COMPUTER APPROACH TO EFFECTIVE ADMINISTRATIVE CONTROL OF PURCHASES AND SALES OF MANUFACTURED PRODUCTS

A Case Study of Minna Pharmaceutical and Surgical Company Limited (MPS)

BY

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CERTIFICATION

This is to certify that this work was undertaken by **ABUBAKAR UTHMAN UMAR** and has been read and approved by the undersigned for the award of Post-Graduate Diploma in Computer Science.

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EXTERNAL SUPERVISOR	**DATE**

DEDICATION

This project work is dedicated to my entire family.

ACKNOWLEDGEMENT

All praise be to God, the almighty that I live to undertake this work.

First, my special thanks goes to my project supervisor, Prince R. A. BADMUS for his good supervision, helpful advises and whose experience and brilliance has aided the production of this work. In addition, I also wish to thank all my lecturers in the department for imparting the knowledge which makes this work possible.

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ABSTRACT

The aspect of administering purchases of materials and sales of finished products in Minna Pharmaceutical requires computer application for the purpose of efficient production operations of the organisation.

In this study, computer application is expected to produce a program which will be used for managing production and sales activities in Minna Pharmaceuticals & Surgical Company Limited.

The intended language for the program development is Database Management System.

CHAPTER ONE

1.1 PREAMBLE

Computer is said to be an electronic machine which has the capability to accept input, process the input in order to generate output. That is, a computer processes data into meaningful information useful for formulating policy and decision making. This forms the basis of computer application into many areas of human endeavour.

One area that has fully benefitted from computerisation is the business environment where computers have been applied to record keeping, general ledger, account receivable and payable, personnel management system, Stock control, payroll system among others. All these made it possible for computers to be used in manufacturing organisation for operations such as procurement of materials, monitoring production process, quality control, stock control, marketing and sales operation, etc.

Minna Pharmaceutical and Surgical Company is an industry that requires computer-based operations. The computerisation can be adopted to all various departments that exist in the organisation for the purpose of attaining more efficient operations.

The features of computer such as accuracy, speedy processing of data, efficient retrieval of information, data security, etc would enhance the day to day operations of MPS.

1.2 HISTORICAL BACKGROUND OF MINNA PHARMACEUTICAL AND SURGICAL COMPANY LIMITED

The company was incorporated as a private limited liability company on 19th July 1982 with registration number RC 48420. by the Niger State government.

At incorporation, the authorised share capital of the company was ₦1,000,000.00 divided into 1,000,000 ordinary shares of ₦1.00 each. The share capital was progressively

increased to cope with the incidence of inflation and now stands at ₦91.00 millon. All have been called up for payment and the sum of ₦62.00 million has been paid up. In April 1990, the Nigerian Industrial Development Bank (NIDB) offered a long term loan for the procurement of machinery/equipment from SCOA Equipment International of France while the installation was done by Messrs LAB-DEBAT Ingenerie of France.

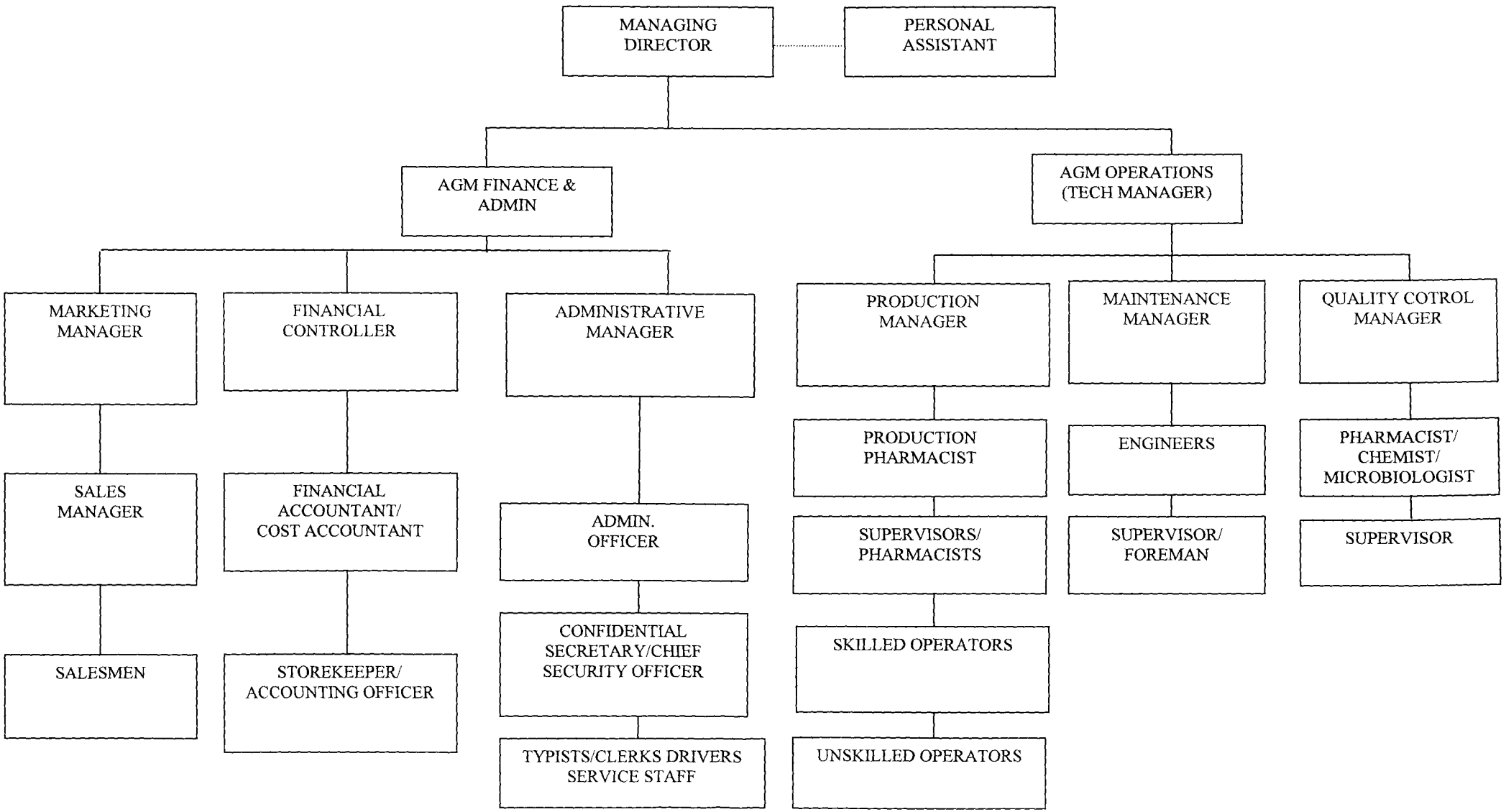
After a successful test-run, the factory was commissioned on 23rd August 1993 by the then President and Commander in Chief of the Armed Forces of the Federal Republic of Nigeria, Gen. Ibrahim. B. Babangida (Rtd).

1.3 OBJECTIVES OF MINNA PHARMACEUTICAL AND SURGICAL COMPANY LIMITED

The company was established mainly to manufacture drugs (in the first phase) and surgical materials (in the second phase) and to contribute to the much desired industrialisation of Niger State. Apart from giving employment to Nigerians, the establishment of the company has advanced the course of self-sufficiency in drug manufacturing in the country.

Under the first Phase, the company is to establish manufacturing plant for the production of tablets, capsules and syrups. The product range is to cover anti-materials, analgesics and antibiotics.

ORGANIZATIONAL CHART



The Managing Director is the Chief Executive Officer of the company. He is responsible to the board of directors of the company.

Next to the Managing Director are the two Assistant General Managers i.e. Finance & Administration and that of Operations or Technical. The AGM Finance & Administration is the head of Marketing, Finance and Administration departments while the AGM Operations is the head of Production, Quality Control and Maintenance departments.

The Personal Assistant to the Managing Director, though an administrative position, is to a larger extent responsible to the Managing Director.

The functions of the departments are enumerated as follows:

1. **MARKETING/MATERIAL MANAGEMENT DEPT**

i. Responsible to the Managing Director

ii. To identify, research, expand and develop new products/lines for the company and new concept and innovation to minimize product cost.

iii. To develop special products and liaise with various government and local government authorities to source for order and manufacturing contracts.

iv. Registration of Trade Names and Products with Government Agency.

v. Represent Company in relevant professional Associations e.g. PMG-MAN, PHARMACEUTICAL SOCIETY OF NIGERIA, etc.

vi. Ensure Company compliance of Government Policies and Regulations.

vii. Collect and collate data, locally and from overseas suppliers and co-ordinate the procurement of raw materials and keep the company abreast of the changes in the market of such materials.

viii. Disbursement of raw and packaging materials and handling of finished products.

ix. Monitoring the stock levels of raw and packaging materials.

x. Initiating the re-order process for items that have reached re-order levels.

xi. Supplier search and solicitation for raw and packaging materials earmarked for purchase.

xii. Monitoring the disbursement of materials used in the production process.

xiii. Responsible for storage and handling of finished products.

xiv. Periodic stock-taking of items in the raw materials and finished goods stores.

xv. Perform any other duties as may be assigned by the Managing Director.

2. **FINANCE AND ACCOUNTS DEPARTMENT**

i. Product, and process costing.

ii. Stock accounting for both raw materials and finished goods.

iii. Receipts and payments in respect of all monies due to the company and payment on behalf of the company.

iv. Preparation of both management accounts and financial reports i.e. Trial balance, profit and loss and balance sheet periodically

v. Liaise with External Auditors in terms of Annual Reports, with various institutions in terms of corporate taxes, levy, and other statutory payment.

3. **ADMINISTRATION DEPARTMENT**

i. Responsible to the Managing Director.

ii. Co-ordinate all personnel functions of the company viz: manpower training, medical and general welfare of staff, maintenance, repairs and usage of vehicles, purchase and maintenance of fixed asset.

iii. Co-ordinate all personnel functions of the company such as recruitment, secondment, confirmation, dismissal and other disciplinary measures as well as leave, salary and allowances administration.

iv. Ensure compliant of factory as regard factory premises, security of plant, equipment, machinery and staff.

v. Assist the Managing Director to liaise with the company secretaries, Auditors, Legal advisers, media, business consultants and other professionals in the conduct of company business.

vi. Maintenance of records as needed for planning and administrative purpose, and generation of management information including preparation of staff lists.

vii. In charge of insurance matters(general).

viii. Purchase of general administrative consumables.

ix. Participating in drafting master and departmental budgets.

x. In charge of promotional activities, e.g. corporate adverts, purchase of promotional items such as souvenirs, calendars, etc.

xi. Public relations co-ordinator with organisations, individuals and government agencies and organising meetings with such external bodies.

xii. Advices management on membership of clubs, Associations; Unions and professional bodies.

xiii. Any other duties assigned by the Managing Director.

4. PRODUCTION DEPARTMENT

The production department has the responsibility and authority to:

i. Manufacture, process, pack and hold drug products in accordance with approved master formulae and procedures.

ii. Initiate manufacturing order.

iii. Develop a system of batch and lot numbering of the company products.

iv. Develop a general coding system for the raw and packaging materials as well as the finished products.

v. Document all production and process control procedures.

The Production and Quality Control departments should share and join responsibility to:

i.. Establish and authorise written production and process control procedures.

ii. Monitor and control the manufacturing environment.

iii. Ensure plant/equipment cleanliness

iv. Plan production validation programme

v. Calibrate measuring devices in the factory.

vi. Train the personnel in accordance with the provision of good manufacturing practice (GMP).

vii. Protect products and materials against spoilage and deterioration.

The department in conjunction with other departments continue to develop procedures for-

a. Product recall.

b. Handling goods returned from customers.

c. Handling products complaints.

d. The maintenance of plant equipment.

e. The storage of products

f. Self-inspection programme

5. MAINTENANCE DEPARTMENT

The responsibility of the maintenance department are:-

i. To keep documents about plant and facilities.

ii. To provide information about plants and facilities when required.

iii. To study equipment and undertake plant revision.

iv. To take care of preventive maintenance.

v. To take care of corrective maintenance.

vi. To take care of the installation of new equipment and supervision of civil work.

vii. To provide routine upkeep of property and premises.

6. QUALITY CONTROL DEPARTMENT

The quality control department is an independent unit charged with the responsibility of ensuring that products consistently have quality appropriate to their intended use.

The department has the responsibility and authority to approve or reject all components, drug product containers, closures, in process materials, packaging materials, labelling, and drug products, and the authority to review production records to ensure that no errors have occurred or, if errors have occurred, that they have been fully investigated.

The department is responsible for approving or rejecting drug products manufactured, processed, packed, or held under contract by or for another company.

Good manufacturing practice specifies the following principal duties for quality control unit;

a. To establish and revise control procedures and specifications.

b. To prepare detailed written instructions for carrying out each inspection, test and analysis.

c. To establish written sampling plan and sampling procedures.

d. To maintain retained sample for future reference

e. To release or reject each batch of starting materials, intermediate, bulk and finished product.

f. To review all documentation relating to the batch processing, packaging and testing of each batch of finished product before authorizing release for distribution.

g. To evaluate the stability of all finished products on an on going basis and raw materials where necessary, and to establish instruction for the storage of materials, and products within the manufacturing plant on the basis of their stability data.

h. To establish expiration dates and shelf-life of raw materials and finished products based on their stability data or storage condition.

i. To evaluate and approve any reprocessing procedure for products.

j. To approve those suppliers of raw materials and packaging materials known and believed to be capable of and reliable for supplying starting materials that meet the company's established quality specifications.

k. To take part or assist in validation program

l. To evaluate all complains received or deficiencies noted about any batch, if necessary in co-operation with other units of the company, and to take appropriate corrective action.

m. To prepare secondary reference standards as specified in the current procedure for testing and to store these standards under proper conditions.

n. To maintain analytical records of the examination of all samples taken.

o. To evaluate returned drugs and determine whether those drugs could be released or reprocessed or should be destroyed.

p. To participate in the self inspection program with other units of the company.

q. To recommend contract manufacturing operation after evaluating the contractor's capability to produce products that meet the company's specified quality standard.

1.5 THE OPERATIONS AND ACTIVITIES OF MINNA PHARMACEUTICAL AND SURGICAL COMPANY LIMITED

1. Production Lines and Production Capacity

The company is highly committed to the production of high quality products suitable for distribution anywhere in the world. In the pursuance of this commitment, the company installed lines for the production of tablets, capsules and syrups.

On tableting line, two semi-automated 27 station rotary tableting machines and a single station tableting press with punches and dies of various sizes have been installed and have annual production capacity of 400 million tablets on an eight-hour single shift per day. This capacity can be doubled as the circumstances may dictate. Complimentary equipment to the rotary machine include;

* Fluid Bed Dryer
* Communiting/Granulating machines
* Cubic Mixer
* Collette(R) Mixer/Granulator

The capsule line is installed with an automated Zanassi(R) capsule filling machine with capacity to fill 40 million capsules annually on single 8 hourly shift per day.

The liquid line is also fully automated with a king syrup line assembly installed. It is fitted with bottle washing, drying, filling, capping as well as labelling devices. It is equipped with sensors to ensure early detection of faults.

The liquid line has annual installed capacity of 10 million 60ml bottles on a single shift operation. Facilities for large volume preparations are also available.

The production department has developed procedures which ensure strict adherence to Good Manufacturing Practice (GMP) standards. These procedures are religiously adhered to, to ensure the manufacture of quality products.

2. Quality Assurance

A product that does not meet internationally acclaimed standards could not have been produced by MPS. The quality control department is fully equipped to meet the challenges of adhering to international standards. A few of the equipment in this department include:

* U.V/ Visible Spectrophotometer
* Laminar flow Cupboard
* Fume Cupboard
* Polarimeter
* Flame fast
* I.R. moisture content determinant
* Centrifuges, Incubator, Colony Counters and Autoclaves

Thus, the quality control department certifies the raw materials used for production, undertakes timed in-process inspection to ensure compliance with the laid down parameters and assures the quality of each product before leaving the factory. As such, each product has quality built into it and therefore meets the desired characteristics of identity, purity, potency, efficiency, uniformity and stability.

3. Factory Maintenance

The survival of any factory is largely dependent on the optimum performance of installed machinery, and associated equipment. With this in mind, an autonomous maintenance department headed by an experienced engineer was established. The department is further subdivided into an electrical and mechanical unit. Technical staff in both fields undertake regular maintenance schedules to avoid breakdowns. The department also maintains a well-stocked spare parts store.

4. Marketing Services

In its desire to ensure wide distributions of its products, the company established a marketing department. In addition, experienced and tested sales personnel were recruited to detail the company's product. Registered distributors have also been appointed in different parts of the country.

Products

After liasing with the appropriate regulatory bodies, the following products were manufactured by the company for open market operations and various clients especially the Petroleum (special) Trust Fund (PTF).

1. Mindol (Paracetamol 500mg) tabs
2. Mindol (Paracetamol 125mg/ml) syrup
3. Minquine (Chloroquine Phosphate 250mg) tabs
4. Minquine (Chloroquine Phosphate 50mg/5ml) syrup
5. Minxyllin (Amoxycillin Trihydrate 500mg) caps
6. Mincillin (Ampicillin Trihydrate 500mg) caps
7. Mincloxin (Ampicillin Trihydrate 250mg + Cloxacillin Trihydrate 250mg) caps
8. Metronidazole tabs 200mg

9. Frusemide tabs 40 mg

10. Amitriptyline tabs 25mg

11. Benzhexol tabs 5mg

12. Dexamethasone tabs 4mg

13. Diazepam tabs 5mg

14. Ethambutol Hcl tabs 100mg

15. Prednisolone tabs 5mg

16. Nifedipine tabs 10mg

17. Praziquantel tabs 600mg

18. Thiacetazone 300mg + Isoniazid 150mg tabs

19. Methyldopa tabs 250mg

20 Folic acid tabs 5mg

21. Compound Magnesium Trisilicate tabs

22. Benzyl Benzoate lotion x 2 Litres

23. Methylated Spirit x 4 litres

The Company's ability to manufacture these drugs is no mean achievement as most of them are rare but essential and life-saving.

Patronage

Since the commencement of production in 1993, the company's products have received wide coverage and acceptance all over the country through the open market operations.

Similarly, the company has been able to produce for esteemed clients amongst which are:

* Niger State Govt.
* Kaduna State Govt.
* Plateau State Govt.
* Sokoto State Govt
* Central Bank of Nigeria, Abuja
* Nigeria Sugar Company, Bacita
* Bio-Medical Services Ltd, Ilorin
* Aso Rock Clinic, Abuja
* Gwagwalada Specialist Hospital
* Petroleum (Special) Trust Fund

Consultancy Service

With the installation of drug quality Control and assurance facilities, the company also undertakes Consultancy Services for individuals and organisations. Substance identification, establishment of potency, and product stability can readily be undertaken by trained hands in the company.

Materials Management and Stock Control

The materials management and stock control department is responsible for;

(a) Procurement and disbursement of raw and packaging materials.

(b) It also has the responsibility for the storage and handling of finished products,

In the discharge of these duties, the department is in constant liaison with production, Quantity Control and Maintenance departments.

The activities of the store in respect of receipt and issuance of all company products and property are also supervised by the department.

1.6 AIMS AND OBJECTIVES OF STUDY

The basic aim of the study is to analyse the operation of purchases and sales of drugs in MPS in order to design and implement a computerised system.

The computerization will be aimed at promoting and enhancing the general operations of the organisation. Given this, the aim and objectives are outlined as follows:

a) To study and analyse the existing system of managing purchases and sales in MPS.

b) To design package which will be used to replace the existing manual system.

c) To provide a basis for the implementation of the new system by putting in place the required environment for its application.

d) To put together, a documentation manual required for the purpose of future reference by the users.

e) To put in place, the required procedures to improve efficiency of the system.

1.7 DATA COLLECTION TECHNOLOGY

A study of this nature requires data to be collected for the purpose of analysis and design. The data needed for collection are information about the purchase and sales activities of MPS.

Specifically, there are two sources of data namely:
Primary and Secondary sources of data. For this study the two sources were adopted to collect the data.

In the case of the primary source of data, the methods used are, observation and interviewing. Observation was made possible because of the participation of the writer in the operations of MPS. Interviewing was only used as a means of supplementing the first method to obtain additional information.

However, the secondary source data was published text, journals and written books among others to obtain information.

CHAPTER TWO

2.1 AN OVERVIEW OF THE PHARMACEUTICAL INDUSTRIES

THE EXPERIENCE OF MINNA PHARMACEUTICAL AND SURGICAL COMPANY LIMITED

Taking an overview of the development of the pharmaceutical industry in the country, the following facts can be identified:

(a) The Pre-1957 Era - which witnessed a predominant monopoly of the pharmaceutical market by foreign companies - local pharmaceutical companies were virtually non-existent.

(b) 1957-1969 Era - in which many of the multinational pharmaceutical companies, including Afrab Chem; Boots, Ciba, Immarsel and Park Davies, displayed more vigour, in only setting up more shops in Nigeria with Biode and Toki Pharmaceutical Companies representing the first set of indigenous Pharmaceutical Companies in 1968.

(c) 1970-1983 Oil Boom Era: This can be described as the golden era which witnessed a Pharmaceutical growth in the Pharmaceutical industry in NIGERIA; especially between 1970 and 1980 - the peak of the oil boom.

The importance of this era are two:

(i) Creation of an attractive economic environment for both local and foreign investment, and

(ii) Forceful incursion of several key multinational companies into Nigeria, with many of them going into local production of drugs, examples included, Bayer, MSD, Roche Upjohn, among others.

(d) 1983-1986 Import License Era - perhaps represented the most turbulent period for the pharmaceutical industry in Nigeria. It was an era when pharmaceuticals were equated

with other commodities as pharmaceutical products were freely imported, with little or no supervision - with the spill-over effect of extending into the present scenario in the country.

(e) The 1987-1995 SAP Era - equated with a period of mass divestment by many multinational companies from Nigeria. But ironically, this opened up more opportunities for increased local production.

(f) 1996-1999 Era has been typified by the operations of the Petroleum (Special) Trust Fund (PTF) set up by Late General Sani Abacha.

Initially, the PTF patronised some of the local drug manufacturers, thus raising the industry's capacity utilisation to about 35%. This never the less, was shortlived.

With 77 companies in active production out of about 130 pharmaceutical companies in Nigeria today, most of the manufacturing going on in Nigeria today is secondary or tertiary because of the lack of Capital and lack of encouragement for local drug manufacturers.

Recently, operators of the Pharmaceutical Industry already operating on the fringe may close shops if the government does not urgently address the major problems affecting the sector.

Some of the problems include:

(a) Lack of government patronage and encouragement;

(b) Poor infrastructure;

(c) Low consumer purchasing power;

(d) High tariff on imported raw materials;

(e) Dumping and smuggling of pharmaceutical products;

(f) Faking and adulteration;

(g) High interest and foreign exchange rates, among others.

In the wave of the intricacies highlighted above, MPS has found itself thriving as a wholly indigenous pharmaceutical manufacturing and marketing company.

MPS's experience has been daunting and persistently challenging for the company which started out in 1983 being one of the most turbulent period for the pharmaceutical industry in Nigeria.

The success of any business enterprises is highly dependent on availability of working capital at commencement of operations. However, six(6) years after commissioning, MPS has been unable to source adequate working capital for its operations. The effect of this has been so severe that the company is constantly under the threat of closure.

The involvement of the company however, in PTF projects from 1996-1999 has contributed greatly to the survival of the company. Apart from the financial benefits, the company was also able to increase its range of products. This Product innovation led to the manufacture of highly essential but rare drugs for the benefit of Nigerians. In the process, the company became the only manufacturer of such products in the country.

In so much as the products of the pharmaceutical industries affect the lives, health and welfare of humans, does it command the continuous attention of the Federal and State Health authorities. Invariably, the production and operations of MPS are routinely monitored by the Pharmacists Council of Nigeria and National Agency for Food and Drugs Administration and Control the two Federal agencies whose operational guidelines are sometimes difficult to adhere to because of their stringent conditions.

The Nigerian economy has been classified as a developing one which is highly dependent on external sources of machinery and equipment as well as raw materials for its pharmaceutical industries. This dependence on foreign sources has always mitigated against the achievement of set target in terms of volume of sales and returns on investment in MPS.

In spite of all odds, with a population of over 100 million, Nigeria should remain an attraction for local drug manufacturing, especially with the prevailing atmosphere of political stability and economic growth.

2.2 QUALITY ASSURANCE AND THE PHARMACEUTICAL INDUSTRY

The survival of a company is largely dependent on its ability to satisfy customers need at all times as well as the functionality and performance of its products. The heart of any pharmaceutical manufacturing system is quality control.

One of the principle objectives of quality assurance is that the materials produced is of the quality required to comply with all government regulations as well as company standards and specifications.

Quality assurance functions in the pharmaceutical industry include:

(i) Establishment of quality standards and approval of specifications and control methods for raw materials, packaging materials, In process control and finished products.

(ii) Evaluation and approval of manufacturing procedures.

iii) Release or rejection of all materials and products after ensuring that all the required tests have been performed by competent, reliable personnel.

(iv) Validation and calibration of equipment.

(v) Evaluation of storage conditions for raw materials, intermediates and finished products.

(vi) Evaluation and justification of the expiry dates based on adequate stability tests.

(vii) Monitoring all production processes and storage conditions

viii) Establishment of adequate sampling procedures

(ix) Active participation in research and development of materials and analytical procedures.

(x) An established system to review complaints and effect recalls if necessary.

2.2.1 Objectives of Quality Control

Most companies undertake quality control programmes with the following objectives in mind.

(a) Reduction in wastage rate

(b) Minimisation of customers' complaints and products return rate

(c) Increasing the proportion of non - defective products going to the customers

(d) Prevention of defective raw materials from getting into the production system.

(e) Enhancing the conformance of product performance with customers expectations.

2.2.2 Conformance Quality

Production and operations management has the task of achieving a product which matches the design quality. Activities towards this achievement are separated into the categories of failure costs, appraisal costs and preventive costs.

(i) Internal Failure Costs

These occur when products fail to reach designed quality standards. In this case, the product is either sold as scrap or re-worked or downgraded depending on the extent of failure. Failure analysis will establish the causes of internal product failure.

(ii) External Failure Costs

These costs occur when products fail to reach design quality standards and detected after transfer to the customer. When this occurs, the products are usually returned with the possibility of warranty claims in some cases.

(iii) **Appraisal Costs**

These costs are associated with the evaluation of purchased materials, processes, intermediaries, products and services, to assure conformance with the specifications.

(iv) **Prevention Costs**

These are associated with the design, implementation and maintenance of the quality system. These are planned and incurred prior to production. Resources devoted to prevention give rise to the costs of making it right the first time.

2.2.3 Validation

Validation is the obtaining and documenting of evidence to demonstrate that a method can be relied upon to continually produce the intended result within defined limits. In the pharmaceutical industry, there are two major types:

(i) Process validation which can be prospective, concurrent, retrospective or repeated (re-validation).

Prospective is carried out during the developmental stage and the result of a risk analysis carried out on the production process while concurrent is carried out during the normal production.

Retrospective involves looking back in to past experiences obtained during production while re-validation of equipment is always required immediately after repairs or extensive servicing.

(ii) Analytical Validation. This seeks to demonstrate that the analytical methods provide results which permit an objective evaluation of the quality of the product as specified.

2.3 THE NEED FOR EFFECTIVE GOOD MANUFACTURING PRACTICE (GMP) IN PHARMACEUTICAL INDUSTRY

2.3.1 Need for Control

Regulated products(Foods, drugs, cosmetic, medical devices and bottled water) contain biologically active substances. They share in varying degrees potentials to induce unwanted as well as beneficial effects on the consumer. The risks of serious un - wanted effects and also of therapeutic failures are greatly accentuated when such products are processed, packaged and labelled in conditions that fall short of accepted norms of GMP due to the risks of introduction of biologically active chemicals, or organisms or excipient and constituents of the environment or contaminants or packaging.

Manufacturers are, therefore, obliged to process and package regulated products in strict adherence and compliance with accepted norms of GMP and also to assure their correct and rational use through adequate, truthful and reliable labelling, backed by marketing force that educates on the appropriate or rational use of the regulated product.

2.3.2 Rational for GMP

The term "Good Manufacturing practice" suggests effective employment and management of the production process in such a manner as to provide reliable safeguards for what can go wrong in the various stages and operations on the manufacturing process. This is specially applicable to large scale operations employing machinery and personnel of diverse functions, qualifications and experiences.

Consequently, the scope of GMP is very wide and in this context, extends from production planning, equipment sourcing, and installation to the requirements for the premises, personnel, raw materials acquisition, specifications and storage and to process operations,

finished product quality assurance, labelling, packaging, advertisement, distribution and sale to the consumer.

3.2.3 Attributes of GMP

Effective GMP in the processing of regulated products are as follows:

(a) Provides a comprehensive and reliable basis for quality assurance auditing necessary to assure that all operations are carried out in specified and acceptable norms;

(b) Provides a safe guard and rational for the certification and acceptance of regulated products moving in international trade and commerce;

(c) Provides safeguard for potential contaminants and impurities relevant to established standards, specifications, and pharmacopoeial monographs which can be generated in the production process if acceptable GMPs are not effectively managed and enforced;

(d) Provides attestation to the competent authority of an importing country that the regulated product is manufactured in an approved processing establishment which is subject to inspection at suitable intervals in order to ensure that the manufacturer conforms to the principle of GMP.

(e) Provides an appropriate mechanism for controlling legitimate trade in regulated products and of combating illicit trade in falsely labelled substandard and counterfeit regulation products.

2.3.4 GMP as a Regulatory Tool

As provided in the enabling laws and regulations, the importation, manufacture, sale and advertisement of drugs in Nigeria is prohibited unless such a drug has been duly registered by NAFDAC. The registration process in NAFDAC regards GMP as the most critical factor that must be evaluated and certified for any drug to be granted marketing license.

Registration is intended to assure that the drug is manufactured by NAFDAC authorised and licensed establishment.

A product would qualify to be registered by NAFDAC after a satisfactory assessment and evaluation of the GMP of the manufacturer supported with analytical evaluation of the drug to conform standards specifications and compendia requirements of the drug in addition to other regulatory considerations.

The process of registration seeks to ensure that the registered drug is suitable for intended purpose, wholesome and safe in usage. The WHO believes the unregistered drug is a counterfeit one.

Various principles and codes of manufacturing have been developed for national, international, professional and trade associations to guide manufacturers of drug and cosmetic products. Such codes are variously described as GMP code of ethics, Code of principle, Guidelines, etc.

Essentially, they provide in detail, requirements and specifications for all aspects of the production, processing, distribution, promotion, sales and advertisement of drug and cosmetic products. They establish norms and specify requirements for:-

1. Premises layout and amenities
2. Equipment installation, maintenance and sanitation
3. Raw materials, in process and finished products specifications and controls.
4. Documentation, labelling and packaging of finished products,
5. Operatives qualification, experience and training
6. Verification of processing operations and quality control systems,
7. Personnel conveniences, hygiene sanitation and medical status of operatives etc.

Certain governments, especially in the developed countries, have the resources to inspect and evaluate GMP in foreign processing establishments from where they import drug products and also can perform full analysis of samples of each imported consignment. But such safeguards are beyond the resources of developing countries which depend mainly on imported drugs. In recognition of this handicap, WHO in accordance with various resolutions of World Health Assembly, have established appropriate requirements for GMP for the manufacture and quality control of drugs.

These requirements have since been developed into certification schemes for such products moving from one country to another. In essence, the certification schemes provide for the exporting country to establish, after due inspection, a list of manufacturers complying with GMP and the insurance of manufacturing and batch certificates of free - sale by the responsible health authority of the exporting country. In Nigeria, this is NAFDAC.

In this connection, it is necessary to briefly highlight the relevant scheme of GMP which has been developed from the initiatives of WHO and essentially for the basis for the manufacture, processing and distribution of drug products especially if such drugs move from one country to another.

Recognizing the need to establish norms for effective GMP the World Health Assembly endorsed the first version of the WHO Good Manufacturing practices Text and WHO certification scheme on the Quality of pharmaceutical products moving in International Commerce in 1969. These texts have since been amended (1975) reviewed, and later expanded in the area of starting materials (1988) to provide additional assurance for active pharmaceutical ingredients. In accordance with this scheme, two kinds of certificates can be issued, Viz GMP certificate and Batch certificate.

GMP certificate identifies a manufacturer and recognizes the GMP capability of the company as attested to by the competent regulatory authority of that country. The Batch certificate, on the other hand is issued by the manufacturer and would normally refer to an individual batch of active pharmaceutical ingredients (API) or dosage form.

It can be inferred from the foregoing that the WHO certification scheme for pharmaceutical products moving in international trade form the drug processing establishments. If therefore portends grave implications for public health and export potentials of Nigeria if we neglect to adopt and strictly enforce their principles in the manufacture, importation, sale and advertisements of Food and Drug products in Nigeria.

Consequently, it is very important and a challenge to consider and evaluate:-

(a) The extent to which GMP of pharmaceutical industries in Nigeria can be said to comply with accepted norms and WHO requirements for GMP as outlined above;

(b) The level of knowledge, experience and culture of manufacture in our industries that can satisfy the requirements for effective GMP;

(c) The regulatory and enforcement capacity necessary to guarantee effective GMP in these industries;

(d) Level of education and awareness among consumers to enable them demand compliance with those requirements that can fulfil conditions for the WHO certification scheme.

2.4 TOWARDS SALVAGING THE PHARMACEUTICAL INDUSTRY

The pharmaceutical Industry is facing serious challenges globally. stiff competition, sophistication of customers or consumers and technological advancement are causing the collapse of some companies while others are sharpening their strategies for survival. Mergers and acquisitions are going on as a way of gaining competitive advantage in the market.

Businesses are adopting better leadership and management strategies to succeed. Many are introducing radical culture changes, developing clearer visions and sense of values and improving on communication, human relations, motivation and stimulation of creativity among the staff. But control of these micro environmental factors alone cannot assure the success of the business strategies.

Factors external to the business which are largely uncomfortable, yet are potentially relevant to marketing plans and decisions represent part of the operational business environment. These factors constitute the macro-environment.

Social, technological economic and natural environments are critical to the survival of the pharmaceutical industry. But by far the most important factor is the government environment.

The Nigeria Pharmaceutical Industry has been described as an over regulated industry. Several Government agencies play one role or the other in creating an enabling environment for manufacture, Sale, importation, Distribution and dispensing of drugs.

NAFDAC, Customs and Excise Department, Federal Environmental Protection Agency (FEPA), Board of Inland Revenue, Standard Organisation of Nigeria (SON) Pharmacists Council of Nigeria (PCN) and even the Central Bank of Nigeria (CBN), all contribute to the macro-environment of the industry.

Government is directly related to economic conditions through exercise of monetary and fiscal policies. The powers and policies of government affect the state of the economy generally.

The industry operates presently under a tariff regime of between 10% and 45% on its raw materials, pays VAT on raw materials while not charging VAT on finished products. The 25% rebate on the tariff on their raw materials input granted all manufacturers including

pharmaceutical manufacturers was removed in the 1999 budget and was later restored for other industries.

In order to encourage the local pharmaceutical industry, government should bring down the customs tariff on pharmaceutical raw and packaging materials to 0%. This will help to justify governments concern for making medicines available and affordable to the people.

Since medicines are exempted from VAT raw materials used for manufacturing the medicines should be exempted from VAT. The fact that the 25% rebate on the tariff on pharmaceutical raw materials was not restored for the industry is surprising. Pharmaceutical industry is one of the strategic industries and therefore, should be so treated.

On the long run, government should reduce its dependence on imported raw materials for drug manufacturers which today stand at about 80%. This can be achieved by hastening the completion of the phase two and three of the pharmaceutical industry. It is estimated that 70% of the raw material requirements for the pharmaceutical industry would be produced when the petro chemical industry is fully operational. Government should have the political will to salvage the pharmaceutical industry.

2.5 ADMINISTRATION OF PURCHASES IN A MANUFACTURING SECTOR

Since Administration is the act of managing human and material resources to achieve objectives set by the Organisation, it is important to note that Administration of purchases for industrial use is aimed at promoting efficiency in the purchasing process.

2.5.1 Industrial Purchases Decision Process

For effective administration, all industrial purchases move through a procurement process. Eight stages of this process are identified below:

(A) **PROBLEM RECOGNITION**

The Purchasing process begins when someone in the company recognises a problem or need that can be met by acquiring good or service.

(B) **GENERAL NEED DESCRIPTION**

Having recognised a need, the buyer proceeds to determine the general characteristics and quality of the needed item. If items are complex, the buyer will work with others - engineers, users etc to define the right quality and quantity, price etc.

(C) **PRODUCT SPECIFICATION**

The buying Organisation will develop items' technical specifications. Tightly written specifications will allow the buyer to refuse merchandise that fails to meet intended standards. Suppliers, too, can use product- value analysis as a tool for positioning themselves to win a contract.

(D) **SUPPLIER SEARCH**

The buyer at this stage tries to identify the most appropriate supplier, through trade directories, computer search, phones etc. Those who qualify may be visited to examine their production facilities and personnel where necessary.

(E) **PROPOSAL SOLICITATION**

The purchaser will now write qualified suppliers to submit proposals. A written proposal or quotation may be required from each supplier.

(F) **SUPPLIER SELECTION**

The purchaser will perform a vendor analysis to select supplier(s). They will consider not only the suppliers technical competence, but also their ability to deliver on time and provide necessary services.

Those things to consider are delivery capability, quality, price, repair service, performance history, production facilities, aid and advise. Buyers must also decode how many suppliers to use etc.

(G) ORDER ROUTINE SPECIFICATION

The purchaser now writes the final order with the chosen supplier(s) listing the technical specifications, the quantity needed, the expected time of delivery, return policies, warranties etc.

(H) PERFORMANCE REVIEW

Here, the purchaser reviews the performance of the particular supplier(s) using any or all the methods listed below.

(i) The purchaser may contact the end users and ask for individual evaluation.

(ii) The purchaser may rate the supplier(s) on several criteria using weighted point method.

iii) The purchaser might aggregate the cost of poor performance to come up with adjusted cost of purchase or industry price.

The performance review may lead the buyer to continue, modify or drop the supplier.

2.5.2 Market Targeting and Market Positioning

Market segmentation reveals the market segment opportunities facing the firm. The market has to evaluate the various segments in order to ensure adequate coverage. To evaluate, we need to consider three factors namely:

(i) Size and growth

(ii) Segment structural attractiveness and

iii) Company objectives

(i) **Size and Growth:-** Large firms prefer segment with large sales volumes, while small firms avoid large segments because they require too many resources. Segment growth is normally encouraged since firms want growing sales and profits. However, competitors will rapidly enter growing segments and increase their profitability.

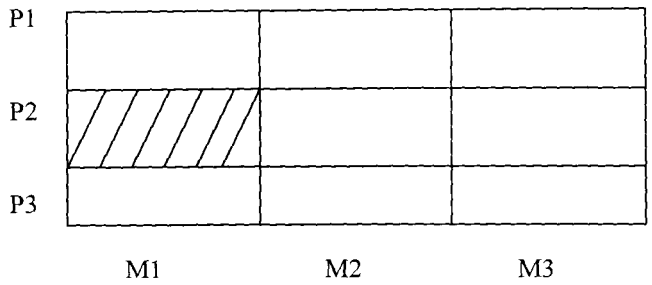
(ii) **Segment Structure Attractiveness:-** A segment may have a good size and growth and still not attractive from profitability point of view. Forces determine the long - run attractiveness of a market such as industry competitors, potential entrants, substitutes, buyers and suppliers. There are threats these forces pose. They are threats of intense segment rivalry, threat of new entrant, threat of substitutes goods, threat of growing bargaining power of buyers, and threat of bargaining power of suppliers.

iii) **Company Objectives and Resources:-** The company needs to consider its own objectives and resources in relation to that segment. Even if segment fits the company objectives, the company will consider whether it has the required skills and resources to succeed in that segment.

MARKET TARGETS

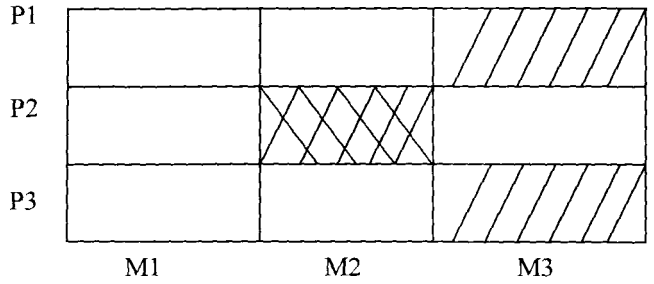
A target market consists of a set of buyers sharing common needs or characteristics that the company decides to serve. There are four patterns of target market selection as given below:

(a) Single – segment concentration



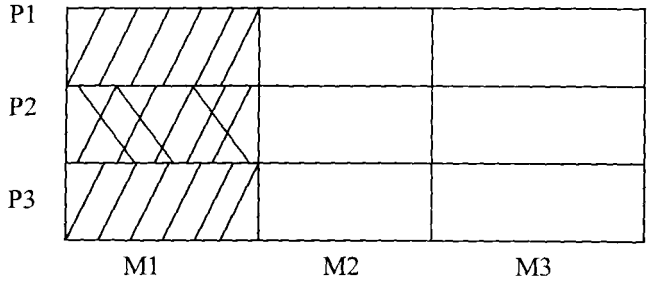
This indicates one market, one product.

(b) Selective specialisation



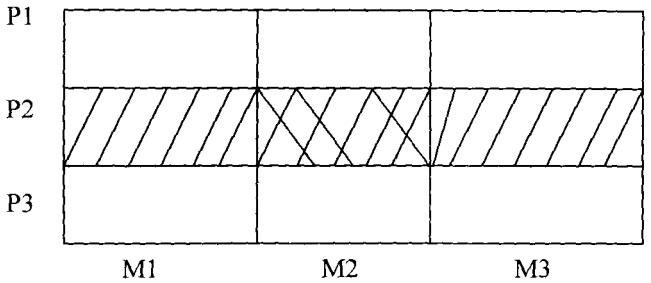
This indicates three (3) products in three (3) different markets.

(c) Market specialisation



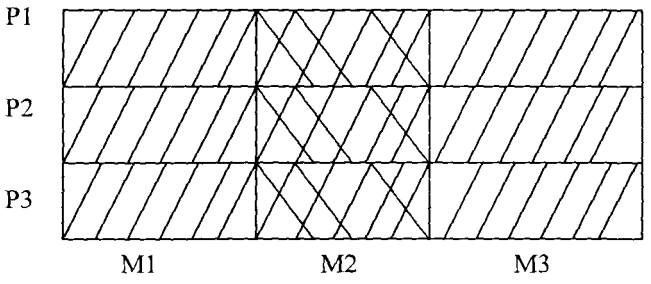
This indicates three (3) products in one (1) market e.g. to reduce costs of transportation.

(d) Product specialisation



This indicates the presence of a single product in all three markets.

(e) Full coverage



This indicates the presence of every product in all the three markets.

PRODUCT POSITIONING

A company must carefully select the ways in which it will distinguish itself from competitors. A difference is worth establishing to the extent that it satisfies the following criteria.

(a) **Important:-** The difference delivers a highly valued benefit to a sufficient number of buyers.

(b) **Distinctive:-** The difference is either not offered by others or is offered in a more distinctive way by the company

(c) **Superior:-** The difference is superior to other ways to obtain the same benefit.

(d) **Communicable:-** The difference is communicable and visible to buyers.

(e) **Pre-emptive:-** The difference can not be easily copied by competitors.

(f) **Affordable:-** The buyer can afford to pay for the difference.

(g) **Profitable:-** The company will find it profitable to introduce the difference.

DIFFERENCES TO PROMOTE

Many marketers advocate aggressively promoting only one benefit to the target market. For example, mercedes promotes its great automotive engineering. Some of the things to promote are "best quality" "best service" "lowest price" "best value" and "most advanced technology".

If a company hammers away at one of these positioning, and convincingly delivers on it, it will probably be best known and recalled for its strength. However, companies are advised to do double or even triple benefit positioning.

However, as companies increase the number of claim for their brand, they risk disbelief and a loss of clear positioning. Marketers are advised to avoid under-positioning over-positioning, confused positioning and doubtful positioning.

In summary, positioning is the act of designing the company's offer and image so that the target market understands and appreciates what the company stands for in relation to its competitors.

2.6 SALES PITFALLS AND HOW TO AVOID THEM

Sales management involves recruiting, training, directing, motivating and evaluating sales representatives.

Once representatives have completed their initial training course, and are out in the field, they begin to make error in selling techniques. The way they promote their products to buyers and any unfortunate personal mannerisms that they develop are not subject to continual supervisory observation. Prospects will, of course, notice the inept choice of phrase, a slight but discernible error in marketing a product presentation, or lack of confidence in dealing with objections, but prospects will seldom pass on their thoughts to any sales representative concerning lack of proficiency.

Unlike a professional footballer who has constant practice session under the eyes of his manager, or an Actor who is often corrected by his director, a sales representative however works alone. The mistakes he makes are not observed and commented upon at every interaction with buyers. Because of this he can easily ship into errors of which he is blissfully unaware. These errors can only be eliminated if he becomes aware of them.

The use of role-playing at refresher courses, sales conferences and cycle meetings are of immense value, but the conditions are not identical with those which apply in the doctors

surgery. It is vital part of your development, therefore, to learn of the mistakes you are making when you are in your territory, and because of this, an area manager will usually spend a few days with you in your territory.

The aim of self-analysis or self-assessment, then, is not to depress oneself, but rather, to provide an awareness of oneself; to isolate areas of weakness in our sales personality and performance and to endeavor to eliminate these; to become aware of our strengths and to develop these to their greatest levels, so as to capitalise on them and use them at their maximum potential.

IMPROVED PERFORMANCE

Before you can start improving your performance, you have to analyze your present strengths and weaknesses. You need to evaluate:-

(a) Your personal attributes

(b) Your job knowledge

(c) Your selling skills

(d) Your management skills

A. PERSONAL

(1) Energy and willingness to work

(2) Enthusiasm

(3) Acceptance of criticism

(4) Personal appearance

(5) Aggressiveness

(6) Persistence

(7) Punctuality

(8) Friendly and sincere smile

B. JOB KNOWLEDGE

(1) Company knowledge

(2) Product knowledge

(3) Market knowledge

(4) Competitor knowledge

C. SELLING SKILLS

(1) Prospecting activity

(2) Appointments

(3) Perception

(4) Customer needs and problems

(5) Use of sales and visual aids

(6) Overcoming objections

(7) Closing interviews

D. MANAGEMENT SKILLS

(1) Managing time

(2) Keeping records

(3) Self development programme

(4) Human relation skills

(5) Communication skills

(6) Itinerary planing

(7) Handling complaints

(8) Self - analysis

(9) Job analysis

(10) Analysis of each interview.

LOST SALES ANALYSIS

We all tend to think back only on those sales presentations which we made successfully and which resulted in increased sales. This is only human. However, when we analyze reports we know beyond any doubt, that over 90% of the sales presentations which we as individuals make have no effect at all, and of the remaining less than 10%, only 1-3% make a truly lasting impression on the customer. So we infact spend our time reminiscing on 1 -3% of our total effort.

Failures can be corrected and selling success achieved. All it takes are as follows:-

1. The willingness to face up to the fact that selling failures are generally attributable to the salesman himself.
2. The courage to dig out hidden mistakes, and
3. The desire to seek the skills to avoid making them in future.

To accomplish this important transition from rationalisation to reason, an organised approach is necessary. It requires discipline and continuing efforts. The sales-man looks at himself in the mirror, so to speak time after time, and from what he sees.

Broadly speaking, to asses any given sales interview, the "six Os" is a very good method. The "six Os" are:-

Objective, Orientation, Organisation, Objections, Opening and Opportunities.

OBJECTIVE:

Did I set objectives before hand? Were they infact realistic? Did my objectives conflict with those of the prospect?

ORGANISATION:

Did I plan my interview and have all the necessary sales materials and aids available? Was everything I needed " in the bag"? Did I plan a psychologically smooth presentation?

OPENING:

Did my opening get attraction from the customer? Did I set the stage for my product? Was it short and businesslike?

ORIENTATION:

Did I guide the customer along a physiological path ending in desire for the product? Did I hold his interest all times? Did he enjoy the discussion?

OBJECTION:

Did I answer the customers' queries and objections satisfactorily? Was he satisfied with my answers? Did I always say "Does that answer your questions?

OPPORTUNITIES

Did I feel any opportunity is close? Did I see buying signals? Did I try to use them to close the interview?

CHAPTER THREE

3.1 SYSTEM DEVELOPMENT

The analysis and design of the proposed system is the major task of this section. In this vein, the analysis of the existing system of the production and sales data will be carried out in order to evolve the basis and operation of the computerised system.

In light of this, issues considered in this section also include the analysis of the present system, the logical design in the form of input and output specification and formats, as well as the basis of data modelling.

3.2 PRODUCTION AND SALES ACTIVITIES IN MINNA PHARMACEUTICAL AND SURGICAL COMPANY LIMITED

The production and sales activities of the organisation is discussed under two main headings which are:

i. Production Activity

ii. Sales Activity

3.2.1 PRODUCTION ACTIVITIES

The production activity involves the following activities:

i. Starting material checking and documentation

ii. Actual manufacturing of the drug

iii. Packaging activities

The production activities involves following all the defined procedures known to be capable to provide assurance of consistently yielding drug production which conform to their intended specifications.

The production activity thus highlighted above are discussed below:

i. **STARTING MATERIALS**

All the incoming, outgoing and the remaining starting materials should be recorded. This record should contain information on the supplies, batch and lot numbers, date of receipt or issuance, date of release and date of expiry.

All the materials released for use should be in compliance with the starting material specifications and should be labelled with the designated name.

The storage condition of the starting materials should be strictly adhered to and the production department should ensure that the materials are issued by the authorised person using an approved procedure. The stock record should be maintained so that reconciliations can be made.

The production should ensure that the weighing and measuring equipment are periodically verified as accurate and should have capacity, accuracy and precision appropriate to the amount of materials to be weighed or measured.

All materials that are not accepted (rejected) should be labelled conspicously for easy identification and be placed separately.

All the production procedures should be properly validated and the record of the validation result should be kept. The validation programme and documentation should provide evidence of the suitability of materials, the performance, and reliability of equipment and systems and the competency of personnel.

ii. **MANUFACTURING (PROCESSING)**

This is the actual act of production of the drugs. This is the complete cycle through which a medicinal preparation passes.

This activity involves the following steps:

i. Making sure that all starting materials to be utilized in processing are in accordance with the required specifications.

ii. The processing environment (processing area) should be monitored and controlled to the degree required for the operation to be performed. Usually before any work would start, steps are taken to ensure that the work area and equipment are free from any material, product, or document not required for the current operation.

iii. Making sure that all the processing are performed in accordance with the written procedures. Any deviation should be justified and reported.

iv. Making sure that that all the containers containing raw, intermediate materials are properly labelled.

v. Making sure that all in-process controls are accurately recorded at the time of performance.

vi. The actual yield is always computed against the theoretical yield at the end of each operation.

iii. **PACKAGING ACTIVITIES**

The packaging activity involves the sub-dividing and packaging of the bulk product produced. This operation is usually performed under strict controls designed to protect the identity, integrity, and quality of the final package.

Usually, there is written procedure describing the receipt and identification of the bulk and the packaging components, proper controls to ensure that correct bulk, printed and unprinted packaging components are used, the required in-process controls, the reconciliation of bulk products, and printed packaging components, and the final package examination. The packaging operation is usually performed in accordance with the instruction given and using the specified materials in the master packaging procedure.

After the packaging, the packaged drug is placed in the quarantine for some times before final transfer to the warehouse and becomes available for distribution to the markets.

3.2.2 SALES ACTIVITIES

The main activities of the Sales Department of MPS are divided into:

i. **Collection of Orders**

The Company's Sales Representatives routinely visit appointed distributors and other valued customers such as clinics and health institutions to canvass for sales in accordance with established guidelines. The order forms are then submitted to the Marketing Department which processes the orders and informs the Sales department accordingly. Information about products, quantities and time of availability are usually made available by the Marketing to facilitate activities of the sales force.

ii. **Order Servicing**

Once a customer's order has been fully processed by the Marketing department, the sales representative is accordingly informed. The products are then collected from the finished products store after proper security checks and sent to the customer. The sales representative must ensure prompt delivery, ensuring that the delivery documents are appropriately endorsed by the departmental head.

iii. **Collection of Payment**

At the agreed periods, the sales representatives visit their various customers to collect outstanding payments for goods earlier supplied. Proper return must be rendered to the Accounts department on return from the collection exercise.

iv. **Periodic Reports**

Sales activities are reported by each individual to the Sales Manager who renders full account of monthly returns to the management.

3.3 SYSTEM DESIGN

System design is the process of developing a new system so as to replace the existing one. The first step towards system design is the identification of system requirements and this is followed by the formulation of design alternatives.

In the process of identifying the system requirement, an analysis of the production and sales activities were carried out as done above. Analysis of a system is the procedural study of its operations with an attempt to discover what the basic problems are. In this vein, an analysis of all the facts gathered were examined so as to make proper design of the new system.

During the design, the following basic principles used in the design procedures are as follows:

i. FLEXIBILITY

This involves the flexibility of the system in order to withstand any changes in the system. The flexibility of the system becomes important in the event of an increase or decrease in the volume of production and sales.

ii. PURPOSE

The purpose for which the software is designed. In this way, a proper care was carried out for the confirmation of the efficiency and application of the proposed system.

iii. ECONOMICAL

Benefits should be related to the cost of implementing the proposed system as against the existing one. In addition, there are more economical methods of achieving the set up targets than the proposed method.

vi. **RELIABILITY**

The proposed software is intended to be designed and implemented in a reliable way for the purpose of efficiency and continuity.

v. **IMPROVEMENT**

The design of the proposed system is aimed at improving on the existing system. In this case, an attempt is made as regards what equipment and other facilities currently being used could be incorporated in the new procedure and other new facilities.

3.4 INPUT SPECIFICATION

Every program accepts inputs. This is in terms of source of data on production and sales activities. For proper execution of the proposed system, some data needs to be inputed for the sake of processing. In this vein, the inputs required are the details of production and sales.

For the sake of production, data that will be required are as follows:

i. Delivery note number.

ii. Production number

iii. Date of production

iv. Product type

v. Quality of product.

The data required for sales activities in the organisation are as stated below:

i. Invoice Number.

ii. Date of sales.

iii. Customer's name and address.

iv. Product type.

v. Quantity of sales.

3.5 OUTPUT SPECIFICATION

The result of any processing is to communicate result to the users via output. This could be in form of softcopy (report that appears on the screen) or Hardcopy (report that appear on paper via printer).

For the proposed system, one of the required reports is the Stock Enquiring report which is a softcopy report and shows the stock position of all the items produced in the organization. Others are the hardcopy reports which are of two types namely: Production Report and Sales Report. The production report shows the details of production while the sales report displays the details of sales activities.

3.6 DESCRIPTION OF DATA FILES

The introduction of computers in organization and the ever-increasing sophistication of data processing system have shown the importance of data as one of the most valuable organization resources. It is from the manipulation and interpretation of data that information is generated and in turn used for decision-making.

The realization of the importance of data has shown that there is a need for proper management and efficient organization of data. This serves as the major reason why the proposed system is designed using database management system where data are stored in a file called a database file.

The proposed system is expected to operate using the following database files:

i. PRODUCT.DBF

ii. PRODUCE.DBF

iii. SALES.DBF

The description and database structure which is used to describe the structure of database files of the above listed files are given below. Each of the proposed system is described in terms of the field names, field types, field width as well as the content of the files.

i. PRODUCT.DBF

This is a database file that contains details of all the products manufactured in the organization. It contains information such as the product code, product description, price and the total quantity of each products. The structure of this file is stated as follows:

S/NO	FIELD NAME	FIELD TYPE	FIELD WIDTH
1	CODE	CHARACTER	2
2	DESCR	CHARACTER	20
3	PRICE	NUMERIC	6/2
4	TQTY	NUMERIC	9

ii. PRODUCE.DBF

This file contains the details of production activities in the organization. The production details such as the production number, date of production, quantity produced and others are entered into the file. The structure of this file is as shown below:

S/NO	FIELD NAME	FIELD TYPE	FIELD WIDTH
1	DNN	CHARACTER	4
2	PNNMB	CHARACTER	6
3	PDATE	DATE	8
4	CODE	CHARACTER	2
5	QPROD	NUMERIC	9

SALES.DBF:

The SALES.DBF is a file that store information about the sales made within a particular time. It is a transition file that keeps sales details such as the invoice number, sales date, quantity sold, and so on within a month. The format of this file is as stated below:

S/NO	FIELD NAME	FIELD TYPE	FIELD WIDTH
1	INVNO	CHARACTER	4
2	SDATE	DATE	8
3	CODE	CHARACTER	2
4	QSOLD	NUMERIC	6
5	SVALUE	NUMERIC	10/2
6	CNAME	CHARACTER	25
7	CADDR	CHARACTER	35

CHAPTER FOUR

4.1 SYSTEM APPLICATION

The new system was designed in such away that the operations of the company which was manually operated upon has been changed to a computerized system. The production processes and the sales activities especially the control of the movement of raw materials and finished products are the paramount areas considered.

As a result of the completion of the design as done in the last chapter, the system is to be implemented for the operation of the organisation. This chapter considers the necessary environment recommended for the full operation of the system.

4.2 PROGRAM AND LANGUAGE APPLICATION

The realization of the importance of data has shown that there is a need for proper management and efficient organization of data. Since the late 1960s, users have been investing in a mechanism that provides facilities for the successful organization and assessing of data. The mechanism is known as Database System, a term that means both the organization of data and software that is needed in order to manage the data provided effectively.

Thus, a database can be defined as a mechanized shared centrally controlled collection of data used in an organization. It is regarded as any collection of useful information organized in a systematic and consistent manner. A good example of this is the telephone directory and library catalog.

As a result of the above facilities embedded in Database Management Packages, the new system was developed using dBASE IV.

4.3 FEATURES OF LANGUAGE CHOSEN

Database system allows the data to be produced and organized separately from other resources. Specifically, the objectives of database system are as follows:.

DATA INTEGRATION IS ACHIEVED

In a database system, information from several files is co-ordinated, assessed and operated upon as though it is in a single file. Logically, the information is centralized, physically, the data may be located on different devices. In this system, it is possible for two or more applications to be showing compatible data. This allows the users to gain valuable information by linking data across the organization. The data are no longer owned by particular application, but instead they are shared among the users.

DATA REDUNDANCY IS REDUCED

Data redundancy occurs in file processing system when the data cannot be arranged to suit all the application programs in accessing these data. This results in the same data appearing in more than one file. This leads to wastage of storage and duplication of efforts during data entry.

DATA INDEPENDENCE CAN BE ACHIEVED

Any changes that occured to the data records during the life of the file, it requires that all programs accessing these data must be changed. However, database system provide data independence of programs. Data independence is the insulation of application programs from the physical or logical storage of data. This objective seeks to allow for changes in the content and organization of physical data without re-programming of applications, and to allow modification to application programs without re-organising the physical data. In database organization, each application system interfaces with the DBMS, rather than directly with the database. Any changes to the data once

accommodated by changes to the DBMS without any changes to the application program being necessary

DATA ARE CENTRALLY CONTROLLED

In database environments, data and operations are centrally controlled, and this can lead to better management of data by enforcing standards for all the database users on how information would be released out.

DATA SECURITY

Specifically, it allows for proper security of data, since there is only one source of data in the organization, such standards would easily be enforced.

4.4 HARDWARE CONFIGURATION

The hardware configuration has to do with the computer hardware requirement needed for the effective execution of the new system. Computer configuration is a collection of hardware which forms a complete computer system. The selection of the computer configuration is done to suit both the current and future needs of the organisation with respect to the volume and types of data to be processed.

However, with the newly developed system a computer with higher speed and larger storage space is required. This is expected to take care of the future need of the organisation. It is also necessary for the organisation to procure an Uninterrupted Power Supply (UPS), a facility to ensure constant power supply to the computer and its environment. This is needed mainly to avoid interruption especially when the computer users are using the system.

In summary, a computer with a hard disk of a minimum of about 6.4GB and having a floppy and CD-ROM drive units is recommended. The drive units will provide for the installation and transfer of the new software, other packages and data from diskettes and CD-

ROM into the hard disk as well as making backup. The computer should have a speed of about 450MHz to allow for fast processing of records and a UPS which can store power for about one hour in case of power failure would also be required.

For the production of hard copy reports, a dot matrix printer of near letter quality, is required. Epson 2170 is recommended and it is expected to be used to generate reports from the newly designed system. In addition, LaserJet 6L model should also be procured for printing good quality reports.

4.5 SOFTWARE REQUIREMENT

Software can be defined as a program that direct and controls the activities of a computer. It is used as a link between the computer hardware and the users. This accounts for why it is believed that software enables the users to fully exploit the capabilities of a computer. The ability of this newly designed system to work on a computer is due to the requirement and ability of the software.

However, the proposed system requires the availability of some forms of software which will enhance the working of the system and other task that would be placed on the system. Specifically, it requires the installation of dBASE IV for the purpose of program modification as the need arises.

Other software that would be required is the Microsoft Office, an integrated package for various purposes. In the Microsoft Office, items such as Microsoft Word and Microsoft Excel are required.

The installation of Microsoft Word is to enable the computer users create, modify and print text of documents such as a report, proposals and other forms of official letters. The use of the WordProcessing package for this purpose enhances the output of the reports and allows

for flexibility of the contents of the documents. In the same vein, Microsoft Excel is required because of its wide usage. Specifically, the package is used to carry out calculations, graphic analysis of data and some forms of statistical analysis.

4.6 PROGRAM TESTING

Program testing is the stage of implementation which is aimed at ensuring that the program works accurately and efficiently before life operation of the system commences. At this stage, the logical and the physical design should be thoroughly and continually examined on paper to ensure that they will work when implemented. Therefore, the system test in implementation should be a confirmation that the system is correct and an opportunity to show the user that the system works.

However, this proposed system is fully tested to confirm its reliability. Specifically a user acceptance testing is performed. This type of testing involves the users of the system in testing to confirm that the system is doing what is required to be done. The testing is done using a set of carefully selected test data which are entered into the system. The result is compared with the result obtained from the previous run and is found to be the same.

In view of this it is then concluded that the newly developed system is working accordingly.

4.7 SOFTWARE CONVERSION

This involves file conversion, file set-up and changeover. File conversion requires changing the old (existing) system files to the format and content required by the new system. File set-up is the process of setting up the new files that would be required to work with the new system. Changeover is the full replacement of all the old procedures by the new ones.

In the proposed system, the file set-up and changeover are required while the file conversion is not needed because the old system is a manual procedure. The file set-up is required to create the database files needed for the successful operation of the system.

Changeover could be in any of these three forms:

i) Direct changeover

ii) Parallel changeover

iii) Pilot changeover.

In direct changeover, the old system is completely replaced by the new system in one move. While in a parallel changeover, the process combines the new and the old systems to cross-check the result. It allows the result of the new system to be compared with the old system before acceptance by the user, thereby promoting users' confidence. And in the case of Pilot changeover, data from one or more previous periods for the whole or part of the system is run on the new system after result have been obtained from the old system and the new results are compared with the old.

Given the various forms of changeover, parallel changeover is chosen for this system. This would imply the processing of current data by both the old and the new systems. The main attraction is that the old system is kept alive and operational until the new system has been used for at least one system cycle using life data in the real operational environment of place, people, equipment and time. In addition, it gives an opportunity of comparing the results of the new system with the existing one.

4.8 COST ANALYSIS OF THE NEW SYSTEM

(a) **DEVELOPMENT COST:-** This is sketched as follows for three working weeks or one hundred and fifty man hours:-

(i)	Systems Analysis/Design		₦	₦
	*	Systems Analyst/Designer	150,000.00	
	*	Systems Programmer	175,000.00	325,000.00
(ii)	Software Development & Implementation			85,000.00
(iii)	Equipment			
	*	1 No. COMPAQ PROSIGNIA - Pentium II Series 400 MHZ - 64MB RAM expandable to 128MB - 6.4GB Hard Disk - 3.5 Floppy Disk Drive - 50X CD-ROM - Multimedia Kit - SVGA Monitor - Windows '98 Keyboard - Mouse & Mouse Pad - Software Preloaded		340,000.00
	*	Computer Printers - 1 No. Epson Printers (DFX 5000)		150,000.00
		- 1 No. LaserJet Printer(Laser 4P)		180,000.00
	*	3 Nos. Stabilizer (UPS) of about 350 Volts (₦80,000.00 each)		240,000.00
	*	Installation Cost (Software)		100,000.00
	*	Procurement & Installation of 2 Nos. Air Conditioners (₦150,000.00 each)		300,000.00
	*	Personnel Training - 4 Operators @ ₦17,500.00 for 2 months		70,000.00
		Total Development Cost		₦1,790,000.00

b)	**SYSTEM OPERATING COST**		₦	₦
i.	Program Maintenance Per Annum			75,000.00
ii.	Equipment Maintenance Per Annum			120,000.00

iii.	Utilities Per Annum		45,000.00
iv.	Supplies of Computer Stationeries		120,000.00
v.	Labour cost		
	- 1 No. Systems Analyst/Programmer Per Annum	120,000.00	
	- 4 Nos. Computer Operators		
	(₦36,000 Per Annum/Operator)	144,000.00	264,000.00
vi.	Miscellaneous expenses		50,000.00
	Total System Operating Cost		**₦674,000.00**

Grand Total of (a) and (b) = ₦2,464,000.00

4.9 BENEFITS OF THE NEW SYSTEM

The specific benefits of the proposed system are as follows:

i. To enhance the efficient operation of the Production and Sales department of the organisation.

ii. To facilitate effective planning method in terms of production plans.

iii. To ensure accurate, speedy and efficient reports generation for use by the management of the organisation.

iv. To check fraud that could arise from pilferage and diversion of raw material and finished products.

4.10 STARTING THE SYSTEM

Once the system is installed, it occupies a directory of its own. Starting the system then involves the following steps:-

* Boot the system to get the operating system prompt (i.e. C\>)

* Type CD\MPS + (Enter key)

* Type DBASE + (Enter key)

* Press (ESC key) takes the user to the dot prompt

* Type DO MPS + (Enter key)

At this point, the main menu is presented on the computer screen from where the users will be prompted to pick a choice.

4.11 DESCRIPTION OF THE MENU STRUCTURE

The menu structure will be discussed using the screen design contained in Appendix 1. This will be referred to as figure in the description below:

The new system is composed of FIVE options which reflect the various facilities provided by the system. The options as contained in Figure 1 are Material Management System, Product Management System, Code Management System, Report Production System and Exit.

At the main menu, the user will be prompted to enter a code out of the specified ones and an appropriate action will be taken. Each of the options has a sub-menu with the exception of Exit menu. On selection, the sub-menu appears prompting the users to make another selection. Each of the listed options in the main menu is described below:

MATERIAL MANAGEMENT SYSTEM

This option is used to manipulate the details of the raw materials used in the organisation in terms of material purchases and usage as represented by Figure II.

PRODUCT MANAGEMENT SYSTEM

This option is used to manipulate the details of the finished products manufactured in the organisation. It contains information about production and sales details as represented by Figure III.

CODE MANAGEMENT SYSTEM

This enables entries and manipulation of material and finished product codes. With this tool, existing codes can be updated while new ones can be entered. The submenu is as shown in figure IV.

REPORT PRODUCTION SYSTEM

This option is used to display various reports available in the system from which the user is expected to select the appropriate report to be printed. The sub option for this menu are displayed in figure V.

EXIT

This is the last option in the menu and when selected, it takes the user out of the system to the operating system prompt.

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATION

5.1 SUMMARY

This project was intended to look into the administration of purchases of material and sales of finished products in Minna Pharmaceutical and surgical Company Ltd. in order to allow for more efficient operations by the use of Computer.

As a unit of the Pharmaceutical Industry in the country, the study went further to explore the micro and macro-economic environment as well as Governmental legislation as they affect the whole industry in the country.

For the purpose of computerisation, an analysis of the existing system was carried out in preparation for the software design. The design of the proposed system was basically menu driven for the purpose of user's friendliness.

After the design, the implementation of the new system was considered. The implementation was looked into in terms of the required hardware for efficient execution of the software, testing the system and appropriate conversion technique.

However, the implementation also considered the cost benefit analysis of executing the new system.

In this case, it was discovered that the recommendation for the purpose of maximisation of benefit, of the new system was outlined.

5.2 CONCLUSION

The computerisation of purchases and sales activities in Minna Pharmaceutical and Surgical Company is expected to form the basis of the full computerisation of the whole

organisation. If the implementation of this system is successful, then, the operations of the organisation are expected to follow:

The computerisation is necessary because of the associated benefits as against the inherent problems of manual processing.

5.3 RECOMMENDATION

To effectively implement the new system, the organisation is expected to note the following:

a. **ENVIRONMENT**

The environment under which the system is to be installed should be properly laid in terms of electrical connections, temperature control (air-conditioning) among others.

b. General computer training for all members of staff who will use the computer.

c. Professionals should be employed to man the system.

d. Consumables should be made readily available.

e. For the purpose of efficient implementation of the system, the recommended hardware configuration should be procured. This is because the following have been considered:

1. Reliability of the system
2. Ease of expansion
3. Maintenance support
4. Availability of back-ups
5. Cost implications.

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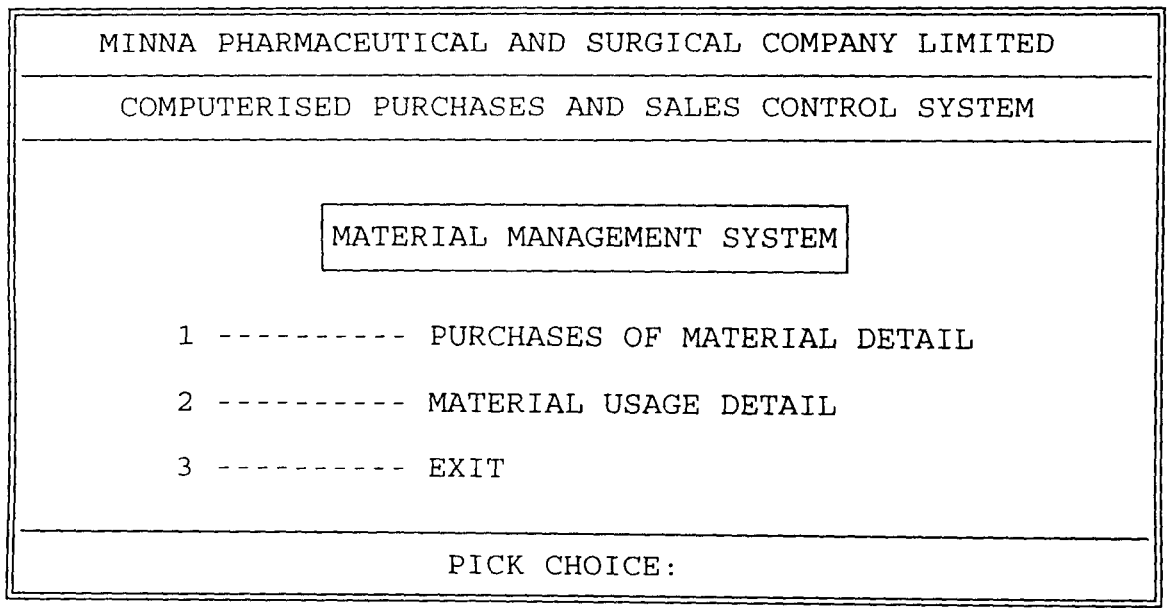
MINNA PHARMACEUTICAL AND SURGICAL COMPANY LIMITED
COMPUTERISED PURCHASES AND SALES CONTROL SYSTEM
MATERIAL MANAGEMENT SYSTEM
1 ---------- PURCHASES OF MATERIAL DETAIL
2 ---------- MATERIAL USAGE DETAIL
3 ---------- EXIT
PICK CHOICE:

FIGURE II

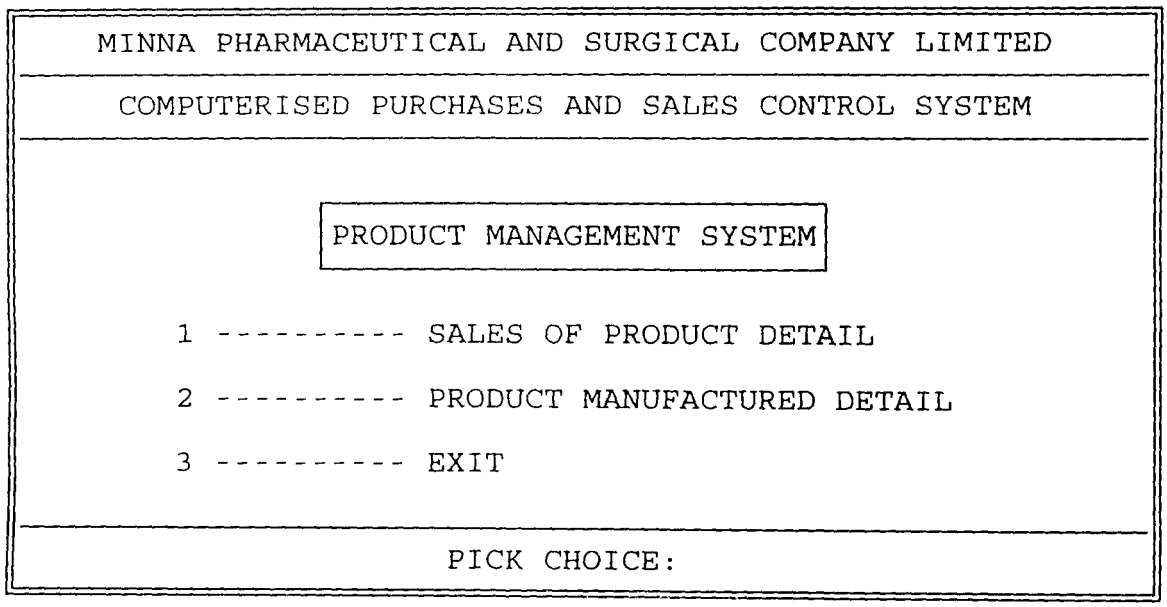
MINNA PHARMACEUTICAL AND SURGICAL COMPANY LIMITED
COMPUTERISED PURCHASES AND SALES CONTROL SYSTEM
PRODUCT MANAGEMENT SYSTEM
1 ---------- SALES OF PRODUCT DETAIL
2 ---------- PRODUCT MANUFACTURED DETAIL
3 ---------- EXIT
PICK CHOICE:

FIGURE III

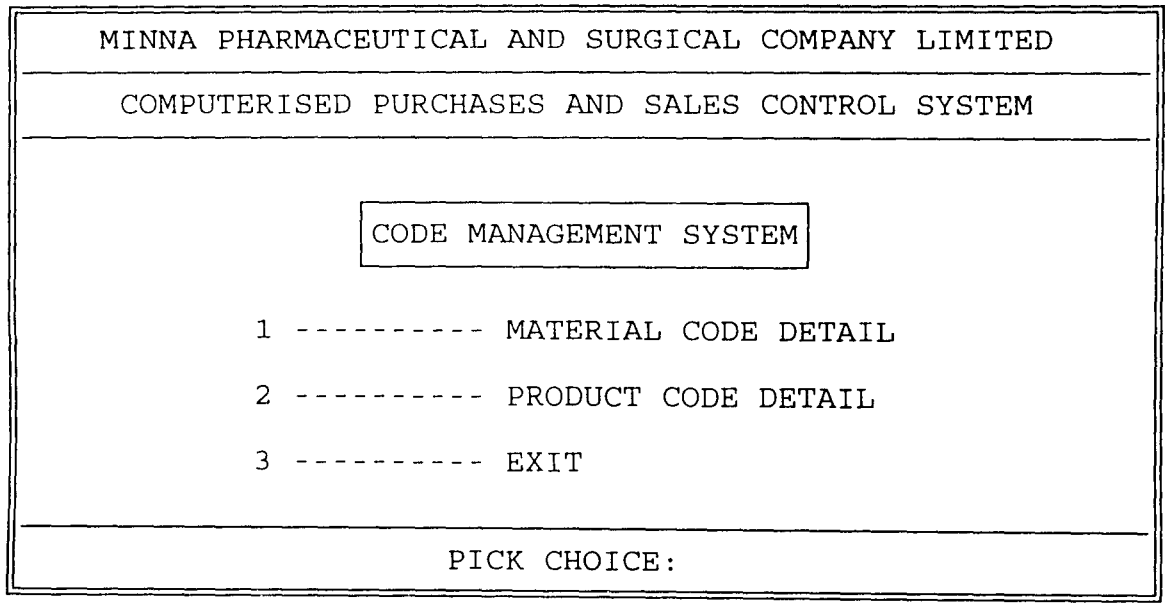
MINNA PHARMACEUTICAL AND SURGICAL COMPANY LIMITED
COMPUTERISED PURCHASES AND SALES CONTROL SYSTEM
CODE MANAGEMENT SYSTEM
1 ---------- MATERIAL CODE DETAIL
2 ---------- PRODUCT CODE DETAIL
3 ---------- EXIT
PICK CHOICE:

FIGURE IV

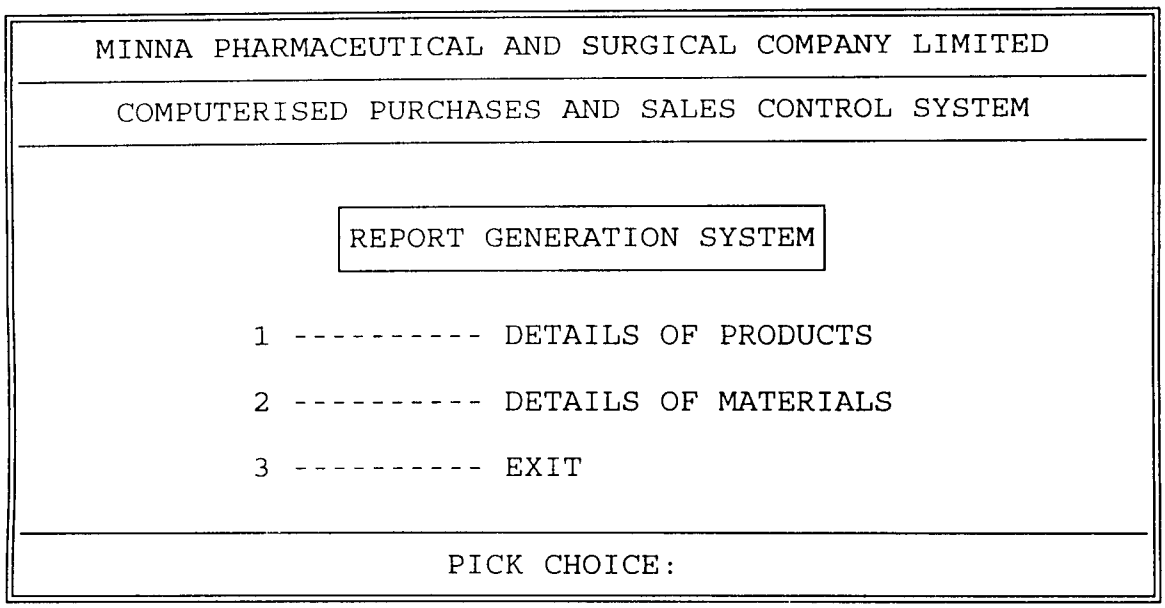
MINNA PHARMACEUTICAL AND SURGICAL COMPANY LIMITED
COMPUTERISED PURCHASES AND SALES CONTROL SYSTEM
REPORT GENERATION SYSTEM
1 ---------- DETAILS OF PRODUCTS
2 ---------- DETAILS OF MATERIALS
3 ---------- EXIT
PICK CHOICE:

FIGURE V

MINNA PHARMACEUTICAL AND SURGICAL COMPANY LIMITED

DETAILS OF PRODUCTS IN STORE

S/NO	PRODUCT NAME	QUANTITY
1	MINDOL (PARACETAMOL 500mg	150,000
2	MINQUINE (CHLOROQUINE PHOSPHATE 250mg) TABS	35,000
3	BENZHEXOL TABS 5mg	120,000
4	PREDNISOLONE TABS 5mg	85,000
5	FOLIC ACID TABS 5mg	45,500
6	NIFEDIPINE TABS 10mg	170,000

FIGURE VI

APPENDIX II: PROGRAM DOCUMENTATION

MPS.PRG

```
set talk off
set scor off
set safe off
set bell off
set stat off
set date brit
set devi to scre
do whil .t.
  clea
  @ 1,10 to 23,69 doub
  @ 2,15 say 'MINNA PHARMACEUTICAL AND SURGICAL COMPANY LIMITED'
  @ 3,11 to 3,68
  @ 4,16 say 'COMPUTERISED PURCHASES AND SALES CONTROL SYSTEM'
  @ 5,11 to 5,68
  @ 7,34 to 9,44
  @ 8,35 say 'MAIN MENU'
  @ 11,18 say '1 ---------- MATERIAL MANAGEMENT SYSTEM'
  @ 13,18 say '2 ---------- PRODUCT MANAGEMENT SYSTEM'
  @ 15,18 say '3 ---------- CODE MANAGEMENT SYSTEM'
  @ 17,18 say '4 ---------- REPORT PRODUCTION SYSTEM'
  @ 19,18 say '5 ---------- EXIT'
  @ 21,11 to 21,68
  @ 22,33 say 'PICK CHOICE:'
  do whil .t.
    resp=' '
    @ 22,46 get resp pict '!'
    read
```

```
    if resp $ '12345'
      exit
    endi
  endd
  do case
    case resp='1'
      do mate
    case resp='2'
      do pro
    case resp='3'
      do code
    case resp='4'
      do rep
    othe
      exit
  endc
endd
clea
retu
```

MATE.PRG

```
set talk off
set scor off
set safe off
set bell off
set stat off
set date brit
set devi to scre
do whil .t.
```

```
clea
@ 3,10 to 21,69 doub
@ 4,15 say 'MINNA PHARMACEUTICAL AND SURGICAL COMPANY LIMITED'
@ 5,11 to 5,68
@ 6,16 say 'COMPUTERISED PURCHASES AND SALES CONTROL SYSTEM'
@ 7,11 to 7,68
@ 9,26 to 11,53
@ 10,27 say 'MATERIAL MANAGEMENT SYSTEM'
@ 13,19 say '1 ---------- PURCHASES OF MATERIAL DETAIL'
@ 15,19 say '2 ---------- MATERIAL USAGE DETAIL'
@ 17,19 say '3 ---------- EXIT'
@ 19,11 to 19,68
@ 20,33 say 'PICK CHOICE:'
do whil .t.
  resp=' '
  @ 20,46 get resp pict '!'
  read
  if resp $ '123'
    exit
  endi
endd
do case
  case resp='1'
    do mate1
  case resp='2'
    do mate2
  othe
    exit
endc
endd
clea
retu
```

PRO.PRG

```
set talk off
set scor off
set safe off
set bell off
set stat off
set date brit
set devi to scre
do whil .t.
  clea
  @ 3,10 to 21,69 doub
  @ 4,15 say 'MINNA PHARMACEUTICAL AND SURGICAL COMPANY LIMITED'
  @ 5,11 to 5,68
  @ 6,16 say 'COMPUTERISED PURCHASES AND SALES CONTROL SYSTEM'
  @ 7,11 to 7,68
  @ 9,26 to 11,52
  @ 10,27 say 'PRODUCT MANAGEMENT SYSTEM'
  @ 13,19 say '1 ---------- SALES OF PRODUCT DETAIL'
  @ 15,19 say '2 ---------- PRODUCT MANUFACTURED DETAIL'
  @ 17,19 say '3 ---------- EXIT'
  @ 19,11 to 19,68
  @ 20,33 say 'PICK CHOICE:'
  do whil .t.
   resp=' '
   @ 20,46 get resp pict '!'
   read
   if resp $ '123'
    exit
  endi
endd
```

```
  do case
    case resp='1'
      do pro1
    case resp='2'
      do pro2
    othe
      exit
  endc
endd
clea
retu
```

CODE.PRG

```
set talk off
set scor off
set safe off
set bell off
set stat off
set date brit
set devi to scre
do whil .t.
  clea
  @ 3,10 to 21,69 doub
  @ 4,15 say 'MINNA PHARMACEUTICAL AND SURGICAL COMPANY LIMITED'
  @ 5,11 to 5,68
  @ 6,16 say 'COMPUTERISED PURCHASES AND SALES CONTROL SYSTEM'
  @ 7,11 to 7,68
  @ 9,28 to 11,51
  @ 10,29 say 'CODE MANAGEMENT SYSTEM'
  @ 13,23 say '1 ---------- MATERIAL CODE DETAIL'
```

```
  @ 15,23 say '2 ---------- PRODUCT CODE DETAIL'
  @ 17,23 say '3 ---------- EXIT'
  @ 19,11 to 19,68
  @ 20,33 say 'PICK CHOICE:'
  do whil .t.
    resp=' '
    @ 20,46 get resp pict '!'
    read
    if resp $ '123'
      exit
    endi
  endd
  do case
    case resp='1'
      do code1
    case resp='2'
      do code2
    othe
      exit
  endc
endd
clea
retu
```

REP.PRG

```
set talk off
set scor off
set safe off
set bell off
set stat off
```

```
set date brit
set devi to scre
do whil .t.
  clea
  @ 3,10 to 21,69 doub
  @ 4,15 say 'MINNA PHARMACEUTICAL AND SURGICAL COMPANY LIMITED'
  @ 5,11 to 5,68
  @ 6,16 say 'COMPUTERISED PURCHASES AND SALES CONTROL SYSTEM'
  @ 7,11 to 7,68
  @ 9,27 to 11,52
  @ 10,28 say 'REPORT GENERATION SYSTEM'
  @ 13,23 say '1 ---------- DETAILS OF PRODUCTS'
  @ 15,23 say '2 ---------- DETAILS OF MATERIALS'
  @ 17,23 say '3 ---------- EXIT'
  @ 19,11 to 19,68
  @ 20,33 say 'PICK CHOICE:'
  do whil .t.
    resp=' '
    @ 20,46 get resp pict '!'
    read
    if resp $ '123'
      exit
    endi
  endd
  do case
    case resp='1'
      do rep1
    case resp='2'
      do rep2
    othe
      exit
  endc
```

```
endd
clea
retu
```