

COMPUTERISATION OF ENGINEERS WORK PROCESSES AT XEROX H. S. (NIGERIA) LIMITED

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CERTIFICATION

This is to certify that this project titled "**COMPUTERISATION OF ENGINEERS WORK PROCESSES AT XEROX H. S. (NIG) LIMITED**" was originally carried out by **MR. AJAYI OLUSAYO OLUGBEMI** in the Department of Mathematics and Computer Science, School of Science and Science Education, Federal University of Technology Minna, Niger State.

We the undersigned have read and approved the project work in partial fulfilment of the conditions set for the award of Post Graduate Diploma in Computer Science (PGD).

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**DEDICATED TO
ELDER S. S. OJO AND HIS FAMILY
TO THE GLORY OF GOD**

ACKNOWLEDGEMENT

All glory and honour to God Almighty for given me the oppourtunity to be part of this program at this time and in this institution, for His provisions, protections and mercy as I travel from Abuja to Minna every weekend to attend lectures, for sound health and the provision of selfless companions in: Godwin Anozie, Bayo Olanrewaju, Victor Ogedengbe, Ladi Ajibulu, Mr. Akale, Doctor, Promising and all my course mate too numerous to mention. My appreciation also go to my father Akuajo Omoniyi Ajayi and my mother Eyelori Daadaa Ajayi for their moral and spiritual support during the cause of study and for laying the foundation on which I now have to build on. I promise I will make you proud.

To the family of Elder S. S. Ojo, I say you are the best support anyone can have in life. I know that the good Lord will repay your services of love. To the Akuajo's I say a big thank you for your understanding during this period. And to you; Ibilola I cherish the love you brought with the pushing to move forward. Mallam Nasiru Ibrahim, Engr. Dele Oyewunmi, Engr. Nelson Fatusin and the best Service Team in the World I appreciate you.

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I pray that the good Lord will repay you all.

ABSTRACT

In the business world today the survival of an organisation depends so much on how best she can satisfy her customers. The success story of Japanese business concerns has been attributed to their ability to produce high quality goods that are closely tuned to the requirements of the market. In the light of the foregoing and the increasing sophistication in customers' requirements, there is the need for Service organisations to have an information system through which conformity to customers requirements can be monitored and improved.

In our case customers have been made to suffer losses because of the lapses in the processes we use in monitoring and delivering of our services. The complaints emanating from the users of office equipment are increasing daily and frustration can be seen clearly written on their faces because of the inability of their equipment to perform optimally. This pathetic situation is what ushered-in the drive to embark on this project. It is geared towards making service organisations more responsive to the needs of their customers thereby alleviating the customers' plight.

The data used for the study was based on the information emanating from the field and the result of other processed data. The choice of

Programming Language was Microsoft Visual Basic, owing to its versatility, user-friendliness and windows based. However, there are still more areas of research within the topic of discussion that are beyond the scope of this study. Therefore, further research is recommended on these area not covered by the study.

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CHAPTER ONE

1.0 OBJECTIVE

The Computerisation of Engineers Works Processes at Xerox H. S. (Nigeria) Limited is the designing of an information system which analyses data from engineers' report on repairs carried out on machines and generates information about the performance of each machine and the service organisation. This is desirable. It helps the company to quantify problems, analyses and fixed them before the customer's complaints emanate from such problems.

The system to be designed is very simple to operate; all bottlenecks and computations that may scare users away are in built into the system and hidden from user's view. The major user will be the Customer Support Centre Executive (CSCE), instead of entering engineers' report into a manual vistem card (which is the current practice) he will be entering them into a microcomputer system environment controlled by the software being designed. The software will be laced with a series of instructions that will guide the user each step of the way. Hard copies of reports will be obtained via the printer.

A computer-based approach towards meeting customer requirements is the best because of the attributes of the computer with respect to its speed, accuracy and reliability. The speed of a computer is closely related to the amount of data it can process and the frequency of the processing it does. The reliability of the

computer is not in doubt because of its ability to operate under the most adverse conditions for extended period without showing any sign of fatigue. It also provides consistently accurate results under all operating conditions. If maintained regularly its downtime can be well under one percent. It is for these reasons (stated above) that organisations now prefer automated data processing (through the use of the computer) to manual information processing with its inherent time delay. Also, microcomputers can be programmed to train users on how to use them. This capability is generally referred to as computer Aided Instruction (CAI) and can range from casual to highly detailed and structured. Thus as employees become less durable, the necessity for a durable information system becomes greater which is provided for via the computer

The other advantage of this project is that it make these data available in electronic form so that all player in the system can have access to the information as at when and how needed, to improve on our Customer Satisfaction drive.

1.1 THE SERVICE TEAM

The service team is directly responsible for the repairs and maintenance of customer's machine. This team exist in all the branches of Xerox. It comprises the service manager who is the team leader. Under him, are engineers who are designated as service Engineer, Senior Service Engineer and Product Specialist and The Customer Support Center Executive (CSCE).

Machines with problems that the service or senior service engineer cannot handle are referred to the product specialist. If he himself cannot solve the problem, the National Product Specialist would be called in from the head office to help in

resolving the problem. The service team also has the task of submitting the Annual Service Charge Invoice to customers with machines whose service contract has expired and following up such customer till the service contract is renewed (i.e. payment made).

The Customer Support Center Executive logs calls into the tracking sheet detailed information about customer's machines that are malfunctioning immediately the customer complains via the telephone line or by coming directly to the office. He also handles all enquiries or queries from customers on the maintenance of their machine. If he cannot handle such queries, he refers them to the service manager. Lastly, a dispatch rider delivers spares to engineers working in the field as the need arises. In addition, the company now operates patch system. This is the system whereby the district is divided into geographical location handled by a particular engineer.

1.1.1 CUSTOMER SERVICE CENTER EXECUTIVE (CSCE)

Apart from all activities above, CSCE also serve as link between the branch and the headquarters. CSCE prepares summary sheet on daily basis indicating the status of the machines worked on the previous day. List of machines requiring spare parts are generated or updated. The same is passed to the store officer to ascertain availability, otherwise the report is sent to the headquarters to replenish the stock level. Also, the CSCE, generates the MIFLIST monthly basis indicating machines still cover by service agreement (either not paid for or just expired). New installation is also added to the report.

All these, coupled with sharing calls to the engineers, liaising with the store officer and receiving customers complains are done manually. The resultant effect is miss-up or inconsistent report to the headquarters. Most of the time, many spares are found missing on the activity report, not because they are available, but rather due to omission during the process of transferring the data from one sheet to another

1.1.2 XEROX H. S. (NIG) LIMITED

Xerox H. S. (NIG) Limited was established in the year 1973 by Nigerian investors with foreign participation. It belongs to the Xerox organization known world wide for the manufacturing of office equipment (copiers, typewriters, printers, facsimiles etc) and Office supplies (paper, ribbons, transparencies etc). Xerox H. S. at inception was giving machines out on a rental basis; the organisation maintains the machine while the customer pays for the copies made. The growth in the business coupled with the 'sharp practises' of some of the customers on the rental system resulted in the company delving into outright sales and servicing of machines. Xerox has a network of branches that spans all the states in Nigeria and the Federal Capital Territory. Some of the states are covered by direct operations while appointed dealers cover others. In the eighties Xerox became a force to be reckoned with, second to none in the industry, with sales growing by leaps and bounds and exceeding set targets. With the advent of well organised and formidable competitors coupled with the thinking in Xerox that it has monopoly of the market (which manifest itself in the company not paying close attention to customers complaints) Xerox lost some of her customers to competitors.

ORGANOGRAM FOR XEROX H.S. (NIG) LIMITED

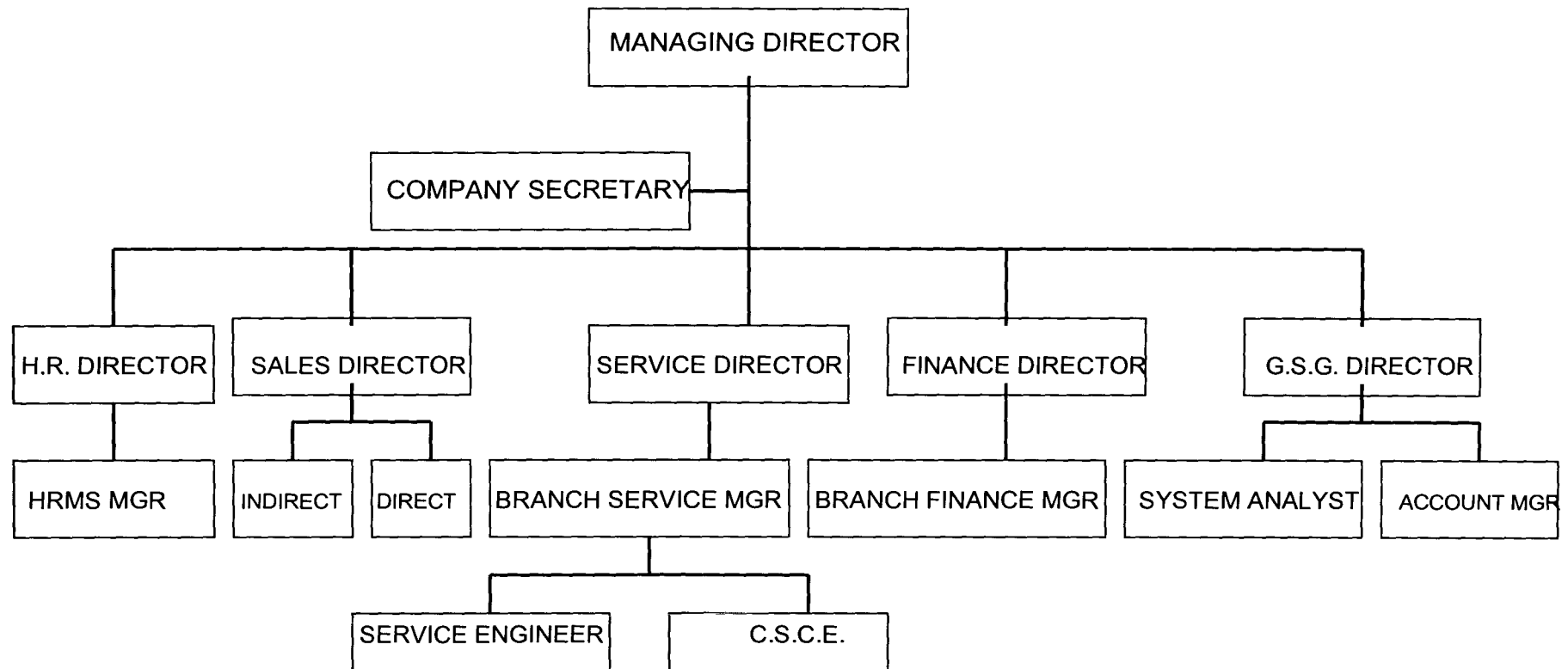


FIG 1.1 SERVICE TEAM ORGANISATIONAL STRUCTURE

1. The Managing Director is the overall boss of the organisation. He reports to the board of directors and also to the Director Middle East and Africa Operations. He is in direct control of the day-to-day operations of the company. We have the following staff reporting directly to the managing director:

2. Finance Director: He oversees the operations of the finance, information management and general services departments. He ensures control of overheads through budgetary control and central purchasing, maintains and updates the information system of the company.

3. Human Resources Director: He handles all matters relating to the welfare of the employees and staff recruitment. He ensures that staff members are well motivated and challenged to achieve superior results for their customers. Finally he ensures correct application of human resources policies and procedures and pervasive use of quality tools.

4. Customers Service Director: He is saddle with the responsibilities of responding to all customer complaint and request. He directs the affairs of the Customer Service Executives (Engineers). He oversees the supply chains and distributions.

5. Marketing Director: He is in charge of the core marketing strategies of the company. Handles promo, bonanza, product lunch, and compensations.

6. Indirect Director: He is in charge of all Xerox operation where Xerox does not an office but operates through representatives or agents.

1.2 THE SCOPE

In the light of all the problems facing users of office equipment the need to overhaul the service offering system and set-up cannot be over-emphasised. Customers are looking for service organisations that will help them achieve their corporate goals through quality service offering and not one that will constitute a clog in their wheel of progress. This informs the need for this project. It aims at designing an information system for the singular purpose of enhancing customer satisfaction. The information will reveal clearly to the service organisation the true state of the customer's machine, its performance level, such information will now serve as a guidepost in planning for better services.

1.3 LIMITATION

Titanic the best constructed Vessel of its age collapse on its first voyage. Bearing this in mind the implementations and success of the program would depend on the human skill present and his interest in learning couple with the organization dynamism for change.

Another drawback of the normal system is that if the present staff decides to resign a vacuum is created. This is an experience, continuity and competency vacuum which will definitely slow down the processing of information in the organization until the new employees master the nitty-gritty of the job. A situation like this can have a negative impact on the customer satisfaction drive.

Electronic Information Processing offers a partial solution to the vacuum created. In the first place, the system itself provides continuity, the same information continues to be available regardless of who puts it into a computer or takes it out.

CHAPTER TWO

LITERATURE REVIEW

2.0 OVERVIEW

In the business world today the survival of an organization depends so much on how best she can satisfy her customers. The success story of Japanese business concerns has been attributed to their ability to produce high quality goods that are closely tuned to the requirements of the market. In a study carried out by the Profit Impact of Market Strategy (PIMS) program it was concluded that the single most important factor affecting the performance of a business was the quality of its goods and services relative to those of its competitors. In an increasingly competitive world, the distinguishing factor between organisations is the quality of service they offer their customers and clients. This not only affects retail and sales outlets but every aspect of industry and institutional life. In the light of the foregoing and the increasing sophistication in customers' requirements, there is the need for organisations to have an information system through which conformity to customers requirements can be monitored. This becomes very necessary because the growth of a company depends heavily on the level of customer patronage.

In our own environment today customers have been made to suffer losses in one way or the other because of the lapses in the processes of organisations offering them one service or the other. Specifically, the complaints emanating from the users of office equipment are increasing daily and frustration can be seen clearly

written on their faces because of the inability of their equipment to perform optimally. This pathetic situation is what ushered-in the drive to embark on this project. It is geared towards making service organisations more responsive to the needs of their customers thereby alleviating the customers' plight.

2.1 THE CUSTOMER:

In a project like this; which is concerned about enhancing customer satisfaction there is the need for one to know who the customer is, so that one will appreciate the necessity of satisfying him/her. The customer is defined as the next person, individual or group in the process that receives your output or the service you are offering and acts on it. The customer can be internal or external; the focus here is on the external customer.

Many corporate organisations have the following priorities:

- (1) Customer Satisfaction and Loyalty
- (2) Employee Motivation and Satisfaction
- (3) Increasing Market Share
- (4) Profitable Revenue Growth and Productivity (Returns on Assets).

A careful examination of these priorities reveals the fact that without the attainment to the first priority, which bothers on satisfying the customer, the other priorities will not be realised. A dissatisfied customer is likely to stop patronising an organization and spread the news about the organization's failure or inadequacies to other potential customers. This will definitely lead to a drop in her market share, profit level and adversely affect her ability to motivate her employees. In the layman's language, it can be said that the customer pays the

salaries of the employees and provide dividends to investors as long as the organization meets his requirements. Seeing the vital role customer patronage plays in the survival of any firm, concerted efforts must be made in order to retain his loyalty and not lose him to competitors. His requirements must be known and the firm rendering service to him must tailor her processes towards achieving such requirements.

2.2 OFFICE EQUIPMENT :

In any organization that deals with one type of business or the other, there is always the need to document every transaction on a daily basis. It may be the typing of a memorandum and making copies to be placed on the various notice boards or faxing such memoranda to other branches of the organization. At other times, there may be the need to prepare invoices or issue receipts to customers. All these documents generated within the organization must be in a form that is presentable and durable so that the information contained in such documents will be effectively communicated to those concerned. The machines used in preparing these documents are referred to as OFFICE EQUIPMENT.

Some of these equipment and their functions are stated below.

- (1) PHOTOCOPIER: This is a machine that reproduces a copy or copies of a document.
- (2) FACSMILLE: This is a device that is used for sending or receiving document(s) from a remote location.
- (3) MEMOWRITER: This is a word processor that is used in typing all forms of documents.

(4) COMPUTER: This is used in processing data and this results in the generation of information that influences decision-making.

(5) COMPUTER PRINTER: This is a machine that produces hard copy of the output from the computer.

(6) PLAN PRINTER: This is a machine that produces copies of engineering drawings.

Since organizations thrive through the dissemination of information, either to her internal or external customers via these office equipments the need to keep them at optimum level of performance cannot be over emphasized. This is the very reason why marketers of these equipment must offer their customers a sound service backup through regular maintenance in order to minimize greatly the down time of these machines. By so doing the customer's business will be prevented from grinding to a halt. This is the concern of this project. It aims at designing a software package that processes data on machine performance from the field, process it and generates information that guides in planning for better service offering.

2.3 QUALITY THE KEY TO CUSTOMER SATISFACTION

Quality is a term that is common in day-to-day conversation, if something needs to be classified as being 'superior ' it is often said to be of 'high quality'. Commodities that possess attributes that make them special are also considered to be quality commodities as against the 'run – of- the- mill' items that are ordinary or 'inferior' as opposed to the former. Product and service quality is of

increasing importance. Quality control has always been important in production processes but is now spreading to many other aspects of business. Quality control requires close monitoring of production processes both from the process control and management control aspects. Computer aided design, analysis and testing help to produce and maintain product and service quality.

Quality for a service being offered has two aspects, both of which together make for an appropriate definition of the term. The first relates to the features and attributes of the service. This ensures that the service meets the need of the users. The second aspect concerns the absence of deficiencies in the service. Customers are satisfied with a service offering only if it meets their expectations through its attributes. Service satisfaction therefore has to be features and attributes towards making service offering worthwhile for the customer. Dissatisfaction has to do with the deficiencies that arise in a service owing to non-conformance to desired specifications. Successful organisations that are engaged in serving the society need to be conscious of both these aspects if they intend to consistently keep their customers and keep them from complaining. In order to satisfy the customer it is crystal clear that the service offered must be qualitative. To achieve this the customer must be the starting point and whatever may be their needs. Such needs are then converted into suitable service features, which are then optimised to maximise customer satisfaction by providing maximum quality at the least cost.

In order to attain total quality in service offering the need for feedback cannot be overlooked. This comprises feedbacks from customers, from those assessing if the output is conforming to customer's requirements and of the planned design

for which the process parameters were determined and put into place. The existence of a proper system that is able to utilise the information that is fed back to the organisation automatically enables the organisation to learn from past mistakes and systematically move to a level of performance that is almost error free. Furthermore it enables the prevention of the same types of mistakes. Time is also an important factor in feedbacks, if an organisation is functioning in a highly competitive industry real time and on-line feed back for the adjustment of process is desirable, so that problem facing the customer can be quickly highlighted and solve before it is too late.

An appropriate definition of quality can be given as performance superiority in delighting customers. The means used are people, committed to employing organisational resources to provide value to customers, by doing the right things right the first time, every time. This definition contains some important phrases that would be explained further.

Performance Superiority: This refers to the fact that an organisation that wants to offer quality service must strive towards being the best in the industry. This is possible by providing value to customers that far exceeds that provided by the competitors.

Delighting Customers: Customers are very much interested in firms that will exceed their requirements in the course of obtaining service from such firms.

Provide Value—Value is defined as the ratio between quality and cost. Thus,
$$\text{Value} = \text{Quality}/\text{Cost}.$$

If customer is to perceive that the service he is paying for provides him value, then the quality of the service relative to the cost incurred by the customer must be higher than that of competitors.

Doing the Right Things – This phrase emphasises the importance of ensuring that only those things be done in the organisation that add value to the final output.

Right the First Time– This suggests that organisations will so fine tune their processes such that the output will be as planned and without any flaw.

In summary, the long-term effectiveness of any enterprise is a direct function of how well it manages its customers through 'Quality' service offering as highlighted above.

2.4 CUSTOMER REQUIREMENTS

The requirements of office equipment users are as stated below:

- (1) They do not want their machines to breakdown; though there is no perpetually working machine the indirect meaning of this their requirement is that breakdowns should rarely occur. This is possible if regular scheduled maintenance is carried out on the machines.
- (2) If a machine breaks down, repairs should be carried out immediately. The customer wants immediate response to their distress calls.
- (3) When functional the machine should operate at optimum level that is its operation should not cause them any discomfort.

These requirements call for a well-organised, excellent customer focussed and a comparable competitor focussed service set-up, the absence of this will prompt

customers to switch over to competitors and endanger further sales of such equipment.

2.5 INFORMATION MANGEMENT: A TOOL FOR PROMOTING CUSTOMERS SATISFACTION.

In any organisation information is an asset. What could separate the winning firms from the losing ones may be their ability to utilise and manage information that is obtained timely and with a high degree of accuracy. It is a condition in which companies do not have the option of choosing, they must elect to play. Much will be said on the need for inputs from the customer, which will be used to fine tune processes in order to satisfy the customer. It is these input that makeup the subject of information management under consideration in this section. It is not sufficient to gather information and store in one medium or the other (which is the order of the day in many organisations). More work should be done in the area of analysing such information, processing them so as to know the true situation facing the customer and ideas proffered on how to improve his lot. In information management time and accuracy are two very important factors that cannot be pushed aside. Information gathered from the customer's end must be accurate the analysis and processing of such information must be fool proof if not the company may be digging its grave unknowingly. Also it must be timely, information about a customers plight coming after he has switched over to a competitor even when acted upon might not be useful in restoring his confidence in the firm. The two factors mentioned above make it mandatory for firms to utilise the computer in the management of information.

Information is our world, and as competitors learn new strategies for managing (analysing and using) information, they have advantage over their less energetic and sophisticated counterparts, thereby enhancing customers' satisfaction and loyalty.

2.6 THE COMPUTER SYSTEM

A computer is an electronic machine capable of storing and obeying instructions at a very high speed. It follows a set or sequence of instructions in order to process data, solve a specific problem or accomplish a particular task. The computer system is basically divided into two parts: Hardware and Software. The hardware refers to the physical components that make up the computer; it comprises the main memory that is used for temporary storage of data and instruction.

2.7 THE BENEFITS OF THE COMPUTER IN INFORMATION MANAGEMENT

A computer-based approach towards meeting customer requirements is the best because of the attributes of the computer with respect to its speed, accuracy and reliability. The speed of a computer is closely related to the amount of data it can process and the frequency of the processing it does. The reliability of the computer is not in doubt because of its ability to operate under the most adverse conditions for extended period without showing any sign of fatigue. It also provides consistently accurate results under all operating conditions. If maintained regularly its downtime can be well under one percent. It is for these reasons (stated above) that organisations now prefer automated data processing

(through the use of the computer) to manual information processing with its inherent time delay. With electronic information processing "great minds" can be used to prepare the logic (the microcomputer program), which can be used over and over long after the "great minds" have departed to face other challenges. Programmers need not be employed they may just be hired to set up the system and train the personnel.

Another drawback of the normal system is that if the present staff decides to resign a vacuum is created. This is an experience, continuity and competency vacuum which will definitely slow down the processing of information in the organization until the new employees master the nitty-gritty of the job. A situation like this can have a negative impact on the customer satisfaction drive. Electronic Information Processing offers a partial solution to the vacuum created. In the first place, the system itself provides continuity, the same information continues to be available regardless of who puts it into a computer or takes it out. Second, microcomputers can be programmed to train users on how to use them. This capability is generally referred to as computer Aided Instruction (CAI) and can range from casual to highly detailed structured. Thus as employees become less durable, the necessity for a durable information system becomes greater which is provided for via the computer

SERVICE PROCEDURES

Xerox has the following type of service offerings:

- (1) Annual Service Contract: For this type of service offering the customer pays for the maintenance of his machine(s) once a year. This payment covers the cost of all the spares that will be used on the machine during the service year and the cost of labour. It is a flat rate for all machines that are of the same

model (e.g. all the customers pay the same amount of service charge for the 5026 model irrespective of the number of spares and time spent on the machine). This payment is made upfront i.e. at the beginning of the service year.

(2) Quarter Service Contract: This is similar to the Annual Service Contract the only difference is that in this case payment is made upfront quarterly.

(3) VIP Service: In this case the customer pays annually or quarterly for the cost of labour upfront and whenever his machine needs a spare, he buys from Xerox and the engineer will go and fix it.

(4) T & M Service: In this case before attending to a customer's call, he will have to pay a certain amount of money, which covers the callout charge and the labour cost for repairing such a machine. If the repairs will require replacement of a spare the customers pays for it and the engineer fixes it

CALL ALLOCATION

As explained in section 2.3 above the Customer Support Center Executive (CSCE) has the sole responsibility of logging customer complaints about their machines into the tracking sheet. These calls are allocated to engineers based on the geographical location of the machine. Fresh incoming calls are allocated to engineers via radio communication. If all the engineers are heavily loaded for the day, incoming calls will be attended to the following day. In the course of effecting repairs on a faulty machine if a spare part is needed, the engineer communicates with the office via his walkie-talkie. If the spare part is available the dispatch rider delivers it to him on the field, if it is not available it will be placed on emergency order from the head office. Whenever the spare is received from the head office, the engineer goes back and fixes the machine.

CALL MONITORING

The engineer after attending to a machine fills a report referred to as the Engineers Call (E C R) Report, the customer also write his own comment on the job done by the engineer and append his signature. The E. C. R. when filled provides the following data about the machine visited:

- (a) Customer Name, Address and Telephone Number
- (b) Contact man's name
- (c) Serial and Model Number of the machine
- (d) The current meter reading (if it is a copier)
- (e) Type of fault, the action of the engineer and spares replaced or to be replaced if there is need for such
- (f) The dispatch, arrival and finished times of the engineer
- (g) Customers' comments, name and signature.

At the end of the day, the C.S.C.E enters the data on the E.C.R into a vistem card. Each machine under service agreement with Xerox has a vistem card that is regularly updated as engineers work on them. This card presents us with a service history of all the machines and the expiry date of the service agreement.

CHAPTER THREE

3.0 ANALYSIS OF THE CURRENT SYSTEM

There are four elemental tools that the Customer Service C Executive is using to run his day-to-day job viz: Vistem Card, Planning Board, Communication System and Report Documentation.

3.1 VISTEM CARD

Every machine that is serviced by the CSCE has an index card, called a customer record card. The customer record cards are kept in a box on the CSCE desk.

VISTEM CARD DESCRIPTION

EXPIRY DATE: The date service contract will expire.

STATUS: The service contract status. There are four types;

1. Machines sold with full annual service contract
2. Machines sold without annual service contract
3. Machines service on labour only
4. Machines on call service only, known as Time and Material (T&M)

RECEIPT NO: Receipt number of payment for contract status

NAME: Customer's name

ADDRESS: Customer's address

LOCATION: The location of a particular machine in customer's premises

CONTACT: Contact person's name

TEL. NO.: Telephone number

3.1.2 PLANNING BOARD

The planning board is used to display the service operation. It is like a photograph. It gives the state of the operation at one moment in time. A glance at the planning board will tell the CSCE, the number of machines waiting for an engineer, the latest time an engineer should arrive at each machine to maintain response targets and which machine each engineer is currently working on.

When a CSCE receives call from a customer requesting service, he/she enters the call details on the customer record card. He then places the card on the planning board against the maximum time the engineer can respond if response target are to be achieved. For example, assuming working to a four hour response target and CSCE receives a customer requested for service at 10.00 am for a copier at University of Abuja, Bursar's office, the CSCE would place the customer record card on the planning board beside the 10.00 time slot.

The planning board allows the CSCE to organise the scheduling of service calls easily and quickly. In theory, this is first communicated to engineer whose patch fall in that customer requesting for a service call before considering the use of any readily available engineer.

3.1.3 COMMUNICATION SYSTEMS

The number of telephone lines is of course dependent of Machines In Field (MIF). The MIF is the number of machines the CSCE is responsible for. At present, there are radio set for each engineer, two engineers with additional pager, a pager for

the CSCE and five telephone lines, two for incoming calls and the others for calling out.

3.1.4 REPORT DOCUMENTATION

As soon as service engineer completes a job the details of the call are entered in the summary report. The information contained in this report is used to update the service management system and is a vital part of the CSCE process. Apart from entering information on the customer record card, the CSCE also completes the summary sheet. The management use the summary sheet report to monitor the performance of their service team.

3.2 REQUIREMENTS SPECIFICATION

The software package to be designed in this project is titled, **COMPUTERISATION OF ENGINEERS WORK PROCESS**. This package will convert data fed into it to useful information that will be used to enhance the satisfaction level of users of Xerox equipment. The requirement specifications which will also make up the features of this package are listed below:

- (a) Authentic record of machines on service contract with Xerox H. S Nig Ltd.
- (b) Updating the records of machines expiring on monthly basis
- (c) Generating report automatically on machines awaiting spare parts
- (d) Providing on-line information to customer on request at touch of a button
- (e) Generating annual service invoice on request.
- (f) Generating MIF for engineers according to their patch.

3.3 FEASIBILITY STUDIES

The aim here is to determine whether the proposed solution to the problems highlighted in the previous chapters is feasible. By so doing many months of effort and financial waste can be avoided if the solution turn out to be a “white elephant project” that is simply impossible to carry out.

The goal of the proposed solution, which is the main issue of this project, is that of designing information system which analyses data from engineers’ report on repairs carried out on machines and generates information about the performance of each machine. This is desirable. It helps the company to see problems and rectify them before the customer’s complaints emanate from such problems. Three areas of this project will be considered in order to determine its feasibility. They are discussed below.

3.3.2 OPERATIONAL FEASIBILITY:

The system to be designed is very simple to operate; all bottlenecks and computations that may scare users away are in built into the system. The major user will be the Customer Support Centre Executive (CSCE). Instead of entering engineers’ report into a vistem card (which is the current practice) he will be entering them into a microcomputer system environment controlled by the software being designed. The software will be laced with a series of instructions that will guide the user each step of the way. Hard copies of reports can be obtained via the printer

3.3.3 TECHNICAL FEASIBILITY:

In order to implement this project a microcomputer system comprising the system unit, Screen, Printer and the software is required. The hardware components can be easily purchased from the local market. The software will then be installed on at least a computer in each branch office (location) afterwards the training of the personnel to operate the system will be carried out. The service Manager can double as a local analyst, go through the report generated by the system since he is familiar with the technical terms that will be contained in the reports generated by the system. This will give Service Managers an idea of how his team is fairing in term of revenue and customer satisfaction

3.3.4 ECONOMIC FEASIBILITY:

The financial implication of this project to the company is very minimal since most of the equipment and personnel needed are on ground. The only cost that comes into play is that of the purchase, installation and maintenance of the software. This is a price, which is not too high to pay when considered side-by – side the benefit of satisfying the customer that will be derived through the implementation of this project.

3.4 GENERAL OVERVIEW OF THE SYSTEM:

The system under design in this chapter will now be discussed with respect to the inputs, outputs and the procedures linking them.

3.4.2 INPUTS

3.4.3 MACHINE DATASHEET FORM: -

This form will contain all relevant data about a customer that has just bought a machine or a customer that renewed his service agreement. Such data include the following: Customer Name ("CUSTOMER"), Address ("ADDRESS"), Location ("LOCATION") Engineer in charge ("ENGNR") Telephone number, Contact man, Model (product type; copier, computer, facsimile etc), Type of Service ("STATUS"), Customer identification no ("ACCOUNT NO"), Service amount ("CHARGE"), Machine Serial number ("SERIAL NO"). It also includes the date the service agreement will be expiring ("EXP DATE"), this will be twelve months from renewal date or fifteen months from installation date. The installation date for new machine and renewal date for old machines as well as the age of the machines will be stated in this form. This form will be updated any time an engineer installs a new machine or a customer renews his service agreement. During the service year if some of the entries become invalid e.g. if a customer relocates to another address or may be a new contact man is in place, the package allows such changes to be entered into the customer database file.

MACHINE DATASHEET	
CUSTOMER	
ADDRESS	
LOCATION	
MODEL	
SERIAL NO	
INST DATE	
EXP DATE	
ENGNR NO	
STATUS	
ACCOUNT NO	
CHARGES	
FIND	
UPDATE	
DELETE	
FIG 3.1	
CUSTOMER	

3.4.3 CALL RECEIPT/ALLOCATION FORM

Since the basic aim of this design is to improve the response of service personnel to customers' complaints. To do this effectively, it must be able to measure the time differences between the time a customer complain and the time his complaint was attended to.

This form contain Customers name, Model, Serial No, Location, Fault, Complainant, Call Date, Time, Engnr, Date/Time, Remarks, Period. When entering data into this form, a machine can be entered twice. The information about form is updated after the call has been allocated.

UPDATE		CALL RECEIPT/ALLOCATION	
CUSTOMER		CALL DATE	
MODEL		TIME	
SERIAL NO		ENGNR	
LOCATION		DATE	
FAULT		REMARK	
COMPLAINANT		PERIOD	

FIG 3.2

3.4.4 AWAITING LIST

This form contains data about machine that needs one or more part replacement after the engineer visited the machine. This help the CSCE to project for the part requirement of the location as to assist in the cyclic ordering process.

The form consist of; the machine information's, Part no, Alternative no, date part arrived, if ordered, date fixed and the engineer who fixed the part.

		AWAITING LIST	
CUSTOMER		CALL DATE	
MODEL		L/CD	
SERIAL NO		ENGNR	
PART NO		DATE BOOKED	
ALT PART NO		DATE ARIVED	
DESCRIPTION		DATE FIXED	

FIG 3.3

Other forms were also created to form the database.

engineers submit these reports (one filled for each machine attended to) to the customer support centre executive who will in turn enter data in these reports into the machine History File, this will be done the following morning.

3.4.6 PRICE LIST:

This list contains the rates for the Annual Service Contract of all models of the machine marketed by Xerox and the model number of such machines. These two parameters are entered into the Contract Fee File any time a new product is launched. Whenever there is a change in the rates the new values are entered into the file. The customer support centre executive does this.

3.4.7 STORE REQUISITION NOTE:

All the engineers will use this to make a request for one spare or the other from the store. It contains the part number and name of the spare, model number of the machine using this spare and the quantity of spare issued out.

3.5 OUTPUTS

3.5.1 MACHINES IN FIELD (MIF)

As soon as a customer data for a newly installed machine or for a machine whose service agreement is renewed recently is entered into the customer data base file, the software automatically generates the MIF and group them into six different categories. The first category is the machines under service contract. The CSCE on touch of a button can give information about customers or machines that are on service agreement and their expiration dates. The second

one are the machine that are not on service agreement, this also depict the expire dates. The third is automatic generation of expiring MIF on monthly basis, such that invoice could be raised and dispatched earlier to various customers probably two months before their expiration.

3.6 FILE STRUCTURE

The file or database structure used in this project is based on the relational approach. Each file that makes up the database is in form of two-dimensional tables of data created in MS Access, consisting of rows and columns. The entries in the files that constitute a row are referred to as a record, while each column is identified by a field name and they are generally called fields. The software being designed makes use data link between MS Access and Visual Basic, VB. There is a two-way communication between each file and the software. Through the software data are entered into the files, it also retrieves data from such files for processing so as to generate the desired output. The description of the four files are given below

3.6.1 CUSTOMER DATABASE FILE:

this file is referred to as MIF in the program, it comprises of twenty fields. A record in this file provides us with vital information about the customer, his machine and the dates for carrying out preventive maintenance on the machine. The structure of the file is as shown in Table 3.5.

Table 3.5

S/NO	Field-Name	Field-Type	Width	Key
4	CUST-NAME	Character	18	Customer's Name
5	CUST-ADDRESS	Character	18	Customer's Address
6	TEL-NO	Character	10	Customer's Telephone
7	CONT-MAN	Character	10	Contact man
8	PRODUCT	Character	12	Type of Machine (fax, copier etc)
9	MODEL-NO	Character	6	Model Number of machine
10	SERIAL-NO	Character	12	Serial Number of machine
11	EXP-DATE	Date	8	Expiry date of current service contract
12	ACCT-NO	Numeric	6	Customer's Account Number with Xerox
13	M- STATUS	Character	5	Status of machine (New or Old)
14	M-AGE	Numeric	3	Age of machine (in years)
15	INST-DATE	Date	8	Installation date of machine (if new)
16	REN-DATE	Date	8	Date service contract was renewed.
17	SCH1	Date	8	Date for 1 st Preventive Maintenance
18	SCH2	Date	8	Date for 2 nd Preventive maintenance
19	SCH3	Date	8	Date for 3 rd Preventive maintenance
20	SCH4	Date	8	Date for 4th Preventive maintenance

FIG 3.5 CUSTOMER DATABASE FILE

The key column in the table above gives the meaning of the corresponding field names. In the program this file is indexed on the CUST –NAME field. Each machine under service contract with Xerox will have a record in this file.

3.6.2 MACHINE HISTORY FILE:

This file consist of sixteen fields, it provides us with information on the history of faults that occurred on machines at one time or the other and the records of maintenance activities that have been carried out on such machine.

The file structure is shown in Table 3.2 below.

S/NO	Field –Name	Field -Type	Width	Key
1	SERIAL -NO	Character	12	Serial Number of machine
2	MODEL-NO	Character	6	Model Number of machine
3	PRODUCT	Character	15	Type of machine
4	CALL-DATE	Date	8	Date customer made a request for service
5	CALL-TIME	Date	8	Time Customer made a request for service
6	RESP-DATE	Date	8	Date Engineer responded to customer's call
7	RESP-TIME	Date	8	Time Engineer responded to customer's call
8	CALL-TYPE	Numeric	5	Description of the type of call
9	FAULT	Character	40	Description of the faults on the machine
S/NO	Field-Name	Field-type	Width	Key
10	CAUSE	Character	6	The cause of the fault.
11	METER	Character	10	Meter reading.

12	REMARK	Numeric	6	Machine's state after engineer's visit
13	SPARES	Character	45	Spare(s) used on the machine (if any)
14	PART -NO	Character	45	Part number of spare(s) used on machine.
15	COPL-DATE	Date	8	Date engineer completed the job.
16	COPL-TIME	Numeric	8	Time engineer completed the job.

Table 3.6 MACHINE HISTORY DATABASE

The field 'CALL-TYPE' gives a description of the reason for which the engineer visited the machine. It could be to carry out PREVENTIVE MAINTENANCE (PM) or to INSTALL (I) a machine. It can also be to FIX CONSUMABLES (FC) or to repair a machine whose PERFORMANCE has DEGRADED (PD). Any of the acronyms in parenthesis above can be entered into the call-type field

3.6.3 CONTRACT FEE FILE:

This file comprises of two fields, it contains the price list for the annual service contract for various models of machines. The structure of the file is as shown in Table 3.3.

S/NO	Field Name	Field Type	width	Key
1	MODEL-NO	Character	6	Model number of Machine.
2	FEE	Numeric	10	Price of Annual Service Contract

Table 3.7 CONTRACT FEE DATABASE

This file is referred to as P-LIST in the program, its major use is in the preparation of the annual service contract invoice.

3.6.4 INVENTORY DATABASE FILE:

This file, which is also referred to as SP-LIST in the program, is made up of eleven fields. It presents to us the true picture of the stock level of every spare and consumable and helps in managing inventory. The file structure is as shown in Table 3.4 below

S/NO	Field Name	Field Type	Width	Key
1	PART-NO	Character	10	Number of a particular spare.
2	PART-NAME	Character	15	Name of the spare.
3	MODEL-NO	Character	6	Model number of machine using spare.
4	PRICE	Numeric	10	Cost of the spare.
5	STK-LEV	Numeric	4	Quantity of this spare in stock.
6	REORDER-LEVEL	Numeric	4	Stock level at which ordering process will be initiated.
7	LEAD-TIME	Numeric	3	Time lapse between order and receipt.
8	ORD-DATE	Date	8	Date of when last order was initiated.
9	Q-AGE	Numeric	4	Quantity of the spare received.
10	REC-DATE	Date	8	Date of receipt of last consignment.
11	Q-ORDER	Numeric	4	Quantity placed on order.

Table 3.7 INVENTORY FILE DATABASE

3.7 MODULES OF THE SYSTEM

In the design of the application software the principle of modularity was used so that the programming and debugging can be easy. The system is divided into different modules; each of these has been discussed in the sub-section in terms of the design concepts built into them. The procedure name for each module is written in parenthesis in the title for each module discussed below.

3.8 ENTERING DATA INTO CUSTOMER DATABASE FILE

This module provides for the indexing of this file on the CUST-NAME field and it is designed such that the user is prompted to enter the serial number of the machine whose data he wants to enter into the file. If the serial number does not exist in the file before this time, the routine will proceed to enable the user to enter other data, but if the data exist in the file the software will display a message "Data already exist in database" this is to avoid duplicating data. This routine also draws up a scheduled maintenance roster for all machines as soon as their data is entered into the file. It is designed such that sixty days after installation or service renewal the first scheduled maintenance will be carried out. The time interval between subsequent schedule maintenance depends on the type of machine. For copiers and plan printers the interval is sixty days, for memo-writer and computers the interval is 90 days while for fax machines it is 120 days. The implication of this arrangement is that copiers and plan-printers will be visited six times in a year for scheduled maintenance, for memo-writers and computers it will be four times a year and for fax machines it will be three

times a year. This package is also designed such that if the scheduled maintenance date by the above arrangement falls on a Sunday or Saturday the maintenance will be carried out on the Monday following it or the Friday preceding it respectively. The calculation for the scheduled maintenance dates is done internally and logged into the file and not on the screen. To ensure that erroneous data are not entered into the file the data entry process is displayed on the screen at the end of the process the software asks a question "Are your entries error free?" This gives the user the opportunity to look over his entries on the screen, if the user responds 'N' (NO) to that question the software allows him to make corrections. If the response is 'Y' (YES) it proceeds to ask "Do you want to enter another set of data?" If the answer is NO control returns to the main program if YES the user will be allowed to enter another set of data.

3.9 UPDATING RECORDS IN CUSTOMER DATABASE FILE

This module provides us with two ways of updating records in the customer database file. Whenever this module is activated all records of machines with service contract that expired more than three years ago are automatically deleted from the file. Also, through this module previous records of machines whose service contract has expired can be deleted before using the data entry module to enter the data of such machines into the file.

3.10 EDITING RECORDS IN CUSTOMER DATABASE FILE (MODREC)

This module provides the user with an avenue for effecting changes in customer

data in the file. It is possible for the telephone number or customer address to change during the service year, such changes will reflect in the file through the use of this module. It is designed such that it displays the complete record of the customer and his machine, so as to ensure that the correct record is the one that is being edited, also the editing is done on the screen before the record is transferred to the file.

3.11 DISPLAYING MACHINES DUE FOR SCHEDULED MAINTENANCE

This module simply displays the machines due for the first, second, third and fourth scheduled maintenance on a daily basis. The software in this module just scans the fields SCH1, SCH2, TO SCH4 of the file, and display records of machines that are due for schedule maintenance. The records are displayed under the following fields, CUST-NAME, CUST- ADDR, PRODUCT, MOD-NO and SERIAL-NO. The scanning of the above-mentioned fields is built into this module, while referring to another module titled SCH does the actual display of the machines.

3.12 ENTERING ENGINEERS DAILY REPORT INTO MACHINE HISTORY FILE

This is a routine that allows the user to enter data from the Engineer Call Report into the machine history file. The data being entered is first displayed on the screen and there is provision for checking such data for error so that correction can be made before the set of data are transferred or saved to the file.

3.13 EDITING MACHINE HISTORY FILE

This module is basically used for making changes in the above-mentioned file.

When an engineer visits a machine in order to repair it, if the job is not completed due to non-availability of required spares 'AP' (Awaiting Part) will be entered into the remark field via the module described in section 3.6.3. If the job is not completed for any other reason 'NC' (Not Completed) is entered into the remark field. When the engineer goes back to fix the machine and it is still not completed the above stated remarks will be entered into the remark field along side other entries from the ECR into the corresponding fields. By the time the engineer pays a return visit and completely repair the machine, this module will be used to change the entry in the remark field corresponding to the first visit by the engineer from 'NC' or 'AP' to OK. The date and time the job was completed will be entered into the COPL-DATE and COPL-TIME fields respectively. Thus if the engineer had to visit the machine three times before it could be repaired, the contents of the ECR corresponding to the first two visits are entered into the machine history file. After the third visit the entries corresponding to the first visit are changed as stated above in the machine history file so as to reflect the fact that the job has been completed.

3.14 HELP MODULES

There are two help modules namely, HOW DO I, and ABOUT THE PROGRAM. These modules give the user a summary of the function of most of the modules indicated in the various menus.

3.6 **FLOWCHARTING**

Flowcharts showing the flow of the program will be drawn under this section, they are as shown on the following pages

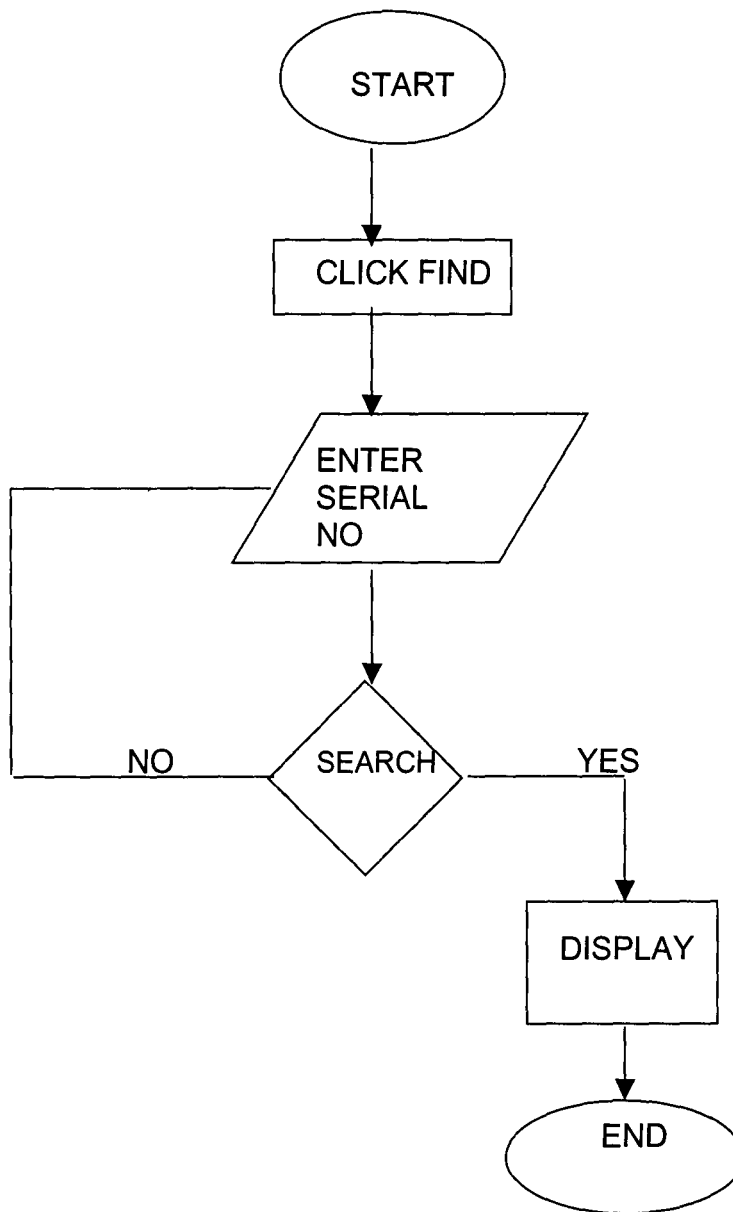


FIG 3.8 SEARCH FLOWCHART

3.7 FLOWCHART

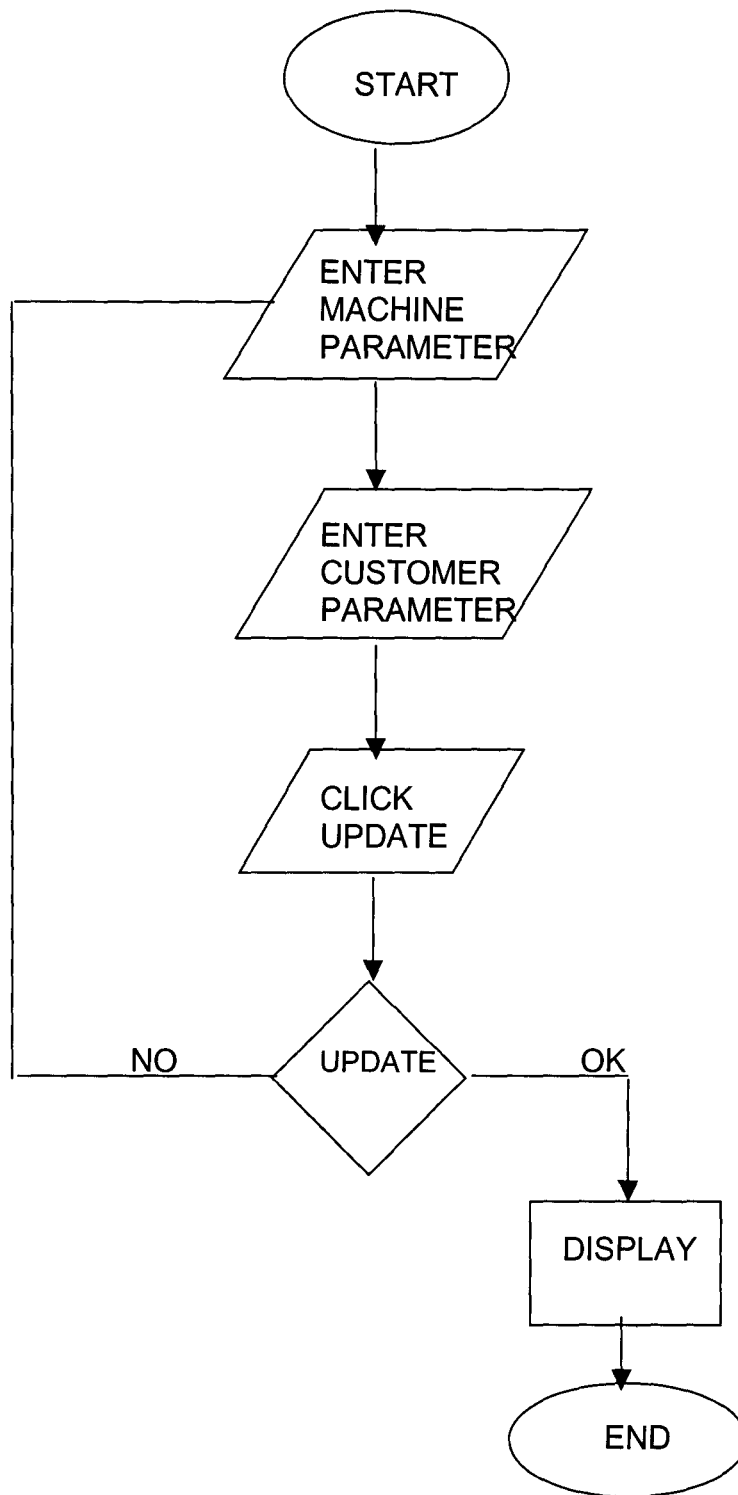


FIG 3.8 UPDATE FLOWCHART

3.8 FLOWCHART

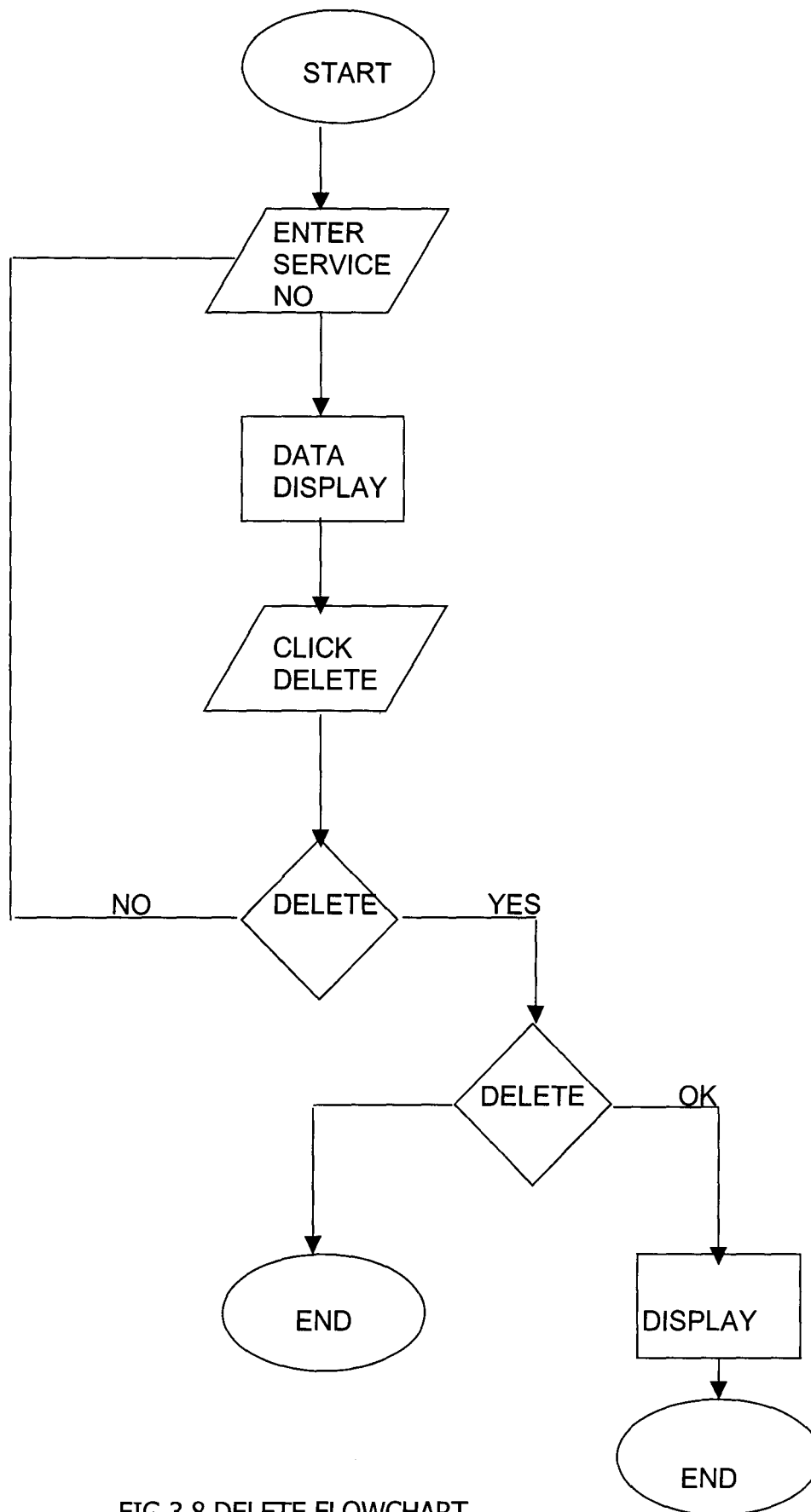


FIG 3.8 DELETE FLOWCHART
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CHAPTER FOUR

SYSTEM IMPLEMENTATION

After analyzing and describing the current manual system which uses card entries stored in card cabinets to provide information about machines, its various deficiencies have been isolated and a new system based on the computer technology has been designed to eliminate the inadequacies of the manual system.

The new system is to be operated on a microcomputer. Also the availability of modems and communications cables makes networking more sustaining for the desired system. Redundancy of data is avoided as one database containing all relevant information is kept, and can be accessed by either CSCE or Engineers. The space used up by card cabinets, and its inconveniences is greatly reduced as various workstations are placed which users can operate easily and quickly.

4.1 MICROSOFT VISUAL BASIC PROGRAMMING LANGUAGE

With technology not being static, Microsoft Windows becomes a household name and is available on virtually every Microcomputer as an Operating System. Visual Basic programming language manufactured by Microsoft Corporation is user friendly and makes use of windows environment to operate. The 16 and 32-bit version of Visual Basic for Windows version 6.0 will run on Windows, Windows for Workgroups, Windows NT, and Windows 95 environment.

Visual Basic allows Object linking and embedding (OLE). This is a technology that enables a programmer of Windows-based applications to create an application that can display data from many different applications and enables the user to edit that data from within the application in which it was created. In some cases, the user can even edit the data from within the Visual Basic application.

The Library program is created, as a CUSTOMER SERVICE. It is a collection of the form modules, standard modules, class modules, and resource file that make up an application. The CSCE window lists all the files in the application. Modules is created through **Form** (A form includes the controls and code associated with that form. You can share code throughout an entire project by putting the code in a form module or standard module and declaring the procedure Public). Forms are created to serve as the interface to the application. Each form is a window that displays controls, graphics, or other forms. A multiple-document interface (MDI) form act as a container for child forms and some controls drawn with the aid of the toolbox.

Controls, which are tools such as boxes, buttons, and labels, are drawn on a form to get input or to display output. They also add visual appeal to my forms. Using the Properties window set properties of each forms and controls. Properties specify the initial values for such characteristics as size, name, and position. The Properties window lists all the properties and their settings for the currently selected module or control. For easy operation by the user, the commands were grouped on a menu bar.

SPLASH SCREEN

A splash screen welcomes you to the running of this program. With "THIS PROGRAM IS LICENSED TO XEROX H. S."

LOG ON DIALOGUE EDITOR

After the splash screen you are requested to log on by clicking on ok to run the menu.

Menu Program: The project is menu driven. The programs that fall under this group are programs that design the various manes, which allows the user(s) to move around the system.

MAIN MENU SCREEN

OPEN: The open menu take you round all the database forms employ in this application, such as: REVENUE, ENGINEERS RECORD, PRODUCTIVITY, and courtesy machine.

EDIT: This allows you to use your familiar window application commands in the package, such as UNDO, COPY, CUT, and PASTE.

HELP: The help menu is design to assist you in going round the package with little or no problem with sub menu as: HOW DO I and ABOUT THE PROGRAM

UPDATE: This dialogue box allows you to save all the changes you made to the database in the course of your work.

DELETE: This module allows records that have already been entered into the database, which is not needed by the cataloguer to be erased.

FIND: This module searches for record in the master database file using any of the following fields, Serial no or model no. The field to search for is entered before the search commences.

4.2 IMPLEMENTATION

Since implementation includes those activities that take place to convert from the manually system which is currently in use to a modern system to be introduced through this project. And in doing this, the cost-benefit analysis theory has to be taken into consideration because huge amount of money will be required to change from the manual system to the new system.

In changing from manual system to a modern system, three questions must be addressed:

- i. The personnel on the ground.
- ii. Who are the people to operate the new system?
- iii. What type of changeover to adopt?

4.3 TRAINING

The various help files that describe the functions of the different routines in each menu have made training the user of this software very easy. Also, the user will definitely be someone who has been doing this same job before, but manually. Thus he is used to the various input documents.

In the light of the above the training process can be completed within two days and it will be carried out by the programmer/analyst that designed the software. It is also advisable that at least two persons are trained so that if one is not available the other person can use the software with little or no supervision.

4.4 CONVERSION

This is the conversion of the old file data into the form required by the new system. It is also regarded as part of changeover. For this aspect to take place, there are some important things to consider.

- (i) The system has been proved to the satisfaction of the system analysts and the other implementation activities have been completed.
- (ii) User manager are satisfied with the results of the systems tests, staff training and reference manuals.
- (iii) The target date for changeover is due when the above have been fulfilled, when the conversion can be done in any form of the followings.

(a) DIRECT CHANGEOVER

This is when the manual system is replaced by the new in one move. It is complete replacement once. This is feasible when everybody concerned has confidence in the new system. The changeover must be planned in detail, systems tests and training must be comprehensive. This changeover directly from old to new system is the least expensive but highly risky.

(b) PARALLEL RUNNING

This means processing current data by both the old and new system paripetu so as to strike a balance in form of result. One thing about this method is that it keeps the old system operation alive until the new system has been proved for at least one system cycle. It allows the result of the new system to be compared with the old system before acceptance by the user, thereby promoting user confidence.

But this method is very difficult and sometimes impracticable to adopt and more so, it is more capital intensive as compared to direct changeover.

(c) PILOT RUNNING

The concept of this is that of parallel running. And this is where data from one or more previous periods for the whole or part of the system is run on the new system after results have been obtained from the old system, and the new results are compared with the old. This method is more practical form of changeover of organisational reason with extended system test

like and is not as disruptive as parallel operation, since timing is more critical.

(d) STAGED CHANGEOVER

This is a method whereby a new system is being introduced in stages, which involve a series of limited-size direct changeovers. Under this system, a complete part or reasonable section is committed to the new system while the remaining parts are processed by the old system. Only when the selected part is operating satisfactorily is the remainder transferred.

This method reduces the risks inherent in a direct changeover of the whole system and enables the analyst and users to learn from mistakes made as the changeover progresses.

DISADVANTAGES

- i) It creates problems of controlling the selected parts of the old and new system.
- ii) It tends to prolong the implementation period.

4.5 MAINTENANCE

Whichever technique is chosen for the changeover from an old to a new method, a high priority must be given to establishing controls, by value or quantity, in order to maintain the quantitative integrity of the system.

Users should keep overall control records incorporating both computer and clerical control figures to prove that the changeover has not corrupted this

integrity. One of the reasons of changing into a new system is because of efficiency. The computer system must be maintained as at when due so that it can render optimum service. Most of the time, the system developer handles the maintenance of a system with other members of his team.

4.6 IMPLEMENTATION REVIEW

This is intended to check the accuracy and timeliness of the new system with a view of identify any unusual situation. This will be achieved through the following approaches:

- a) Event logging: This entails a user recording unusual event that affects the new system.
- b) Impact Evaluation: this determines the effect of the new system on the organization under review.
- c) Attitude Survey: This entails sampling the views of the staff on the ground towards the computerisation of assets declaration forms for public officers and the attitude was positive.

CHAPTER FIVE

5.1 OBSERVATION

Most of the outputs from the program designed in this project are displayed on the screen, while a few are printed outputs. This is in consonance with the modern concept of a paperless office, which aims at eliminating printed documents so that space can be conserved in the office. Outputs displayed on the screen can be analysed right there by the service team in order to know their strengths and weaknesses, decisions are then taken on what needs to be done in order to improve the lot of the customer. For outputs generated in printed form, the program was designed in such a way that such outputs are first saved to a disk file. Those files are printed using the mother software (Microsoft Access). By so doing the limitation of the programming language is overcome and the final output will be presentable.

It is assumed in this project that the service organisation maintains the following equipments: copiers, memo-writers, computers, plan-printers and facsimile machines. It is clear that the ranges of products classified as office equipment are more than these. The program can with minor adjustments be made to accommodate other types of office equipments not mentioned in this project.

Finally, it is important to note that the software designed in this project can be applied to the service management of other equipments that do not fall into the class of equipments considered here.

5.2 RECOMMENDATION

I hereby recommend that Xerox H .S Nig L t d that was used as a case study in this project should have the software installed on a computer system accessible to the engineers in each location. Also the company should in future think or plan towards connecting all the computer systems having the software in a Wide Area Network system so that all locations can have the opportunity of accessing a global database. The advantage of this comes to the fore especially when a customer is relocating to another state. As such customer requests for service in its new location, the Xerox office can by searching through the database know whether this customer is on service agreement or not and then advise him accordingly. In the present set-up such customers are often told to produce a receipt of payment for the Annual Service Contract as evidence that their service contract is still on. If the customer is unfortunate to have misplaced such a receipt he might be denied service for some time until Xerox is able to determine his contract status, may be by contacting the head office, it is certain that such a customer will be disappointed. To avoid this situation, the Wide Area Network should be put in place.

5.3 CONCLUSION

In this new millennium, organisations all over the globe have a uniform goal, which is that of making life more comfortable for man. World bodies like the United Nations are thinking of making the world a happier place for man. Manufacturing concerns are churning out products that will give man a higher level of convenience in his daily endeavours. Software developers are designing software that simplifies processes in the work place and make them result oriented. Service Organisations are regularly reappraising their procedures in order to offer better services lest they lose out to competitors. It is this same line of reasoning that prompted or motivated me to design this system: COMPUTERISATION OF ENGINEERS WORK PROCESS AT XEROX H. S. (NIG) LIMITED. I strongly believe that the aim of the design which can be summarised as "DELIGHTING THE CUSTOMER" will be attained in any service organisation that correctly applies this software to its service offering procedures

5.4 REFERENCES

- (1) Ogunwale, A. Customer Satisfaction Enhancement in the new Millennium,
Handout F.U.T Minna, 1999 (Unpublished Material)
- (2) Microsoft Office, Bill Gate 1997.
- (3) Microsoft Visual Basic, C.D Learning Edition.

5.5 APPENDIX

The following specimen outputs generated by the program and included in this section are listed below:

- (1) MIF (ASC)
- (2) MIF (UNPAID)
- (3) EXPIRED MIF
- (4) MACHINES AWAITING SPARES

All are labelled accordingly.