COMPUTERISATION OF BANKING SERVICES LIMITATIONS AND PROSPECTS A CASE STUDY OF UNITED BANK FOR AFRICA PLC (UBA PLC) LAGOS.

BY

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DECLARATION

I hereby declare that this project is a result of my initiative and that it is a record of my own research work.

It has never been presented in any previous application for a higher degree to the best of my knowledge. The various sources of information are clearly indicated in the references. Any errors in the script are entirely my own.

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CERTIFICATION

This project is titled, **"COMPUTERISATION OF BANKING SERVICES, LIMITATIONS AND PROSPECTS"** by GLADYS OBIAGELI AHMED (MRS), meets the regulations governing the Award of the Degree of Masters in Business Administration (M.B.A.) of Ahmadu Bello University, Zaria and it is approved for its contribution to acknowledge and literary presentation.

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DEDICATION

This work is dedicated to my dear husband and children, Tina, Mike and Vicky.

ACKNOWLEDGEMENT

I wish to use this medium to express my appreciation and gratitude to the numerous individuals on whom I have depended on their assistance for the successful completion of this research which would not have been a reality. It was at the initial stage looked like a hurdle that can never be accomplished.

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ABSTRACT

Computer prospect are very bright in the banking industry as a tool to facilitate banking services for their customers.

In Nigeria, it is unfortunate that the powers and benefits of computerisation is yet to be exploited.

Customer satisfaction in service environment has not fully utilised the facilities and computers available within this context.

Little did the researcher know that computer usage in the banks is in shamble and seriously under utilised with particular reference to UBA PLC, Lagos.

The bank is engulfed with numerous problems which hinders effective use of the equipment to increase efficiency and productivity in their operations.

UBA PLC have to really, stand-up on their feet to improve on quality of customer service, because some of the banks customers especially the individual depositors do not see appreciable impact on the use of computer to the banks.

In order to improve on Customer services efforts should be made to address the issue of man power resources, - software, power failure and maintenance of the equipment.

United Bank for Africa, UBA PLC, as one of the Top tree with its numerous customers both corporate and individual bodies can afford to maintain computer hardware system.

The banking service is automation and not manual. So for the bank to operate effectively in order to meet the customer demand, these machines ought to be put in shape without minding the course. It is just like a farmer going to the farm without his tools he cannot perform at all.

Despite its efforts to satisfy its numerous customers with the creation of corporate branch office, and express service delivery, the problem of queue still exist. These group of customers, corporate customers form part of the heavy savers. Express service delivery is given to customers not from corporate branch in order to ease the queue when they come to withdraw huge amount.

He is given the priority to cash his money with special attention in order for the cashier to authenticate the signature and at the same time lessen the queue for low savers. A seperate counter is given to a customer to counter his huge some say N10,000 and above to reduce the waiting time of customers.

United Bank for Africa UBA, should go beyond data processing where they so much batch process for computer print outs which provide information to the branches at the beginning of the day for the cashier to know the customer outstanding balance.

They should embrace Network system, On-Line-Real-Time, in order to stand and face the challenge of competition new and competent banks when it comes to customer services.

The products of electronic banking automated teller machine, ATM should be sort for to facilitate customer services. There is no way a bank can operate this ATM for express service without Network System. Here the customer transact the business alone without having a contact with the cashier. It operates 7 days in the week and 24 hours. Banks who use this facility enjoys the customer services.

TABLE OF CONTENTS

PAGE

Title Page i

Declaration ii

Certification iii

Dedication iv

Acknowledgement v

Abstract vi

Table of Contents vii

CHAPTER ONE

THE STUDY AND ITS METHODOLOGY

		PAGE
1.0	Introduction	3
1.1	Statement of the Problem	4
1.2	The objective of Purpose of the Study	8
1.3	Hypothesis	8
1.4	The Scope of Study	8
1.5	Research Methodology	10
1.6	Significance of Study	11
1.7	Delimination and Limitation	12
1.8	Definition of Terms	13

CHAPTER TWO

LITERATURE REVIEW

2.0	Introduction	25
2.1	Charles Babbage Difference & Analytical Engine	28
2.11	Computers and Computer Generation	31
2.2	Views on Recent Electronic Computer Development ...	39
2.3	Classification of Computers....	52
2.31	Types of Computers	56
2.4	Computer System	60
2.41	Hardware	60
2.42	Software	70
2.5	Management Information System	81

CHAPTER THREE

A PROFILE AND DEVELOPMENT OF COMPUTER USUAGE

3.0 Introduction 88

3.1 Developments in Banks 91

3.2 Traditional or Arm Chair Banking 93

3.3 Computerised Baning 96

3.31 Batch System 98

3.32 On-Line 99

3.33 Real Time 99

3.34 Electronic Banking 100

3.35 Automated Teller Machine (ATM) 103

3.4 Banking Services 113

3.41 - Current Account 114

3.42 - Savings/Withdrawals 117

3.43 - Loans/Advances 117

CHAPTER FOUR

USES AND LIMITATIONS

4.0 Introduction 122

4.1 Computer Application in United Bank for Africa UBA PLC 123

4.2 MICROBOSS - A Decentralised Baning Computer Application Under Study 131

4.3 Impact of Computers 136

4.31 Benefits to Customer For Better Services 137

4.33 Corporate Customer... 140

4.4 Limitations of Computer Usuage 142

4.41 Threats of Loss of Job 145

4.42 Computer Fraud 147

4.5 Evaluation Between Mechanised Operations And Computerised Operations 150

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATION

5.1 Prospects of Computers 152

5.2 Summary 153

5.3 Conclusion 159

5.4 Recommendation 160

APPENDICES

CHAPTER ONE

THE STUDY AND ITS METHODOLOGY

1.0 Introduction:

We are in Computer age and the researcher discovers that almost all the modern books on business Administration or management science finds pleasure in treating Computer as a sub-topic.

This shows how important modern Computer has been to the individuals firm, society and the world in general.

The history of computing is as old as man kind. Before the advent of modern computer the manual method was the first means employed to process data. Many organisations transact their various businesses with the manual labour which was very slow and cumbersome. As man became more sophisticated with resultant increase in the volume of data to be processed and in order to get more accurate results, it became imperative for faster processing or tools to be used for computing. The earliest mechanical aid to calculation was the Abacus.

During this period pencils, adding machines and Abacus (abax) calculating table in Greek word or similar device were used to process data.

Computerisation of banking services is a process in which the banking operation is transferred from manually or mechanically operated systems to the Computer based accounting system. That is the automation of banking services such as current, savings, withdrawals and loans.

Electronic banking is a kind of banking that involves electronic form of money transmission which are concluded in a fifty (moment). e.g. On-line fully automated banking. It involves the use of computer network in dispensing cash and transfer of funds.

The primary objective is to replace intensive labour operations and thus help reduce the waiting time of customers.

For now Nigeria in electronic banking products are limited to the automated teller machine, (ATM), do it yourself banking transaction, by a customer without having an access to the cashier in the banking hall, Electronic Fund transfer (EFT) and Magnetic ink character Recognition (MICR)

Computers are used in business to improve the quality of, and accelerate the flow of information and thus speed up and improve the performance of planning, decision making, and control activities. Almost every one living in a computerized society is a beneficiary of the use of computers in

organisation. The Nigerian Financial services industry and the banking sector in particular, in undergoing one of the most fundamental changes in recent times. The deregulations of economy, has ushered in a new wave of competition among the various financial institutions in the Country. While the process of deregulation is opening up the market place, it has introduced several risks and opportunities, competitive trends within the industry suggest the need for a more dynamic and innovative approach to the management of information systems.

The banking world is being profounding influenced by information technology. Banks, by the nature of their business, are essentially tracking and manipulating information, they have been quick to discover the efficiency which computers could bring to their operations.

The introduction of data processing systems in the financial industry, especially banks has resulted in a sufficient increase in the efficiency and effectiveness of these institutions.

Management information is more than ever before, timely and comprehensive.

The response time for concluding a transaction such as cashing a cheque or inquiries has improved significantly.

The consequence is that those whose operating have been significantly automated are being preferred by Customers to those still operating manually. It would thus appear that the more banks are licenced the more the threat posed to existing ones and the more aggressive are the marketing techniques adopted by them.

1 Statement of the Problem

A lot has been written and said about these electronic computers. You go there, Computers. Here and there, computer is in existence Wao!, especially the personal computer (PC) desktop widely used in most businesses and main frame preferred for larger organisations.

In our present modern society, enterprises, organisations both public and private parastatals try to embark on the application of electronic Computers because of its obvious advantages. Banking institutions were one of the first types of business organisation to experience large financial gains through computer automation.

This automation has reduced the cumbersome operation and time wasted method of performing manual operation/reduce the work load of staff and waiting period of customer for transaction.

Despite the fact that computer has all these advantages there still exist, some problems of under-utilization. But the important question is, how effective is computers potential in meeting the needs of our today's banks in general, United Bank for Africa Plc, UBA, in particular and the society it is meant to serve?

Is Computerization not meant to facilitate banking services to customers and also enhance productivity since it has created awareness to the society to some certain degree?

Computerization of banking services should be more automated to reduce waiting time in the banking hall and staffers labour.

However, the bank under study has made a huge outlay on Computers. But it is a general consensus that the Computer equipment system software and hardware is under utilized in the banking industry. During the course of research it was discovered that the following factors are responsible for the general problem of under utilization.

i) In a situation where you buy a software to run the computer, you might find that despite the capabilities of your computer, it may not be

possible to manipulate the software unless the owners are contracted. In most cases sources - codes are never released to buyers.

ii) Lack of Man Power Resources. This human resources are scarce because the organisation is under staffed. You see one staff doing many jobs more than he can cope with. They are less qualified to handle the software and hardware system. There are enough computer tools but do not have able staff to operate the machines. This can paralyse the banking services and send them back to the traditional System they left themselves (Customer/Staff)

iii) Lack of Motivations:-

a) Benefits (housing, transportation and medical services etc)

b) Salary Wise

Individuals come to an organisation with devise needs. Some are impressed and motivated on the job itself, how challenging it is, others are motivated by the pay package especially if he has a large family responsibility.

iv) **Lack of Proper Maintenance of PCs (Personal Computers)**

If there is a break down of PCs, it needs an urgent attention of the maintenance Officers or Company's doing repairs otherwise it can lead to under utilization of the system where they are put off for a long period thereby leading to ineffective use of the Computer.

v) **Lack of infrastructure:-**

Power failure even the use of uninterrupted Power Supply (UPS) to ease the problem for thirty minutes to hold the Computer system. Each time there is power failure it will paralyse the operations of the bank, since a period of 30 minutes for uninterupte power supply is not enough.

vi) The response time is considered to be quite slow when compared with small banks.

7) The batch system of computerization instead on Line System, Network, information to branch are compiled at head office and in a situation where there is breakdown, print outs for one or two days are not available to the branches to transact the banking services.

1.2 The Objective or Purpose of Study

The objective of study therefore, is to Utilise electronic Computer effectively to facilitate banking services, decongest queue System, improve service response in order to enhance efficiency, effectiveness and productivity for the bank. For instance, United Bank for Africa.

To explore the limitations and prospects involved in applying electronic computers to solve banking problems.

1.3 HYPOTHESIS

The objective of the study has been crystalised into a hypothesis to be tested during the course of the research such as: whether the bank is under utilising its computers despite its huge financial investment in them.

1.4 The Scope of the Study.

The scope of the study centers on computerization of banking services, prospects and limitations, the services are saving/ withdrawal Demand Deposit (Current Account) Loans and Advances.

Efforts were made to interview some experts in different banks who were knowledgeable on banking application at Lagos, First Bank which is now fully automated (on Line Real-Time System) with First Card ATM, Automated teller machine, do it

yourself banking transaction with out the customer coming in contact with the cashier at the banking Hall. This bank has reached the climax of electronic banking in Nigeria. This ATM Services is only applicable to customers at Lagos.

Bank of the North, Zaria branch which still operates the old system were studied too. Then UBA Plc graduated from manual operation to batch system of computerisation of banking services. The staff at both Lagos and Zaria branch were studied. This Batch System is computer based but not as sophisticated as On-line Rea-Time System where banking transactions are done instantly (i.e. at Jiffy). It is just a graduation from mechanical operation.

A case study was then narrowed to UBA PLC (Lagos), after knowing the problems confronting these banks in order to ascertain their problem since Lagos is a densely populated area with a lot of customers scattered all over Lagos. Perhaps at branch level one may not be able to identify the problems confronting the bank.

The period under review is the present challenge in growth of intense competition of computerization in banking services which is brought about by the present deregulation whereby the banks go all out to win deposits from customers. This brought the era of sitting in Ivory Towers and conducting arm chair banking over.

1.5 Research Methodology

The Researcher mainly relied on primary data and some secondary data to augment the sources of information of its data to have a full understanding of the problem.

The survey method (random sampling) of research were employed and questionnaires were administered through personal interview; structured questionnaires embraced both open and close ended. Access to simulation exercise the ATM Junior First Cash Lagos were given as part of the primary source of information.

The secondary sources of information was obtained in Central Bank of Nigeria (CBN) bullions, UBA Annual Report including dialogues, text books, Business Journal and Magazines. Efforts were made to ensure that parts obtained where from a reliable and responsible sources.

Historical research were equally employed because it addresses itself to the past and relates it to the present happening from annual operation, mechanical and computerised electronic banking.

Finally, to make sure that the data reported here were relevant to the purpose of the study, the researcher had to re-arrange some of the original data that are irrelevant and introduced new features that are necessary for the analysis.

1.6 Significance of the Study.

1. Old fashioned manual method have given way to highly automated computerized method. Ledger cards are no more kept.

2. To find solution to the problem of under utilization of hardware and software system and experts to man it.

3. To eliminate the fear of people against electronic computer that it will throw them out of job and that the artificial intelligent of computers having machine do the brain work, will relegate them to the background and makes slave out of them.

4. To remove the erroneous belief that the Computer makes mistakes through software but rather the faults emanates from people associated with it. Garbage in garbage out. Whatever program given to computer is what it takes and gives out.

5. To provide a base which incoming MBA Students will develop more research on the issue.

6. It is written for the vast majority of students who will be managers and computer users rather than computer experts.

1.7 Delimitations and Limitations

Banks has many services to render to customers but due to shortage of time the researcher delimited the scope to areas of customer services such as Savings/Withdrawal, Current Account and Loans/Securities.

In a research like this a short period will not make a comprehensive research and the researcher owes apology to any mistake found in the script since time is squeezed out to make it elaborate.

There is also a financial problems which makes the research very expensive. Conducting a research at Lagos is not easy since the researcher mainly relied on primary source of information.

The response rate was very slow and poor despite the fact that the researcher were there face to face with the respondents. There were unwillingness to fill the questionnaires, and in a situation where they were willing to fill the form, official secrets were hidden. They were not ready to answer certain questions that relates to their official documents which would enable the researcher to make a comprehensive research.

1.8 Definition of Terms

In a technical research such as this, it is very necessary to define the terms that would be frequently used by the researcher to acquaint the readers better understanding and also clear ambiguity that might arise. In a nut shell these are stated as follows:

- Computer
- Central Processing Unit
- Arithmetic/Logic Unit
- Primary Storage Unit
- Memory
- Input Unit
- Secondary Storage
- Software
- Hardware
- Computer Programming
- Machine Language
- High Level Language
- Basic
- COBOL
- FORTRAN
- Artificial Intelligent
- Operating System
- Application Packages
- Computerisation
- Banking Institution
- Customer Services
- Electronic Banking

- Manual Operation
- Automated System
- Management Information System
- Data Base
- Data Base Management Systems - (DBMS)
- Analog Computers
- Digital Computers
- Micro Computers
- Mini Computers
- Mainframe Computers
- Magnetic Ink Character Recognition (MICR)
- ATM Automatic Teller Machine - On Line System
- Batch Process
- Electronic Fund Transfer, EFT
- Floppy Diskette
- Syntax

  Keyboard -
- Visual Display Unit - Monitor
- Printer

Computer is a device capable of solving problems by accepting data, performing described operations on data, and supplying the results of these operations or an electronic device that accepts input, process it and produces output at a very high or fast speed with a high degree of accuracy.

Input:

This is a medium with which the System accepts data or information. This could be through the keyboards, floppy disk, magnetic tapes etc. Some of this input devices can function as input devices as well as back up devices.

Output:

This a medium through which the System produces information via the printer on to computer sheets or papers. Output can also be stored on diskette.

Central Processing Unit (CPU)

This is known as heart of the System. It is the Central Processing Unit where all operations are performed, retrieved and accessed. It consist of Arithmetic Unit, Logical Unit and Main Storage etc take place.

Arithmetic Unit:

This is where Arithmetic calculations such as additions, subtraction, division

Logical Unit:

This is where all logical conditions are performed such as NOT, GT. LT etc. NOT - An Operator that changes the value of the expression that follows it from true to false or vice versa.

Main Storage or Base Memory

This is the brain of the System. Computer Stores its data and instructions for immediate use. It stores information, make information available for subsequent use.

Control Unit:

This is also referred to as a System Co-ordinator. This part of the processor co-ordinates all parts of computer system, controlling the transfer of data to and from various devices.

The unit fetches instructions interprets them and issues necessary signals to the components making up the system and also direct all hardware operation.

It can for instance send a command to a disk drive to read from a file or to transfer data from the internal memory to a printer. It performs its activities automatically according to the program requirements for a given application.

In effect, the control unit acts as a traffic controller, switching control to various channels to allow the movement of data.

Analog Computer:

A computer that uses continuous data. Analog Computer measure things, continuous physical magnitudes. It obtains answer by measuring. e.g. Speedometers, thermometers and slide rule designed for specific jobs.

Digital Computer

A computer that uses diskette data. Digital Computer count things. Most digital computers count things.

Micro Computers

A small Computer designed for a single user Micro Computers typically on a desktop, or even in a brief case. They can be linked to other computers.

Mini Computers

A small computer that can usually handle the Computer needs of several people. The distinction between Mini and Micro Computer is blurred.

Mainframe Computers

A large Computer installation that typically handles the computing needs of several dozen on hundreds of users simultaneous.

Hardware:

This refers to the physical components that make up the Computer of which without one the system may be wholly or partially rendered ineffective.

It consist the monitor - Visual Display Unit Monitor Screen, e.g. Television Screen which shows the flow of operations or actions being performed. It allows it to monitor your work while you feed information into the system.

Keyboard:

Typewriter like rectangular box where all alphabetic, numeric, function and special character keys are placed for use.

Printer

A device through which the system sends out to users. The System communicates directly by sending out signals to this device to print out report on hard copy or flow lines.

Software

Computer Programs that accomplish specific application, routines which directs or facilitate the operation of Computer and can be divided into System Software and Application program.

Operating System:

A set of programs that standardize the way a computer resources are made available to application programmes. It is a software (programs) that is used to assist in operation and use of Computer Hardware.

Application Program:

Are prepared by the users of the Computer for the purpose of solving particular processing jobs such as Payroll, Bills or Inventory Control.

Program

A set of instructions given to a Computer.

Programming

The process of giving these instruction to the Computer is called Computer programming. Programming language are Basic, COBOL, FORTRAN

BASIC - An early all purpose language. BASIC - (Beginner All purpose Symbolic Instruction Code) is the most popular language for personal Computers.

COBOL - The earliest Business oriented - Computer language. COBOL (Common Business - Oriented Language) is still the most widely used business computer language because of its transportability and focus is on solving business-oriented problems.

FORTRAN - An early high level especially suitable for scientific applications. FORTRAN (FORMULA TRANSLATION) is widely used.

ASSEMBLE LANGUAGE

- A low level computer language that replaces machine language instructions with memory like, ADD and that uses labels to identify memory addresses.

HIGH LEVEL LANGUAGE

- A computer language that is closed to natural language than to Machine language.

ARTIFICIAL INTELLIGENCE

- Computer processing that functions like the human in arriving at logical conclusions to problems that are posed to it.

BYTE - Combination of bits used to represent alphabetic characters. Eight binary databits.

A byte contains one character of data. Character - A single Letter, Numerical or Symbolic Special (1,7, 1 etc)

BIT - A single binary digits

BATCH PROCESSING

- Collecting transaction data for processing all at once as opposed to processing each transaction as it occurs.

BATCH ENTRY

- Loading a series of programs with their data into a computer then executing them one at a time.

FLOPPY DISK

- Flexible Disk is a Mylar disks used mainly in Micro and Mini Computers. Flexible disk or floppy disk are removeable from the disk drive.

DATA BASE - A collection of data that provides access to all applications and users with minimal redundancy.

DATA PROCESSING

- The process of converting raw data into information.

DATA BASE MANAGEMENT SYSTEM (DBMS)

- This is a program designed to store and retrieve data as effectively as possible.

MANAGEMENT INFORMATION SYSTEMS (MIS)

- A System that provides information for operational, tactical and strategy decision making

  Subsystem of an organisation generally implemented on large mainframe Computers.

MANUAL SYSTEM

- A System that does not involve a Computer.

AUTOMATED SYSTEM

- A System that requires a Computer in order to function

PASSWORD - A security device used to prevent unauthorized access to Computer or data store in it.

SYNTAX - The rules for writing for a Computer instruction, Syntax is different from every language.

TIME SHARING

- Concurrent independent use of a single computer system in a given time period.

MAGNETIC INK CHARACTER RECOGNITION (MICR)

- A means of entering data into a computer system using character printed with a magnetic ink.

ON LINE OPERATION

- Direct entry of Input into a computer without intermediate retrieval of information.

REAL TIME PROCESSING

- Processing of transactions as they occur.

ELECTRONIC BANKING

- Transacting bank business (deposits, withdrawals, Loan Payment etc.) by Computer either by telephone or at an or at an Automatic Teller Machine.

ELECTRONIC TRANSFER (EFT)

- The transfer of funds by electronic means.

COMPUTERIZATION:

- This is eliminating manual aspect of the work or operation through the use of Computer based on accounting system.

BANK: - A bank is a financial institution accepting (deposit) or savings from customers and made out payment when required. Gives financial aids to customers through loans and advances, technical advises to corporate bodies.

CONCLUSION:

In conclusion, the influx of commercial banks caused by the licensing and deregulation exercise has brought intense competition in banking industry thereby eliminating the traditional method of Ivory Tower - Arm Chair banking to a hurt and being replaced by the Computer based accounting System.

The objective was to facilitate banking services to customers reduce waiting time caused by long queque in the banking Hall.

For an indepth understanding of the research work efforts were to define the itmes that will look ambiquous to the reader, since they are too technical.

CHAPTER TWO

LITERATURE REVIEW

2.0 INTRODUCTION: HISTORICAL DEVELOPMENT OF COMPUTERS

At this junction in a research like this, it is imperative to know the historical development of Computers and Computer generations. Understand the present position of Computers in industry by reviewing the views and opinions of various computer experts or writers to enable readers know the recent development of Computers.

It is wrong to think that Computer have suddenly arrived on the scene although it is true that their number and use have greatly increased during recent years. Calculator have been in use for long time, even during the days of old navigators and astronomers. But as man became more sophisticated there was the need for calculating instrument to relieve the human brain of work.

The history of manual entering computing device is interesting as that of recording methods and numbering system which was originated from the predecessor Abacus.

ABACUS was the earliest mechanical aid to calculation. It originated in China in the seven century B.C. It is basically a configuration of beeds strung on rods or wires set parallel in a trance.

Arithmetic calculations are performed by manipulating the beeds.

To register a number, beeds are moved towards the centre horizontal counts bar.

*Abacus has been an important computation aid in oriental countries for thousands of years.

By some manipulation the Abacus was used to perform addition and subtraction.

Paschal Calculating Device (1642)

The significant development in the computation aids took place in seventeen century.

The first true adding machine was invented by the French man Paschal Blaise, a young mathematician at the age of nineteen years. He was motivated by a desire to reduce the numerical labour involved in his father's work who was a tax collector with arithmetic problem. He developed a simple adding machine to aid his father in computational work.

Between 1663 - 1668 Sir Samuel Morland in England quite independent of Paschal, developed three calculating machines. The first of these was needed for adding and subtracting of Pounds, Shillings, Pence and Farthings.

Morland's other two machines were not calculating machines in the real sense but devices for giving access to pre-calculated tables.

In 1690, the great German mathematician and philosopher Got Fried Leibuiz, deviced a calculator.

The machine was to improve upon Paschals calculating device. The machine has the capacity to perform the four basic arithmetic functions and extra square roots which was its distinguishing characteristics, that it could perform multiplication, division and addition.

However the Leibnitz calculator was not completely reliable just like Paschals.

Accounting Machine - In 1909 the first accounting machine was develcped for National Cash Register company by Charles E. Kettering. It had the ability to sort data into a number of records, calculating and summarising. By the end of the World War I, the impact of the accounting machine on the business firm was considerable.

2.1 CHARLES BABBAGE DIFFERENCE & ANALYTICAL ENGINE.

The evolution of thought and technology which culminated in the modern computer are significant in contributions of English Mathematician known as Charles Babbage. He was born in Devonshire in 1792, and was educated at Trinity College Cambridge.

Babbage contribution to computer development was first on his difference engine and later his analytical engine .

He developed them, and around 1822 demonstrated the use of the difference engine, a mechanical device constructed for the purpose of creating numerical tables which is of help to students of business and science.

While developing this engine, however Babbage saw the visions of a machine with an even greater calculating capability. His mind was for a general purpose calculating machine, one whose capability, diversity and capacity would surpass his basic difference engine.

After much efforts Babbage's Analytical Engine was quite close in concept to modern computers which had a store or memory device capable of storing 1,000 numbers, a mill or Arithmetic device punched card in-put system and as external memory store.

It is different from the difference Engine in that it could be programmed, that is to say, the user could present it with a prescribed set of operations which it could proceed to carry-out. The difference engine, of course could carry out several of addition built into it.

The program for the analytical engine was held on punched cards similar to those that had been developed by the French Weaver Joseph Mario Jacquard to control intricate pattern on a silk 100m. Analytical engine was intended to print its own output. In this way Babbage hoped to eliminate transcription errors.

Nevertheless, Babbage never got the financial backing he sought from the government for the analytical engine and could not complete the work because his idea continued to develop far beyond the regional concept.

Babbages contributions were significant, but they did not include further development of mechanical computing devices until quite a few years later. He died in 1871[1], approximately 40 years after he first conceived his analytical engine.

The gap between his efforts and the emergence of the Harvard Mark I computer in the 1930s gives some indication of the earlier genius of Charles Babbage who was bestowed the title of "Grand Father" of the modern Computers.

Unfortunately, the technical sciences of the day were not advanced enough for practical implementation of his analytical engine.

Charles Babbage Analytical Engine was considered the fore runner of today's electronic computers of which it provided the fundamental basis for the development of Modern Computer.

MARK I COMPUTER

Mark I was considered to be the first digital computer or general purpose Computers completed in1944.

Mark I was the brain child of Howard G. Aiken a professor of applied mathematics of Harvard University. He worked closely with IBM Engineers and it was the first Computer capable of automatically performing a long sequence of Arithmetic and logical operations. Mark I or the Arithmetic Sequence Controlled Calculator (ASCC) was designed to follow automatically a service of instructions punched in a paper tape ¾ inches wide. The internal operations of machine were controlled automatically with electronic relays, and the counters were mechanical devices. Consequently, Mark I could not be considered an electronic Computer but rather an electro-mechanical one.

Mark I is significant because it was the first automatic sequence controlled automatic calculating machine that could perform an extended series of arithmetic and logic operations without human intervention beyond the initial starting of the machine.

2.11 COMPUTERS AND COMPUTER GENERATION

To really have an indept understanding of the topic in question, it will be necessary to look into the term "Computer" and its uses before relating it to its relevance in topic under study.

(a) What is Computer?

A computer can be described as an automatic device consisting of mechanical, electro mechanical and electronic components which can perform the following tasks:

1) **INPUT** Items to input consist of both data which are regarded as raw facts to be processed and program which is a set of instructions written in a Computer language and directions and directs the processing of the data.

ii) **PROCESS** The processing performed on the input items as an arithmetic e.g. addition, subtraction, multiplication, division; or logical comparison of values to determine which is greater or otherwise. Any complex problem can always be broken down into these basic operations.

iii) **OUTPUT** The results of processing input are know as output. The Computer has to communicate the output to the user in a form understood by the User.

The International Standards Organisation (ISO) defined a Computer as "data processor that can perform substantial computation, including numerous arithmetic and logical operations, without intervention by a human operator during the run".

The United States of America Institute (USASI) defined a Computer as, "a device capable of solving problems by accepting data, performing described operations on the data, and supplying the results of these operations".

On the other hand, a computer is an electronic machine which automatically process input data, in accordance with a set of instructions (programs) stored within the Computer, and then pro·ides the results in a useful information. Computers are electronic devices known for their speed, accuracy and capacity for storing data in large quantities.

Computers are sometimes referred as Electronic Data Processing System (EDPS) or Automatic Data Processing (ADPS). Computer is defined as a Machine with extra data from input device, performs arithmetic and logic operations in accordance with defined programmes and finally transfers processed data to an output device either for further processing or in printed forms such as business documents, schedule or management reports. These days, most of the work of Computer is done by tiny solid state electronic component called "Chips".

It can handle millions of items of information in a second. It makes it easy to process information with great speed, accuracy and reliability. Finally, for managers and people to understand the nature of this device and put into proper use, they have to be trained and guided on it to avoid pit falls that will emanate from lack of know how to handle the machine. Since it is a device or tool for providing better service and enhance performance on the job, planning, decision making and control activities.

B. COMPUTER GENERATION

It is usual to associate each stage of computer development, with one sort of technological innovation or another.

Each innovation usually makes possible certain things which were not possible earlier. The characteristics of present day computer have been arrived at through a process of development, most of which has occurred since the middle nineteen forties.

First Generation Computer

The stored program concept was the innovation that led to the first generation computers. The ENIAC was then under construction when the concept was discovered. EDVAC was then proposed as an improvement that would incorporate this system principle operation. First generation computers were characterised by the use of vacuum tubes as the basic blocks for building the logic parts of the Computer. The technology used for the storage elements included the mercury delay lines, electrostatic tubes, magnetic drums and magnetic cores.

The main problem encountered during the era of first generation computers was that they occupied large amount of space and large circuits were involved such that programs were installed and changed by engineers who continuously

changed the wiring. Also Computers of the first generation were slow in operation, dissipated a lot of neat and had problems of reliability. Computers manufactured in this generation included UNIVAC I, UNIVAC IIQ3. IBM 700 series etc. The period of first generation Computers spanned the mid forties to the mid fifties.

Second Generation Computers:

In 1946, an invention made in Bell Telephone Laboratories in the U.S. Revolutionized not only the computer industry but the whole of electronic engineering: This was the TRANSISTOR. This little device could do all that the electronic valve (vacuum tube) could do, but it did it much more conveniently. It did not consume so much electricity power, it is physically smaller by several orders, cheaper, and best of all, much more reliable than the electronic valve.

The magnetic core was used for the main memory while the magnetic tape storage was used mainly for storing data files and hence was used as the storage medium for peripheral devices such as the input/output device.

The computers of this generation had larger instruction set, large internal memories and the processors were capable of performing arithmetic functions much faster than the processors of the first generation computers.

The Computers manufactured in this generation include Whirlwind I, IBM 7030, 7090, UNIVAC 1107, NCR 315 and Honeywell 800. The period concerned covered late fifties to about the middle sixties.

Third Generation Computers

A very important technological innovation in the third generation was the integrated circuit. This involves chip of material loss than two millimetres long. The main result of this is to make computers even cheaper. Integrated circuits are smaller than the circuits they replace and this resulted in smaller and faster computers. The first integrated circuits contained about ten or twenty interconnecter transistors, giving three or four basic computer circuits on a single module. Modules of this type are referred to as small scale integrated circuits (SSI). Later, the number of transistors per chip rose to a hundred or more so that complete functional circuits such as adders, counters and storage registers could be fabricated on a single chip. Such modules are characterised as medium-scale integration (MSI). Very recently large-scale integration (LSI) and very large scale Integration (VLSI) modules are in the market containing tens of thousands transistors on one chip. In the third generation computers, the cheap metal-oxide semi conductor (HOS) replaced the magnetic core memory of the earlier generation thereby providing fast memory access.

Substantial attention was paid to communication problems in computers especially between the input/output devices and the main memory and the ability to use computers to perform many jobs at a time. These considerations led to the design of sophisticated operating Systems. It became possible to write computer programs to do many different things. Time-sharing devices and data channel communication came into existence. The third generation computers featured in between the mid-sixties and the seventies. This period witnessed the flooding of the market with minicomputers and conventional large-frame computers. The Computers were generally less sensitive and more reliable than the second generation computers were linked up via networks. Important companies that got involved in Computer manufacturing and marketing included IBM, Data General, ICL, Honeywell, Digital Equipment Corporation (DEC) etc.

Fourth Generation Computers

One of the most important results of large-scale integration was the introduction of the microprocessor in the forth generation. A microprocessor is a central processing unit fabricated on a chip. The introduction of microprocessors led to the production of microcomputers that is computers on a chip. Microcomputers are naturally much less powerful than full-scale computers, but they are still capable of carrying out very complex tasks.

The principal application of microprocessors to date has been in the replacement of special-purpose electronics used in the control of relatively simple systems.

Thus, microprocessors are being used to control pumps, washing machines, tickets issuing machines, printers visual displays and a host of other devices.

Progress in Software development also enables the forth generation computers to perform more efficiently than the previous computers. Software tools such as the database management system etc make programming more interesting and rewarding.

The era of the forth generation computers could be identified as the period between late 1970's and the entire 1980's.

Fifth Generation Computers

By 1990 or thereabout, the fifth generation computers are expected to arrive. The later half of 1990 might witness the arrival of supercomputers whose main attraction over previous computers was speed and power.

It is expected that the architectures of this generation of Computer will be basically different from the Neumann Model of the first four generation. The architectures envisaged will be such that the execution of the instruction in the

computer will occur immediately all the data required by the instructions are ready. In other words Computer will be data driven and control driven as with the previous Computers.

It is also contemplated that artificial intelligence will play a leading role in the full development of generation computers especially in the area of softwares in this extent.

2.2 Views on Recent Electronic Computer Development

A developing nation such as Nigeria, the use of Computer is gaining currency. Nigerians are fast catching up with the Computer age and there are numerous Companies to satisfy their needs. Computers are used in business to improve the quality of, accelerate the flow of information and thus speed up and improved the performance of planning, decision making and control activities.

Almost everybody living in a Computerised society is a beneficiary of the use of Computers in organisations. The Nigeria financial industry and the banking sector in particular is undergoing one of the most fundamental changes in recent times.

According to Ajoagbaje (1972), speical report on Computer Services has this to say,

"Computer is the latest craze in Nigeria, and it will continue to be relevant as the country develops. It has gained acceptance in all sectors of the economy, education, health, labour and others. It is gaining increasing popularity and this will even increase with time".

Computer is fast changing methods of business operation by replacing the drudgery of manual operations and quickening achievement of results. The adaptation of Computer to specialised jobs has made their performance much more easier. With modernisation computers are fast changing like other facets of technology.

The modern design has increase speed, efficiency and compactibility and packaging.

Efficient packaging, integrated circuits and general miniaturisation have resulted in a ten fold reduction in size of Computers every ten years.

Ukwuegbue (1992) Computer Scientist, "Most important uses of Computers are being put in areas of financial planning and management. Financial Management is the arm which determines source of funds, its effect on capital base and effective deployment. Like payroll preparation, personnel management and optical character recognition in industrial countries, computer pay-rolls and inventory control system has become routine".

He goes on to say that most research work in advanced countries are done today through the aid of Computer. Computer brains the central processing unit, CPU, Process and analyse data so fast that what used to take three months and even years to process now take a few hours at most.

Corporate restructuring could be said to be brought about by some environmental pressures such as competitive pressures. Technology (Computer) which complements or substitutes peoples mental and clerical capabilities is also a factor for restructuring.

According to Best Mann (1989) Bullion publication of Central bank of Nigeria (CBN) Vol. 13 No. 1, "one of the results of restructuring is automation of industry which combines information and mechanical technologies, thus providing the facility to program machinery and for the equipment to monitor and adjust on the computer controlled industrial processes.

Expert Systems, (artificial intelligence software programmes) support is indispensible value added services. Self Service is becoming the classical mechanism for the routine banking products.

And according to First Bank Business and Economic Report (1991), some commentators are of the view that banks need to rely less on human labour to perform, most of the routine jobs that tend to consume the typical Nigerian Banker's time.

It is estimated that 80% of top 200 international banks have a new telecommunications network installed in the prototype Countries. Today Allied Bank is able to establish a wider communication network for its services as part of corporate restructuring for survival and growth.

Computer literacy is very important and it has two visible impacts upon the society such as the automible and the Computer. Over 90% of the population between the ages of 21 and 65 are auto literate but less than 5% of that group can drive a computer.

Larry Mcgregor (1989) Chairman, Premier Banks ...Illinois has this to say concerning the Computer literacy:

> "I believe that within the next 5 years, any bank officer who does not use a computer directly in his work will be functionally illiterate, we cannot afford to have functional illiterates as Senior Bank Officials".

Computer experts are of the view that staff has to be trained and retrained in order to eliminate or lessen obsolence of know how.

According to Mcgregor, the life cycle of know-how is shortening, if not steadily trained; "A banker loses 50% of his knowledge in 5 years to a system expert in 2 to 3 years". To avoid obsolence, professionals must spend a good share of their time learning. The choice invest or fall behind. And that the best way to wise productivity investment is through the able training of the equipment users; the proper study of the work place and able and timely preparation; Zubairu (1992) UBA PLC, he is of the view that adequate training of human resources will increase productivity in the organisation since no organisation functions in a vacum. Today most people are only commonly vaguely acquainted with Computers.

"I believe in the bank, those most familiar with Computers are the Secretaries who are very conversant with word processing. This is not the philosophy behind introducing personal Computers. I believe even the person at the very top should be able to tap computer information at will".

He concluded by saying that the bank (UBA) will not necessarily purchase new computers but would maximise the use of what they have at the moment.

He emphasised also that middle management cadre will be trained to ensure that they have an understanding of the role of Computers.

Data Science equally view training and development as an asset and not a loss to the organisation. They believe that to get optimum result from employees they have to be trained and retrained on regular basis.

Ekpe (1992) Data Science, supported the view by saying that "the only way an organisation can keep pace with the fast changing business environment is to keep training and retaining its staff on regular basis".

Data Science send an average of two staff on monthly intensive training to UK, USA and Western Germany. Without training steadily even experience becomes obsolete faster than it builds up. Data Science has taken a bold step to challenge the existing multinational with their intimidating stock of human and material resources which emerged wholly an indigenous computer Company.

Etiebet (1992) Data Science, "Where the environment is rightly appropriated, structures put in place, staff exposed to new ideas and fully motivated, no organisation has excuse for not performing as well or even better than their foreign counter parts".

For instance its staff are best motivated and the staff output is one of the highest in the country. Staff motivation triggers the organisations output.

Society is of the opinion that Computerisation will send them out of job and having machine to do the brain work will relegate them to the background. There has been always this fear of losing job because of the new innovation. Human being fail to realise that Computer is a tool that assist and ease the work load. Computer experts and bank officials are of the view that it will not send them out of job.

According to Ahmed (1992), ICL, "Computers are simply tools for providing better service. It is meant to enhance performance on the job. Most establishments that have gone computer, had to retrain their staff in the new dispensation".

Adetunji (1992), First Bank PLC, has this to say on the issue.

> "You have got to employ people to operate the Computer, write programs etc. I agree if it is optimally used, it may reduce staff especially at the clerical level".

On the other hand, he agrees that it poses some threats and if computer is used wisely, human factor apart, it can reduce the staff strength especially the routine clerical operations.

Ojo (1992) UBA PLC is of the same view that Computer is not a threat, but rather a tool to create jobs.

Computer creates jobs in other way. By the time you start or commence with the Computer, it involves "redesigning a new form in another dimensions to the formal operations. Some staff has to be moved to the areas that has the greatest work load in as much as the Computer will not do the physical counting of Naira notes and identifies the genuiness of them. Manual works, such as writing of draft or cheque issued and passing of internal entries and local transfer"

Like Computer users in developed nations, computer users in Nigeria are daily bombarded with innovations in Computer hardwares and are also changing their tools of enhanced efficiency brought about by new development.

Before the mainframe and minicomputers were the most common but the emergence of Micro Computers (PC) has changed all that. Micro Computer come in small frames, some times not larger than a note book. They are very light and can be placed on desktops, lap tops etc.

The high performance and its ability to readily integrate into already existing systems off sets its disadvantage in terms of limited capacity, especially for full grown computing environment. Micro Computer, it is clear and suits out door assignment better because of their small frames.

According to Femi (1992) Data Science, the whole idea of PC is to have something to hold at your side and allow you to do your work at your pace. He goes on to say " I can travel with it to London and work with it in the place and through fax send or get additional information from home office if I want. But the network must be there".

Ajoagbaje comments, "Micro is a free market for everybody because it is something that a person can decide to buy and use, while the main frames are restricted in their use to corporate organisations. It is also competing favourable with Main frames in performance.

We have seen that lap top is gaining more relevance in engineering as well as office automation".

Computer can perform any function if it is well programmed and information fed into it is accurate, complete and factual since it is gradually taking over all aspect of business.

Brightman and Dimsale (1986) asserts with great exaggeration that, "Programmers are a dying breed ... Future sales growth for Main frames and Minis is projected to be bleak. But Micro Sales are brisk. And Micros need no programming.

According to Ogunsemore 1992, Nigerian Banker Journal, "Electronic banking, is the natural fall out of intense competition going on in the market which is brought about by the efforts of banks to introduce automation into banking services. It involves electronic form of money transmission". Here the banking services are fully automated such that transactions are concluded in a jiffy (moment).

It involves the use of Computer network indispensing cash and transfer of funds.

The primary objective of Electronic banking is to replace intensive labour operations and thus reduce the waiting time of customers. For now in Nigeria Electronic banking products are limited to the Automated Teller Machine (ATM) and Electronic Fund Transfer (EFT).

With ATM, Customer enjoys the banking services without coming in contact with the cashier. The machine performs the traditional functions reserved for bank cashiers and other counter staff.

Hanson (1967) in his book, "Service banking" stated that Automated Teller Machine (ATM) was first introduced in the United Kingdom in 1967 while Nigeria ATM is two years old in the market. Societe Generale Bank got it in November 1990, trade name is "Cash Point 24" while First Bank PLC own their ATM in December 1991. The trade name is "First Cash".

Illiterate and literate not sophisticated in banking services are not eligible to operate the System. It is the modern customer sophisticated in financial matters are suitable for Electronic Banking.

Despite, the fact that Computer has gained tremendous success and advancement in Computer development, one set back that still affect its general application is the Computer virus, an infected programme that eliminates information as it is fed into a Computer System or a disk.

It has various names and the most dangerous name among other virus is Michelangelo. This is because it is a disk and data killer. According to Computer expert Michelangelo is potentially the most destructive because it could wipe out the entire disk where all data is stored". The most attacked is the International Business Machine (IBM) Compatible Computers.

Although virus has a negative effect on Computer but Computer experts are of the view that it has some positive impact. Ajoagbaje is of the view that "the positive effects are two folds. "It has created awareness that copying is not good business and brought into lime light the issue of licensing every software you are putting in your programme. It has also created an awareness on this to stop, unauthorised copying and a need for copy right for every software".

According to Obiora (1992) special report on Computer Services advised that to avoid contacting virus and be on a safe side, Computer users should buy their own programmes and avoid the use of contaminated diskettes. Also he said that they should have efficient back up services for all their hard or floppy diskettes".

Since virus has been seen as an enemy of Computer Software that destroys the program, many Computer Firms and Computer experts in banks have take adequate measures to protect virus in order to save data and information gathered.

ICL, Lagos (1990) advises user on security of virus. "Watch out"; there's a VIRUS about! Protect your PC from Virus attach.

* Log out of all application when leaving your PC.
* Also logout your PC if possible after the end of the day

The Company goes on to say that user of Computer Systems should never do the following:

1. Take unauthorized copies of Software (if it is illegal and put both you and your organization at risk
2. Run unlicensed Software in your Personal Computer (PC).
3. Use diskette of unknown origin.

According to Adetunji, First Bank PLC (1992) advises computer user "Load Programmes from original diskette(s), and make sure you don't encourage use of disks from unknown source in your system"

Okoro (1992), UBA PLC is of the assertion that users should "discipline not to use pirated software. Software should have facilities for automatic logging".

At this juncture the researcher first acknowledgement went to Paschal Blaise a young man at the age of nineteen which invented an early adding machine to assist his father in his arithmetic problem and Charles Babbage difference and Analytical engine, who was bestowed the "grand father" of modern Computer by his contemporaries. It was on the basis of their background that Electronic Computer sprang up.

Data Science Managing Director Etiebet is equally complimented for his giant stride to embark on successful indigenous computer which has strengthen the computer growth since organisation cannot operate in isolation he realised that the biggest assets of an organisation is on its customers, its employees, and technology. The welfare of the staff are adequately taken care of such as housing, transportation, medical services and other facilities.

The researchers third acknowledgement goes to the pioneer of electronic banking which has finally brought a solution for the long queue in the system. A customer spends 3 to 4 hours cashing only =N=500.00 and the branch manager is in its cosy office never bothered as they themselves benefited from the choas into which the queues had degenerated. It creates in them auro of indispensability and a customer who is conscious of time would want to see the manager in his office to perform the behind the counter duty or deal to him!. Now automated Teller Machine (ATM) and other products of electronic banking brings the era of manual and mechanical banking to an end.

The researchers fourth acknowledge went to Ajoagbaje who contributed immensely to Computer awareness to educate the society.

Finally, International Computers Limited (ICL) is equally commended for its elaborous advice on virus free security.

2.3 CLASSIFICATION OF COMPUTERS

Computers can be grouped into three main types depending on the manner in which data is represented or constructed and how they are used within it.

They are grouped according:

a) By Nature of Computer

b) By Purpose

c) By Size

By Nature of Computers

Nature of Computer consist of three kinds, that is, Analog, Digital Computer and Hybrid Computers.

1. **ANALOG COMPUTERS**

These are computers designed to perform arithmetic functions upon numbers representing directly measuring quantities such as rotations, voltage or resistance. They are mostly used in industries to control processes, such as mixing chemicals making steel etc. They cannot store data in large quantities. Sliderule is analog in nature.

ii) **DIGITAL COMPUTERS**

These are computers or machines capable of performing operations on data expressed in decimal, binary or other numbering system.

They can be programmed to perform almost any business task. They are used for accounting, forecasting and aid other general business purposes. They can store data in larger quantities.

Digital Computers have the advantages of accuracy, ease programming and versatility while Analog may be cheaper.

Logarithmic tables can be said to employ digital method because values are represented exactly.

iii) **HYBRID COMPUTERS**

In an attempt to combine the high speed of analog machine with the flexibility of digital computer, hybrid machines have been developed. A hybrid computer consists of an analog and digital system connected together in a single system. Hybrid computers are mostly found in scientific and technical applications. Hybrid Computers are normally applied to specialized problems in which input data is derived through a series of measurements, converted into a digital format, and processed into a useful output using a Computer program used in computer controlled manufacturing process and production. e.g. is the stimulation of guided missles system or new air craft.

B **BY PURPOSE**

By Purpose Computers can be sub classified into general purpose and special purpose computers.

i) **General Purpose Computers**

They are those which are completely programmable and can be used to perform variety of numerical calculations and business problems. It has the ability to store different programmes of instructions. The Program to process the payroll can be carried out by the computer at one time and finished. And they be immediately replaced by the inventory controlled programme for a new job. These are used for business commercial environment.

ii) **SPECIAL PURPOSE COMPUTERS**

This is designed for a specific type of application and has its programme not programmable. Most analog computers are special purpose computers and the examples are the stimulators for training air pilots, devices to monitor petroleum distillation. Hence forth, any reference to a Computer will be taken to be digital general purpose computers.

C) **THE SIZE OF COMPUTERS**

Computers come in various sizes from large systems to a very small desk top variety. They may be arbitraly classified in terms of relative computing power and cost into Micro-Computers, Mini-Computers and Mainframe Computers. They are basically digital computers but there are diffences between them.

Computer size means data processing capability which is co-determined by the following factors:

1) The amount of data can be stored in memory capacity.
2) The speed of internal operations of the Computers.
3) The number and type of peripheral devices.
4) The amount and type of software (programs) available for use with the Computers.

Based on these factors there are three major types of Computers.

2.3.1 TYPES OF COMPUTERS

There are three major types of computers and they are as follows:

i) Micro-Computers
ii) Mini-Computers
iii) Main frame Computers

To have a full understanding of each type, the researcher explained them one after the other thus:

1) **MICRO COMPUTERS**

These are small and portable computer systems. There are many different brands of Micro Computer, but they share the same basic configuration such as:

- a micro processor
- a key board (for entry of data and instruction)
- a display screen
- an anxillary or backing storage device
- a printer (Optional)

In some models are these components are built into one box, while in others the display screen keyboard and backing storage may will occupy different units connected to each other and to the main power supply by cables.

This basic configuration is enough to support many interesting applications. All Micro-Computers are designed to be expandable. Main store (memory) can be added so that large programs can be run, and peripheral devices of any type can be plugged into a standard interface.

The processing capability of the large micro computers is comparable to that of many mainframes of the 1960s. Many Micro-computers are able to meet a dual purpose:

However, the process of making the basic electronic components of Computers even smaller led to the production of initially hundreds and subsequently thousands of circuits on one wager or `chip' of a particular type of material usually silicon.

Examples of building blocks of computers made in this way are Micro-processor. A Micro-processor is an entire small computer processor manufactured on a single chip. The first Micro-processor was produced in 1972 by Intel Corporation. Most Micro-processor do not contain main storage which is normally produced on seperate silicon chips.

II) MINI COMPUTERS

Mini Computers (Mini) were able to exploit some of the first moves towards miniaturisation in electronics, or integrated circuits, os that they gained in compactness and cheapness. They are cheaper, smaller and easier to install than Main frame Machines.

They were designed primarily for various types of engineering and control work (particularly characterised now by industrial robots in the automation industry, which led to some important demands and characteristics:-

- high reliability
- ease of use
- limited number of use, often dedicated to single use
- relatively simple software
- ease of device attachment
- reliability

The hardware features of a typical Mini computer system include:

a) Medium size processor and main storage

b) Hard Disk storage Magnetic tape storage

c) Line printer

d) Multiple terminals e.g. 20 VDUS (Visual Display Units or more)

Minis are being used as Front End Processors (FEPs) to handle input and output from various terminals in a Mainframe Computing environment. The FEPs may not only deal to the main computer, they may also deal with remote terminals which are situated at the end of data transmission lines. A terminal is an I/Of (Input - Output) device capable off sending and receiving information.

III MAINFRAME COMPUTERS

A `Mainframe' is a large expensive computer. The earliest machines were all mainframes in this sense, even though their speed and versatility were greatly inferior to that of a modern Micro-Computers.

It is widely but falsely believed that Mainframe are far more powerful than all other Computers, there is a substantial over lap, and some of the smaller Main frames are out performed by Mini-Computer which cost one ten as much.

2.4 COMPUTER SYSTEM

A System is a collection of several things or people organised in such a manner that they become intergrated. In other words a system is a collection of integrated components put together to achieve a particular aim or objective. These Components are called subsystem.

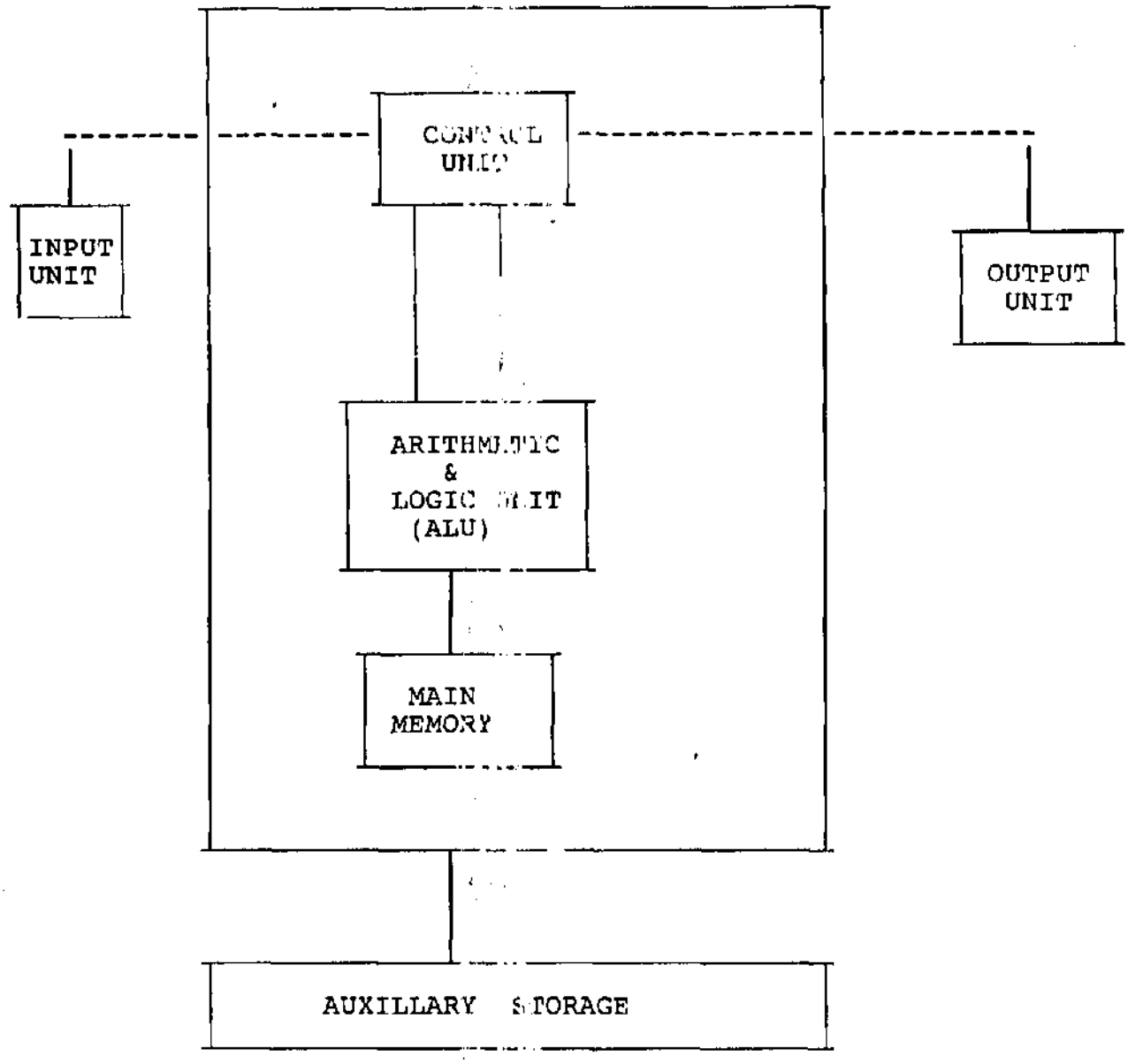
The Computer system is a composition of three composition such as:

1) Hardware
2) Software and
3) Firmware

2.4. HARDWARE

The hardware refers to the physical equipment or machine which make up the Computer configuration. The hardware is made up of two components: (a) Central Processing Unit (CPU), and (b) Peripheral Units.

CPU (CENTRE PROCESSING UNIT)



Block Diagram of a digital Computer

--------> Data System Flow

--------> Command/Synal Flow

(A) **CPU**

The central processing unit is the heart of the computer system. The CPU is a brain system in which all calculations comparisons and controls are done. The CPU is made up of three units viz:

(I) Control Unit

(II) Arithmetic & Logic Unit (ALU)

(III) Main Memory or Main Store.

(I) **Control Unit**

Control Unit is the part of the hardware that is directed by a program when in operation. It controls and extracts instructions one-by-one in sequence from the store, decodes them and initiates any action that the instruction indicate. The regulation of the other parts of the computer rests with this unit. It decodes, interprets the instructions and then directs their implementations.

(II) **The Arithmetic and Logic Unit (ALU)**

Arithmetic Logic Unit (ALU) is the workshop of the CPU which is directed by the control unit to perform series of operation on the data in accordance with the instructions of the program.

It consist of two units such as arithmetic unit which performs arithmetic operations such as addition, subtraction, multiplication, division and the logical unit which performs logical operations such as comparision between two items of data to determine which one is larger or for identification purposes. The data operated upon is not limited to number alone, they also include alphabetical characters.

(III) **Main Store/Memory Unit**

The main store/memory or immediate access store (internal store) is the part of the HARDWARE that holds instructions, data and immediate results. It is divided into pigeon holes called "Location, each is identified by a number of holding one word, and each is identified by a number known as "its address".

It holds the programs being executed and the data to be worked upon. Results of processing are also stored here prior to transfer to an output device or auxillary storage device. Main Store is a fast storage device, but it could be expensive.

In modern computers, this main store is an integrated circuit produced on wafers of crystalline silicon (Chips) by automatic masking, printing and etching processes.

b) The Peripheral Units.

The peripheral Units can be sub-divided into three units such as:

i) Input Device

ii) Output Device

iii) Auxillary Storage Device

INPUT DEVICE

Input device is a device through which data is fed into CPU. Before Data can be entered into the Computer, it must be converted from form that is intelligible to the user to a form that is intelligible to the Computer. An input device performs this function.

Input data is recorded on punched cards and paper tape reader and keyboard.

The common input devices Punched Cards:

The modern punched card is fairly rectangular in shape and made of cardboard. It is 7.75 inch by 3.25 inch (187mm by 6 82 mm).

This size was chosen arbitrarily by inventor Herman Hollerith to be of the size of the American Dollar bill of the time. The standard Card consists of 80 Columns (there are also 40 - and 96 Column Cards) and 12 rows.

The information to be passed to the central processing Unit is normally hand written first on coding forms, so as to be easily read by any one involved in the punching. Punching is performed by an operator using a machine known as the Key Punch Machine similar to an elaborate type written and the process of punching also resembles the process of type writing.

Punched cards are read at speeds ranging form 3000 to about 1500 cards per unit by a machine called the card reader, giving a maximum character transfer rate of approximately 120,000 per unit. Punched cards are straight forward, easy to ready manually since each card has its data printed across the top edge. They are relatively cheap when compared to other input devices. They are almost unique because it is viable to sort, merge, match and reproduce them off-line.

KEY-TO-DISK SYSTEM

A Key-to-disk system obviates the need for media such as punched cards by accepting data and transferring it directly to magnetic storage.

The essential constitutents of a key-to-disk system are made up of a number of keystations, a super visors console, a mini processor, a magnetic disk unit and magnetic tape unit A key-staion consists of key boards, laid out similarly to that of a type written and also a visual display unit (VDU).

The average number of key stations per system is around 12 but as many as 32 are incorporated in large system. Each key station is linked to the micro processor, and when the input data is keyed, it is immediately transferred to an entry buffer - Error correction is facilitated by the use of VDU. Like other multi-key board system, the key-to-disk systems achieves greater control over keyed input as regards, its accuracy, security, operator guidance and progress monitoring.

KEY-TO-DISKETTE SYSTEM

The pre-eminent key to diskette system is the IBM 374 Data Entry System with this system, Data is keyed into stand - alone data stations and recorded on diskettes (floppy disks) inserted therein. It is capable of holding about 1500,000 characters in the form of 80 character records, or 240,000 characters as 128 character records. A data station is equipped with a

keyboard and a small VDU. The key data is held in a buffer in the data station before being recorded on the diskette - Verification takes place in the usual way by re-keying the data with the data station switched to verify mode.

The data stations are self contained, and hence there is little possibility of a complete system break down.

Also the diskettes can be passed form one department to another for further data to be added or held on the shelf until the next batch of source data is ready.

KEY-TO-CASSETTE SYSTEM

With Key-to-cassette systems, data is keyed into a workstation comprising a keyboard and either a VDU or printer. The keyed data is recorded on a magnetic tape cassette inserted in the station. Each cassette encloses a small reel of magnetic tape capable of holding between 9,000 and half million characters per second.

Cassettes are of two types - data cassettes holding the keyed data, and program cassettes. The program cassette are write-protected so that they cannot be accidently over written and so lose the programs needed for controlling the format of keyed data.

DOCUMENT READERS

Transferring input data to cards or paper tape is costly and time consuming subsequently a great deal of effort has been put into devising means whereby a computer can be made to read original documents. Document readers can be divided into three classes: Magnetic in Character Recognition (MICR), Optical Mark Recognition (OMR) and Optical Character Recognition (OCR).

ii **OUTPUT DEVICE**

This is a device through which information (processed data) is transmitted to the user from the CPU. Examples are Video Display Unit (VDU) Printers and Graphic Plotters.

Furthermore, information derived from the Computer is stored in various storage devices such as external Hard Disk, diskettes, Magnetic Tapes, Microfilms etc.

PRINTERS

The most usual form of output, if the data is needed for human interpretation, is on sheets of printed continuous stationary. The most common type of printers are the Line Printers.

In a Line Printer, rows of Character sets are either wrapped around a drum or affixed to a chain. The drum or chain revolves across the path of a series of hammers, each of which corresponds to a print position. As the character to be printed is selected, a magnetically controlled hammer presses it on to an ink ribbon and then on a paper, rather like a typewriter works. Line Printers perform at speeds from 200 to 2000 lines per minute where a formated line would normally consist of up to 120 - 132 characters or symbols.

VISUAL DISPLAY UNIT (VDU)

The VDU is a type of terminal with a key board for Manual input of characters to the computer and with a screen for character display of output. The VDU is used both for input and output. Information is displayed much more quickly than by the conventional Keyboard Printer Terminal. It is used for example in a IV Line seat reservation where speed is the essence in handling customer enquiries.

One disadvantage is that no hard copy (printed copy) is produced except if it is attached to a printing device.

iii) **AUXILLARY STORAGE**

This is also known as backing storage, external store or secondary store. Since the Main Store is very fast, it would be ideal to store all data and programs permanently on it. But because of its cost, there is need to have auxillary storage to back up the Main Memory. Data programs not currently required for processing are held in auxillary storage devices until they are needed.

2.4.2 SOFTWARE

The Software Computer System refers to the program which is processed by the Hardware. Software is taken to mean all the programs used by Computers control and direct it to perform its function of data processing.

However, a program is regarded as a sequence of instructions which are carried out by the hard ware to solve a given problem in order to get a particular job done.

The word sequence connotes the need for programs to be written in a certain order, since computers carry out their functions in steps. The Computer does not think, it simply performs the job in the step it is instructed.

Since the Computer is built to obey certain commands, its reasoning is therefore limited to the commands. The preparation and marketing of software became a big business in the late 1960s after IBM "unbounded" the software and today software costs are greater than hardware costs.

In spite of the technological sophistication of Computers, they are useless without software. In fact, no other artefact is able to accomplish such an elaborate tasks in terms of repetitive logical processes.

TYPES OF SOFTWARE

Software is normally classified into three broad groups (1) Application Software (2) System Software and (3) User Programs

1) **APPLICATION SOFTWARE**

Application Software is written by the Vendor or user. It contains the logic to update, maintain and process a company's records or files. The main purpose of Application Software is to ease the burden of day-to-day activities of the Company. It assist in taking care of most of the routine operations that take place in an organisation. It is vocationally related.

A business package is a complete suit of programs with its documentation covering a business routine. It is usually supplied by a Software house or a manufacturer either on lease or purchase. It is usually intended to meet the needs of a wide range of user companies.

Typical applications cover payroll, auditing, stock control, network analysis (PERT). Advantages of such package include quick and cheaper implementation minimum time for its designs, implementation and testing, usually accompanied by full documentation and also very portable.

SYSTEM SOFTWARE

System Software comprises of different types of Software which work together to assist the Computer user to utilize his computer Systems in the most effective manner.

System Software is hardware related, i.e. It serves as an interface between the hardware system and the Application Software.

Every User of a Computer requires some basic programs that are provided by its manufacturer. These basic programs are called Systems Programs or System Software.

The following types of Software make up System Software or System Programs:

a) Operating System (OS)

b) Programming Languages (Language Translators)

c) Utility Programs

Operating System (OS)

Operating System is a suite of programs acting as interface between users of Computers on one hand and the hardware on the other. It provides the users features that make it easier for him to code task, executes it, debugg and maintain his programs while efficiently managing the hardware resources. One of the suits called executive program remains resident in the main store and controls all other programs.

Programming Language (Language Translators)

Programming Languages (i.e. COBOL, FORTRAN, BASIC) have to be translated to absolute or object instruction. All instructions have to be in this object or absolute format before the computer can execute them.

A language is a set of notations used for Communication. A programming language is a set of notations in which we express our Computer programs. At the initial stage of Computer development, programs were written in machine language consisting of the binary system i.e. 0 and 1. Such programs were hard to write, read, debug and maintain. In an attempt to solve these problems other Computer languages were developed.

However, Computer can run programs written only in machine language, there is therefore the need to translate programs written in these translators.

The inital program written in a language different from machine languages called the source program and its equivalent in machine language is called the object program.

Three examples of classes of language translators are assemblers, interpreters, and compilers.

i) **Assemblers**

An Assembly Language is a set of notation using Symbols or mnomics that are easily readable to write computer programs. An Assembler is a computer program that accepts a source program in assembly language and produces an equivalent machine language program called the object program or object code.

Each machine has its own assembly language therefore a program written in an assembly language of one machine cannot run on another machine.

ii) **Interpreters**

An interpreter is a program that accepts a program in a source language and executes without producing an object program.

iii) **Compiler**

A Compiler is a computer program that accepts a source program in one high-level language and produces an equivalent program called the object program or object code in machine language. For each high level language there is a different compiler. We therefore talk of COBOL Compilers, FORTRAN Compiler etc. A Compiler also detects syntax errors. Errors that arise from the use of the language Compilers are portable i.e. a COBOL Compiler in one machine can run on a different machine with minimum changes.

C) **Utility Software (Programs)**

This is a set of commonly used programs in data processing departments also called Service programs.

It is also a general Purpose program that can be used in conjunction with many application programs. e.g. file, copying programs, sorting programs etc.

File Copy - makes an exact copy of a file from one medium to another medium. e.g. copy from one area of disk pack to another area.

Sorting - Provide certain parameters and request the machine to arrange a set of records into a certain order (ascending or descending) using their keys.

3) USER PROGRAMS

This is a suite of programs written by programmers or Computer users required for the operation of their individual business.

The two main classes of computer languages are called Low Level Languages and High Level Language.

1. Low Level Languages

A Low Level Computer Language consists of machine language or an Assembly Language.

Machine Language

Machine Language is the fundamental Language of Computers. Instructions made up of 3 zeros and one. Tell the the Control Unit of the Computer CPU what to do and what data to use.

Machine Language is the lowest level language. It was the first available to programmers, and in fact the only language until 1950s. It is very fast since no translation is needed and it makes very efficient use of memory. The programmer has complete control of the Computer and it is able to use all of its capabilities.

It is very easy to make errors in a machine language program and very hard to correct them. For instance, if a programmer omits an instruction, every line following the omission will probably be wrong. Machine language programs can only be run on the machine for which they were written because machine language is directly related to the logic that is wired into each processor.

It is difficult to learn and expensive to develop. Finally Machine Language Programmers cannot use coding written for other programs in a new program. Because of this disadvantage nobody programs in Machine Language any more.

Assembly Language

Assembly Language was developed in the early 1950s to alleviate some of the difficulties in using machine language. It replaced the memory code Machine Language Instructions with Symbolic names; or Mnemonics.

Assembly Language programs are not transportable, that is, they can only be used on the Machine for which they were written. It has relative addressing; instead of specifying every storage location, the programmer specify only the first location to used. Assembly Language makes use of Mnemonics which provides a memory aid to programmers as they write code.

Assembly Language requires a translator to translate a program to equivalent program in machine language because this is the only Language in which a program in computer can be performed.

2. **High Level Languages**

These were developed to further ease the work of programmers by making the languages more problem - oriented as opposed to the low level languages that are machine oriented. The statements of high level languages are closer to natural English Language. A program in a high level Languages is called a Source Program and must be translated (Compile) to an equivalent object program code by a Compiler of the High Level Language. The examples of High Level Languages are BASIC, COBOL, FORTRAN etc.

BASIC

BASIC (Beginner's All-Purpose Sysmbolic Instruction Code) is the most popular Computer Language in the world today. The Language was developed by John Kemeny and Thomas Kurtz of Dartmouth College in the early 60s. Many commercial programs written for Micro-Computers have been coded in BASIC. The Language is available on virtually every MICRO Computer because its interpreter requires very little memory.

It is equally used with Mainframe and Mini-Computers. It is a very simple High-Level Language intended for use in a time sharing environment. It is useful in educational institutions for training purposes. And makes it possible for users to retrieve information from Mainframe data files.

Basic is a general purpose procedure-oriented, interactive language that is normally interpreted, though many Compilers are available. This allows programmers to write, debug, and test their programs using an interpreter and then compile their correct programs and enjoy the speed of object program execution. Programming in Basic include ease of use, flexibility, good diagnositc messages, and its interactive nature. It lacks standardization, slow execution speed and limited transportability.

COBOL

COBOL (Common Business Oriented Language). It was established as COBOL - 60 by the Government Printing Office in 1960 and has been extensively used. COBOL is heavily used in Commercial and government Computer installations. As much as 80 percent of government and business programming has been written in COBOL. It is easy to read and tends to be self documenting, machine independent programs are fairly transportable but requires a very large compiler. He has also become available in MICRO Computers. COBOL Programs are constructed like an essay. There are divisions sections, paragraphs and sentences.

A program in COBOL has four divisions. The first is the identification division which distinguishes the program from all other programs.

The second is the environment which specifies the Computers to be used for compiling and running the program and its peripheral equipment.

The third is the data division which specifies the formats of input and output data.

The fourth is the procedure which gives the statement instructing the computer on what tasks to perform.

These statements are made up of verbs and names.

FORTRAN

This is a High Level Language designed for scientific problems and sparingly used for business application. Early Computer users were scientists and engineers. FORTRAN is short form for FORMULA TRANSLATOR. Scientific problems are characterised by Complex Arithmetic Computation, minimal Input and output, and limited use of data files.

FORTRAN was developed by IBM Group lead by John Backus. The first appearance was in 1956, but errors in its compiler led to a corrected version known as FORTRAN II which was released in 1959. FORTRAN IV, for example was designated as standard FORTRAN by ANSI in 1966. Revised in 1977 as FORTRAN 77.

2.5.1 MANAGEMENT INFORMATON SYSTEMS

Introduction

Management Information System (MIS) can be defined as a combination of related procedures aimed at providing the various levels of management with information for control and decision making. These procedures may be manual or computer based.

Whether manual or computer based, MIS embraces the following:

- **Data Processing** which involves the Systematic recording, arranging, filing, processing and dissemination of facts (data) relating to the physical events occurring in the business.

- **Control/Decision Making** using processed facts (information) form data Processing to control the business direction and make Management/Functional decisions.

With the increase complexity of Business Management resulting from growth, competition, technological development and government legislation etc. Information is coming to play an ever-increasing part in the day-to-day management of business. With

- the share volume of data needed to be processed in order to derive certain information,
- the requirement to make vital information available at the least opportune time,

- the requirement for a high level of accuracy,
- all the above and other requirements at an optimum cost

have left large and medium size establishments with no other option than to put in place some form of **Computer-based Management Information Systems.**

Such Systems maintain Computer based files which hold data on some/ aspects of the establishment operations. These Computer based files can be grouped, according to functional areas, into databases, or centralized into a single database.

In an establishment like UBA PLC, one database can hold on Staff Payroll, Fund Transfer etc while another can hold data on Staff Records.

The key to an effective MIS lies in the design/implementation of the data-bank (the various databases and manual files), from which Control and Decision making information are to be derived from. Consequently, in developing a MIS, a lot of effort is put into:

a) Identifying the type of data the establishment deals with,
b) Identifying relationship between the various data types and
c) Grouping of the various data types into optimum structures or files.

Equally important in operating an effective MIS is the procedures in place for recording physical events occurring in the business (Data Collection Approach). The procedures so adopted should have enough in-built mechanism for detecting 'garbage', where possible, during input to forestall 'reaping garbage', at the information derivation stage. This becomes more critical when the MIS is computer based.

1. **DATA PROCESSING**

The bottom line of every Management Information System is its ability to provide, on request, all required information promptly and accurately for effective control and decision making, by the various levels of Management/Functional areas, at an optimum cost. To achieve this, Data Processing has to be done correctly, using appropriate tools which may be well developed Computer-based application systems.

The various tools to be used depends on the size of the establishment, the type of business it is involved in and thus its information requirement.

For a small establishment that does not deal with voluminous data for their day-to-day operations, an optimum solution could be well developed non Computer-based Data Processing Procedure which may include the use of adding Machines and some other support equipment.

However, for medium and Large establishments, a well developed Computer-Based Application System ensures, its responsiveness to business needs and provision of prompt and accurate Control/Decision making information.

The computer-based Applications can be developed to operate in a **Batch Processing Mode, Online Real-time mode** or a combination of both depending on business requirements.

With the **Batch Processing Mode**, data to be entered into the System are collated and processed at predetermined times. In operating this mode,

- Physical events occurring in the business, are transferred to appropriate forms designed for such purpose, where necessary.
- Collated manually or entered into a computer for the collation (Online Batch Processing)
- Passed to a Data Control Section for Batch Control activities and
- Processed (Validated and the database updated).

This mode is suitable for functions that do not have immediate use for the data to be processed. In a Payroll function, for example, whatever inputs are made are actually not used until when payroll calculation is to take place at the end of the month. Thus a Payroll Applications are usually batch.

With the **On-line-Real-Time Mode**, the physical events occurring in the business are entered and processed as the events happen. The database is immediately updated making the data entered immediately available for decision making, if required. This mode is particularly useful for functions that may require decisions to be taken at any point in time based on most recent information. For example, a bank cashier may want to know the position of a customer account any time the customer wants to make withdrawal.

2. INFORMATION FOR CONTROL/DECISION MAKING

In every establishment, information needs vary, depending on the type of business the establishment is involved in. Also with the same establishment information needs vary across the various levels of management.

When developing Information systems, therefore, Systems Analysts usually define at the outset, the type of Business an establishment is engaged in. Also, the Analyst interviews all managers, in order toe establish the information they require for effective control of their functions and for making decisions.

In general, however, the higher the level of management, within an establishment, the more the information must be provided in summarized form for speed of interpretation and reaction. More detailed information is normally required by functional managers for day-to-day control of operations and decision making at the tactical level.

The exception principle, which involves provision of information on the basis of exception, allows management to grasp essential facts more speedily and to correct adverse trends much sooner, as only significant factors are reported on.

One of the strong points of a computer system is the volume of computation it can perform within a short time. This strength is usually made use of in computer-based MIS to derive analysis of events for decision making.

3. DATA COLLECTION FOR MANAGEMENT DECISION MAKING

With a well designed data-bank for an establishment, it should be possible to derive most of the information required for control and decision making from it. Data collection, to populate this data-bank thus becomes, as mentioned earlier, an important area of an effective MIS.

In computer-based MIS, emphasis are placed on collecting data at the points the physical events occur in the establishment, where necessary. With relatively cheap powerful microcomputers and work-staitons, many establishments will be in a position to set up this approach if found to be suitable for their needs, with work-stations provided at these points for data entry.

Some data that may be input into the data-bank for some functional areas may be a result of the processing of some inputs from other areas. A computer-based MIS should have the capability for automatic updates of such occurrences.

In conclusion, the research highlighted the readers awareness by discusssing computer at the grass root level right from the time of Abacus, Paschal Blaise adding machine, Charles Babbage difference and Analytical Engine including Computer generation. The various views on recent computer was equally discussed. The Computer classification/System Software and Hardware and finally management Information System.

CHAPTER THREE

A PROFILE AND DEVELOPMENT OF COMPUTERS USAGE

3.0 Introduction

In data presentation three commercial banks were evolved by the researcher during the course of study.

They are Bank of The North Limited, Zaria branch which is still using manual operation at branch level. The Second is United Bank for Africa PLC whose computer based application is still Batch Processing Mode. The Bank is on the pipe line to to go on-line system at Victoria Island Branch of the bank. And finally, First Bank PLC, has reached advanced stage of computerisation using On-Line Real Time System with the use of Electronic Banking product such as Automated Teller Machine (ATM).

i) Bank of The North Limited, Zaria

The Company was established in 1960 and it is owned by 15 Northern States in the Federation. Although it is computerised at headquarter level and some few major branches, it is still manually operated. That was the Zaria branch under study.

And for that reason they made use of manual labour greatly. Customers waste a lot of time cashing cheques thereby making the system inefficient. This process creates a lot of job opportunities for school leavers.

The staff of the bank are heavily compensated package wise. The customers in turn are elaborately showered with Agric Loan in order to retain the Customers patronage.

Bank of the North is not a proud bank unlike the "Big Three" Banks. Bank of the North has branches scattered almost throughout the Federation.

ii) **The United Bank for Africa**

The United Bank for African, UBA PLC, is one of the top three of Nigeria's Commercial Bank, which was established in 1962 in an agreement with five international banks to take over the banking business carried in Nigeria since 1949 by the British French Limited.

The Bank has over 190 branches scattered all over Nigeria with assets of over =N=12b as at 1991.

Nigeria interest controls 60 percent of the share-holding of bank while foreign own 40 percent of the share-holding.

The bank has less than 9,000 members of staff as at 1992. All the 96 urban branches in the banks network have had their operations computerised. Head Office Financial division is the first beneficiary of the new System followed by other cost centres during the 1991/92 financial year.

UBA is operating Batch process of Computer based application and Data Processing Unit is situated at third floor of the Bank at Marina Lagos. UBA is yet to introduce on-line-real-time. The plans are on the pipe line. It is only a branch at Victoria Island which is to start ON-Line-System (Network).

iii) **First Bank PLC**

This is the First bank introduced into the country in the later part of nineteenth century. It has been in operation for a period of 98 years and was established in 1894.

It has branches all over Nigeria around 300 branches precisely. Most of its branches have gone computerised with the exception of rural branches.

First Bank PLC, is a large organisation and has a staff strength of 12,000. So from the figure, the Bank is not understaffed.

The staff employed are both highly skilled and non skilled.

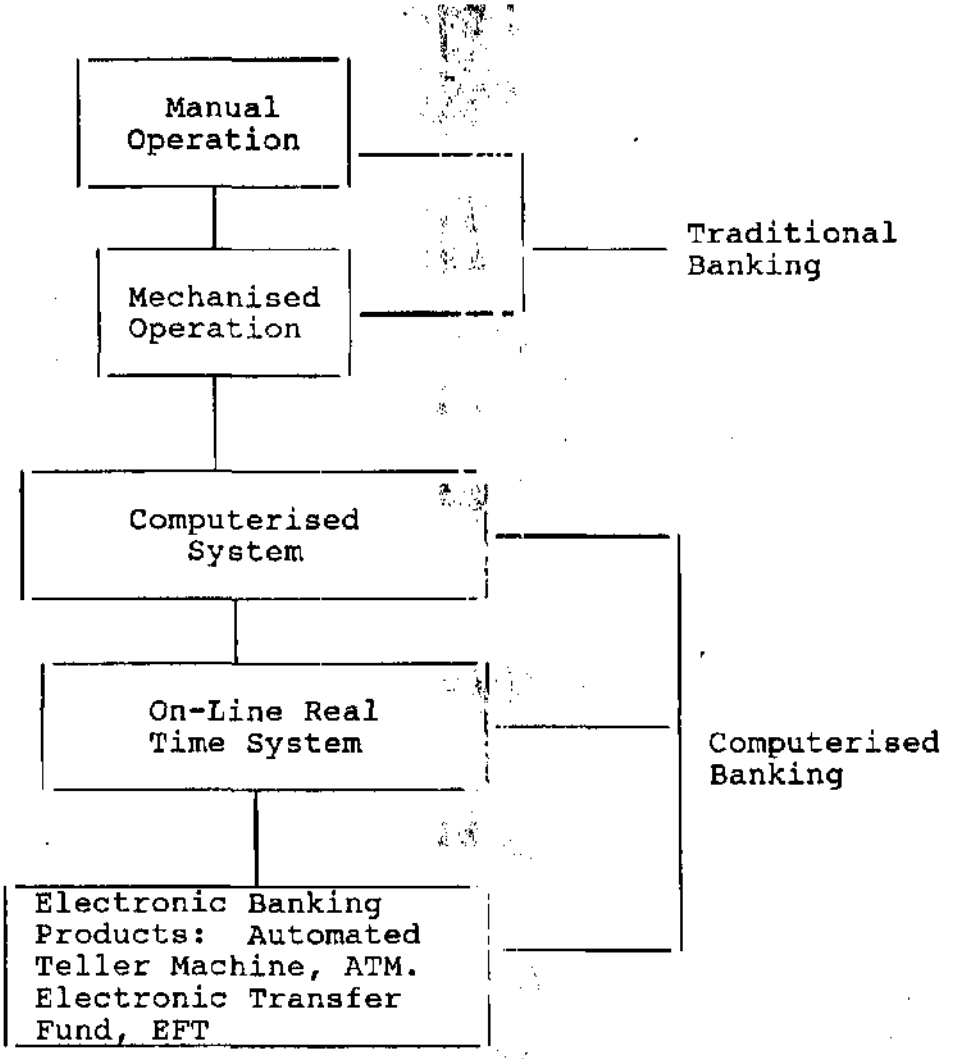
3.1 DEVELOPMENTS IN BANKS OPERATION:

Development in the banks operation has undergone some tremendous changes right from the time of inception, from the era of manual mechanical operation known as Traditional banking or "arm chair banking", to the era of computerised banking or sophisticated banking. Computerised banking is made up of different types of computerisation such as:

1) Batch System
2) On-Line System
3) Real Time system
4) Electronic Banking

A chart is drawn below to represent the format of both traditional and computerised banking operations.

Traditional and Computerised Accounting Procedures In The Banks Operation



3.2 Traditional Banking Operation

In the past banking services were crudely operated manually which characterised the banking transactions then. This happened without the aid of any machine or calculator. Hands were used to record every transaction which made it crude, slow and cumbersome. Later it graduated into a stage of mechanical operation which includes partially machine operated (adding machine), in the sense that apart from the posting of the ledger cards other transactions are manually calculated. Such as, interest on savings account, commission on turn over (COT), where interest is charged based on number of times a customer makes a withdrawal, interest on loans and overdraft O/D. Bank of the North, Zaria is characterised with this procedure where efforts were made to calculate every transaction one by one.

Manual data processing is limit by the speed of the human hand and eye. A human may introduce errors into the system through illness, boredom and carelessness.

Traditional banking equally known as "Arm Chair Banking" creates monopoly power or inefficiency in the sense that little or no conscious efforts were made to improve on the customer services. Then banks usually depend on government deposits or patronage who Maintain their operational account with the banks unlike now that government accounts with commercial banks are closed.

Banks have traditionally provide some services to the personal, corporate customers in Nigeria, prior to the advent of the structural adjustment programme (SAP) in 1986. Deposits come easy and there was no serious competition. Banks operation were not under much pressure. The banks were either lending or accepting deposits, and document bills for collection.

In mobilising deposits attention was given to hard core savers like the corporate customers and the government since they rely on their patronage. This not withstanding, depositors were made to stay helplessly on the counter for hours, only to be attended by impolite bank cashier.

Cashing of cheques was not anything better, for customers had to sit for long hours to cash their cheques. The traditional banking rely mostly on human labour to perform the routine jobs that tend to consume the typical Nigeria banker's time from the time the customer comes to the banking hall presents a cheque to the counter, the messenger collects it, take to the appropriate officers for checkings and signatures. By the time they finish these a customer spends 3 to 4 hours cashing may be =N=300.00. This makes traditional banking service to be of poor quality. A standard time of thirty minutes for a customer to be attended to at the bank is recommended especially in relation to the withdrawal and deposit function.

The security checks that were put in place by the traditional commercial banks were simply cumbersome and clumsy procedures which was done under the pretext of preventing frauds. By and large this have contributed to the congestions usually witnessed at the banks' counter. Ironically this clumsy situation have not helped to reduce the incidence of frauds that constitute the greatest headache confronting bank management.

In money transfer, funds were transferred locally through bank cheques and bankers payments, and out side a clearing area through bank draft. mail transfer or telegraphic transfers. Experience has shown that customers holding bank drafts have difficulties in cashing them at the drawee branch. In most cases this instrument may not be honoured and returned uncashed.

Apart from spending considerable length of time at the counter, bank customers have had to contend with inefficiencies in varying degrees such as wrong posting in statements of accounts and unbelievable arithmetic errors in cash paid and receive over the counter. Deduction from this would mean that the more customers stay over the counter, the more errors are made by bank officials.

In order to eliminate drudgeries of manual operation, reduce waiting time of customers, bring speed, accuracy, flexibility, efficiency and productivity in banking services, automation of banking operations was introduced.

3.3 Computerised Banking Or Sophisticated Banking

Computerisation is eliminating the manual operation through the use of computer based accounting system.

SAP has brought to an end the kind of arm chair banking services rendered by the first generation of banks. It is a fact of economic life anywhere in the world that once a few dominated the market monopoly power and efficiency developed. No human makes conscious effort to improve or change for the better service. In the new competitive environment, however, organisations driven by survival instincts are forced to respond to threats in the environment. It would appear that the more banks are licensed, the more the threats posed to existing ones and the more aggressive are the marketing techniques adopted by them which is the major objective of Structural Adjustment Programme (SAP). The new banks, responding to the changes in the market are out aggressively to change the face of bank service delivery.

As number of banks in the country increases competition stiffened, at present the number of banks as at 1991 has risen to 125 as opposed to 40 in 1985.

As CBN and government imposed some strict measures on the commercial banks they have to wage war for survival.

Right now, the government has closed their accounts from commercial banks and transfer both their capital account and operation account to Central Bank of Nigeria (CBN). The directive was given to the parastatals by their government.

The purpose is to control the governments' funds. So right now every detail comes from the capital A/C of CBN e.g. salaries, projects and contracts etc.

So for banks to survive they must innovate or be consumed by the technological realities of the present times that characterised competition.

Banks go out to look for deposits drive in order to improve their liquidity ratio or position since there is frequent excess liquidity mopping by CBN in order to control the economy through issuance of securities.

CBN directs the commercial banks to give high interest rate in order to attract more deposits so that cash flow or the money in circulation can be mopped or minimise. High interest rate on loans and advances to discourage public from getting more loans from banks. All banks in order to be efficient try to improve on their services which heightened competition hence they try to undo new banks.

Computerisation is made up of different stages and the researcher will in turn discuss them one after the other.

3.31 Batch Process

Batch processing gathers transactions and saves them for processing all at once. A bank for example might process all of the deposits and withdrawals for the day after the close of business.

That way, all of the routine updating of depositors accounts is done at once. As a consequence, the status of each account is ordinarily one day behind. This is a part of computerised banking that has not gone network. This system is more sophisticated than manual operation. This is why waiting time of customers have not improved (batch process).

UBA operates in batch process systems whereby all the jobs done in the branches are stored, copied in a disk pack for processing in the mainframe located at Headquarters terminal Raymond House, 5th Floor.

The processing will be done in form of output (print out). All these print outs will be returned to the branch first thing in the morning after all the customers having operations for that night have been updated. The cashiers will then use the print out to pay whenever the customers come to withdraw, by checking the balances and block in front of the customers balance by way of writing the amount withdrawn.

3.32 **ON-LINE** (First Bank PLC)

This is a system whereby other branches/banks are linked up with telecommunication system (network) that a customer can withdraw/cash his cheques in any branch of his choice. First Bank PLC, has graduated to this stage.

On-Line is a one way communication between operators at the CPU and terminals. An on-line system is not always a real-time (immediately inquiry-response) system, but real-time system must have On-Line capability and equipment.

3.33 **Real Time Processing**

However real time processing immediately now. Transactions are processed as they occur immediately. The processing of data in a sufficiently rapid manner so that the results of the processing are available in time or influences the current activity or process being monitored, the transactions are able to be retrieved from the master file as they happen and information is obtained from the system on demand.

Requirement. Real Time processing requires dual purpose input output devices, such as terminal and VDUs.

The communication front end is necessary to interface lines connecting remote terminals to the CPU. It is useful in specialised applications and in a situation where time is critical factor like in banks and the processing is on demand.

Thus the Electronic Transfer Fund (ETF), updates checking accounts at the moment of purchase so that the accounts are always current. (Airline seat reservation systems are the oldest example of real time transaction processing having been operational system since the introduction of American Airlines SABRE System in the late 50s).

3.34 ELECTRONIC BANKING

Electronic Banking is a kind of banking that involves electronic form of money transmission. In this respect Banking services are fully automated such that transactions are concluded instantaneously (jiffy).

This involves the use of computer network in dispensing cash and transfer of funds. Electronic banking is a natural fall out of the intense competition going on in the market, which is brought about by the efforts of banks to introduce automation into banking services.

The primary objective is to replace the intensive labour operations and thus reduce the waiting time of customers. For the moment in Nigeria the electronic banking products are limited to Automatic Teller Machine (ATM), and Electronic fund Transfer. Some of electronic device can also be treated such MICR - Magnetic Ink Character Recognition and Electronic Card products. Electronic banking came into Nigeria scene in the 90s while it came to British banking scene in the late 60s.

Societe Generale Bank launched their first automatic teller machine in November 1990 at Lagos while First Bank follow suit in December 1991.

The emergency of electronic banking products brings to an end the era of labourious banking.

a) **Electronic Banking Customers:**

Electronic Banking discriminates the kind of bank customers to deal with the selection eliminates the illiterate customers and literate customers who are not too sophisticated in banking matters and considers educated and sophisticated customers.

(i) **Illiterate Customers**

They depend largely on bank staff to do a lot of things for them, some of which technically speaking are illegal. In most cases most of them cannot write their names, rather their finger-print impressions on banks instrument like cheques and other bills of exchange.

(ii) **Literate Customers**

These are other category of customers though literate but not sophisticated enough as to transact in financial matters. This is because these category of customers do not keep accurate records of their banking transactions.

They are in the habit of arguing over the accuracy of their bank balances. Banks must also keep these category of customers of electronic banking, otherwise, the bank may be exposing itself to a lot of dangers of over debits emanating from the use of automated Teller Machine, ATM, or debit cards.

(iii) **Educated and sophisticated customers**

Electronic banking products ATM, and ETF are now directed to the above category of customers. These group of customers could be individuals or corporate bodies. This is because it is them that can understand the intricacies involved. Banks need to exercise due care and diligence in dealing with them too. This is because since many of them are literates in both financial and legal matters, they often resort to legal action whenever an inquiry is sustained. In such a situation, a trained banker is expected to know what to do when dealing with such category of people. The modern customer being educated and sophisticated can easily point to a bank the errors made; he will even go ahead citing the relevant statute to buttress his point. So a banker need to be well groomed. The modern customer has the money and is aware of trends in the money market, capital market and other alternative investment outlets. He is in a hurry to conclude his business, since to him time is money.

There is the need to provide facilities which will reduce his waiting time at the counter.

Individual customers are interested in banks facilities which will enable them cash their money as quickly as possible and have ready access to some form of credit. Demands of corporate customers extend far beyond the point.

They need cash management advice; cash flow forecasting, and global import and export service that will replace today's time consuming document encumbered system. Both group of customers desire faster and safer means of transferring funds.

Since customers can no longer stand the nauseating waiting time of the past, banks that have the financial muscle had to introduce expensive electronic banking products which a kind of 'Do-It-Yourself' banking.

3.3.5 AUTOMATED TELLER MACHINE (ATM)

(Improvement on banking services)

ATM is an automated cash dispensing machine designed to enable customers enjoy banking services without coming into contact with Bank Tellers (Cashiers). It eliminates personal contacts with the Cashiers. The machine itself performs the traditional functions reserved for bank cashiers and other counter staff.

It is electronically operated and as such response to a request by a customer is done instantly. Its introduction into the market heralds a movement towards self service banking.

The ATMs are very friendly to users. Users are welcome to the machine with voice instructions that lead him to each stage of operations.

Different languages can be programmed into the ATM and the machine will know in which language to address a customer through the magnetic stripes on the customers card.

For example each of the machines will welcome a customer with "Good Morning, you are welcome to `FIRST CASH'. Thereafter it tells the customer what to do.

First Bank's ATMs are located in six of the banks branches in Lagos and the trade name in "FIRST CASH". First Cash is a trade name of ATM services offered by First Bank of Nigeria PLC.

Access to ATM is through the use of personal identification number, PIN, and a plastic card or First Cash Card issued by the bank that contains magnetic strips with which the customer is identified. PIN is a random number generated by the computer for individual card-holder. Both the personal identification number and first cash card works hand in hand.

One does not work in isolation. A customer should hold both of them together during transaction. Banks especially First Bank PLC usually hand over the PIN to the customers personally instructed not to disclose number to a third party. On receipt of the PIN Mailer you should endeavour to memorise your number, it should not be written down or disclosed to any person. No one knows your PERSONAL IDENTIFICATION NUMBER (PIN), not even the bank.

Where you consider it appropriate, you can change your PIN through the Automated Teller Machine, by selecting PIN change option. If you have forgotten your PIN, you should return to your branch for replacement at a cost which will be one quarter of the joining fee ruling at that time.

ATM card is about the size of normal credit card and apart from the need to ensure safety, its surface strips would be mutilated. If it is mutilated, the machine many reject the card even where correct identification number had been inserted.

Practically, the first step to take when you want to avail yourself of the use of ATM is to insert your card and thereafter your personal identification number. If the information on the card as contained in the magnetic strip agree with the personal identification number, the customer can select the service option he requires.

Assuming that a customer wants to make a withdrawal, he instructs the machine with the voice module by pressing the "Withdrawal" key; again he presses the number keys for the amount of money required (say =N=250.00 since the ATM in Nigeria is programmed for =N=500.00 the limit approved for customer is 7 days cycle, if you have a limit of five hundred Naira, and your card was used initially on Monday, you will be able to withdraw as many times as you wish between Monday and Sunday (7 days) up to the five hundred Naira limit approved for you).

ATM in Nigeria is not programmed to accept or dispense coins and currencies of small denominations. In First Bank the minimum denominations that a customer can withdraw from the machine is =N=20 and =N=10 notes.

If for example a machine is programmed to dispense only N20 and N10, it will be unwise to ask the machine for a withdrawal of N55; automatically, the machine will reject the instruction and tell the customer why it has done so. It is not enough to punch the amount you require, you need to do one thing that is common with all computer equipments, you need to press "ENTER" for ATM to work on your instructions. And it obeys what ever instruction given. As soon as you press the ENTER button, it will give you the courtesy by asking you to wait. "We are processing your transaction". In less than two minutes you would have withdrawn your cash. That is if you follow the appropriate procedure.

If the customer breached the procedure, or key in the wrong information, your card may be rejected but in almost all cases, the ATM will provides a reason for rejection. In other instances, where after inserting the card, the customer waste some time before inserting the number or where he insert the wrong number, his card may be seized. This implies that the machine is suspecting a fraudulent practice.

In a situation where a customer's card is seized, it can only be handed to the customer after making a report to the branch manager. It is therefore in the interest of the user (customer) to ensure that accurate information is fed into ATM.

Cash holders should never withdraw money from the ATM if there is no sufficient funds in their account. Such practice will cause the cash facility to be withdrawn without notice. Uncleared cheques are not ready for withdrawal until after the normal clearing period. ATM withdrawals should strictly be based on the outstanding clear balance.

In advanced countries ATM have been programmed to perform different kinds of functions of which the commonest amongst being savings/withdrawal, provision of balances of accounts and request for each balances.

In Nigeria, First Bank PLC and Societe Generale are the first to introduce ATM in the banking industry and their primary objective was to decongest the counter.

The following services are available on the Automated Teller Machine (ATM):

(i) Cash withdrawals

(ii) Cash and or cheque deposit

(iii) Statement of account request

(iv) Fund transfer

(v) Cheque book request

(vi) Bill payment (such as utility bill)

(vii) Confirmation of balance of account.

For now the only service available to consumers is cash withdrawal services by the First Bank. Both Banks (Societe Generale and First Bank PLC) performs only withdrawal services.

As time goes on First Bank PLC will introduce above services in phases and the customers will be advised as and when such services will be available to customers.

The benefits of First Cash Cards enjoy by cash holders in nutshell are:

(i) Instant cash withdrawal round the clock

(ii) Convenient banking hours

(iii) Savings in man-hour through elimination of waiting time for service over the counter.

(iv) Savings in the cost of buying cheque book especially with the introduction of MICR cheques.

ADVANTAGES OF ATM

The First Bank ATM, provides ample opportunity for the banks to give 24 hours service to customers thereby render weekend banking irrelevant. ATM is located outside the banking hall in order to serve this purpose or on off-site like hotels, airports and supermarkets.

ATM is equally cost effective because fewer staff will be required to deal with routine jobs.

Bank Customers can derive immense benefits from the use of ATM. In the first, most bank customers who spent hours in the queue waiting to be served are relieved with the use of Automated Teller Machine.

It is equally possible for user to have access to money at odd hours of the day or week without regard to bank's official hours of operation.

It minimise users losses due to theft or fire. This is because users do not keep large sums of money at home during week end and customers do not have to suffer from Cash Crunch when Bank Workers embark on strike action.

Simply because the operationals mechanism of ATM is so simple that Management Staff can perform the routine job of replenishing the stock of Naira Notes at periods when workers go on strike.

Disadvantage

One problem related to the use of the Automated Teller Machine is the question of multilated notes.

Mutilated notes cannot be fed into the machine. This means that branches with ATM machines must always have access to new currency notes. Apart form that, when dealing with ATM, the Customer does not have a choice with regard to the denomination in which his money is to be paid.

However, just as the historians believe that change is the essence in human history, a wise banker should either change or be consumed by the change. Tradition must give way to modern practice. It should be noted that the bulk of bank customers particularly in the cities where the machine are in use are people who have schooled and acquired high degree of banking culture. This group of customers will have no difficulty in adjusting to the new dispensation. But what about the illiterates with chain of businesses who are high networth individuals?

Educating them to meet the new challenge may be a bit difficult. Some of this affluent men constitute the life wires of branches located outside the city centres.

If bankers must retain the patronage of these people the ATMS and other electronic banking products should be restricted to the city centres where the sophisticated elites reside.

Computer fraud is common all over the world. A recent survey showed that in America, American banking system loses about $500 million due to computer frauds annually and that each fraud is anything near $500,000. The statistics underscore measures the magnitude of the problem, and therefore suggest that necessary instituted to forestall them.

The major obstacle facing electronic banking in Nigeria is the level of infrastructural facilities. Most of the electronic banking products depend mostly or wholly on efficient and uninterrupted power supply (UPS) and good communication network.

Our public utilities are not in any way reliable and that is, banks need to forge an alliance with government in order to provide some of the infrastructural facilities needed.

ELECTRONIC FUND TRANSFER (EFT)

This system allows a customer account to be credited electronically within 24 hours any where in the Country. Universal Trust bank of Nigeria is the only commercial bank that has introduced this product in its operation.

It is more suitable and cost effective way of transferring funds when compared with the traditional modes such as Mail Transfer, and Telegraphic Transfer. It is more secure and time is saved when money is transferred through Electronic Fund Transfer (EFT).

Usually, the Nigerian EFT uses the technology of FAX. Money is transferred electronically by the Bank through their branches or accredited agents nationwide.

AUTOMATED CHEQUE SORTER - MICR CHEQUES

Magnetic Ink Character Recognition is a device introduced by the Central Bank of Nigeria (CBN) in order to aid the sorting of cheques in branches and at the clearing houses. Each MICR Cheque will be coded by the bank which first receives it so as to make automatic handling through regular clearing easy. It is good that the machine is introduced now that the number of banks have grown at a very rapid rate. The technology will greatly enhance the performance of cheque handlers at the Central Bank and at each of the bank branches and their head offices.

It would have been difficult and time consuming for branches and head offices to sort cheques without the aid of Automatic Cheque Sorter. MICR Cheque has a code number at the bottom. These codes are captured by Automatic Sorter which are high speed machine capable of deciphering the codes.

A "Cheque Scanner" is the device in the machine that reads the magnetic code across the bottom of the MICR Cheque.

The objective is to make it possible for banks to sort cheques very rapidly and to transmit them as quickly as possible to the drawee bank.

MICR Cheque should not be folded or mutilated by the holder through smearing or folding.

The drawers should not allow their signatures to cross the code number otherwise Automatic Cheque Sorting will be made difficult.

It is imperative to note that an intensive public awareness has been made by Central Bank who mounted campaigns in the print and electronic media to educate the general public on the use of MICR Cheque.

3.4 BANKING SERVICES TO CUSTOMERS

Bank is a financial institution accepting deposit or saving from customers and make payment when required, gives financial aids to customers through loans and advances and technical advisers to corporate bodies.

Banking services are services rendered to customers by the bank, for example, such services are Savings/withdrawal, current Account and Loans.

A customer can be seen as someone who has one form of account relationship with banks which could either be for a short or long run.

When a customer enters a bank to transact business his first procedure is opening of Accounts. It could be either current Account or Savings withdrawal.

Current Account: For current account the following items are demanded from the customer such as:

1) Passport Photographs
2) Reference Letter from a customer either within or outside the Bank
3) Register Certificate
4) Letter from Employer for company worker and
5) Cheque book issuance
6) Signature Card for current Account holder.

3.4 **CURRENT ACCOUNT**

An account where deposits can be withdrawn by the use of a cheque. The type of current account depends on the documents and procedures for opening the account. Transaction is mainly done through paying cash or/and cheque and issuing cheques drawn on the account.

Cheque can be any instrument drawn on account by the account holder demanding payment from the bank. The transaction involves three person that is, the payee, or bearer, Drawer - owner of the account or account holder and finally the Drawee Bank. The bank on which the instrument is drawn. Banks also makes a draft payment which is equally a cheque payable on site.

The cheque consist of two types of cheques, they are, crossed cheque and uncrossed cheque. In the case of cross cheque, there are two types of crossing which are account payee only and account payee/not negotiable.

Crossed Cheque - Account Payee Only

The cheque can be endorsed to the third person or party and in a situation where the payee does not have account with the Drawer's bank say Bank of the North, the payee may decide to pay it to her bank say UBA or endorse to third party a customer of BON who would then pay to the payee on withdrawal form the third party's Account (BON).

Account Payee - Not Negotiable

This is not endorsed to the third party. It is only paid to the person his name appear on the cheque. For account payee not negotiable he wants to be sure that his cash gets to the right person he wants to pay.

Credit balance outstanding on current account are referred to as demand deposits or current deposits because the balances are repayable to the customer on demand.

A customer may be granted overdraft facility that is, he may be permitted to draw cheque up to an agreed figure beyond the amount standing to the credit of his account.

Interest is charged on daily basis on amounts overdrawn. Commission on turn over is usually charged on services rendered, whether in credit or debit and it is calculated in accordance with banker's tariff on the debit turnover.

Customer's mandate terminates with the death of the customer. Further debit transactions are stopped until the executor/ Administrator (court) comes forward. 4% interest is charged on current account.

Some banks charge (=N=1.00 one Naira per cheque leaf which consist twenty-five leaves for the cash book. While some banks can charge may be 25K, salary accounts are free in other banks, while in others they charge commission on salary accounts.

3·42 **Savings Account**

This is an account maintain by bank customers for precautionary purposes. These are used to solve unforseen problems that might arise doing the raining day. Savings account take almost the same procedure like current account but not as sophisticated as the C/A protocols. The following are demand by a customers who wants to transacts business in the bank concerning savings.

i) Passport Photograph just like Account above

ii) Signature Card

iii) Savings withdrawal/Deposit forms

iv) Savings ID Card.

On presentation of the withdrawal booklet with saving identity card the customer can be paid off a certain sum within the power of the cashier (=N=500.00) without reference to the officer in charge.

3·43 **Loans & Advances**

Commercial banks finance any type of viable projects and all types of loans as provided in the second schedule of Central Bank of Nigeria (CBN) is being guaranteed by the Bank.

For instance each branch of Bank of the North fill a form and at the end of the month the forms will be sent to the head office which will in turn consolidate and send to CBN at the end of each month. CBN return for the month as submitted by the Bank of the North tell the true position of types of loans and advances granted by the bank for that month.

The purpose of the sectorial allocation of the loans is in order for the government to develop all sectors of the economy so that no section is left untouched. This sectorial allocations is being directed by the CBN to all banks according to their liquidity position. The Central bank after knowing the liquidity position of BON probably N50 million, the CBN will then authorise the bank that certain percentage should be given to each sector, for instance, Mining Quarry, Agriculture and Industry etc.

If the Commercial bank (BON) now exceed the certain percentage directed to pay they will be fined for violating the order issued.

Presently the current feasible rate of interest is 29% on savings or deposits but with prime rate of 2% fixed interest arrange with CBN that they have agreed to charge the above percentage together with the current rate making 31% e.g. Bank of the North and UBA charge the rate.

For now CBN have directed commercial banks to give high interest rate on loans and advances in order to discourage public from getting more loans from the banks.

There is also prudential guideline introduced two years ago by the CBN to kind of bringing caution and sanction to the commercial banks that banks should not be charging interest on loans given to customers which have not be paid. That is continuous charge of interest as part of the profit is un-far while the capital have not be repaid. CBN says the system should be discontinued.

The guidelines imposed new and somewhat far-reaching requirements in the classification of risk assets and provision for bad and doubtful debts. The guideline compels banks to review their credit portfolios at least quarterly and provide an encompassing definition of credit to include advances, commercial paper, bill discounted, bankers acceptances, leases guarantees and other loss.

Assets are to be classified as performing and non performing depending on whether the principal and interest are paid within 90 days or not.

Non-performing assets are further classified into three:

Substandard if interest or minicipal is in arrears for 90 to 180 days

Doubtful, if interest or principal is in arrears for 180 days to 360 days and there are no perfected tangible security.

Lost if interest or principal is arrears for more than 360 days there is also no perfected tangible security.

The CBN wants the accounts of the loans not performing to be placed in suspense Account and not to be delayed as earning since it is unrealizable profit.

Before a loan is given to a customer to finance any project there must be security to back it up. Such as document bills to enable a customer ship his goods. All the transaction with regard to documents to clear the goods will be in the position of the customers bank. A letter of credit will then be sent to the local bank to the foreign bank in respect to the goods importing, Real Estate, Certificate of Occupancy on the developed or non developed land can be issued as a security to the bank in order to enable the bank issue loans. Corporate and government securities, equipment and plant the factory, personal guarantee etc.

CONCLUSION

In conclusion, a survey of three commercial banks were made which operate different operations, such as Traditional Banking or manual operation of Bank of the North Limited, Zaria.

Computerised batch process of United Bank for Africa PLC, On-Line-Real-Time advanced banking with network system, and electronic banking products such as automated teller machine ATM and Electronic Fund Transfer (EFT) of First Bank Plc to eliminate waiting time.

Improvements on customer services was necessary hence innovation of automation to embraced by banks who has the financial muscle to install automation.

This brought intense competition as number of banks increased due to the Structural Adjustment Programme (SAP) introduced in 1986, and de-regulation made banks go all out to look for deposit drive from customers, both individual and corporate customers, thereby creating an avenue to reduce queue and waiting time of customers in the Banking hall.

Finally services to customers such as loans, Current A/C (demand deposit) and Savings/Withdrawals were adequately taken care of.

CHAPTER FOUR

USES AND LIMITATIONS

4.0 Introduction:

Performance of UBA prior to computerisation was very slow compared to the present situation. Both head office and branches were using accounting system manually to perform operations.

Payroll were done manually and numerous problems were encountered with the Staff Strength of 5,000 to prepare payroll and it was only 70 branches then.

The type of operation the bank adopted then posed numerous problems for their transaction.

According to survey reports the initial problems encountered were as follows:

I) Inadequate information subject to human errors

II) Fatigue (tiredness) or the job

III) Inaccurate calculation of interest and commission on turn over (COT)

IV) Delays in customer services and monthly statement of Accounts.

V) It creates an open gate to fraud because a ledger card can easily be manipulated by a fraudulent person.

As banking operation becomes more sophisticated, there was the need to innovate in order to improve quality of service, competition, change, reduction in operating cost, profitability, efficiency, staff development, speed and eliminate obsolence of accounting machine. Computerisation was then the answer.

4.1 COMPUTER APPLICATION IN UNITED BANK FOR AFRICA (UBA) PLC AND ITS USES

Computerisation in UBA PLC started in earnest in 1976 with Mainframe to computer payroll. The philosophy adopted was that of centralisation of computer services being the best alternative, as at that time, in view of available infrastuctural facilities computer hardware and software resources. Seven branches were initially computerised at Lagos.

In the year 1992, all urban branches were computerised, with exception of rural areas which was as a result of infrastructure. All efforts were concentrated on Payroll/Personal Share Registrations, Inter Branch Accounting Systems, and computerisation of branches in Lagos Banking Sector with a centralised Branch Accounting System (BI) due to proximity.

UBA have four different Computer applications for the banking operations.

They are namely:

1. Branch Accounting System, BI
2. MICRO Banking Operation Support System - MICRO BOSS.
3. PEAT BANKER and
4. BRAINS - Branch Accounting Information System

4.1.1 BRANCH ACCOUNTING SYSTEM - BI

B1, Branch Accounting System, is a batch processing banking Application developed by a French Consulting firm which has been in use since 1984. This application is found in most branches in Lagos area of the Bank. International Business Machine (IBM) 370, was the first application system later used for the Branch Accounting System.

With centralised system, computing power is usually concentrated in a well equipped Main-Frame Computer generally known as Data (Information) Processing Centre. This centre is currently located on the 5th Floor of Raymond House, Head Office Building in Lagos.

The centre comprise of Computer Operation Division (COD) and Computer System Division (CSD) of the 5th Floor.

The centre is well equipped with IBM 434` and 4381 Mainframe computers and peripherals which consist of magnetic tape drives and disks drives.

Also at the centre a PDP 11/34 Mini computer configuration, data are either captured at the source (branch) or sent to a central capturing unit. The captured data are usually recorded on Computer input media (files - tapes, diskettes, disks, cassettes etc), or are either transmitted via communication lines or physically delivered to the main centre for further processing. It is either processed during day, over night or when ever required.

Branch Accounting System, BI, in use in Lagos, UBA PLC, Banking sector, data, such as banking accounting entries and administrative information are captured or collected after a days job through the disk packs by the branches concerned in Lagos and are processed at the centre processing Unit.

The captured data by the branches on DPD 11/24 Mini Computer configuration installed are in each branch. Each branch sends its data file (recorded on disks) to Head office at close of business for overnight processing and collect reports (print outs) early in the morning of the next work day. While Mini Computers are presently used at Lagos Area.

Mainframe and Mini Computers have the following advantage over Micro Computer:

1) Mainframes are bulky which has a greater file storage, and memory capacity and can cope with all the largest data processing problems. Both of them are useful for the banks batch processing, branch Accounting System.

2) Mini Computer is the medium version of Mainframe

3) They are both expensive than the Micro Computer but the most expensive is the Mainframe. Mini Computer system Software is Comparable to that found on Mainframe.

4) It has high performance and ability to readily integral into already existing system.

Mainframe and Mini Computer have some short comings. When installing Mainframes you need to prepare the site provide for a large space and ensure that the environment is dust-proof and condusive enough; and ensure a specified temperature level. This type of Computers are only in banks where large data are processed and other big establishment.

2 **MICRO BANKING OPERATION SYSTEM SUPPORT - MICROBOSS**

MICRO BOSS also a branch processing banking application is in branches outside Lagos known as up-country and Micro Computer is widely in use of up-Country.

MICROBOSS was developed by Staff of UBA, it runs on MICRO Computer and has been in use since 1987.

With the evolution of Micro Computing Powers, impressive storage capacities, interactive facilities, economic space requirement for physical installation of equipment coupled with the availability of these equipment, and in keeping with the banks objective on efficiency, quality of service etc.

The Computer operation Divisions (CODs) adopted a decentralisation philosophy in computerising branches.

The MICROBOSS is a decentralised batch processing. This is the use of data processing facilities at individual locations on a stand-alone basis without the need to use centralised computing facilities.

More computing powers are obtained at source, processed at source and output (reports, print outs etc).

The Computer systems Division in October 1986 Commenced the design and development of UBA Banking package to operate on MICRO Computers in conjunction with organisation and methods Department and Inspection Division.

The package was implemented under the name UBA MICRO Banking operation Support Systems (MICROBOSS) revolutionised the computerisation of distant branches.

Between 19 January and May, 1986, Abeokuta Branch was used for the pilot test of MICRO BOSS version 1.00 for non-savings customers account (C/A Deposit Loans) and Impersonal Account.

As at end of December 1987, twenty urban and states capital branches of the states Banking Sector were computerised and placed on MICROBOSS Version 1.10 (with enhanced security Controls). Between mid June 1988 and end of July 1988, MICRO BOSS Version 2.10 which incorporates the statement savings was fully tested.

MICRO BOSS incorporate the Foreign Currency Domiciliary Accounts (FCDA) facilities for flexible prime interest Rate management and Activity Log System.

Prime Interest rates management was implemented nation wide in December 1989 and January 1990.

Version 3 is the current version of MICROBOSS in branches which has system support utilities for Diskette formatting at branch level. As at now, about eighty branches are enjoying the services of MICRO BOSS both current and savings.

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Advantages of Micro Computer

Advantages of Micro Computers includes:

a) Not exorbitant

b) Cheap Software packages arising out of the large volume of sales.

c) Just plug into the nearest main socket.

d) User-friendly "menu driven program" means that there is no need to employ specialist staff, the computer can be operated by general clerical staff.

e) Bring EDP (Electronic Data Processing) within the budget of even the very smallest organisations.

f) Allows a large organisation to implement distributed processing within each department possessing its own Independent processing facilities.

Disadvantages of Micro Computer

Disadvantages of Micro Computer includes:

a) Limited file store and memory capacity.

b) Smaller systems often lack language other than Basic.

c) Purchased software is often of poor quality.

d) Too often purchased by non-specialist who are too easily convinced by Sales men.

e) Can lead to several departments duplicating the same procedure.

3. **PEAT BANKERS**

It is punched by package On-Line-Batch processing in use at the Corporate branch of the bank. Since 1989 Peat Banker involves processing at branch level.

It is pertinent to know that data input and output can be transmitted to and from the main computer centre via communication lines (On-Line facilities). This is the communication of information from an information source to an information destination as a basis of control and decision making. The way data or information is communicated is very diverse and dependent upon circumstances.

The readers will quite agree with the researcher that Nigeria Communication facilities as at today cannot effectively support an efficient banking data (Information) transmission System.

4. **BRAINS**

Brains - Branch Accounting Information System. This is developed by the bank staff in-house, modern On-line Real time banking application. Pilot implementation done in one branch with a plan to generalise to all branches of the bank, shall replace all other banking applications.

For more efficient and satisfaction of customer UBA is on the process of using network system in a bank's branch at Victoria Island and this system is later to be introduced to other branches.

An On-Line and Real Time Banking is now being developed. This type of system operates on the basis of conversational or interactive processing. A control system which most be capable of responding to events as they occur in order to optimise the operating efficiency to which it relates.

2 MICRO BOSS DECENTRALISED BANKING COMPUTER APPLICATION UNDERSTUDY

All Operations of the MICRO BOSS are performed in the Branch, a decentralised banking computer application.

The UBA MICROBOSS Operates in batch mode and eliminates the use of ledger cards and accounting waste machines for all customer and impersonal (general ledger) accounts with in-built features that provides security, flexibility and-ease - of use to assist the branch improve productivity accuracy, speed, customer service and effective daily book keeping. The facilities provided are compatible with BI Accounting and reporting System being used in Lagos Banking Sector.

Installation

A minimum of two set of the Micro Computer is installed in a branch. One is the Master System (Ms) and the other is the Data Collection System (DCS).

The MS is the Main intelligent system of a branch which keeps all customer and impersonal records, performs daily book keeping and produces all administrative and accounting reports other features include automated interest calculation and its application, COT calculation and its application and the printing of customer statements.

The DCS is used to capture daily accounting entries. At the end of the day's job or end of a shift the transactions would be copied to diskettes. The number of DCS configurations to be installed in a branch depends on the volume of daily transaction.

Also, two (2) fast printers will be provided. One for daily printing of reports, while the other serves a back up printer.

One (1) Uninterruptible Power Supply (UPS) Unit is installed in the branch. Its main function is to hold power supply to the systems up to about 15 minutes when ever there is power failure and also serve as a stabiliser. Therefore, all systems must be connected to UPS Lines. However, the UPS must not be over-loaded.

MICRO BOSS Applications are grouped into 5 sub system such as:

(A) **ACCOUNTING DATA CAPTURE**

i) Captures daily vouchers

ii) Print Journals of captured on entries (Per DCS)

iii) Copies captured accounting transactions form the hard disk to diskettes for subsequent merging.

(B) **SUPERVISOR**

Administrative update facilities such as opening, closing, amendment of an impersonal account.

* Delete previous accounting transactions form the hard disk prior to daily capture or beginning of another shift.
* Updates Tables of Bank and Transactions codes
* System Information Management for Accounting Data and Password Codes
* End of Day processing activities involves merging transaction diskettes capture for accounting day, update customers an impersonal master files with daily transaction (posting), print outs (daily, monthly, quarterly or on request etc)

C) **INTEREST AND COT**

Interest and Commission on Turnover (COT) are calculated on current account calculation

i) (C/A Interest calculation

ii) C/A Interest Application

iii) Savings Interest Calculation

iv) Savings Interest Application

v) COT Calculation and

vi) COT Application

The above two applications are to be explained in details such as savings interest and COT calculation and application.

iii) **Savings Interest and Application**

The calculation is to be effected after the 15th day of every month, managers, there after, authorises the system to apply the calculated interest.

MICRO BOSS allows the officer a month of grace to conclude interest calculation after due date.

iv) **COT Calculation and Application**

The procedure is the same with that of interest calculation and application above.

COT is also maintained as a monthly function and can only be effected as from the 26th day of the month. The System allows the staff a month of grace to conclude COT Calculation and Application. This implies that the COT month is 26th of the previous month of the current month. COT is concluded on or before the last accounting date of the month.

D) **DAILY BACK UP**

The number of diskettes to be used for daily back up depends on the size of file on hard disk and type or size of diskettes used. Backs up the system's master files at each day's job/processing form the hard disk to diskettes.

However to protect a branch from Loss of information and for an immediate and effective recovery if need be, the operator must ensure that specific Back-Up of his Master files are effected daily, keep the Computer room clean and free of dust always and handle diskettes and equipment with care.

E) **RESTORE**

Restoration of back up files as a recovery/reprocessing measure. Information that had been kept on back up diskettes can be stored to the master system.

F) **SYSTEM SUPPORT UTILITY**

This allows formatting of diskettes on the branches system. It can be invoked through the exit routine of the MICRO BOSS System.

When the MS is used as a DCS, transactions captured must be copied to diskettes for subsequent End of day processing starting with the merge process of the MS. However, to use The DCS facilities of the MS, Branch must obtain approval from the Chief Inspector.

4.3 IMPACT OF COMPUTER

Managerial Benefit

The primary role of top managers lie in formulating policies, planning and guiding overall organisational strategy. Computer based systems have through the use of improved simulation techniques, on-line data bases, and Computer graphic terminal, helped remove some of the uncertainties from the usually unique and ill-structured problems that top executive face.

Electronic mail/message system may be used by the executive to reduce telephone interruptions, improve the dissemination of the messages to subordinates, and reduce the time required for schedule meeting through the use of computerised confering techniques.

More accurate and timely information supplied by Message System (MS) has also given middle and lower level staff the opportunity to spend more time identifying problems, recognising opportunities and planning alternative course of action.

It reduces work load, because jobs are broken down into smaller units and also makes banking interesting to work with.

It improves the condition of service of banking staff since UBA PLC, uses Print outs batch process system to process the captured datas at the end of a day's job at the main centre where the computer experts work round the clock, while the non-computer staff close around 2 or 3 p.m. daily.

Elimination of dull and routine work . The duties of cashiers and other clerical employees have changed from routine, repetitive operations to more varied and appealing tasks through computer USAGE making their jobs more challenging, it also improved morale of personnel at work situation.

Finally it brings good return on investment to the organisation.

4-3 **Benefits to Customer Better Service**

Computerised banking process make possible the following:

It avoids delays of customers in the bank and reduce customer waiting time.

This idea brought about the introduction of computer for fastness, efficiency, effectiveness and accuracy to increase productivity.

It also involves the periodic training of bank staff and the employment of more hands.

Introduction of express cash delivery or service for both savings and current account holder and payment of cash on demand form a customer withdrawing large amount of money that may pose danger to the bank and customer.

The Customer is therefore given priority. People saving heavy sum of money like =N=10,000 or above are required to come in or given a note counter just to separate them from the smaller depositors or withdrawals. Small depositors are encouraged to operate savings account for pr cautionary purposes.

Olisambu, UBA PLC, Managing director and chief executive, believed that they must have some customers upon whom the bank can take risks in order to improve on customer service. When such customers come in, the bank should pay on the spot without verification of bank or signatures. After all banking is a matter of trust. You must as a manager show confidence for your staff will follow suit.

The bank do operate quick service with the aid of personal identity card. On presentation of the withdraw booklet with saving I.D. Card the customer can be paid off a certain sum within the power of cashier for example, =N=500.00 without any reference to the officer in charge.

Customers on withdrawal and savings deposit are enlightened of the customer awareness of implication of the banking systems and reconciliation of accounts before argument.

For quick transaction UBA Card special can be used to withdraw money from any branch of UBA throughout the Federation.

LOANS/OVERDRAFT

The bank gives financial assistance to the customer to augument working capital and other financial services with a repayment plan of 6 months, 1 year and 3 years since a bank is not a charitable organisation.

Overdraft facilities are given to customers in order to overdraw or draw more than his balance in terms of agreement, and this overdraft can be repaid at any time when there is fund.

For better services separate account are opened for corporate customers at branch in Breadfruit Street Lagos. This branch do not keep any other bodies account other than Corporate bodies who are heavy save in millions of Naira. The UBA staff are not eligible to operate accounts there but some where else at Marina West Branch.

More efficient control of transactions

Better record keeping

It gives them accurate information for retrieval.

4.3.2 CORPORATE CUSTOMERS

For efficiency and better Customer Service the bank discovered that the corporate customers who desire better service are not getting it from the bank. The UBA response time was very slow compared to that of the new banks according to the banks corporate customers.

They further recognised that the needs of corporate customers are different, the bank in turn recognised themselves in order to be the best the most profitable and the biggest.

The strategic way for more effective use of resources to take care of customers was specialisation. And the objective realised was the creation of corporate banking sector at the head office level to accommodate most of corporate customers with big corporate companies which =N=1000 million turn over or more per annum.

In order to improve response time you cannot expect a man from whom you make up to =N=40 million to queue behind 40 people from whom you do not even make =N=20,000.00. Such companies have the personal attention of the respective Executive Directors, Deputy General Manager and Assistant General Manager.

The Companies still maintain their accounts at their respective branches but where there is more complex transactions, they are given direct access to Head Office.

Finally as mentioned by Arthur Anderson the firm's consultancy firm, the objective of commercial and credit policy, corporate banking and retail banking was meant to correct some of the weaknesses of the past such as quality of UBA services profitability and productivity. Many branches are still showing losses even today.

4.3 BENEFITS FOR IMPROVED PRODUCTIVITY

The use of Computers in banks is with aim of improvement in productivity by:-

i) Limitation of paper volume and flow especially ledger cards
ii) Ability to service increasing transaction volumes
iii) Reduction of transaction recording
iv) Reduction of cost per transaction
v) Simplification and standardisation of documents and procedures
vi) Elimination of duplicate entries
vii) Automatic acquisition of accounting transaction and
viii) Reduction of general cost like personal mail, forms and so on.

4. BENEFITS OF GREATER EFFICIENCY

Use of Computers save time or make the use of time more efficiently instead of spending a lot of time, looking for Customer information such as names, addresses amount of deposits, withdrawals, loans taken/if any and countless other things worthy of retrieval, the user can simply enter the appropriate subject key or keys at the keyboard, and the information is retrieved in a second or two.

4.4 LIMITATIONS OF COMPUTER USUAGE

Computer usuage in United Bank for Africa Plc is under-utilized which is meant to facilitate banking services rendered to customers instantaneously. The Bank is confronted with numerous problems which hinders its efficiency on productivity. The following problems or limitations are responsible for the under utilization.

i) Lack of manpower (Software)
ii) Power Supply
iii) Poor infrastructure
iv) Maintenance of Equipment
v) Virus Infection
vi) Threats of losing jobs
vii) Lack of Stationery e.g. Papers etc.
viii) Brain Drain
ix) Computer fraud
x) Under staffed

For clearer understanding the major limitations of Computer will be explained in details by the researcher.

i) **LACK OF HUMAN RESOURCES**

Manpower (Software). The limitation of Computer usuage is mostly human factor.

If a staff understand his or her requirements, he can always get a computer hardware with appropriate softwares to perform his or her job. Limitations could be in terms of not getting the right skill to do a job and not having the machine (Hardware).

Actually during the cause of research the Company made a huge outlay on adequate Computers Machines (hardware) but the problem was mainly the manpower (Software).

UBA is understaffed with only staff strength of less than 9,000. Some areas are over-staffed while some are understaff like in Computer Section

ii) **POWER FAILURE**

Electricity Supply has been the greatest problem facing Computer to ease customer services. Power Supply - In this country is not steady. It fluctuates every now and then. the introduction of Uninterruptible Power Supply (UPS) to hold the program for some minutes is not enough.

This UPS, holds the power supply to the systems up to about 15 minutes whenever there is power failure. It also serves as a stabilizer. All system must be connected to UPS Lines.

iii) **ENVIRONMENT ERROR (POOR INFRASTRUCTURE)**

Computer equipment cannot perform well under bad infrastructures e.g. electricity and telephone. The site must be dust free environment. The air-condition is not for human beings in the rooms but for the machines. It generates a lot of heat and needs air-condition for it to perform if not the machine will be packed up.

Telephone lines are there also where a customer tries to get a line finds it difficult and this hinder transaction also.

iv) **MAINTENANCE OF EQUIPMENT**

UBA PLC has enough and adequate computers of all kinds namely MICRO , MINI, and Mainframes as already said.

In fact, the researcher could not believe it the first day a visit was made at Marina Branch of the bank. There was a head shoke on under-utilized Machines which were faulty and laying idle. When enquired the lack of spare parts and the System is very expensive to repair. One only imagines the number of man-hours lost because of this malfunctioning.

Lack of proper maintenance of the equipment can lead to under utilization of the system when they are put out of use for a long period. Thereby resulting to ineffective use of the equipment.

v) **VIRUS INFECTION**

Virus infection seen as an enemy to Computer Software that destroys the program (data and information gathered). Michelangel kind of virus is said to be the most dangerous one and a disk and data killer.

4.41 **THREAT OF LOSING JOB**

Is computer accepted by everybody in the society and bank workers in particular?

It is not generally accepted because of the `danger' the society (customers) and bankers foresee in it, the possibility that computer like many other of man's invention will become a threat to safety or privacy rather than asset. Loss of Job by thousands of workers and their families.

It is very surprising that most of the Computer experts the researcher interviewed did not see Computer as a threat to loss of job but rather than saw it as a tool to facilitate banking services if adequately utilized.

The fears are much on non-computer experts. According to them the fears are several and related to each other, but three major ones encompassed the lot.

1) The one that worries the columnists and commentators is that computer will host unemployment so intolerably that the free enterprise system will be unable to cope with the problem and that the Government will have to intervene on a massive scale.

2) The second fear is that Computer will eventually become so intelligent and even more creative that it will relegate, or most men, to a humiliating and inferior role in the organisation. Some feel that having machines do the brain work will demoralise and make slaves out of man. This notation is based on the fact that the Computer already can learn, can show purposeful behaviour, can sometimes act "creatively" or in a way its programmer does not expect it to, and on the probability that artificial intelligence research will improve enormously on all accounts.

3) The third fear is that the computer's ability to certain neat, clean decisions will beguile men into abdicating their obligation to make the important decision including moral and social ones.

Displacement occurs when jobs are eliminated as a result of technological charge or innovation. Some staff whose duties are structured and repetitive have found that those duties were programmed on Computers. The Computers have therefore taken over those duties and the need for as many staff to perform the reminder of the job has been reduced. In computerised banks like UBA PLC, and First Bank PLC, those who were not displaced found their job less challenging because although they retained the duties that require less judgement, their tasks that called for the skilled interpretation of System information were moved upward in the organisation.

4.2) COMPUTER FRAUD

The advent of Computers in the banking industry has however had its peculiar problems. Fraud and forgery which had hitherto been linked only to the Manual system have been found to occur in automated process. This usually manifest themselves in the form of Computer software fraud.

Computer as Garbage in garbage out (GIGO), what ever program given to Computer is what will execute. It is not human even though it has artificial intelligent.

Some fraudulent people are using the advantage in manipulating the computer to end up in defrauding the bank via inefficiency in supervision.

This lack of supervision results from illegal access to the computer system, unauthorized access to specific modules/functions within an application software, intentional alteration of data or the denial of service to authorised person.

Banks as well as customers lose money to the computer thief. For instance an operations officer at Wells Fargo, branch, bank in California, U.S.A. allegedly created bogus deposits at one branch office by using an inter-branch account settlement process to withdraw funds from a different branch. To keep the system from catching the manipulations, new fraudulent credits were created to cover withdrawals. The takeover a 2 year period exceeded 21 million US dollars.

In Nigeria, fraudulent customers might decide to open an account purposely to defraud a bank, in carefulness collusion with bank staff. For instance a customer having account at UBA paying a fraudulent cheque of UBN say N100,000.

In another more sizzling story of computer robber the chief teller at a Union Dime Savings Bank branch in New York City embezzled about 1.5 million US dollars from the bank's account. Hundred of legitimate accounts and then withdraw, false information was fed into the bank's computer so that when quarterly interest payments were due the legitimate account appeared intact.

What made this case unique was that all this was done by a person who did not have direct access to the computer. He was caught only when police investigated a gambling parlour and found that he was in the habit of placing large bets.

In short, it has been estimated that loses suffered by organisations as a result of fraud and embezzlement now exceed those caused by robbery loss, and minor thefts, and computer is the target in an increasing number of theft cases.

Brain Drain

There are brain drain of both key staff and middle management in UBA. The staff exit was due to lack of motivation, long period between promotions. Those who leave the organisation are attracted by better offer than that of UBA, more challenging jobs and responsibilities.

Lost of staff is not healthy for an organisation due to expensive training given to such staff but the management of UBA is of the opinion that brain-drain do not affect them. In 1989, 63 staff out of 8,400 left the bank out of their own volition seems to be insignificant to the management.

4.5 EVALUATION BETWEEN MECHANISED OPERATIONS AND COMPUTERISED OPERATIONS

(a) Mechanised Operation

(1) In mechanised method posting is done mechanically and the duration is delayed.

(2) The trial balance is done manually and weekly and takes a duration of 1 - 2 days.

(3) Interest calculation is manual and last for a period of one to two days.

(4) Interest application is manual and last for a period of one to two days. The same application is done for the commission on turnover COT, and commission on turnover calculation.

(5) Statement on request is manually typed and delayed for some minutes.

(b) Computerised Operation

(1) Posting is daily and automated for a duration of 20 minutes.

(2) Trial balance calculation is daily and automated.

(3) Interest calculation automated and duration is 15 mins.

(4) Interest application is automated and it takes the duration of 10 mins.

(5) Commission on turnover calculation is automated and takes a duration of 15 minutes.

(6) Statement on request is automated and takes 5 seconds

Automated service is fast and more accurate than the manual operation as can be seen from the high lights of some of the operations.

The conclusion therefore is that banking services of UBA before computerisation was nothing to write home about because of its slow and cumbersome nature.

After automation there was improvement on customer services and the workers can close quick and have time to think of other corporate plannings. The computer application in UBA is both centralised and decentralised system. The (BI) Branch accounting system is centralised batch process where data are captured at the end of the day's job and the computer print outs are brought to the branches at the beginning of the day.

The decentralised MICRO BOSS banking operation system support is an in-house application package designed by the staff of UBA to assist distant branches that are up-country and automated.

The problems facing the computer equipment which hinders its efficiency and productivity is tackled. The benefits of computer application has brought to the customers are also highlighted. Including the evaluation of manually operated system and computerised system.

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATION

5.1 THE PROSPECT OF COMPUTERISATION IN THE BANKING SERVICES

The prospect of computer is very bright and high as economic climate becomes more sophisticated, most bank and financial houses are getting computerised:

(a) Computerisation will facilitate speed and accuracy in all banking services.

(b) Easy transaction of businesses in all banking sectors. Easy transmission of funds from one point to another.

(c) Customer services will be improved generally in the banking world

d) With computer the cashier is able to have easy recognition of customer's signature coupled with quick regular balance of his account and quick service.

e) Elimination of over time by the use of automation will result in high profit for the bank.

f) With the better working tool and the early closure by staff the bank will pay less expenses on medical treatment thereby enhance productivity.

5.2 SUMMARY

In the past the accounting procedure were manually operated with the use of ledger cards and pass books but now automation of banking services have replaced the manual or mechanical operations.

Banking services have improved to an appreciable extent, reduced waiting time of customers for cashing a minimum sum of N350.00 in the banking hall. Due to influx of banks in the country there was an intense competition from both new and old banks going on in the country. The new banks try to undo the old banks in their accurate and timely services to the customers. Banks with strong financial muscle struggle to automate in order to bet their competitors in the market.

Chapter two trys to give an in-depth knowledge of computer historical background right from the time of abacus era when mechanical calculator capable of calculations the basic arithmetic operations, addition, subtraction, multiplication and division.

Paschal Blaise Adding Machine, Charles Babbage an Englishman bestowed the "Grandfather of electronic computer" due to his contribution in difference and analytical engineer. Computer generation was included there too.

The views of various writers concerning the recent computer development were high lighted and the major proponents were acknowledged.

Computer system software and hardware which consists of the manpower software program and the hardware which is physical equipment were looked into. These two systems make up the core of computer of which one cannot operate in isolation. With software, hardware is useless vice versa.

Computer classification known as the Micro, Mini and Mainfarmes used to process the datas to an information were touched including the management information system which disseminate appropriate information to various departments through computer based accounting system.

Three commercial banks were studied as said earlier in order to compare the effectiveness of computer usage. Manual operation without the use of computer, bank of the North computerised operation batch process UBA PLC and electronic banking First Bank PLC - Lagos.

The development of banking operation was grouped into two traditional banking and computer based system. Computerised system made up of batch process, On-line, Real Time Network

system and electronic banking. Electronic banking products automated Teller machine and Electronic Funds Transfer cannot operate without network. Insert a card on the ATM machine, where a voice module would speak to one please enter your Personal Identification Number. The instruction on the screen will indicate to you the next transaction button you will press.

If the PIN is entered incorrectly Re-Enter number and press enter or press cancel key to get the card back. The number is secret to the a/c holder.

When correct numbers are entered, it would print select transaction on the screen either receive money, make a deposit or make a transfer etc. Buttons are close to each transaction you intend to press for your selection e.g. Where is the money coming from? Savings, press the button in front of savings it will give you how much you would want to receive, such as, how much would you like to receive, N100 or N75.

If the amount you want is not there you have to obey the instruction and press the button beside some other amount you want will appear on the screen.

The six step - enter amount on the keyboard, press enter key. Amount entered must be divisible by N5.00. Enter the amount N250 if it is okay by you, you press clear and input the amount you want.

When you enter the amount that exceeds what is programmed the ATM junior will tell you wait, we are processing your transaction. The service option on the screen of ATM will be your request which exceeds your account balance.

What ever instruction one wants the ATM junior to obey, you must press the next button nearer to next command.

Customer has option of 10 cards for 20 years and each sequence is suppose to last after 3 years.

The advantage is that when you want to open a new account you used the same account number but the sequence has to change from 0 to 1 after 3 years. ATM is programmed for only N500.00.

Automated Teller Machine can only be operated by literate person, illiterate persons ruled out.

This type of transaction can take place anytime of the day because it is placed outside the bank. The customer do it himself banking service without coming into contact with the cashier.

Those using the service at First Bank PLC, Lagos are enjoying it. People will get use to it in the long run since innovation is difficult for people to embark on.

These facilities ATM and EFT are not ultimately utilised

1. Due fear of fraud.
2. Authority is centralised. Definition of responsibility in some cases is not there. A cashier cannot go beyond N500.00.
3. Application software that drives the machine, no matter the amount used to buy the machine, you cannot set optimal result.
4. The program has to be flexible. Adopt the software to your need. If you have people to manipulate you will have optimum result.

The machine is programmed to the amount of N550.00 for withdrawal and you cannot get up to N950.00 because it is not flexible. If there is nobody to manipulate the software you have to use hand to write the returns unlike when it is flexible.

Banking services to customers such as Loans, Current and Savings/Withdrawals were equally discussed.

Conventional computer application in UBA prior to computerisation was not encouraging it takes about one to two days to calculate interest on savings, commission on turnover (COT) calculation and others.

During automation, banking services were revolutionised, competition was very intense because of numerous banks and each bank is trying to impress its customers with express service since modern customer is conscious of time and in a hurry to conclude his business, since the modern customer to him time is money.

Computer application in UBA is made up of 4 applications that is, Branch Accounting System BI, MICROBOSS, MICROBanking Operation system support, Peat Bankers and Brains - Branch Accounting Information System. They have both centralised and decentralised system. B1 is centralised accounting system (batch process) applicable to branches throughout Lagos. This provides computer print outs to the various branches at the beginning of the day.

While the MICROBOSS is for up country operation, decentralised to provide information to distant branches. It is in-house development by staff of UBA.

Benefits of computer to customer services were extensively addressed where express cash service is provided to the customers both for savings and current account holders.

When emergency arises in certain situations, a customer who is withdrawing large amount of money is given priority to

attend to because this may pose danger to the bank and the customer. In this case the customer is therefore given priority.

In a situation where a customer comes to save a huge sum of money say =N=10,000 and above he is given a separate cashier to count his money. The customer is then invited inside to ease queue.

Problem of under utilisation facing the bank was highlighted and solution will be given at the later part of the study.

5.3 Conclusion:

Conclusion, having analysed the research introductory chapters and main chapters it is of the view that computer usuage in UBA is seriously under utilised because the bank has invested so much on computer and had a huge outlay of equipment.

Finally, under utilization of computer usuage in UBA to facilitate banking services is more of internal than external problems which are due to lack of manpower (software), infrastructure, electricity, lack of proper maintenance of personal computers PC, dedication to work, computer fraud and computer virus.

These problems have hitherto hindered effectiveness, efficiency and productivity in the organisation.

The quality of service to customers would have been better the situation the researcher met the bank if adequate care is taken to avert most of the problems.

5.4 RECOMMENDATION

The following recommendations are deemed necessary in order to facilitate the customer services by bank.

(a) MANPOWER (SOFTWARE)

The bank will embark on adequate training of the bank personnel both at computer section and in banking operation to utilise the software programme in order to improve on quality of the bank services. The bank need well-trained and dedicated manpower especially trained in terms of delivery services to customers, efficiency and effectively.

The quality of the bank's other services had to be improved in terms of accuracy and timeliness.

(b) The banks consultancy services to the outside companies should be discouraged by employing well equipped and trained computer experts to man the system. They will be dedicated to their duty unlike an outside consultancy who has dual responsibility. He owes allegiance to his parent company and host company too. Performance will be hindered in this situation.

The documents of the bank are very sensitive and suppose to be secret. It must not be seen by an outsider. Zubairu, Executive Director (Administration and Finance), UBA PLC, is of the same view that servicing other clients are not the answer to the problem of the bank lack of human resources.

(c) **Maintenance of the Computer**

UBA as one of the Top Three banks is equal to the task of maintaining computer hardwares, they are financially buoyant with huge corporate customers, turnover, despite the fact that it is very expensive to do the repairs, the firm must try to employ the consultancy firm that does the routine maintenance of their machinery. Refusing to do the repairs because of cost is like a farmer who went to the farm without equipment. He cannot perform so it is the same to the bank because the quality of their service to the customers is not manual but should be automated.

(d) Power Failure - Electricity supply is the major obstacle confronting automation in banking industry. The banking operations depend wholly on efficient and uninterrupted power supply (UPS) and good communication network. Our public utilities are not in any way reliable. For banks and UBA in particular to function efficiently they must forge an alliance with government in order to provide some of the infrastructural facilities needed.

c) **COMPUTER FRAUD**

The problem of computer fraud could be minimised by improved control system, restriction of access into the computer and computer room.

The proper treatment of security of the system before adoption for use. The software should also have access to automatic logging and the software needed to be thoroughly protected with pass words.

Other measures of fraud will have to start with internal control. Staff involved in the sensitive computer operation and other machine involved in the movement of cash or processing of transaction, must be carefully selected and be under the watchful eyes of management. While specialisation which is acquired through regular practice is desirable, it should also be said that bank staff should be rotated at regular intervals, so that "Fraud Syndicates" are not allowed to develop. Some of the machines installed "through the walls" should also be protected so that unscrupulous element do not vandalise them.

`It is not healthy for all the banks to opt for an outright purchase of computer and computer software for the development of electronic data processing. It is advisable for all the banks to develop most of its software in-house like United Bank for Africa PLC

It is equally healthy for banks to buy separate hardware and software. The bank should also emphasis professionalism of adequate skill in their employment schedule in order to improve quality of service.

NETWORK SYSTEM

The Bank must go network, On-Line-Real-Time in order to compete effectively with their competitors. The Bank should embrace the services of Electronic Banking products such as Automated Teller Machine. Here banking services to customers are done momentary. The ATM is used by customers for 24 hours and throughout 7 days in the week. Automation of banking services in UBA has not been fully implemented. UBA has to be fully automated network, clearing cheques have to be automated for efficient service e.g. MICR.

VIRUS INFESTATION

Load programs form original diskettes and discourage use of storage diskettes on your system.

Discipline not to use privated software. Proper protected computer media like diskettes will be of help to prevent fraud.

Virus has created awareness that copying is not good business and brought into lime light the issue of licensing every software you are putting in your programme.

There is the need to stop unauthorised copying and a need for copyright for every software.

Computer users should buy their own programmes and avoid the use of contaminated diskettes.

They should also have a sufficient back up services for all their hard or floppy diskettes.

Computer literacy awareness for all or almost all banking staff. Both customers of the banks and bank staff should be trained on computer awareness to make the service delivery easy.

Computer do not eliminate people from their employment but rather creates jobs for the boys - software/Hardware.

That is more reason while people should be educated on computer. They should look at the equipment as a tool that creates jobs and not enemy to their progress.

It is true that it will render labour redundant in the banking halls, automation is expected to make more efficient. In a situation where the number of counter staff are to be reduced, such staff will be deployed to data processing section within the branch where the bulk of the work will now be handled

UBA will move beyond data process into environments enriched with expert systems (artificial intelligence).

Brain drain to an organisation is not healthy and must be avoided by the banks because of the huge financial investment made on the employee.

When an individual joins an organisation he must have a general direction in a plan of 5 - 10 years to the particular stage at the organisation hierachy through hard works, training and promotion. In 10 years time, I will be at this level. In a situation where the prospect is not there, the staff has to quit or voice out for review of employment.

It is unwise for an executive to believe that brain drain is healthy probably a fresh blood will be injected into the system. No matter the number of years of experience and academic excellency one has to put him through on the jobs for weeks if not months for adaptation into the new system.

In conclusion, to the researcher point of view, if all the recommendation are properly handled and monitored, computer is going to eliminate cumbesome operation of armchair banking and improve the quality of customer service

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AUTOMATED BANKING FIRM

Questionaire No. 1

This questionaire is designed in order to collect information for a research programme titled Computerization of Banking Services in Nigeria, (a case study of UBA Lagos), for the partical fulfilment of the requirement for the award of the masters in Business Administration (MBA) Degree of Ahmadu Bello University, Zaria.

Your cooperation is highly appreciated as it will equally contribute to the success of the research programme.

1. As a computerised banking institution, what type of computers do you use in your operation as main concern? Please tick as appropriate in box(es) provided.

   a) Micro Computers ☐

   b) Mini Computers ☐

   c) Main Frame Computers ☐

   d) Any other, Please specify.

   ---

2. What are the hardware computers for the above types you use?

   a) Magnetic tape drive
   b) Magnetic disks/drive
   c) Floppy disk/drive
   d) Options records
   e) Any other, Please specify

   ---

3. What type of system software do you use?

   a) Operating System ☐

b) Data Base Management

c) Utility Programme

d Translators

4i) APPLICATION SOFTWARE

User application programme (Programming language).

a) BASIC

b) COBOL

c) FORTRAN

d) PASCAL

5ii) Please specify any of the Application packages you use:

a) Word Star & Word Perfect (Word Processing packages)

b) LOTUS 123

c) Super calc (Spread Sheet)

d) DBASE I & II

6. How long has your company been in operation?

---

7. What calibre of personnel do you employ?

---

8. Do you make provision for training and retraining of the staff on regular basis?

YES ☐ NO ☐

9. Within what category would you place your company in terms of size as regards to customer services? Please tick

a) Large
b) Medium
c) Small
d) Any other, please indicate ----------

---

10 Do you have branches elsewhere in Nigeria? Please specify them.

---

11. What is your staff strength like?

---

12. What are the banking services you render? Please specify:

---

13. What are your banking terms like to the customers?

---

14. What are the problems you encounter with the customers?

---

15. What effort are you making to decongest in queuing discipline first in first out (FIFO)?

---

16. Which category of customers belong to this group FIFO

---

17. In situation of emergency last in first out (LIFO) are given priority, which category of customers belongs to this group?

---

18. How do you operate the customer services you render with reference to current, savings, and advances?

---

19. What category or categories of customers do you serve

a) Heavy savers (corporate bodies) ☐

b) Low savers (individuals) ☐

c) Illiterate customers ☐

d) Illiterate customers not sophisticated in banking terminologies. ☐

20. If you eliminate C & D above with the use of ATM (autonated teller machine) don't you think it will pose some problems to the individuals? Please comment in details.

---

21. What is banking institution?

---

22. Despite the fact that computer brings flexibility, speed and accuracy in banking operations, there still exist some problems of under utilization.

YES ☐ NO ☐

23. If yes, why are these problems? Please specify in details:

---

24. In terms of quality of services, are your customers satisfied with the computerization you employed?

a) Very satifactory c) Unsatisfactory

b) Satisfactory d) Any other, specify

---

25. Society have impression that computerization will send them out of job and having machine to do the brain work will relegate them to the back ground.

YES ☐ NO ☐

If yes, do you believe that? Please specify ---

---

26. What are the problems facing computerized banks now? UBA in particular

---

---

27. What problems were you having before computerization? Please specify in details.

---

28. What are the computer Applications - UBA

---

29. What are in your opinion are the computer prospects in Banking institutions?

---

30. What are the benefits of being computerized to the customer, services, the staff and the society in general. Please outline them.

Questionnaire NO. 2

This questionnaire is designed in order to collect information for a research programme titled Computerisation of Banking Services in Nigeria, (a case study of UBA Lagos), for the partial fulfilment of the requirement for the award of, the masters in Business Administration (MBA) Degree of Ahmadu Bello University. Zaria.

Your cooperation is highly appreciated as it will equally contribute to the success of the research programme.

1.What are the solutions to the fraud and forgery caused by software ? Please outline _____

_____

2.How can you access to the system logged automatically to controlfile printed. Please specify _____

_____

3. Apart from these 3 errors made by computer peripherals and operators such as

(a) Syntax error

(b) Execution error

(c) Hardware error

Is there any other error made by the hardware and the operator.Please specify _____

_____

4. Virus has been seen as an enemy of computer software that destroys the program, how can one take adequate measures to protect virus in order to save Data and information gathered ?

Please specify _____

_____

5. What do you have to say to this comment ? "The pract
whereby all the banks opt for an outright purchase of equ
ment and software does not augur well for the development
Electronic Data Processing (EDP)in the financial institut
?.

_____

_____

6. Have you started A.T.M System (Automated Teller Machine)
in UBA for customer services Yes ___ No ___
If yes why. Please specify _____

_____

7. What are the problems facing non-banking institut
including the computer ? Please specify in detail.

_____

_____

8.What are the prospects of computer in Nig

_____

_____

9. The staff, do they feel good having automated on line fa
ities ?
(a) Good / Secured ____
(b) Bad / Unsecured ____
(c) Challenged to a new innovation ____
(d) a and b above ____

10Now that you operate automated services, do you have much to do.

11 Have the staff strength reduced since getting automated.

True --- false ---.

12 How many times have you retrenched staff after getting automated- - -

a once --- b twice --- c thrice, d non of the above.

13 What is present staff strength now that you are automated please specify.

14 What is computerisation of banking services, please specify

---

15 Do you operate efficient prompt and satisfactory services to your customers with the one of computer software and hard ware system -------- a Yes --- b No ----

If yes, how please specify -------

16With the recent development in computerization of banking services, do you have enough equipment to go around the customers.

a Yes --- No ---

If yes why are there some delays please specify --------

Management practice

16 What is the pattern of reporting and control relationship in your organisation-----

(a) To p -down

(b) Bottom - up approach ---

17 What are your management information system (MIS)

18 Does your organisation insist on maintaining professional

ism in all its operations Yes ------ No -----

If yes or no please briefly state reasons --------

19 How many computer experts are responsible for the customer services ----------

20 What to your organisation is the minimum acceptable academic qualifications for professionals ----------

21 Do you agree that it is easier and more rewarding to deal with professionals Yes --- No -----

briefly state reasons ------

22 How would you asses information system in your organisation please state as appropriate ------

(A) excellent ---- Average

(B) very effective ----

(C) Good -----

22 As a computerised firm, how has the computer help in your operations as a practical basis for convincing students to patronise . state in a few sentences.

23 Customer services current, savings and advances strategies.

24 What is your firms disposition towards customers satisfaction.

25 What are the kind of loan facilities you sure to your customers, please specify. ----------

What percentage are for savings and percentage for a current accounts ----------

26 How do cashiers settle customers with the use of P C. Please specify ----------

27 Do you think computerisation is competitive Yes --- No ---

28 How do you value before and after customer services :

(please chuck appropriate box)

(A) indispensable ------

(B) very important -------

(C) important ------ -

(D) helps --------

(E)can do with ---------

out of them

If a -- e above , how can you compare before and after services to customers specify briefly ----------

29 What is your view of the future of computerisation of banking services -------

(A) Very bright ----

(B) bright -------

(C) Good --------

(D) fair ------

(E) not encouraging ----

Please note that the answer you give will be regarded as a forecast for the future based on present trends.

30 With prevailing economic situation on your business activities, what are the effects in the areas of customer services such as

a) savings accounts -------

b) current accounts -------

c) Loans and Advances -------

31 What has been the overall effect of the recent deregulation exercise on your performance in terms of customer turnover for deposits ?

32 In view of the economic crisis at present, what strategies are you employing to keep prospective customers aware and interested despite astronomical increase in standard of living that is to say that propensity to save is low. (please specify).

33. What assistance do you render customers especially those with low ability to save. (Specify briefly).

REPORTS ON LOANS AND ADVANCES

(To be submitted in accordance with section 16 of the Banking Decree 1969).

As at ..... day of ..... 19.....

Name of Reporting Bank .....

Address .....

SECTION A

Loans and advances analysed by Sector Borrowers

CODE Major	Minor			
		AGRICULTURE		₦ .....
	01.	Food Crops (Grains) Production ( )	₦	
		Distribution ( )	₦	₦ .....
	02.	Other Food Crops (Such as tuber, cirtrus, vegetables, etc)		₦ .....
	03.	Cash Crops (Such as cotton, cocoa, groundnuts, oil seeds, palm produce, rubber, tobacco, etc.)		₦ .....
	04.	Poultry		₦ .....
	05.	Other Livestock		₦ .....
	06.	Forestry		₦ .....
	07.	Fishing		₦ .....
	08	Others		₦ .....
1		MINING AND QUARRYING		
	01	Coal	.....	
	02	Metallic mining (tin, ore, iron, zinc and lead)	.....	
	03	Crude petroleum and gas	.....	
	04	Other non-metallic mining (including quarrying and standpits) ...	.....	₦ .....
2.		MANUFACTURING		
	01	Flour milling and bakeries	₦	
	02	Meat and other food processing, canning and cold storage	.....	
	03	Beverages, tobacco and tobacco products	.....	
	04	Textile and apparel (including spinning, weaving fishing, textiles and tailoring)	.....	
	05	Footwear (excluding rubber footwear)	.....	
	06	Wood products (including furniture)	.....	
	07	Paper and paper products	.....	
	08	Printing, publishing, etc.	.....	
	09	Manufacturing of Rubber products (including rubber footwear)	.....	
	10	Soaps, oils and detergents	.....	
	11	Petroleum and coal products ...	.....	
	12	Building materials, pottery, ceramics and glass	.....	
	13	Other non-metallic products ...	.....	
	14	Basic metal products (including smelting and fabricating)	.....	
	15	Miscellaneous manufacturing and processing	.....	₦ .....

SECTION B

10. MONEY AT CALL AND BILLS DISCOUNTED

Major	Minor				
		A. Money at call			
	01	Commercial banks			
		01.1 In Nigeria	...	.....	
		01.2 Abroad	...	.....	₦ .....
	02	Merchant banks	...	.....	.....
	03	Others	...	.....	..... ₦ .....
		B. Bills Discounted			
	04	Export bills	...	...	₦ .....
	05	Import bills	...	...	.....
	06	Domestic trade bills	...	...	.....
	07	Total Section B	...	...	₦ _____

SECTION C

11. LOANS AND ADVANCES BY TYPE OF SECURITY

	01	Document bills	...	...	₦ .....
	02	Real estate	...	...	.....
	03	Plant, equipment	...	...	.....
	04	Time and saving deposits, life insurance policies and other cash deposits	...		.....
	05	Corporate/and or Government securities and other financial assets	...	...	.....
	06	Personal guarantee	...	...	.....
	07	Otherwise secured	...	...	.....
	08	Unsecured	...	...	.....
	09	Total Section C	...	...	..... ₦ .....

SECTION D

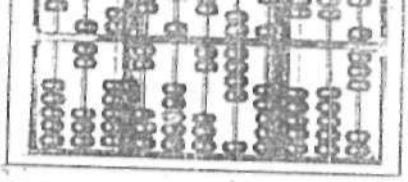
12. LOANS AND ADVANCES BY MATURITY

	01	On call	...	...	₦ .....
	02	Maturing within 3 months	...	...	.....
	03	Maturing between 3 months and 6 months			.....
	04	Maturing between 6 months and 12 months			.....
	05	Maturing between 1 and 3 years		...	.....
	06	Maturing between 3 and 5 years		...	.....
	07	Maturing after 5 years		...	.....
	08	Total Section D	...	...	...
	08.1	"of which past due and uncollected			₦ ..... ₦ .....

SECTION E

13. LOANS AND ADVANCES BY METHOD OF REPAYMENT

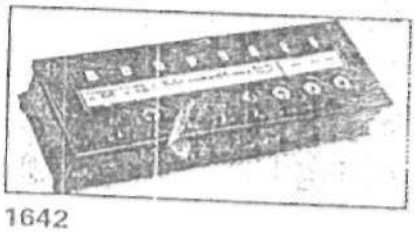
	01	Overdraft	...	...	₦ .....
	02	Repayable by specifically agreed instalments			.....
	03	Repayable in one single payment		...	.....
	04	Total Section E	...	...	₦ .....



3000 B.C.
Abacus (p. 118)

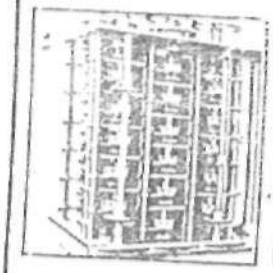
1617
Napier's Bones (p. 118)

1642
Blaise Pascal's Arithmetique (p. 118)



1804
Punch-card operated Jacquard Loom (p. 118)

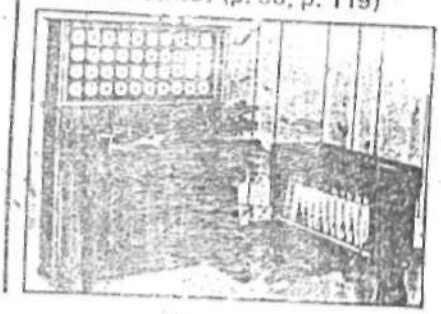
1833
Charles Babbage's Difference Engine (p. 119)



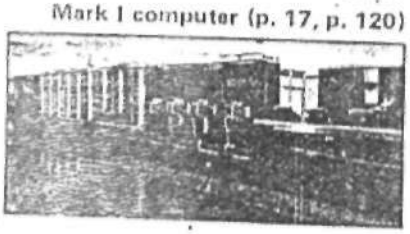
Ada Augusta Byron (Lady Lovelace) develops the first "program" (p. 254)



1890
Herman Hollerith uses punched cards and a tabulating machine to collate the 1890 census (p. 50, p. 119)



1944
Mark I computer (p. 17, p. 120)

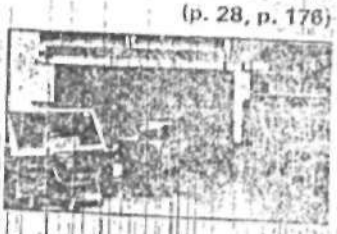


1948
Transistor invented (p. 121)

1946
ENIAC computer (p. 16, p. 120)



1951
UNIVAC installed at US Bureau of Census (p. 28, p. 176)



THE FUTURE

Fifth Generation of computers, artificial intelligence, advanced telecommunications, natural language processing (p. 18, Point/Counterpoints)

1956
FORTRAN language developed (p. 245)

1958
Integrated Circuit developed by Jack S. Kilby (p. 121)



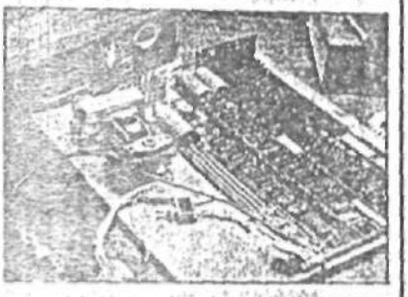
1959
COBOL language developed by team including Grace Murray Hopper (p. 247)

1963
John Kemeny and Thomas Kurtz develop BASIC. TrueBASIC, a structured version of the language, developed in 1984. (p. 249)



1971
First integrated circuit on a microchip developed by Ted Hoff at Intel (p. 121)

1978
First Apple built (p. 7)



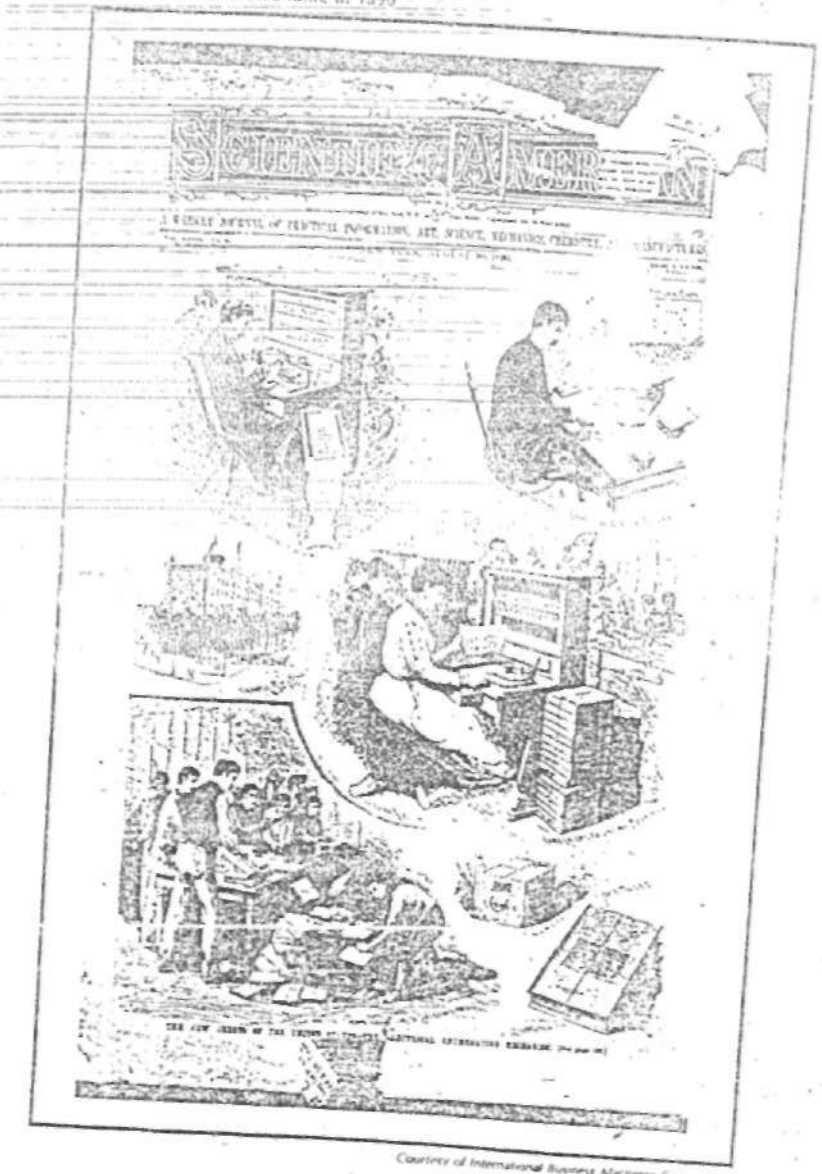
1978
Visicalc, first business/professional application program for microcomputers (p. 408)

1979
Apple II computer desktop model which runs Visicalc, becomes available (p. 408)

1981
IBM PC released

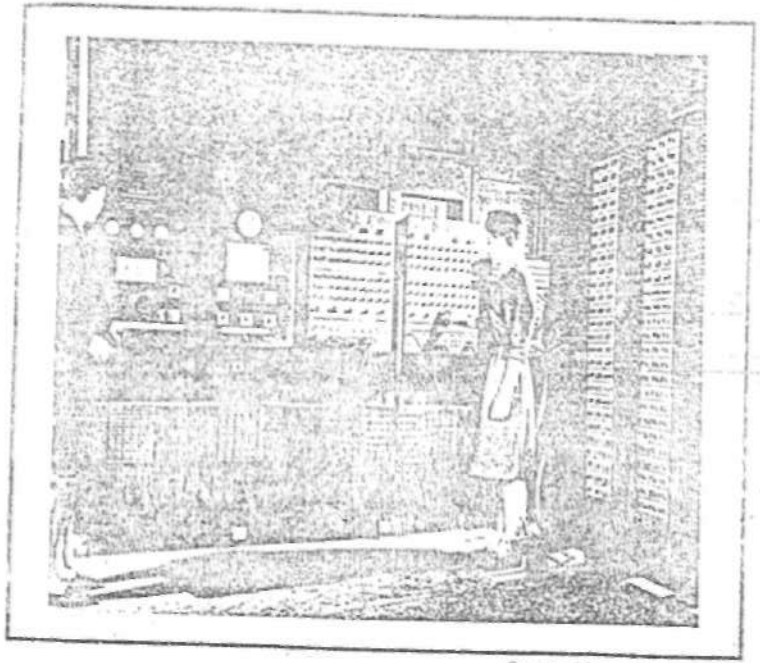
PRINCETON THEOLOGICAL SEMINARY
INSTITUTE OF ...

Figure 3-8: Hollerith's fame in 1890



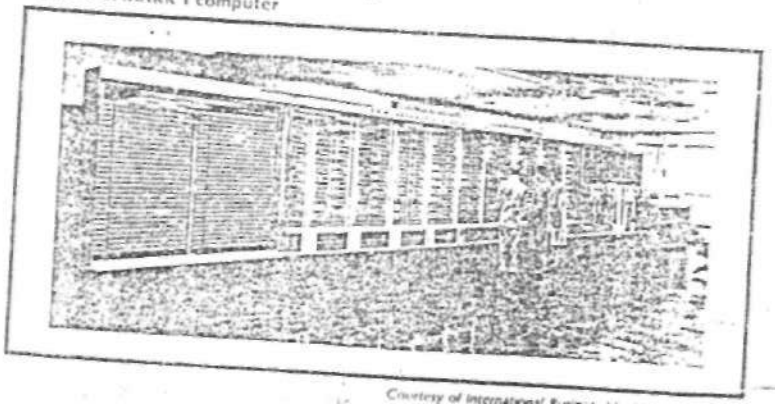
Courtesy of International Business Machines Corporation

Figure 3-10: ENIAC



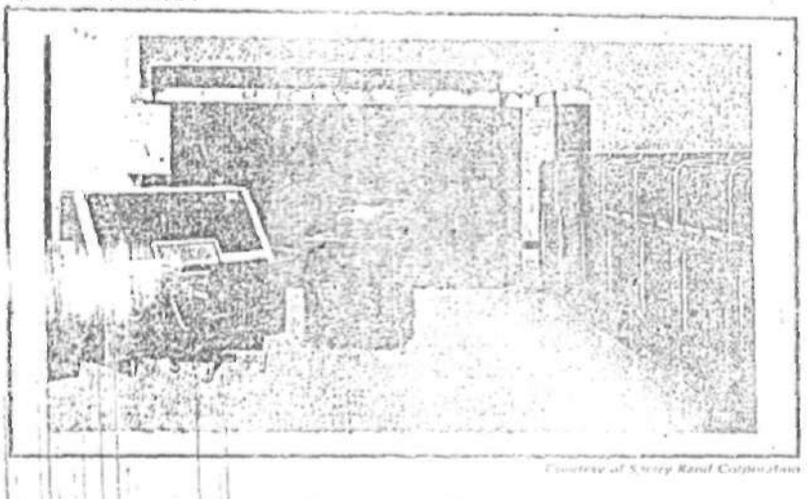
Courtesy of Sperry Rand Corporation

Figure 3-9: MARK I computer



Courtesy of International

Figure 3-11: Univac I®



Courtesy of Sperry Rand Corporation