because it has been subject to widespread abuse with junior officials issuing cheques in their names to bring cash to Ministries, Departments and Agencies (MDAs) for onward transmission to their bosses. Consequently A treasury circular, Reference No TRY/A8 & B8/2008 was issued on October 22, 2008, prescribing a broad guideline for the implementation of the E-payment.

Following the presidential directive, the Office of the Accountant-General of the Federation held discussions with Ministries, Departments and Agencies (MDAs) of government where detailed implementation plan was mapped out. It also held series of sensitization meetings with Personal Secretary, Directors of Finance (DFAs) and Heads of Accounts, and also met with the representatives of Central Bank of Nigeria (CBN), Commercial Banks and National Payment Committee.

The commencement of the Electronic Payment system in all Federal Ministries, Departments and Agencies (MDAs) in January 2009 was to introduce cashless regime in all government's transactions with the aim of hastening and quickening payments to the beneficiaries. The policy is aimed at eliminating cash and cheque in payment as well as to allow little or no physical contact between the beneficiaries and those making the payment.

The e-payment regime covers all payments with particular emphasis to payments to contractors and consultants and to service providers like the Power Holding Company of Nigeria (PHCN). It also covers all payments to government workers and to other government agencies like the Federal Inland Revenue Service (FIRS).

According to the then Minister of Finance, Dr. Mansur Muhtar : "E-payment is the platform through which transparency and accountability is

guaranteed". The implementation plan also prescribed that mandates to effect payment must reach the paying banks within 72 hours after approval for payment had been given by the accounting officer in each of the ministries, departments or agencies.

E-payment is a subset of e-government which is the application of electronic means in the interaction between Government and Citizens and Government and Businesses.

Due to infrastructural problems such as efficient telephone network system and strong Information Technology (IT) network, the end to end e-payment system could not be implemented, but the manual E-payment system is currently being implemented, which is a mixture of manual and electronic process. By 2011, it is expected that all will migrate to the end to end system, where payments can be made directly from the offices to the beneficiaries through the banks.

The Manual E-payment system as currently implemented is fraught with problems and has not effectively addressed the problems with the previous manual way of paying with cash or cheques.

Its implementation has been dogged by controversies. Many civil servants did not receive their salaries on time and those who did were either short-changed or were given someone else's pay.

The banking industry still has the big challenge of making payment by either credit or full e-payment. Nigeria's banks are still lagging behind in cashless transaction.

Quicker payment and transparency were cited as some of the basic reasons for introducing the e-payment regime, but so far, the system is so slow that many people are getting worried. The process involved in the manual E-payment system is largely responsible for the inefficiency currently witnessed in the implementation.

The current method of entering payment request details from vouchers into Excel spread sheet so as to generate bank schedule and the mandate instruction makes it slow and cumbersome. It is also makes it difficult to generate other information for accountability for Governments funds; which was why the new system of payment was introduced.

The Automated Manual E-Payment System being designed by this project will allow easy entry of Payment request details from Vouchers and other account documents, easily generate bank schedule; and other reports that will enhance efficiency and accountability, as well as a basis for facilitating seamless integration into the end-to-end E-Payment system that is expected to commence in 2011.

1.2 Statement of the Problem

The manual method of payment using cheques and cash allows for corrupt practices, inefficiency and poor accountability. The inception of the e-payment has come with attendant problems such as delays in payment, inability to easily key in payment requests and also accountability. Thus it is necessary to design an automated system that is fast and efficient in the registering of payment vouchers, easy and timely generation of bank schedules and instruction for payment as well as performing audit trial and accountability.

1.3 Aims and Objectives

The aim of this research project is to facilitate and enhance a robust e-payment system that is efficient and allows for accountability.

The objectives of the study include the following:

i. Easy entry of payment request records from vouchers (PVs)
ii. Easy modification / update of payment request records
iii. Generating bank schedules / Instruction for payment
iv. Provide records of unpaid Vouchers
v. Enhance audit trails
vi. Facilitate accountability
vii. Security of Data

1.4 Methodology

The project will be implemented with Visual Basic as the programming language. Visual Basic (VB) is an ideal programming language for developing sophisticated professional applications for Microsoft Windows. It makes use of Graphical User Interface for creating robust and powerful applications. The Graphical User Interface as the name suggests, uses illustrations for text, which enable users to interact; and MS excel as the data base. Although there are other more robust databases, Excel is a cross platform database programme that has been adopted by banks and the government organisations for easy integration.

1.5 Significance of the Study

Fraud and lack of accountability is the bane of development of any country and the e-payment system was introduced to tackle the issue of corruption, accountability of public funds and as well enhance efficiency in the payment process for public expenditure. Since the present process of manual e-payment system has it attendant problems of inconsistency, delay in payments as well as not allowing for accountability. The project becomes significant in designing an automated payment system that encompasses the easy and timely entry of payment request records, easy modification were necessary as well as allow for accountability of funds.

1.6 Scope of the Study

The Automated Manual E-payment system is designed to fulfil the objectives earlier mentioned, which include the entry of payment request records, modification of records and generation of bank schedules as well as information for accountability. The system is limited to public expenditure payment system and it is a subset of e-government which involves an integrated electronic process system of transactions between Government and Citizens as well as Government and Businesses.

1.7 Limitation of the Study

This study is limited to the objectives already stated and limited to the public sector alone which has its own extant financial rules and regulations. It does not consider the processing involved in contract administration or expenditure generation.

1.8 Definition of terms

Automated: A computerized process

Beneficiaries: Recipients of payments or benefits.

Consultants: persons or groups of persons, who are not employees but hired by government to carry out some task and will be paid for executing such tasks.

Contractor: A person who receives a contract for execution

Corruption: The act of misappropriating funds for one's personal interest

Data Base: A systematically arranged collection of data for easy entry and retrieval of data

Fraud: The crime of cheating or obtaining money or benefits under deception

Networks: A collection of computers interconnected to share information and data over communications lines.

Payment Voucher (PV): Money paid out by the Government has to be supported with a payment voucher. This is to evidence the purchase of goods or services rendered. Vouchers are prepared at the points payments are to be effected.

Public Accountability: Obligations of public enterprises and agencies (who are entrusted with public resources) to be answerable for fiscal and social responsibilities, to those who have assigned such responsibilities to them.

Public Records: Also called public documents. Document (such as court records, land deeds, and public registers) authenticated by a public officer and made available for public reference and use

Recurrent Expenditure: Cost or expense (such as for administration, insurance, rent, and utility charges) that relates to an operation or the organisation as a whole

Sensitization: Attempt to make oneself or others aware of and responsive to certain ideas, events, situations, or phenomenon.

Subsystem: A part of a System

System: A collection of interrelated components working together to achieve a common goal.

Transaction: Event that effects a change in the asset, liability, or net worth account.

Visual Basic: A third generation event driven programming language and integrated development environment (IDE) from Microsoft.

CHAPTER TWO

LITERATURE REVIEW

2.1 Overview of E-Payment

Payment represents both cash and non-cash financial transactions, which take place between two or more parties. But, in a strict sense of the word "payment" represents only non-financial transaction. It is more common for two parties exchanging value to hold accounts with alternative banks, in which both banks become the parties of payment. While the traditional method of payment using cash, cheques and bank draft was sufficient in the early times, however, due to technological innovation, and the need for commerce and transactions across the globe, the electronic payment option has become imperative. According to Sumanjeet (2009) electronic payment system is an integral part of e-commerce. e-commerce or eCommerce, consists of the buying and selling of products or services over electronic systems such as the Internet and other computer networks. The emergence of e-commerce has created new financial needs that in many cases cannot be effectively fulfilled by the traditional payment systems. Recognizing this, virtually all interested parties are exploring various types of electronic payment system and issues surrounding electronic payment system and digital currency. The relative convenience, speed and comfort provided by the e-payment system have

made it imperative as the ideal payment option. Selander (2008) captured it succinctly: "Perhaps the easiest way to grasp the true value of electronic payments is to envision a world without them. Clearly, if electronic payments came to a sudden halt, many facets of commerce: - travel, trade and the Internet just to name a few, would face dire consequences. While cash and checks still have their place, they lack the speed, convenience and safety required by consumers, businesses and governments in today's fast-paced, ever-shrinking world."

In-spite of the huge benefits derivable in the e-payment option, several factors militate against it.

Sumanjeet (2009) identified the following as militating against e-payment:

(a) Integrity: to ascertain that transmitted financial information is unchanged in transit.

(b) Non-repudiation: to ascertain that all parties have non deniable proof of receipt.

(c) Confidentiality: to ascertain that transactions are protected from possible eavesdroppers.

(d) Reliability: to ascertain that there is reduced possibility of failure.

(e) Authentication: to ascertain that there are reliable proofs of identities of all parties involved.

(f) Authorization: to ascertain that individuals are recognized and granted the desired rights and privileges.

2.2 Traditional Payment System in Nigeria's Public Sector

To get into the depth of electronic payment process, it is better to understand the processing of conventional or traditional payment system. A conventional process of payment and settlement involves a buyer-to-seller transfer of cash or payment information (i.e., cheque and credit cards). The actual settlement of payment takes place in the financial processing network. A cash payment requires a buyer"s withdrawals from his/her bank account, a transfer of cash to the seller, and the seller"s deposit of payment to his/her account. Non-cash payment mechanisms are settled by adjusting i.e. crediting and debiting the appropriate accounts between banks based on payment information conveyed via cheque or credit cards.

Before the commencement of the e-payment regime in the public sector, payments were made on public expenditure either by cash or through cheques issued to the payee and payment made through the Banks. The public service is guided by financial regulations which provide the guide lines on how financial transactions and payments are made. The head of each Government Agency is the accounting officer and each Government

organisation has accounts and audit departments, to ensure accountability for funds and ensures that financial regulations are adhered to.

Once approval is given for expenditure to be incurred a payment voucher is raised containing details of expenditure and the payee after which approval is given for payment either by cash or by cheque.

The system of payment introduced corruption and wastage in the system. Employees of government could easily lump together various request for payments under one cheque to be cashed by an employee of Government, instead of paying directly to the contractor instance. Consequently, it become difficult for audit trail of funds expended to be easily done.

There was also the movement of large quantity of cash with its attendant risk. The payment of cash to contractor or issuance of cheques provided opportunity for contact between contractors and Government employees. Delays in payments in the system were deliberate so as to encourage gratification. It was on account of the inefficiency and lack of accountability with the system, which aided corruption, that the option of e-payment system was introduced in the Nigeria's public service.

2.2.1 Financial Regulations on Payment Procedures in the Public Service

(a) All payment entries in the accounts must be vouched for on one of the prescribed forms. Vouchers will be made out in favour of the person or persons to whom the money is actually due.

(b) Separate vouchers will be used for separate sub-heads. Separate vouchers will also be used for the payment of different services.

(c) Voucher Particulars:

(i) All vouchers will contain full particulars of each service, such as dates, numbers, quantities, distances and rates, so as to enable them to be checked without reference to any other documents and will invariably be supported by relevant documents such as Local Purchase Orders, Invoices, Special Letters of Authority, Time Sheets, etc.

(ii) The following particulars as may be applicable must be given on vouchers:

- Reference to contracts and details of any previous payment(s) under a contract;
- Reference to the numbers, dates and stations of deposits vouchers in case of repayments;
- Reference to special authorities;

- The appropriate authority for expenditure as under:

(d) The following rules shall be strictly observed in the preparation of payment vouchers:

(i) Vouchers shall be made out either in ink or ball pointed pens or indelible pencil or shall be typewritten. All copies must be legible. The totals of all vouchers shall be written in ink in words as well as figures.

(ii) No erasures of any kind, whether in typescript or manuscript or the use of correcting fluid shall be allowed.

(iii) A single thick horizontal line shall be drawn immediately before, and immediately after the Naira (#) figure where it appears in word. Spaces shall not be allowed. Where the (#) figure is nil, the word "Nil" shall be entered in the appropriate space.

(e) Only the originals of payment vouchers shall be signed in full in ink, or ball pointed pens, or indelible pencil by the certifying officer and the payee. Copies shall be initialled or stamped. Facsimile signature stamps shall not be used. Any name stamp used for copy vouchers must be strictly safeguarded by the officer concerned.

(f) Each certificate on a payment voucher shall be signed separately. Signatures shall not be written across one or more certificates.

(g) Duplicate and triplicate, etc. copies shall be clearly marked "Duplicate", "Triplicate", etc. copies shall not be accepted as payment vouchers.

(h) Alterations to the amount of a voucher whether in words or figure are not permitted. A new voucher must be prepared when necessary. Any other alteration must be supported by the full signature of the officer certifying the voucher or, if the alteration is in the receipt, of the payee.

(i) A sub-Accounting Officer may not make payment against a voucher unless:- The voucher is certified for payment by the officer who is authorised to do so.

- The voucher is stamped 'checked and passed for payment at ..... Only",

(Name of station)

and is duly signed to that effect by the checking officer in the appropriate place is on the voucher.

- Less than three months has elapsed since the vouchers were signed.

2.3 What is E-Payment

Dakwambo (2009) describes e-payment can be described as the method of effecting payments from one end to another end through the medium of the computer without manual intervention beyond inputting the payment data.

E-payment systems refer to the automated processes of exchanging monetary value among parties in business transactions and transmitting

this value over the information and communication technology (ICT) networks.

2.4 Types of Electronic Payment System

There are different types of electronic payment that have been proposed or already in use. The grouping can be made on the basis of what information is being transferred online. Murthy (2002) explained six types of electronic payment systems: (1) PC-Banking (2) Credit Cards (3) Electronic Cheques (i-cheques) (4) Micro payment (5) Smart Cards and (6) E-Cash. Kalakota and Whinston (1996) identified three types of electronic payment systems: (1) Digital Token based electronic payment systems, (2) Smart Card based electronic payment system and (3) Credit based electronic payment systems. Dennis (2001) classified electronic payment system into two categories: (1) Electronic Cash and (2) Electronic Debit-Credit Card Systems.

Thus, electronic payment system can be broadly divided into four general types (Anderson, 1998):

- Online Credit Card Payment System: It seeks to extend the functionality of existing credit cards for use as online shopping payment tools. This payment system has been widely accepted by consumers and merchants throughout the world, and by far the most

popular methods of payments especially in the retail markets (Laudon and Traver, 2002).

- Electronic Cheque System: Electronic cheques address the electronic needs of millions of businesses, which today exchange traditional paper cheques with the other vendors, consumers and government. The e-cheque method was deliberately created to work in much the same way as conventional paper cheque.
- Electronic Cash System: Electronic cash (e-cash) is a new concept in online payment system because it combines computerized convenience with security and privacy that improve on paper cash. Its versatility opens up a host of new markets and applications.
- Smart Card based Electronic Payment System: "Smart cards" are receiving renewed attention as a mode of online payment. They are essentially credit card sized plastic cards with the memory chips and in some cases, with microprocessors embedded in them so as to serve as storage devices for much greater information than credit cards with inbuilt transaction processing capability (Chakrabarti and Kardile, 2002).

2.5 E-Payment Regime in Nigeria's Public Sector.

The need to curb corruption practices with its ramifications in public expenditures as well as enhance efficiency and productivity in governance gave rise to the commencement of the E-payment regime in

the public sector in Nigeria. The e-payment regime started on the 1st of January 2009 as directed by the then President, Late Shehu Yardua.

E-payment as designed according to Dakwabo(2009) E-payment is a subset of e-governance which is the application of electronic means in the interaction between Government and Citizens and Government and Businesses. It is a form of direct payments and banking without physical appearance at the MDA or Bank through the means of electronic, interactive communication channels and other technology infrastructure.

2.5.1 Options of E-Payment

- **End to End Processing:**

  Here, all the processes from approvals to the receipt of value by the beneficiary are done electronically

- **Manual e-payment or use of Mandate:**

  It is the mixture of manual and electronic process where the available infrastructures cannot support the End-to-End processing

The guide line prescribed the commencement of the Manual e-payment in January 2009 and by 2011, the end to end option will be fully implemented. The lack of adequate infrastructure necessitated this position of government.

2.6 Implications of E-Payment

- There is a new payment regime;
- The use of cheques or cash payments to beneficiaries has been discontinued;
- No physical contact between accounts officials and beneficiaries in the Ministries, Departments and Agencies (MDAs);
- Effective use of Information Technology i.e. the use of Computer and Computer Software applications ;
- However, normal book-keeping will continue to be effected in all MDAs.

2.7 Benefits of the E-Payment Regime

The benefits of the e-payment regime to the public service as envisaged are as follows:

- Easy Tracking of payments to Beneficiaries' Accounts hence it will assist Audit Trail;
- It reduces cases of corruption;
- It will assist Corruption fighting Agencies like the EFCC and ICPC in cases of investigation;
- It is the beginning of a cashless society;
- Overall increase in the efficiency of operation:
    - Reduced transaction costs

- Enable transactions of very low value

- Increased convenience of payments:
  - Payment can be made swiftly and remotely using various devices
- Accountants will appreciate Information Technology (I.T) more and this will improve the quality of financial reports generated by MDAs;
- Economic Growth and Development as Transparency and Accountability improve;
- Real Time Reporting; and
- Eliminates writing of cheques:
  - The risk associated with cheques been stolen, forging of signature and disparity between amount in words and figures has been totally eliminated.

2.8 Implementation Road Map of the E-payment Regime

- End to End Processing is the ultimate.
- Temporary use of mandates to instruct banks to effect payments in the absence of e-payment platforms in the MDAs.
- Immediately the platform for End-to-End is ready, MDAs must migrate to it.

- A common platform configuration for all MDAs is in the process of being introduced by the OAGF.
- The Governor of CBN has already been advised to instruct banks not to honour cheques issued on Government Accounts and dated from 1st January 2009. The CBN has already issued this directive.

2.9 Detailed Guideline on the Implementation of e-payment

The Office of the Accountant General of the Federation issued the following guidelines for the implementation of the E-payment Regime.

(a) Transactions covered by the e-payment :

All payments to Contractors, Payments to Service Providers PHCN, Payments to staff , Payments to other Government Agencies e.g. FIRS

(b) **Format of Instructions to the CBN and Commercial Banks:**

In the absence of infrastructures in the MDAs to support End-to-End processing, the temporary use of mandate to effect payments is suggested.

The mandate must have the following features:

- Unique Reference Number – Generated by a combination of the abbreviation of the MDA's name, Type of Fund, the Year etc.
- Date of the transaction
- Account Name of the beneficiary
- Account Number of the beneficiary

- Bank and Branch of the beneficiary

- Sort Code (if not part of Account Number)

- Amount Payable

- Purpose of the Payment

- Signature and Thumbprint impression of the accounts signatories.

(c) **Medium**

The medium of sending instructions to the Central Bank of Nigeria and Commercial Banks will be electronic i.e. soft copy in form of Non-re-writeable CD with a hard copy conveying and confirming the transaction.

- **Data Integrity**

The integrity of the system is assured by the combined use of electronic copy of the mandate as well as the hard copy which acts as a confirmation, since it will contain the authorized signatures of officers in the MDAs.

- **Elimination of Delay**

For the purpose of avoiding delays in the payment procedures, the mandates to effect payment must reach the paying banks within seventy two (72) hours after approval for payment by the Accounting officer.

- **Correct Account Number of Beneficiaries**

MDAs must insist that, the detailed particulars of the Commercial Banks accounts of the contractors are clearly stated on the invoices submitted for payment. In addition, contractors must attach stamps when forwarding invoices for payment.

2.10 Challenges to the E-Payment Regime

(a) Lack of Technological Infrastructure: – the implementation of e-payment is been impeded by unavailability of ICT infrastructure. Most rural areas where majority of small and medium scale industries are concentrated have no access to internet facilities. It is proactive to also know this: research shows that it will take an average of 225 years for Africa to catch up in overall economic development in ICT compared to US (Aniebonam, 2003).

(b) ICT Equipment Costs – where available, the cost of ICT is a critical factor relative to per capital income. This makes the cost of entry higher compared to developed countries.

(c) Regulatory and Legal Issues – inexistence of proper legal and regulatory framework.

(d) Non-readiness of banks and other stake holders (acceptability) – even though some have shown impressive willingness, some banks are still not fully ready to for this new payment regime. Especially the

non-regular banks that do not enter clearing e.g. Microfinance banks, mortgage houses and Savings and Loans banks. This is a concern because many civil servants are indebted to these non-regular banks through mortgage loans.

(e) Resistance to changes in technology among customers and staff due to:

i. Lack of awareness on the benefits of new technologies,

ii. Fear of risk,

iii. Lack of trained personnel in key organisations,

iv. Tendency to be content with the existing structures, and

v. People are resistant to new payment mechanisms;

vi. Security – where disclosure of private information, counterfeiting and illegal alteration of payment data may be rampant.

(f) Transport Costs – Nigeria, with a land mass of over 356,000 square miles is a vast land and is logistically difficult to move goods across due to poor transport infrastructure. Movement of ICT equipment from remote locations is a bit cumbersome.

(g) Frequent connectivity failure in telephone lines

(h) Low bandwidth, particularly for internet

(i) Frequent power interruption

CHAPTER THREE

MATERIALS AND METHODS

3.1 Review of Existing System

In System Development Life Cycle (SDLC), the first stage is the Analsys of the Existing system in order to determine the need or otherwise of replacing or modifying the system. A review of the existing system of Manual E-payment was done at the National Gallery of Art, an Agency of the Federal Government and since all Agencies employ the same financial system and regulations, the outcome can easily be replicated and adopted across all Agencies of Government.

3.1.1 Input System

Once the yearly budget is passed into law, it becomes operational. Ministries, Departments and Agencies receive allocations which are distributed across Expenditure Heads. An authority to incur expenditure is released to the MDAs after which funds are credited to the various accounts of the MDAs.

Depending on what type of Expense, whether Capital projects or recurrent expenditure which comprise mainly of running costs and then personnel which covers staff emoluments, what is common is there must be approval for payment by the accounting officers who are the heads of the MDAs.

3.1.2 Payment Vouchers (PVs)

Money paid out by the Government has to be supported with a payment voucher. This is to evidence the purchase of goods or services rendered. Vouchers are prepared at the points payments are to be effected.

A payment voucher is raised for any item of expenditure for payment and it contains details of the payee, date, amount as well as the purpose or type of the expenditure.

All requests for payments are keyed into an Excel Spread Sheet with the aid of a personal computer by an assigned staff of the Accounts Department who is also the cash officer.

With this system, periodically as request for payment records from Payment Vouchers are generated, they are key into excel spread sheet and so what you have is a disjointed collection of different excel spread sheets.

3.1.3 Bank Schedule / Mandate.

The payment involves generating a Bank Schedule / Mandate for payment, which is simply a printed out Excel spreadsheet containing a list of Payment Vouchers which other information such as a code representing the MDAs, the Bank account and must be signed by the Accounting Officer in accordance to the operating guidelines of the E-payment regime. The signed Bank Schedule / Mandate both in hard and

soft copies are sent to the bank of the Ministries, Departments and Agencies for electronic payment to the respective payee's bank accounts. See Appendix III

3.1.4 Payment Processing: NEFT and INTERSWITCH

Just like in the traditional payment, the central bank of Nigeria is the clearing house amongst various banks, when payment is between banks. Nigeria Interbank Settlement System Plc (NIBSS) was mandated in 2006 to develop and operate a nationally accepted and internationally recognised National Central Switch (NCS) for the Country. The core objectives of the NCS as directed by the Bankers' Committee in 2006 are to serve as frontline catalyst for economic growth and support the financial sector reform. Two, to foster healthy competition between switch operators and related service providers; optimise investment and transaction processing costs; ensure safety and security of all services rendered as well as promote integration with global networks for Straight-Through Processing (STP).

The present Automated Clearing system is being coordinated by the Central Bank of Nigeria (CBN) in collaboration with NIBSS.

InterSwitch Limited is an electronic transaction switching and payment processing company with a business footprint that covers the provision of shared, integrated message broker solutions for financial transactions, e-commerce, telecoms value-added services and e-billing in the Nigerian

environment. The company is an independent, private sector led, limited liability Company focused on facilitating the exchange of value between service providers (financial, telecommunications and utilities), merchants, their customers, & other stakeholders on a timely and continuous basis nationwide.

Through its "Super Switch" infrastructure, InterSwitch provides an online, real-time electronic payment system to support automated customer transactions from different customer touch points and transaction channels.

3.1.5 Electronic Payment through NEFT

NEFT stands for NIBSS Electronic Funds Transfer. A payer hands the payment instruction directly to his own bank, which then makes payment to the beneficiary's bank through the NIBSS, for the benefit of the payee, all within 24 hours.sed that NEFT was designed as a low value fund transfer service with a maximum single payment not exceeding N1 million. The two categories of the product the single item and Bulk NEFT transactions. In a single item transaction, a bank customer who desires to transfer funds to another party would have to approach a branch of any bank and complete a NEFT form indicating the amount to be transferred, the beneficiary's account number, and the code of the receiving branch.

The paying bank would then have to process and transmit the instruction through the next Automated Clearing session, where the beneficiary bank would earn credit for the benefit of the customer so indicated in the transfer instruction.

For the Bulk NEFT transaction, a corporate customer of a bank would need to deliver an electronic file containing several single NEFT instructions to a bank for onward presentation at the Automated Clearing House.

Single item NEFT best suits sundry consumer transaction payments, club subscriptions, payment of tuition fees, taxes, and utility services, including electricity, and telecommunications. While the Bulk NEFT could be used for payment of salaries, pensions, dividends, direct credits and standing order all within 24 hours. A fee of 0.1 percent is charged on the amount transferred.

3.2 Issues Arising from Existing System

From the foregoing, there operation of the Manual E-payment option has some issues that require modifications / improvements in order to enhance efficiency and accountability, the reasons why the E-Payment regime was instituted.

- The process of recording Payment Vouchers using Excel, though software does not allow for flexibility when it involves a large amount of Data.

- The process of generating a Bank Schedule / Mandate instruction to be sent to the Bank for payment, using excel does not allow for flexibility and robustness.
- The present system where we have a disjointed spreadsheet will not allow for performing audit trails and other useful reports that will help in the accountability for funds dispensed. Where it is possible in excel, it will require good programming skills on Excel, which the accounting staff do not have. Secondly, Excel is unwieldy to work with when you work with large amount of data, because of memory consideration and the possibility of inadvertently modifying cell contents.

3.3 The Automated Manual e-Payment System Design

The project design a computerized process which adequately provides for the input of Payment Vouchers (PVs), modifying Payment Voucher records when necessary, the generation of Bank Schedules and parsing the result into Excel Spread sheet for onward submission to the Banks for payments.

The Automated system allows for generation of useful reports such as the audit trail to determine the amount of funds paid to a staff or contractor.

The total amount spent on a particular expense head.

All these will enhance accountability.

3.3.1 Input Process

In the design process, the programme provides a user friendly input screen, where all vital information from Payment Vouchers and others required by the operational guidelines to be entered serially. All the required fields will be fed into a Database. A relational Database makes it possible for easy entry and modification of records when necessary. Therefore, the programme design also allows for records to be edited, deleted.

3.3.2 Output Process

The design makes it possible for also all entries to be displayed and viewed on the screen and can be printed to have a hard copy.

3.3.3 Bank Schedule and Mandate Instruction

With this design, a Bank Schedule can easily be generated from the database records for payments and the result parsed into an Excel file from which both hard and soft copies can be sent to the Bank.

3.3.4 Audit Trail

The purpose of instituting the E-Payment regime was to allow for accountability of Government's funds and performance of audit trail has been captured by the Design. It is very easy to generate accounts details of payments to individual staff or contractor as well as provide details of payments under each expense head.

3.4 Program Flow Chart

The Algorithm of the Automated Manual E-Payment system is displayed using a flow chart to show the flow and interconnection between the various modules of the programme. A flowchart is a type of diagram that represents an algorithm or process, showing the steps as boxes of various kinds, and their order by connecting these with arrows. This diagrammatic representation can give a step-by-step solution to a given problem. Process operations are represented in these boxes, and arrows connecting them represent flow of control.

See Appendix for Program Flowchart II.

3.5 Programming Languages

A Computer system is made up of hardware and software. While the hardware are the tangible parts of the system, software are the intangible parts. Software are also known as programs. A program is therefore a series of instruction and data for processing. A programming language is a notation for writing programs, which are specifications of a computation or algorithm Anthony (2004). Programming languages can be used to create programs that control the behavior of a machine, to express algorithms precisely, or as a mode of human communication.

3.5.1 Types of Programming Languages

According to Winters (2010): the progression of computer programming languages was made possible by the programmer's search for efficient

translation of human language into something that can be read and understood by computers. The languages generated, called machine code, have high levels of abstraction, which hide the computer hardware and make use of representations that are more convenient to programmers.

As programs evolve and become more sophisticated, programmers found out that certain types of computer languages are easier to support. Winters (2010) classified Programming Language as follows:

- **Object-Oriented Programming Languages:** Known as the newest and most powerful paradigms, object-oriented programming requires the designer to specify the data structures as well as the types of operations to be applied on those data structures. The pairing of data, and the operations that can be done on it is called an object. A program made using this language is therefore made up of a set of cooperating objects instead of an instructions list. Examples are C#, C , Visual Basic, Java, and Python.

- **Structured Programming Languages:** An exceptional type of procedural programming, structured programming provides programmers with additional tools to handle the problems created by larger programs. When using this language, programmers are required to cut program structure into small pieces of code that can easily be understood. Instead of using global variables, it employs variables that are local to every subroutine. Examples are C, Pascal, and ADA.

- **Procedural Programming Languages:** Procedural Programming involves a list of operations the program needs to complete to be able to attain the preferred state. It is a simple programming paradigm where every program comes with a starting phase, a list of tasks and operations, and an ending stage. Also called imperative programming. Examples are BASIC and FORTRAN

3.6 Choice of Programming Tools

The system design used Visual Basic 6.0 as the programming language to develop the application, and with Ms Access and Ms Excel as the database software.

- Visual Basic 6.0: The programme was coded using Visual Basic (VB) 6.0. Visual Basic (VB) is the third-generation event-driven programming language and integrated development environment (IDE) from Microsoft . Visual Basic is relatively easy to learn and use and enables the rapid application development (RAD) of graphical user interface (GUI) applications, access to databases using Data Access Objects, Remote Data Objects, or ActiveX Data Objects, and creation of ActiveX controls and objects. Programs written in Visual Basic can also use the Windows API, but doing so requires external function declarations.

- Microsoft Office Access is a pseudo-relational database management system from Microsoft that combines the relational

Microsoft Jet Database Engine with a graphical user interface and software-development tools. It can also import or link directly to data stored. Access is supported by Visual Basic for Applications.

- Ms Excel is a spread sheet application, into which the result from the access database can be parsed into for onward submission to the banks both in hard and soft copies for easy transfer of payment data directly from the soft copy of the Bank Schedule / Mandate Instruction to the bank's software for payment processing. It allows one to enter numerical values or data into the rows or columns of a spreadsheet, and to use these numerical entries for such things as calculations, graphs, and statistical analysis.

CHAPTER FOUR

RESULTS

4.1 System Requirements

Modular and subsystem programming code will be accomplished during this stage. Unit testing and module testing are done in this stage by the developers. This stage is intermingled with the next in that individual modules will need testing before integration to the main project.

This chapter describes each of the program modules that make up the system, their functions. How the system can be deployed, the tools used and reason for choice.

To be used efficiently, all computer software needs certain hardware components or other software resources to be present on a computer. These pre-requisites are known as (computer) system requirements and are often used as a guideline as opposed to an absolute rule. Most software defines two sets of system requirements: minimum and recommended. With increasing demand for higher processing power and resources in newer versions of software, system requirements tend to increase over time.

4.2 Hardware Requirements

A complete system with the following configuration:

- 256 MB of RAM (minimum)

- 20 GB Hard Disk (minimum)
- Printer
- 1.0GHZ processor and above
- Uninterruptible Power Supply (UPS)

4.3 Software Requirements

- Operating System: Microsoft Windows 98 and above
- Visual Basic 6.0 and above
- Microsoft Access

4.4 Program Output

4.4.1 Login Module

This is the first page of system that authenticates the user and it is the Login screen. Only authenticated users can have access to the program. Here the user is required to submit his username and password, after which the user is granted access to the use of the Software.

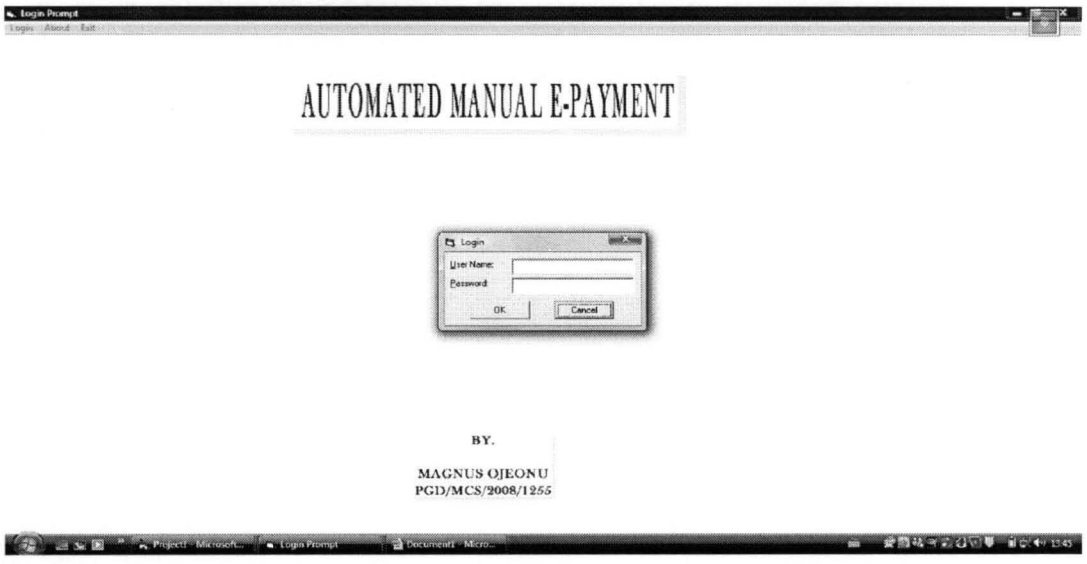

Fig. 4.1 : Login page

4.1.2 Main Menu

The main menu displays, after the user has been authenticated and it has two options. The first menu option is TASK and it contains a list of activities to be carried out by the user of the system. It contains the Add Records menu option, the Modify Records, Display Records, the Report Generation sub menu. The main menu also has a help facility that displays a list of Banks and corresponding sort codes during data entry activity.

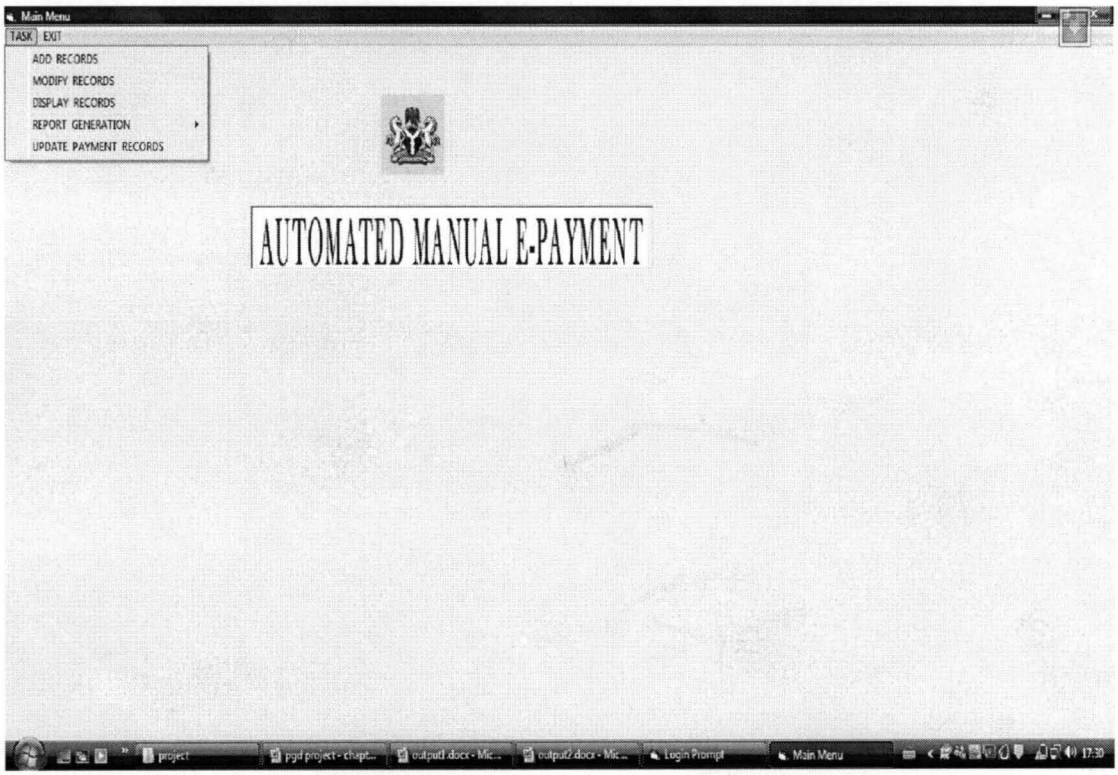

Fig. 4.2 : Main menu

4.1.3 Add Records

This menu option allows the user to input all payment request. Input information is derived from the details on the payment vouchers, which must be produced for every expense according to financial regulations.

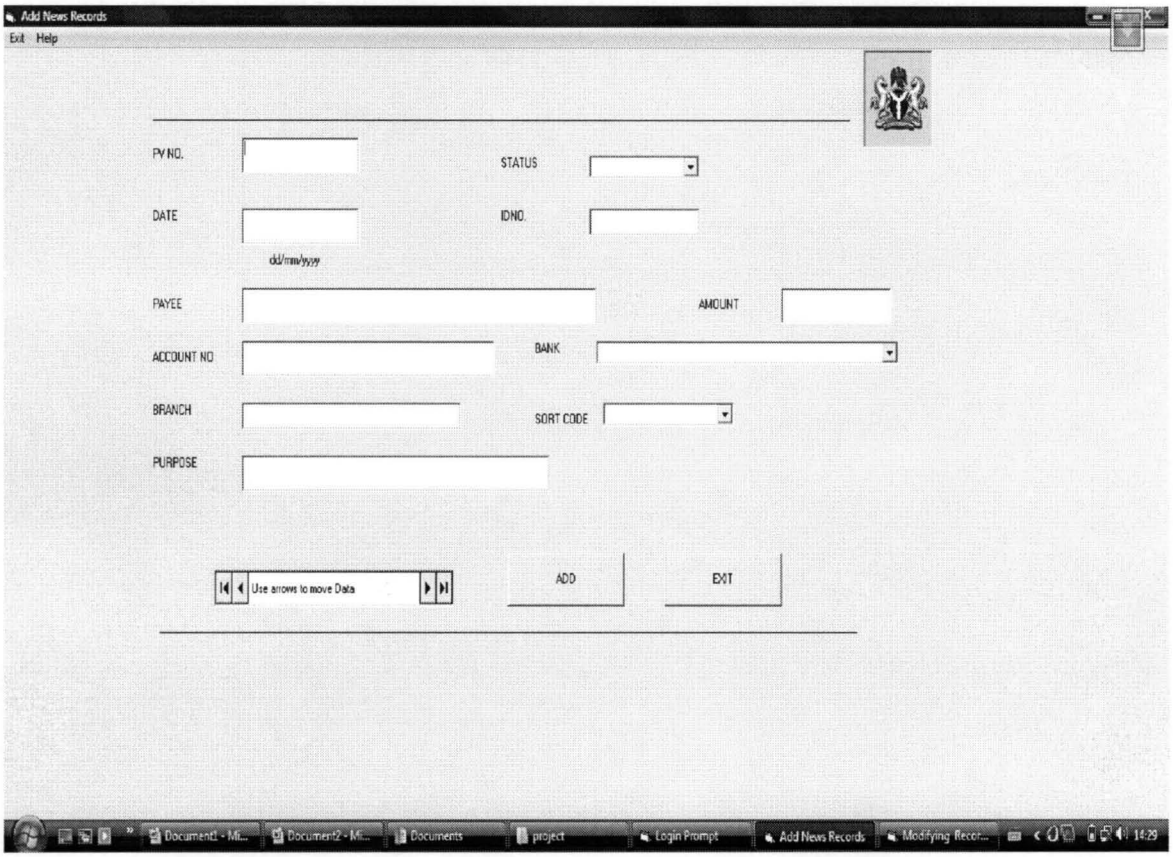

Fig. 4.3: Add Records Form

4.1.4 Display Records

This option enables the user to view all payment requests entered into the database. It also enables the user to look thorugh the records to be sure that the right data have been input for each record.

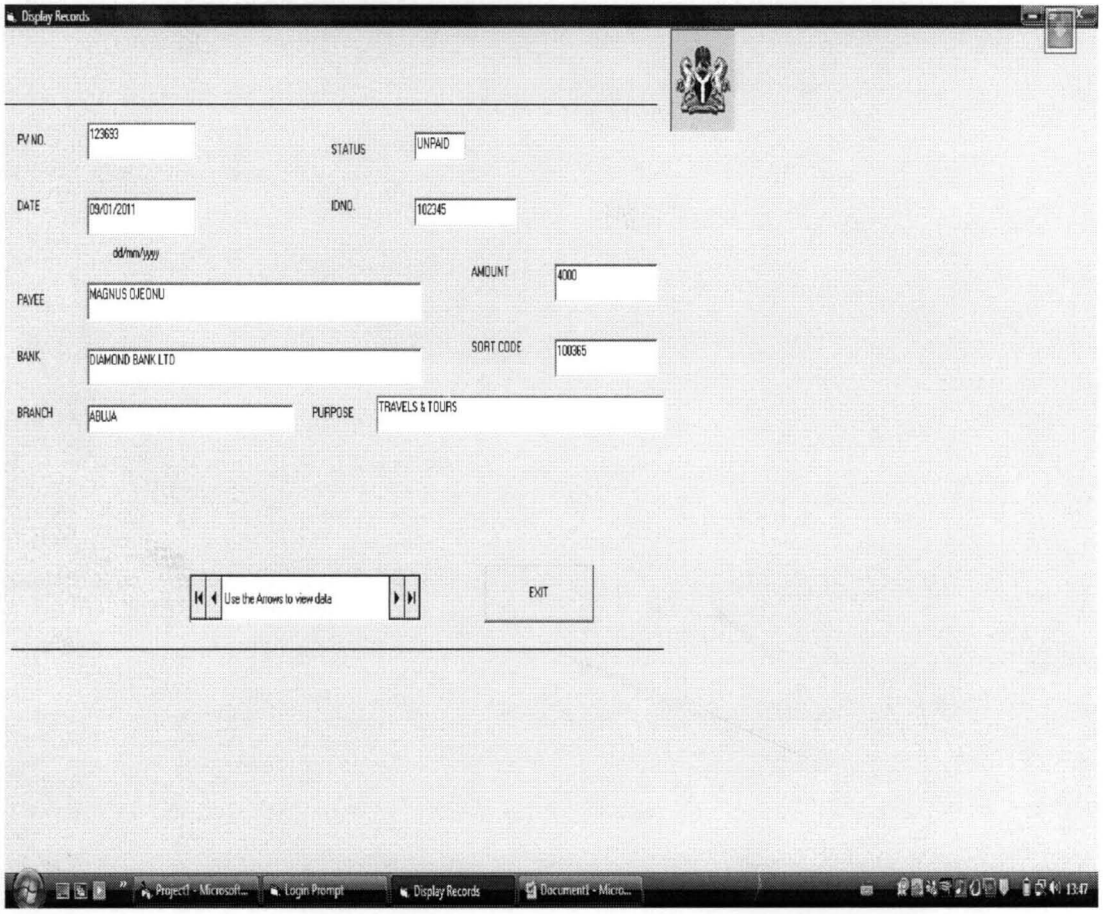

Fig. 4.4 : Display Records Form.

4.1.5 Modify Records

This menu option allows the user to make correction and update the records. The user can also delete records, where necessary.

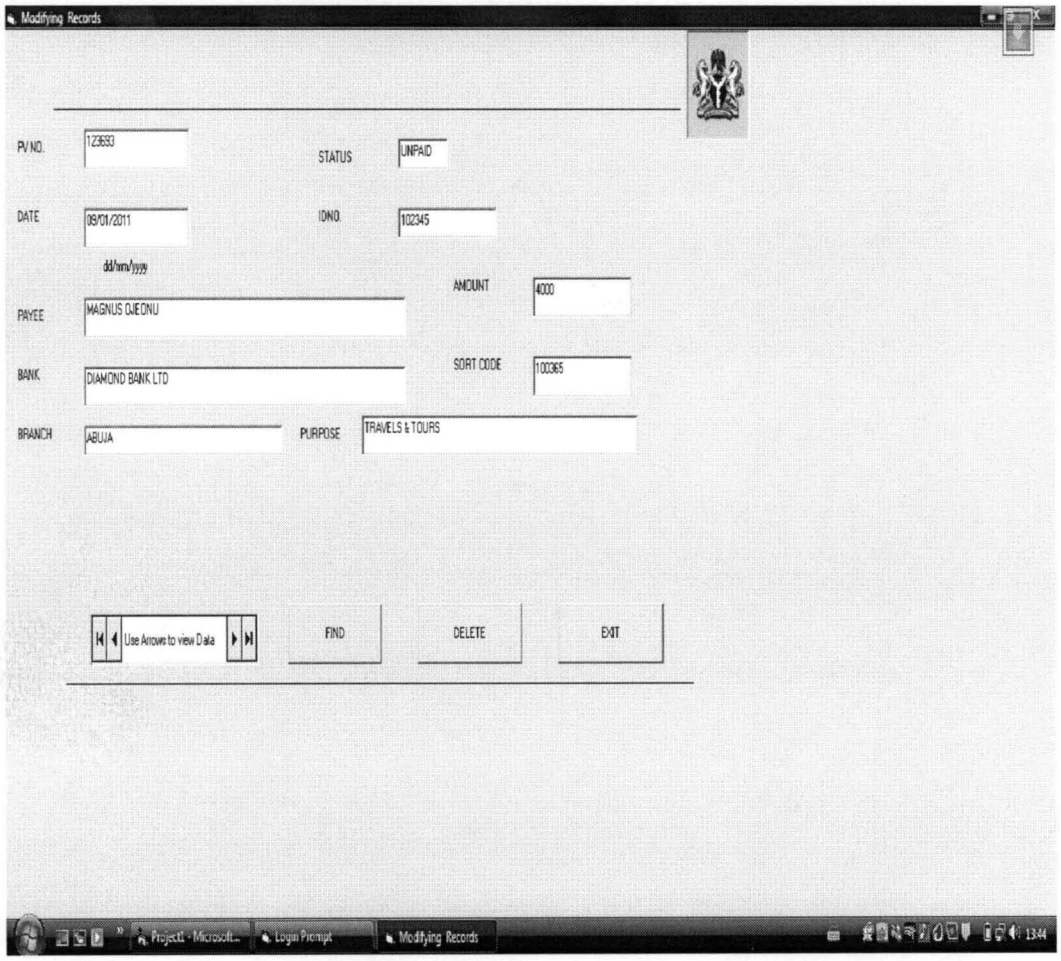

Fig. 4.5 : Modify Records Form

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATION

5.1 Summary

Oil is the main stay of the Nigerian economy. With the dwindling fortunes of Oil, the volatile nature of Oil business and the restiveness in the Niger Delta also affecting the oil business; which invariably affects the revenue profile of the Country, it becomes sensible that if we must survive the economic meltdown, the Federal Government must curb excesses, entrench accountability in public expenditures; as well as reduce corruption to the barest minimum.

The institution of the E-Payment regime in Public Service is a step in the right direction as it will enhance efficiency in the payment process of public expenditures as well as ensure accountability of funds. However, for the e-payment regime to succeed, the process of the manual e-payment must be efficient able to achieve the objectives of the system,

The automation of the Manual E-Payment System has been designed to improve efficiency and ensure accountability of public funds.

5.2 Conclusion

This Automated Manual E-Payment System will improve the existing process of electronic payment of Public expenditures, as it is a design that has taken into consideration the drawbacks of the process in place. It covers the input stage of all payment requests, the generation of the Bank

Schedule / Mandate Instruction as well as provide reports that will enhance audit trails and accountability of public funds, thereby reducing waste and curbing corruption.

Even though the design also considers issues of security of the system and data, we know that no system is fraud proof as input will still have to be done by designated staff of the accounts department. It becomes imperative that there is the need for sensitization on the need for the e-Payment regime to succeed and also moral re-armament of staff concerned and the entire public work force.

5.3 Recommendations

The following issues are crucial:

- Infrastructure Funding:– there is need for adequate investment in ICT. This could be planned on any form that may be acceptable and convenient for government.
- Security of CDs/Flash drive:– measures should be taken to ensure that storage medium are delivered as intended.
- Regulations:– applicable regulations including those for electronic approval processes, consumer protection and e-transaction should be developed and standardized as needed.
- Public Education and Acceptability:– e-payment is still new, series of sensitization meetings should be arranged at all levels. The banks and

other stake holders must be educated and informed of the need to consolidate efforts to make e-payment successful.

- Monitoring of Compliance:– the Office of the Accountant General of Federation (OAGF) should take the responsibility of assessing the level of compliance in all MDAs. A work plan should be developed as regards this.
- Workshops, seminar/e-reporters invitation to events:– there is need for training and retraining of operational staff.
- Expansion of Infrastructure:–the government should systematically expand the necessary infrastructure by promoting the development of necessary technologies, recruiting professional human resources, and expanding the high speed information network. This will foster a strong foundation for e-governance.

5.3.1 Recommendation for future research

It is hoped that future research will extend this system to incorporate all other subsystems and systems related to procurement and other public expenditures.

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APPENDIX I

```
Public Sub SubFrmCntr(CurrentForm As Form)

        CurrentForm.Move (Screen.Width - CurrentForm.Width) \ 2, (Screen.Height
-       CurrentForm.Height) \ 2

        Load CurrentForm

        CurrentForm.Show

 End Sub

'Then, When you want to center a form:

'SubFrmCntr (Me)  ' Since me is the object name of the current form

'Return


Private Sub loadForm(frm As Form)

        Load frm

        frm.Show

End Sub


Option Explicit

' Reg Key Security Options...

Const READ_CONTROL = &H20000

Const KEY_QUERY_VALUE = &H1

Const KEY_SET_VALUE = &H2

Const KEY_CREATE_SUB_KEY = &H4

Const KEY_ENUMERATE_SUB_KEYS = &H8

Const KEY_NOTIFY = &H10

Const KEY_CREATE_LINK = &H20

Const KEY_ALL_ACCESS = KEY_QUERY_VALUE + KEY_SET_VALUE + _

                KEY_CREATE_SUB_KEY + KEY_ENUMERATE_SUB_KEYS + _
```

```
KEY_NOTIFY + KEY_CREATE_LINK + READ_CONTROL

' Reg Key ROOT Types...
Const HKEY_LOCAL_MACHINE = &H80000002
Const ERROR_SUCCESS = 0
Const REG_SZ = 1                    ' Unicode nul terminated string
Const REG_DWORD = 4                 ' 32-bit number

Const gREGKEYSYSINFOLOC = "SOFTWARE\Microsoft\Shared Tools Location"
Const gREGVALSYSINFOLOC = "MSINFO"
Const gREGKEYSYSINFO = "SOFTWARE\Microsoft\Shared Tools\MSINFO"
Const gREGVALSYSINFO = "PATH"

Private Declare Function RegOpenKeyEx Lib "advapi32" Alias "RegOpenKeyExA"
(ByVal hKey As Long, ByVal lpSubKey As String, ByVal ulOptions As Long,
ByVal samDesired As Long, ByRef phkResult As Long) As Long

Private Declare Function RegQueryValueEx Lib "advapi32" Alias
"RegQueryValueExA" (ByVal hKey As Long, ByVal lpValueName As String, ByVal
lpReserved As Long, ByRef lpType As Long, ByVal lpData As String, ByRef
lpcbData As Long) As Long

Private Declare Function RegCloseKey Lib "advapi32" (ByVal hKey As Long) As
Long

Private Sub cmdOK_Click()
  Unload Me
End Sub

Private Sub Form_Load()
   Me.Caption = "About the Program " '& App.Title
```

```
   lblVersion.Caption = "Version " & App.Major & "." & App.Minor & "." &
App.Revision

   lblTitle.Caption = "AUTOMATED MANUAL E-PAYMENT SYSTEM"
'App.Title

End Sub

Private Sub cmdAddnew_Click()

prompt$ = "Enter the new record, and then click the left arrow button."

reply = MsgBox(prompt$, vbOKCancel, "Add Record")

If reply = vbOK Then

  txtpvno.SetFocus

  datPayments.Recordset.AddNew

End If

End Sub


Private Sub cmdExit_Click(Index As Integer)

Unload Me

frmMainmenu.Show

End Sub


Private Sub menuExit_Click()

Unload frmAddrecords

End Sub


Private Sub menuHelp_Click()

Dialog.Show

End Sub

Private Sub cmdDeleteRecords_Click()

prompt$ = "Do you really want to Delete this Record?"
```

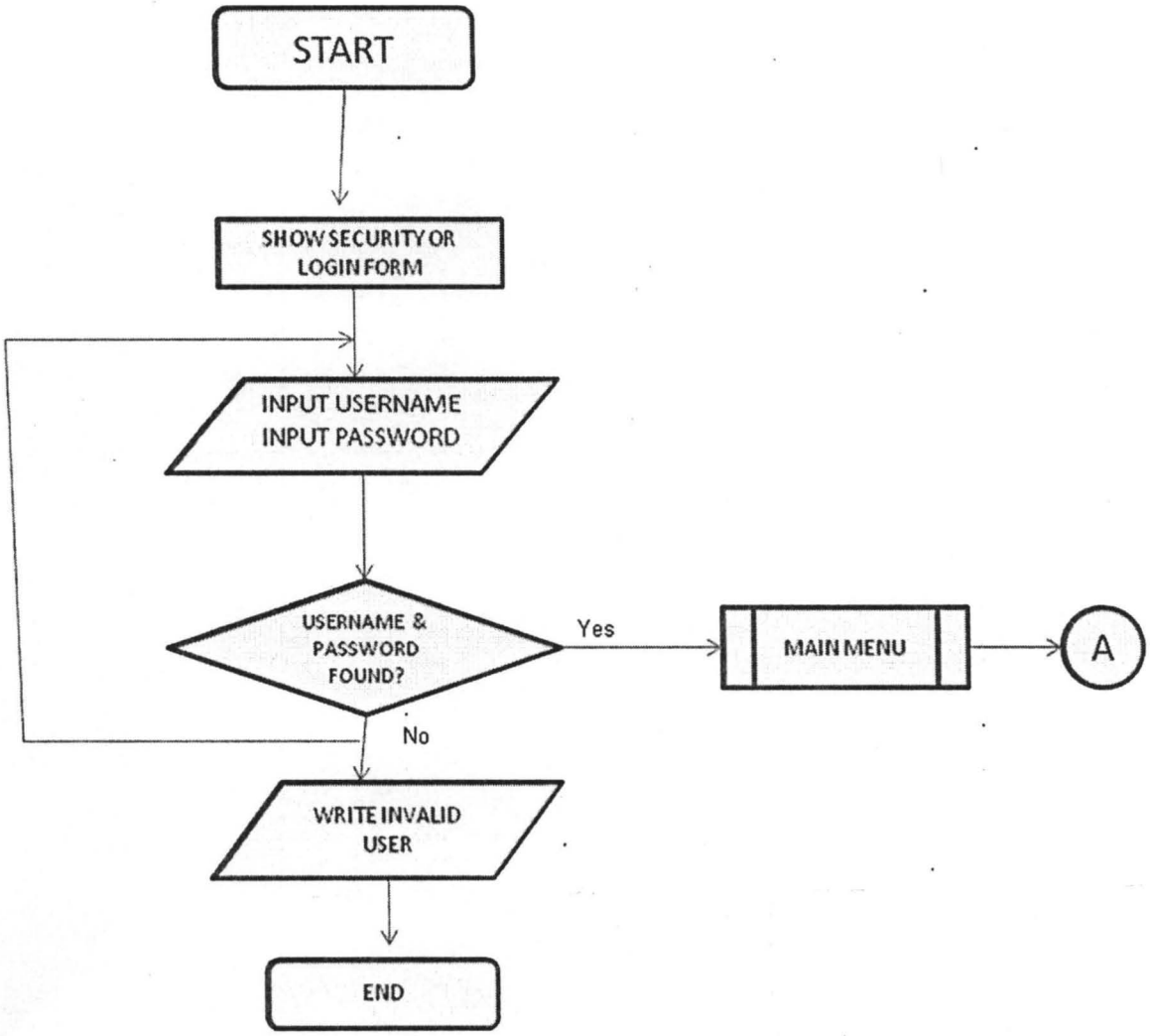
```
reply = MsgBox(prompt$, vbOKCancel, "Delete Record")
If reply = vbOK Then
   datPayments.Recordset.Delete
   datPayments.Recordset.MoveNext
End If
End Sub

Private Sub cmdExit_Click(Index As Integer)
Unload Me
frmMainmenu.Show
End Sub

Private Sub cmdFind_Click()
Dim strpvno As String
prompt$ = "Enter PV NO:."
SearchStr$ = InputBox(prompt$, "PV NO")
'datPayments.Recordset.FindFirst = "PVNO"
'If datPayments.Recordset.NoMatch Then
  ' datPayments.Recordset.MoveFirst
'End If

End Sub
Private Sub cmdExit_Click(Index As Integer)
Unload frmDisplayRecords
frmMainmenu.Show
End Sub
Sub main()
```

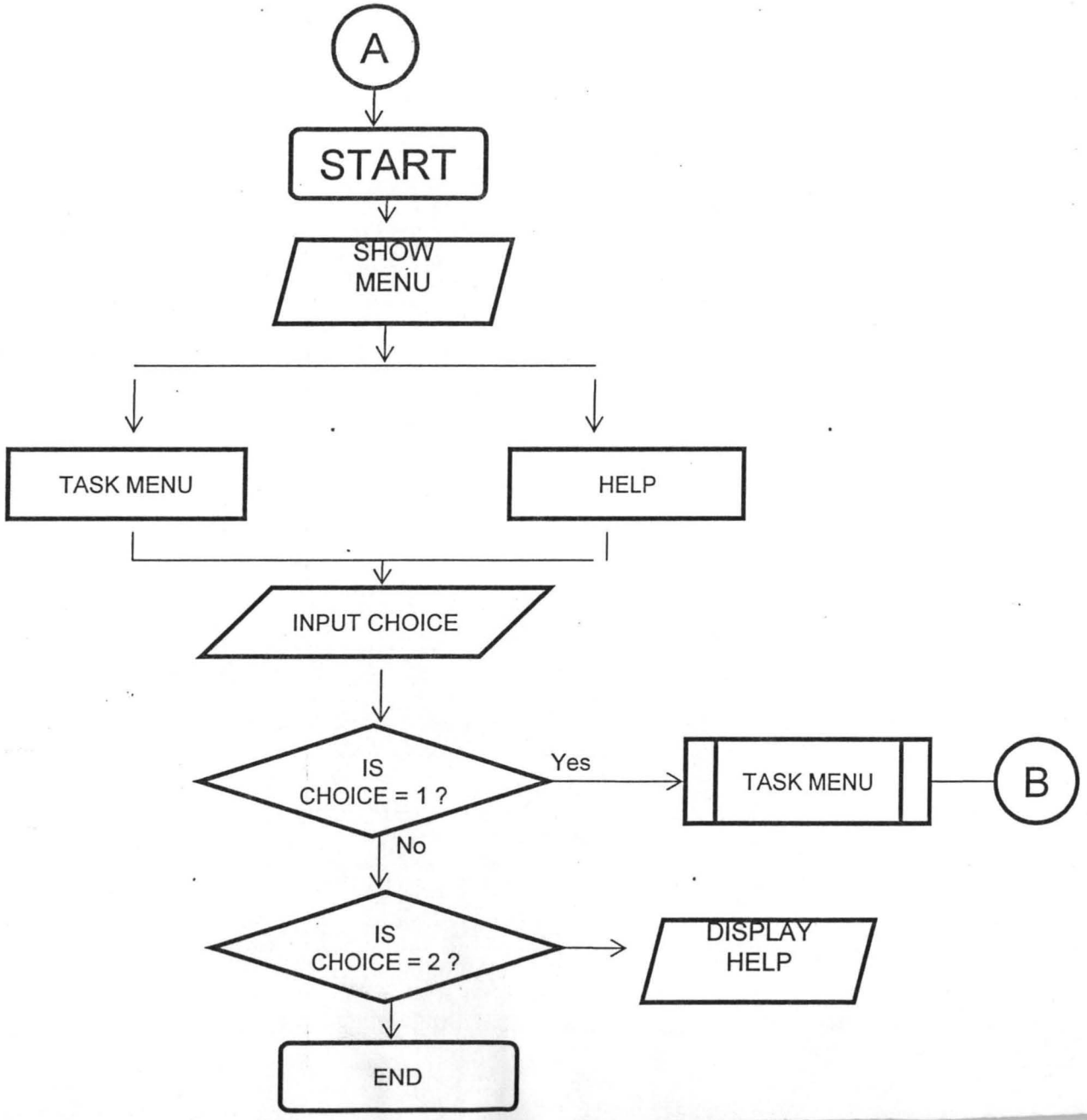
```
Unload frmLogin
Call loadForm(frmMainmenu)
End Sub

Private Sub menuAbout_Click()
frmAbout.Show
End Sub

Private Sub menuaddRecords_Click()
    Unload Me
    frmAddrecords.Show
End Sub

Private Sub menuDELETERECORDS_Click()
    Unload Me
    frmDeleteRecords.Show
End Sub

Private Sub menuDISPLAYRECORDS_Click()
    Unload Me
    frmDisplayRecords.Show
End Sub

Private Sub menuEDITRECORDS_Click()
    Unload Me
    frmEditRecords.Show
End Sub
```

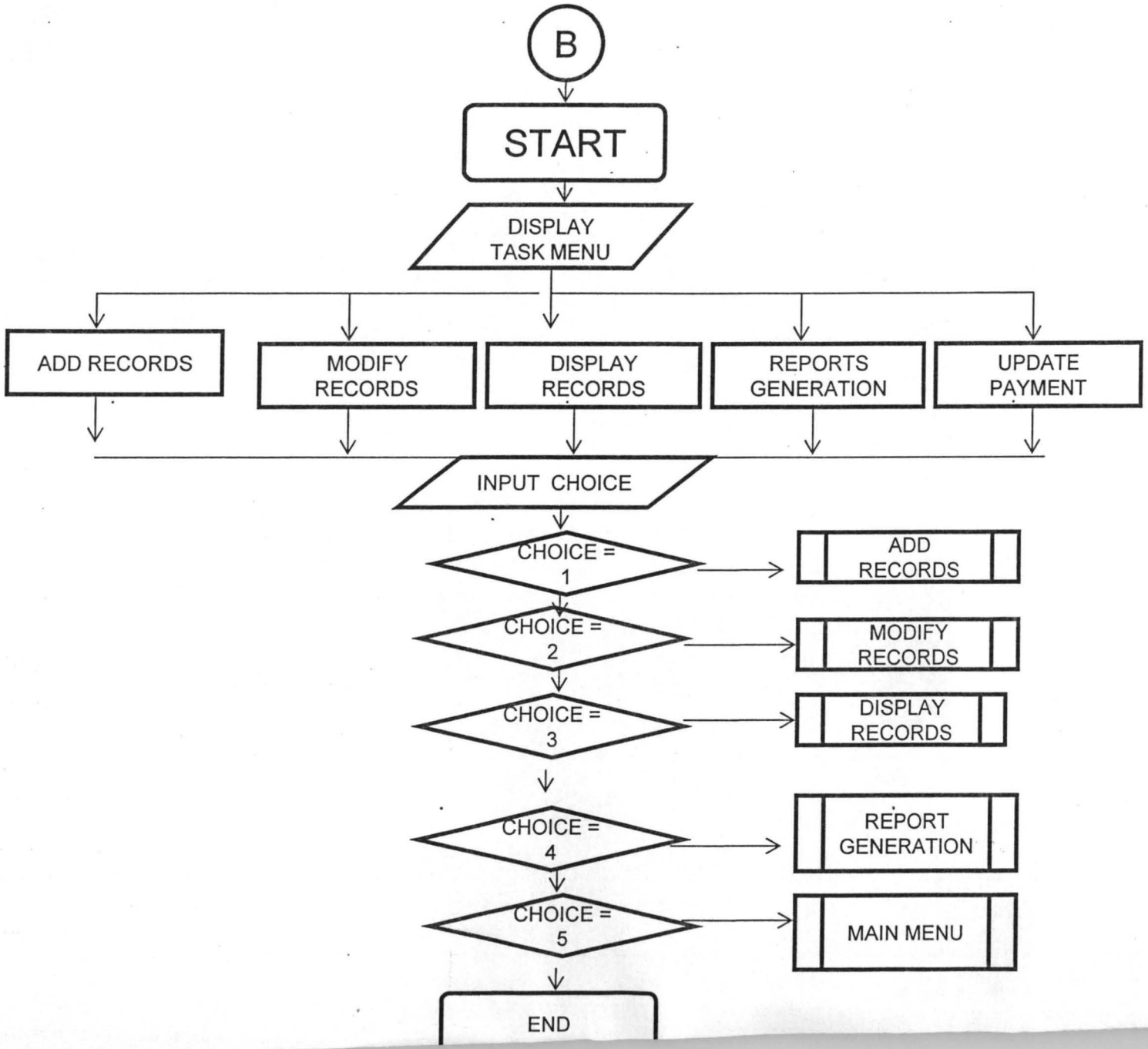
```
Private Sub menuExit_Click()
        Unload Me
        frmMain.Show
End Sub

Private Sub menuLogin_Click()
        frmLogin.Show
End Sub

Private Sub menuMODIFY_Click()
        Unload Me
        frmDeleteRecords.Show
End Sub

Private Sub menuUPDATEPAYMENTRECORDS_Click()
        Unload Me
        frmtry.Show
End Sub

Private Sub menuExit_Click()
        frmGoodbye.Show 1
End Sub

Private Sub menuLogin_Click()
        frmLogin.Show
End Sub
```

```
Private Sub menuAbout_Click()
        frmAbout.Show
End Sub


Option Explicit
Public LoginSucceeded As Boolean


Private Sub cmdCancel_Click()
   'set the global var to false
   'to denote a failed login
   LoginSucceeded = False
   Me.Hide
End Sub
Private Sub cmdOK_Click()
   'check for correct password
   If txtPassword = "password" Then
      'place code to here to pass the
      'success to the calling sub
      'setting a global var is the easiest
      LoginSucceeded = True
      Me.Hide
      frmMainmenu.Show
   Else
        MsgBox "Invalid Password, try again!", , "Login"
      txtPassword.SetFocus
   End If
```

APPENDIX II


START
SHOW SECURITY OR LOGIN FORM
INPUT USERNAME
INPUT PASSWORD
USERNAME & PASSWORD FOUND?
Yes
MAIN MENU
A
No
WRITE INVALID USER
END


A
START
SHOW MENU
TASK MENU
HELP
INPUT CHOICE
IS CHOICE = 1 ?
Yes
TASK MENU
B
No
IS CHOICE = 2 ?
DISPLAY HELP
END


B
START
DISPLAY TASK MENU
ADD RECORDS
MODIFY RECORDS
DISPLAY RECORDS
REPORTS GENERATION
UPDATE PAYMENT
INPUT CHOICE
CHOICE = 1
ADD RECORDS
CHOICE = 2
MODIFY RECORDS
CHOICE = 3
DISPLAY RECORDS
CHOICE = 4
REPORT GENERATION
CHOICE = 5
MAIN MENU
END

Sample

e-PAYMENT MANDATE - Recurrent

The Manager

.....

Please credit the account(s) of the under-listed beneficiaries and debit our Account Number.....accordingly.

No: /OHD/2009/0001/C

Date: .....

S/No.	Beneficiary	Bank	Branch	Account Number	Amount	Purpose o Payment
	Grand Total			₦		

Authorised Signatory_____

Name:_____Thumb Print

Authorised Signatory_____

Name:_____Thumb Print