INFORMATION SYSTEM SUPPORT FOR PLANNING AND CONTROL IN AN ORGANISATION

BY

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PGD/MCS/142/93.

A PROJECT SUBMITTED TO THE DEPARTMENT OF MATHEMATICS/COMPUTER SCIENCE, FEDERAL UNIVERSITY OF TECHNOLOGY, MINNA, IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE AWARD OF POSTGRADUATE DIPLOMA IN COMPUTER SCIENCE.

MARCH, 1998.

CERTIFICATION

This project has been certified as having met the requirements of the Department of Mathematics, Statistics and Computer Science Federal University of Technology, Minna for the award of Post Graduate Diploma in Computer Science.

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DEDICATION

I dedicate this project to God, my parents and to my most beloved wife, Esther Abana.

ACKNOWLEDGEMENT

With great reverence, I give thanks to God and Father of Our Lord Jesus Christ, whose grace and provisions has led to this great project work. God by His faithfulness and truth provided me all I needed to undergo this course. In short, this course, to me, is a divinely granted benevolence.

Thus, I place on record my sincere gratitude and appreciation to my Supervisor, Dr. Y. M. Aiyesimi. Infact, he took time to proof-read the whole of the manuscripts and made necessary corrections and advice.

I wish to equally appreciate the unrelenting assistance of my head of department Prof. K. R. Adeboye, my Lecturers Prince R. Badmus, Dr. S. A. Reju, and all other members of staff of the department from whom wealth of experience and knowledge were gleaned over the years.

I wish to also acknowledge with profound gratitude the willing co-operation and great assistance received from the numerous sources that all contributed to make this project a success in this course.

I am also indebted to Mr Elimian The Federal Pay Officer (FPO), with the Federal Ministry of Finance, Office of the Accountant General of the Federation, Federal Pay Office, Minna, whose moral support and will accorded me the rare opportunity of undergoing this course. I am also indebted to all my colleagues in my place of work, their understanding and collegial advice enable me to complete this course without hitch.

I pray that the God of blessing will abundantly reward you all.

ABSTRACT

This project covers the role of computer as an information system supporting planning and control in an organisation. However computer system is an information system that, in addition to providing all necessary transaction process for an organisation, provides information and processing support for planning, control and decision functions.

Organisations have always required systems for collecting, processing, storing, retrieving and distributing information. The computer has added a new and a powerful technology to information systems so that computer-based informations systems can be different from systems using manual or electro-mechanical processing.

Computer-based information system is so new that the available text material is not well defined as to content and coverage. This project is unique in its attempt to provide a comprehensive conceptual and structural foundation for the study of the area. Therefore it is possible to device a different code to identified each message. The law of requisite variety illustrate that the pre-requisite of planning is control to make effective and efficient decisions and judgement in an organisation.

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CHAPTER ONE

1.0 A SYSTEM IN PERSPECTIVE

A system is composed of interacting parts that operate together to achieve some objective or purpose.

The term "system" is in common use. One speaks of an educational system, computer system, software system, solar system, and the like information system. System can be abstract or physical. An abstract system is an orderly arrangement of interdependent ideas or constructs. For example, a system of theology is an orderly arrangement of ideas about God, man etc. A physical system is a set of elements which operate together to accomplish an objective. The information system receives inputs of data and instructions, processes the data according to the instructions, and outputs the results. The basic system model of input, process, and output is suitable in the simplest information processing system case when all inputs come in at the same time.

1.1 DEFINITION OF INFORMATION SYSTEM

Information is an imprecise term as commonly used. However, underlying the use of the term "information" in information systems are several ideas: information adds to representation, it has surprise value, or it tells something that the receiver did not know or could not predict. In a world of certainty, information reduces uncertainty. It changes the probabilities attached to expected outcomes in a decision situation and therefore, has value in the decision process. A useful general

definition of information for information system is data that has been processed into form that is meaningful to the recipient and is of real or perceived value in current or prospective decisions. The relation of data of information is defined as that of raw material to finished product. Or more precisely, the processing system process data in unusable form into usable data that is finished product - illustrated the intended recipient.

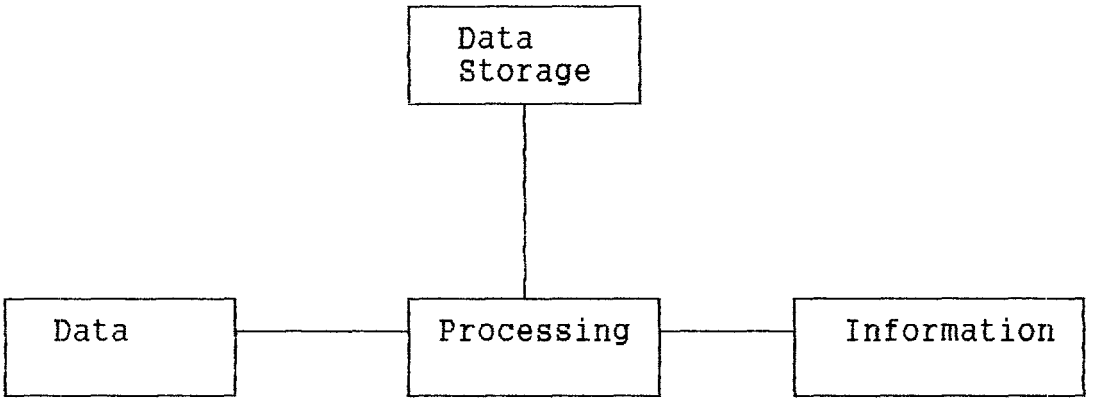


Fig.1.1 - 1: Transformation of data to information.

1.2 MATHEMATICAL DEFINITION OF INFORMATION SYSTEM

As used in the Mathematical theory of communication has a very precise meaning. It is the average number of binary digits which must be transmitted to identify a given message from the set of all possible messages to which it belongs. In other words, the theory says that there are a limited number of messages which may need to be transmitted. It is therefore possible to devise a different code to identify each message. The message to be transmitted is encoded, the codes are sent over the channel, and the decoder identifies the message intended by

the codes. Messages can be defined in a variety of ways. For example, each alphanumeric character may be a message or complete sentence, may be messages if there is a limited, predefined number of such sentences to be transmitted.

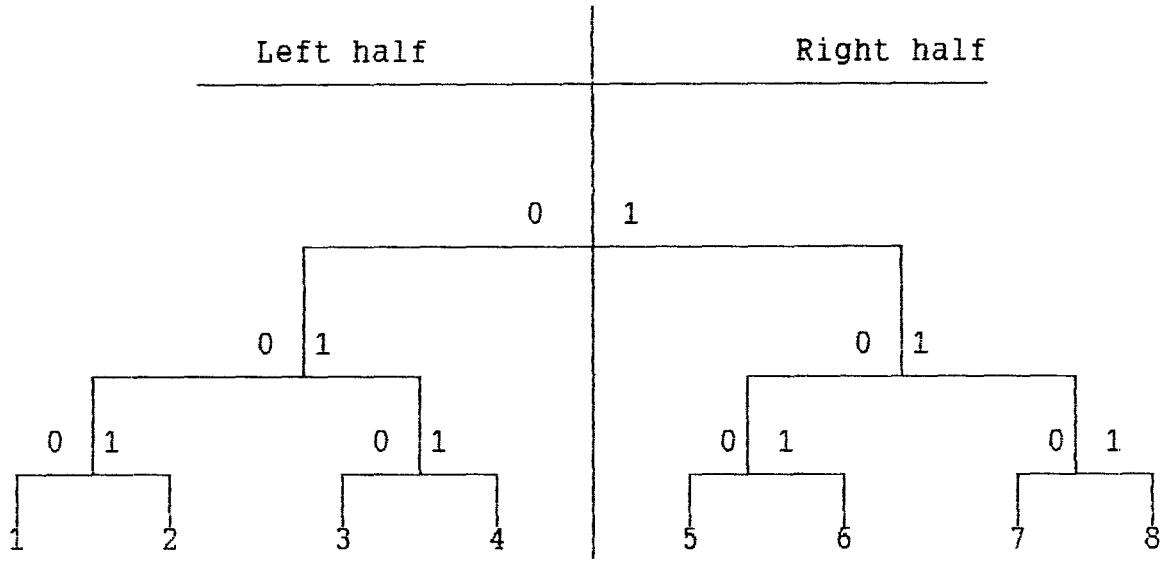


Fig. 1.2 - 1.

The size of the code is of course dependent on the coding scheme and the number of possible messages. The coding scheme for information theory is assumed to be binary. This is convenient for several reasons including the fact that most machine communication uses a binary code based on two states of the signal being transmitted. One bit is defined as the amount of information required to identify one or two equal probable messages. In other words, if the communication system is required to only two messages, "yes or "no", then the system

needs to transmit only two signals, which can be represented by 1 and 0, the two values in the binary system. As another example, assume a system used to transmit only birth day greetings. However, the sender may not write his own greeting - he may select from only several standard messages. Such as "wishing you happiness on your birthday". Now, assuming that there are eight such messages, the information content to identify the message for the receiver is 3 bits. Note that the first bit identifies the message as being in the left half or the right half. The second bit identifies the half identified by the first bit. See figure 1.2 - 1.

Message No	Bits
1	000
2	001
3	010
4	011
5	100
6	101
7	110
8	111

Fig. 1.2 - 1.

Note that a separate unique code of three 0s and 1s identifies each message and distinguished it from the other seven, and the decoder receives the bits from left to right.

The information content (or code size and bits) may be generalized as

$$1 = \log^{7} n$$

where n = the number of possible messages and all messages are equally likely.

To understand the application of this formula, consider some examples where n = 8

n = 2

n = 1

(1) n = 8 $1 = \log_2 8 = 3$

This is the same as the example of eight greetings where it was shown that 3 bits would be needed.

(2) n = 2 $1 = \log_2 2 = 1$

If there are only two outcomes, a single bit (0 or 1 value) can identify which of the two is intended.

(3) n = 1 $1 = \log_2 1 = 0$

If there is only one message to select from, there is no need to transmit anything because the answer is already known.

1.3 LAW OF REQUISITE VARIETY

One of the basic notions of system control theory is the need for requisite variety to obtain control. There must be at least as many variations of controls to be applied as there are ways for the system to get out of control.

$S_1, S_2, S_3 \ldots\ldots S_n$ Decision Rules + Judgement $C_{X1}, C_{X2}, C_{X3} --C_{Xn}$

Fig. 1.3 - 1 Method providing sufficient system control response.

"A Company making heavy equipment suddenly found its raw materials and in - process inventory climbing, but, at the same

time, it was experiencing reduced sales and reduced production the system was out of control." The cause was traced to the materials analysts who made the detailed inventory decisions. They had been furnished with decision rules for ordering, cancelling etc. In other words, the system did not provide the requisite variety of control responses. In this case the urgency of remedy did not allow new rules to be formulated and validated. Instead, each materials analyst was treated as a self organizing system, given a target inventory, and told to achieve it. Given the freedom to generate control responses, they reduced the inventory in a few months.

For the information system designer, the Law of requisite variety means that for a system to be controlled every controller (man or machine) must be provided with either

(1) enough control responses (what to do in each case) to cover all possible condition the system may face.

(2) decision rules for generating all possible control responses, or

(3) the authority to become a self-organizing system in order to generate control responses.

Computer - controlled open system are not feasible because of the Law of requisite variety. The solution is the use of man/machine systems in which the computer applies decision rules to generate control responses for expected cases and a human decision maker is used to generate control responses for the unexpected.

1.5 SCOPE AND LIMITATIONS

The scope of this project is cost control measure in an organization. The scope covers the system in perspective, planning and control in organization. This has to do with planning process, nature of control in organization, development of planning model, financial planning computation and information system support for planning. The project also covers the system design and system development and implementation.

The limitations include lack of sufficient time since this is an academic activity. Besides, there is the problem of finance to cover the wider aspect of the organisation.

CHAPTER TWO

2.0 PLANNING AND CONTROL IN ORGANIZATIONS

A plan is a predetermined cause of action. It combines organizational goals and the activities necessary to achieve those goals. The organisation plan is not mechanistically determined; it is very dependent on the individuals making up the organization. An organization may be viewed as a coalition of individuals, and the organizational goals then represent bargaining among the members. The goals change in response to changes in the coalition membership and in the goals of the participants.

Different types of planning require different rates for adoption of computer-assisted approaches. Operations are characterized by frequent repetition of planning at fairly low levels in the organization, making this area more attractive for computer support than strategic planning, which occurs infrequently.

Project planning, the planning of a specific project, is a special problem that is amenable to computer methods. The project planning aid most commonly used is Network scheduling. The network planning approaches are called "Critical path scheduling", "PERT", and "CPM", A large number of software packages are used in preparing a network of events. They also calculate expected completion time, the critical path of events for meeting completion time, and slack time available for events not on the critical path. Resource plan can involve a number of

ifferent plans. Some examples are

* Manpower planning.
* Facilities planning.
* Raw materials supply planning.
* Research planning.
* Market planning.
* Financial planning.

The financial planning tends to be especially significant because it provides a framework for summary planning. Example of financial planning are the profit plan, the debt/equity plan, and the cash management plan.

The control process uses the concept of feedback loop. The control unit need be concerned only with deviations which are outside allowable control units. This reduces the information processing requirements of the control unit and focuses the units attention on the items needing investigation of corrective action. Control is dependent on planning because the planning process provides the standard against which performance is measured. Improvements in planning can therefore allow improved control.

2.1 NATURE OF CONTROL IN ORGANIZATION

The control process requires measurement of performance, and a standard of performance. Measurement is basic to human experience; we think, move, and act in terms of measured amounts of time, distance, and value. Performance is expressed as measured unit of input, activity, and output. Measurement must evaluate performance, but evaluation implies that the planning

nd control authority knows what is acceptable and what is not. t requires a standard against which an object, activity, or result may be placed to decide whether it is satisfactory. Are oranges at 20 naira per kilogram expensive. The answer is dependent on having a standard of customary price for oranges. The standard may be vague or precise, written or not written, but for evaluation to place there must be a standard.

For control purposes, the standard can be a budget or plant that was previously arrived at following due consideration of all the alternative and surrounding conditions. The planning performance is usually the best to be expected rather than what is desired. A loss may be budgeted by a business. If the actual loss is the same as the budgeted loss, the performance must be evaluated as acceptable.

In other words, it is the deviation from the budget or plant that calls for corrective action. Performance is acceptable as long as it does not deviate in an unfavourable direction from the plan, assuming the plan is a correct expression of what should be expected. The information system support for control is therefore based on the comparison of actual performance with the plan and the analysis of reasons for any deviations.

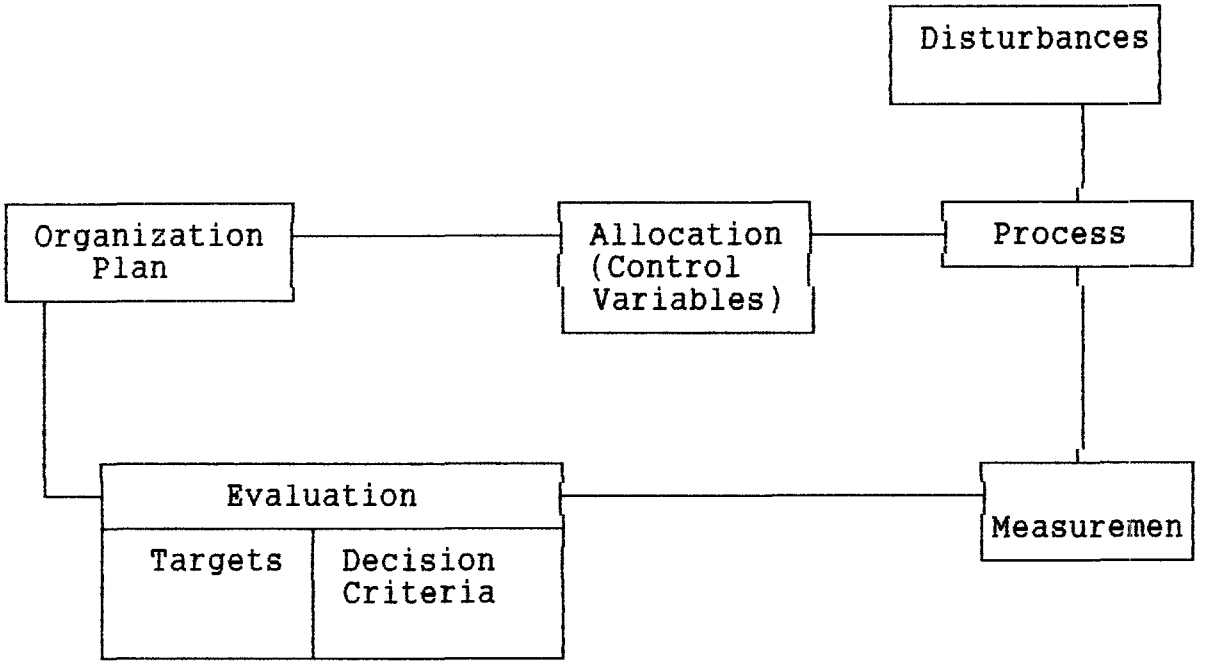


Fig. 2.1 -1 The Organisational Control Cycle.

The acceptance of an unfavourable variation between planned and actual performance as a basis for corrective action implies that personnel connected with the activity being evaluated regard the standard or plan as being fair. Experiments indicate that individuals reject standards that are too easy or too hard. The acceptance of goals are enhance by their use as a motivator (and as a basis for satisfaction, if achieved) are enhanced by their being set within the limits that the individuals involved consider feasible.

Therefore, it is considered desirable for the individuals themselves to participate in setting the budget or standard by which they may judge themselves and by which they know they will be judged by others.

p2.2 PLANNING PROCESS

The plans an organization represent expectation about the environment, expectations about the capabilities of the organization, and decisions that have been made on such matters as allocation of resources and direction of effort. The quantified expectations are input variables for models used in planning. One objective of the information system is to assist in the formulation, quantification, classification, and use of these expectation.

The classification of expectations is dependent on the type of plan for which they are being classified. Data may be organized in a variety of ways. The way data is classified affects the value of the data for analyzing past behaviour and generating future expectation. Classification differ in their objectives; the following examples provides some indication of the variety of their uses.

Classification	Possible Purpose
Object of expenditure	Control over what is being purchased
Function	Control over the functions for which expenditure are made
Program	Control over results to be achieved by a level of expenditures.
Organizational Unit	Control by person making decision to spend
Cost variability	Estimation of planned costs under different level of activity.

Fig. 2.2 - 1.

2.3 DEVELOPMENT OF PLANNING MODELS

A planning model is a method for structuring, manipulating, and communicating future plans. The model describes the process by which plans are developed from input data and from internal calculations for example, a very simple profit model of a business organization might consist of the following statements:

Sales = Input variable.

Cost of sales = 0.40 x sales.

Gross margin = Sales - Cost of sales.

Operating expenses = Input variable.

Profit Before taxes = Gross margin - operating expenses.

Taxes = 0.48 x profit before taxes - taxes

Net Profit = Profit before taxes - taxes.

Fig. 2.3 - 1.

The profit model requires two inputs - sales and operating expenses for example, an input of ₦100,000 for sales of ₦52,000 for operating expenses would allow the model to produce the following simplified income plan. A different set of the two input variables would yield a different profit plan.

XYZ COMPANY
PROFIT PLAN FOR THE YEAR ENDED 199X

	₦
Sales	100,000
Less: Cost of Sales	40,000
Gross profit	₦60,000
Less: Operating expenses	52,000
Profit Before Taxes	₦8,000
Less: Taxes	3,840
Net Profit	₦4,160

Fig. 2.3 - 2.

This simple example illustrates the nature of a planning model. The model provides for the following:

(1) A format for presenting the result from processing the model.

(2) A set of input data.

(3) A set of processing statements (formulas, logic statements, etc) to operate on the input data.

Model building for a planning model can begin with simple models calling for inputs of major, high - level items. Subsequent model development can expand the details of the model to calculate the high - level items from more basic input. For example, in the simple model just given, the operating expenses were an input variable. An expansion of the model might provide a set of statements such as the following:

COMPUTATION OF OPERATING EXPENSES

Selling expenses	=	0.10 x Sales.
Advertising expenses	=	0.05 x Sales.
Interest expenses	=	0.07 x average long-term debt + 0.08 x average short-term loans.
Bad-debt expense	=	0.01 x accounts receivable balance at beginning of period.
Administrative expense	=	Input variable.
Operating expense	=	Selling + advertising + interest + bad - debt + administrative expenses.

Fig. 2.3 - 3.

2.4 FINANCIAL PLANNING COMPUTATION

Models that involve financial plans need to provide for various computations and analyses commonly required for measuring or evaluating profitability. Examples are the depreciation computation, rate of return analysis, and break-even analysis.

Depreciation is a significant computation in most financial planning. It effects profit computations because it is considered as an expense and it affects cash flow indirectly because of its impact on taxes. There are several methods for computing depreciation, all of which should be available to the planner. These methods are straight-line, double-delivering-balance, sum-of-the-years-digits, and production or use basis.

Rate of return analysis is a method for computing the profitability of an investment, taking into account the timing

of the investment and the cash flows stemming from the investment. There are several methods for computing rate of return. These should be a part of the information system support for planning.

Break-even analysis is a fairly simple but very useful computation for determining the volume of activity at which there is no loss or profit. In evaluating alternatives, two situation may have identical expected profit but the one which a lower breakeven point is to be preferred (all other factors being equal).

2.5 INFORMATION SYSTEM SUPPORT FOR PLANNING

The planning process requires a planning model, input data, and manipulation of the model to produce the planning output. The information system should provide support for each of these requirements.

The information system provides data and computational capabilities. Data is provided for developing both the model and input to the model. For example, historical sales would be analyzed for seasonal patterns to use in the model; they would also be used in the sales forecasting algorithm to estimate future sales.

CHAPTER THREE

3.0 SYSTEM DESIGN

The design of the processing system is divided into three phases - system design, program development, and procedure development. Upon completion of this stage of the life cycle, the processing system will be ready for implementation.

The physical design stage begins with the system design. This is the design of the processing system that will produce the reports specified in the information analysis. It designs the equipment usage, the files to be maintained, the processing method, the file access method, the flow of processing. The results of the system design phase are:

(1) File design layouts and specification including access method.

(2) System flow charts showing, for example, use of equipment, flow of processing, and processing runs.

(3) A file - building or file - conversion plan.

(4) Control flow chart showing controls to be implemented at each stage of processing.

(5) Backup and security provisions.

(6) A system test plan.

(7) A hardware selection schedule (if required).

The programming and procedure development phases can proceed concurrently. Programmers will be assigned to do the programming; analysts will normally prepare the procedures. The programming phase uses the system specifications from the information analysis and system design phases to define the

programming task. A program plan is prepared which breaks the programs into modules and specifies interfaces among the modules. A test plan is prepared for each module and for the system when all modules are combined. Modules are assigned to programmers who code and test them. The modules are then combined, tested, and debugged as a program system. Documentation is completed and assembled. The result of the programming phase is a set of tested programs that are fully documented.

Procedure development involves. The preparation of instructions for the following:

(a) Users

(b) Clerical personnel providing input

(c) Control Personnel.

(d) Operating personnel (Computer operator, Librarian, data administrator etc).

The procedures are written; tested for completeness, clarify, and ease of use; and reproduced for distribution. The procedure development phase can also include the preparation of training material to be use in implementation.

This section summarizes the application these concepts to information system design.

The mathematics of information theory has been applied in communication system design. The mathematics does not apply in the more complex management information system environment, but the insights provided are several.

(1) Information has a surprise value

(2) Information reduces uncertainty

(3) There is no information unless there is choice.

(4) Not all data that is communicated has information value.

(5) Redundancy is useful for error control of communication.

The basic model of an information system is more complicated when humans are included. The humans are goal - directed, self - adaptive systems, which, of course, makes them more difficult to describe than hardware information system.

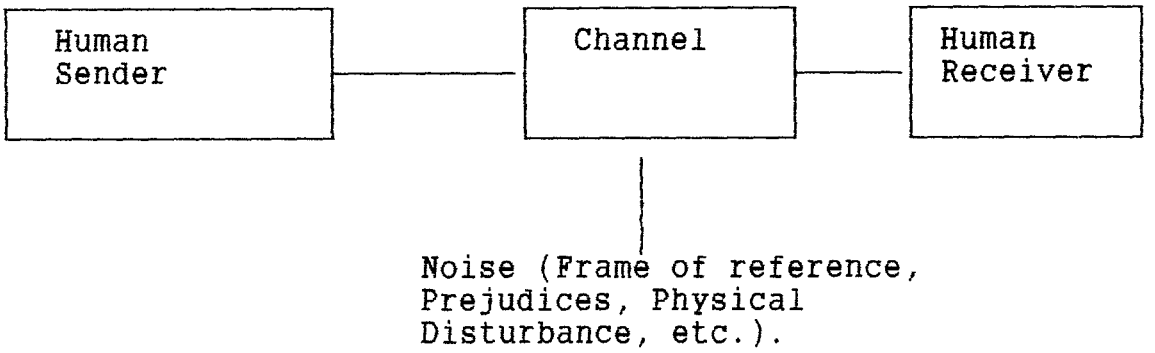


Fig. 3.0 - 1.

Information is associated with uncertainty because there is a choice to be made and the correct choice is uncertain. The reason for having information is to reduce uncertainty so the correct choice can be made. If there is no uncertainty, there would not be a need for information to influence the choice. The basis of choice is the relative efficiency of alternative causes of action. Information received will modify the choice by altering the subjective estimate of the probability of success.

If a receiver is in a decision making situation, it is easy to understand the definition of information as being messages which modify the decision maker's probabilities as to the success of possible actions. But much data is received and stored without reference to decisions being made. Mathematical

information theory has no explanation for data not related to a choice. Two views are possible:

(1) There is no information content until there is a choice.

(2) There is information content if there is expected use for potential choice.

The second view is close to the information system view that information is data that is meaningful to the recipient and is of real or perceived value in current or prospective decisions.

In management information system, there is substantial noise due to the differing backgrounds of humans, differing frames of reference, varying prejudice, level of attention, physical differences in ability to hear, see, and other causes. Redundancy can be effectively used to overcome noise and improve the probability of the message being received and interpreted correctly.

The information quality concepts apply to information system design is the provision of methods to detect and adjust for bids and methods to detect, control, and reduce errors.

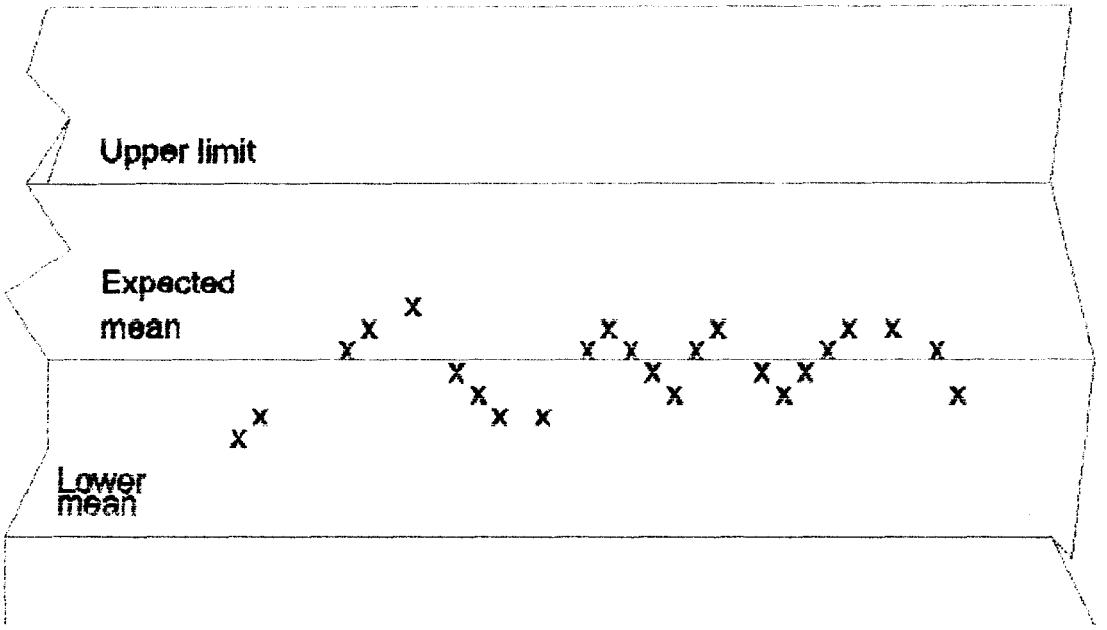
3.1 INFORMATION SYSTEM SUPPORT FOR CONTROL

The information system support for control begins with the planning model. This same model can generally be used to set revised standards of performance which consider the changed level of activity. These revised standards are necessary for control. The computational support for control reports includes variance analysis plus other analyses which might assist in understanding both the reasons for variances and also the courses of action

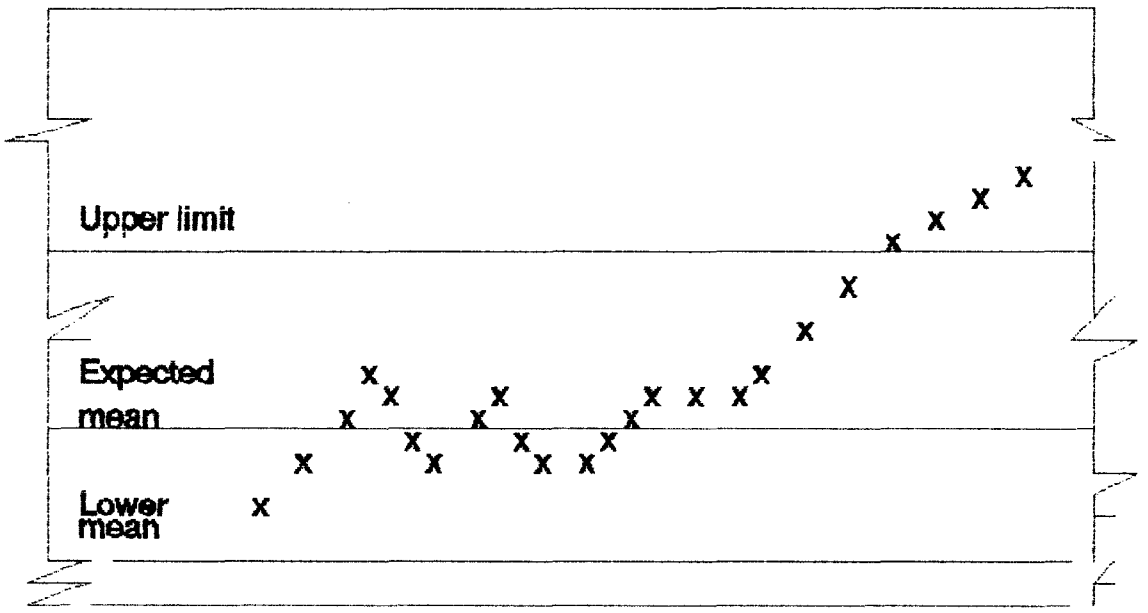
that will correct future performance.

Another use of information system support in control is continuous monitoring of performance rather than just periodic reporting. The monitoring makes use of the planning model plus the concept of control limits to track performance. When the performance falls outside the control limits, a message is provided to the proper control unit. The control limits are set so that random variations do not trigger control actions. The concept may be visualized by a control chart showing one process in control, even though it has random variations, and a second process that has gotten out of control.

Process A - In Control



Process B-Out of Control



3.2 MANAGEMENT INFORMATION SYSTEM (MIS) IN PERSPECTIVE

The perspective of management information system is a collection of reports that are distributed to managers. These reports are:

(1) Schedule reports are produced periodically or on a schedule. Such as daily - weekly or monthly, for example, a production manager could use a weekly summary report that lists tape payroll cost to monitor and control labour and job costs.

Other scheduled reports can help managers control customer credits, the performance of sales representatives invorty level etc.

(2) A key - indicator report - a special type of scheduled report summarizes the previous day's critical activities, and is typically available first thing in the morning of each work day.

Key - indicator reports can summarize inventory levels, production activity, sales volume. Managers and Executives can use this report to take quick, corrective action on key areas of the business.

(3) Demand Reports - are developed to give certain information at a manager's request. In-words, these reports are produced when demanded. An executive, for example, may want to know the inventory level for a particular item. A demand report can be generated to give the requested information.

Other examples of demand reports include reports requested by executives to show the hours worked by a particular employee, total sales for a product for the year etc.

(4) Exception reports - are automatically produced when a situation is unusual or requires management actions, for example, a manager might set a parameter that generates a report of all inventory items with fewer than fifty units on hand. A report of all employees who had worked more than 40 hours for the week is another example of an exception report. In general, when an exception report is produced, a manager or executive takes action.

3.3 SUBSYSTEMS OF MANAGEMENT INFORMATION SYSTEM (MIS)

Systems may consist of numerous subsystems, each of which has elements, interactions, and objectives of the total system. For example, an educational system may consist of individual courses that are subsystems. Each course provides specific knowledge that is a part of the overall educational system and contributes to its goals. In a business system, various functions are subsystems. Marketing, finance, and manufacturing, for example, are subsystems. Within the marketing subsystem, the sales order entry and credit checking functions are subsystems.

Each subsystem uses its resources to meet specific objectives. Successful achievement of these goals requires good management of internal resources. For instance, in managing the sales order entry function, the supervisor needs to develop

procedure, to maintain records, and train personnel.

Within the management information system (MIS), there are 4 subsystems that carry out specialized information roles - (1) Management support system (2) The decision support system (3) Function information system (4) Officer information system.

(a) Management Support System:- This MIS subsystem that is aimed at helping managers make decisions by providing them with reports that are timely and to the point is called MSS. Operational managers depend a great on the information from the report generated through management support system to make their decisions. While factical and upper level managers also use reports generated by MSS, their decisions are not easily programmed like those of lower level, since they must depend intuition and problem - solving talents as well as reports, for this reason, they also use information from other sources.

(b) Decision Support Systems:- To aid the upper level of decision - makers a DSS combines data with models and graphics to answer a decision - maker's questions about the data.

A decision support systems allows a decision - maker to ask "What If" questions about the data by using models to solve problems involving the data. If a decision is highly structured that is, if it can be made using set policies - then the MSS's reports are sufficient to make the decision e.g a decision on how many spare parts to keep on hand for production equipment can usually be made based on the reports generated by the MSS. On the other hand, if the decision is unstructured - that is, if it cannot be made using clearly defined policies - then the models and graphics supplied by a DSS must be used. E.g a decision on

financing a company's department might be based on sales forecasts and future interest rates using a decision support system (DSS).

(c) Functional Information Systems:- Each functional area of a business - marketing, manufacturing, personnel, accounting etc needs its own information subsystem in order to carryout its operations. In many situations, the FIS is either informal or not very well developed. However, as more managers realize the importance of information to their functional areas, functional information system will become more formalized and the computer will be used to implement them. E.g in the marketing area, a commuter - based information system is useful in managing lists of active and potential customers; manufacturing, an information system is useful in managing the inventories, scheduling etc.

(d) Office Information System:- An OIS attempts to make the work of so-called knowledge, workers easier. Officer Information System (OIS) is a machines combined with a communication system and users to make more efficient the job of obtaining, organizing, storing, retrieving, and preparing needed information.

Output from an OIS can be data that have been converted to a form usable by the computer, a report, a proposal or brief. Without an adequate OIS, the reports generated by the MSS might never be written, and a manager's decisions might never be transmitted to the parties who must carry them out.

(e) Expert System:- A new type of information system that is being used more and more to support managerial decision - making. It is an organized collection of people, procedures,

databases, and devices used to generate exzper advice or suggest a decision in an area or discipline. These computer systems are like a human specialist who has many years of experience in a field. For example, expert systems have been developed to search for oil and gas, make medical diagnoses, and to assist in finding problems with electrical and mechanical devices. It is important to note that Expert Systems do not replace humans; they are programmed to behave in predesigned ways by human experts in a particular field.

CHAPTER FOUR

4.0 CHOICE OF LANGUAGE

dBASE III PLUS from Ashton-Tate is one of the loading database program. dBASE III PLUS can create simple database applications, such as keeping names and addresses or inventory records. It can also be used to create complex applications such as general ledger, accounts receivable, accounts payable, payroll, and so on.

Because dBASE III Plus is a relational database, file is organised in the form of a table made up of rows of records a database must have the same of fields, and the corresponding fields must have the same structure and must contain the same type of information.

A dBASE III Plus database can be made up of many database files of which as many as 10 can be active at any one time. A database file can have up to one billion records or two billion characters. A record can have up to 128 fields and can contain up to 4,000 characters of information. You can use dBASE III plus in a very simple manner, using a menu facility called the Assistant. You can also use dBASE command (called dot commands) directly without using the menu facilities provided by the Assistant. dBASE III plus offers a large number of commands for you to create and manager your database files.

dBASE III plus offers a programming language that enables you to construct your own database applications. A large number of built in functions are provided, including mathematical functions, string manipulation functions. The programming

language includes commands to perform conditional branching, looping, calculations, sort records, format input screen, output report, and so on. A screen design facility is provided for you to custom design your input and output screens and to perform error checking and editing on input. Multiple database files can be also be linked (joined) to form a large database. dBASE III plus also provides a local area network operating model, permitting multiple users to access the same database on a local area network system.

dBASE III Plus can used either for basic filling or to construct quite complex applications. Its versatility is perhaps one reason why it is so popular. dBASE III plus requires a minimum of 25k bytes of memory and two disc drives. However, it should be used on computers with more than 256 bytes of memory, and a hard disk is recommended.

4.1 FEATURES OF LANGUAGE

(a) Language and interpreter - computer cannot read English words so the dBASE III plus interpreter reads each command line in order and translate it into a language that the computer understands before executing the instruction.

(b) Writing and editing a dBASE III plus programme:- Once all the instructions have been entered they can be saved to disk by typing CTRL and END keys at the same time. The modify command can also be used to edit an existing program file.

(c) Running dBASE III plus program:- This opens the program file and read each line of the file, starting at the top of

the file, performing each command in sequence.

(d) Program Structure:- (i) The set up area normally begins a dBASE program. It is used to determine the operating environment. (ii) The body of the program (iii) The closing section.

4.2 PROGRAM

Getting started with dBASE III Plus

(1) Hard Disk Drive

If you are using a hard disk drive with dBASE III plus on the disk:

(a) Insert your formatted work disk in drive A and close the door.

(b) Type dBASE at the C:\DBASE> prompt

(c) Press the enter key.

You are now readily to begin using dBASE III Plus.

(2) USING THE ASSIST MODE

When you enter dBASE III Plus, you are automatically placed in the assist mode, assist mode is a series of menu design to allow you to manipulate the programs commands. You can move to any of the commands on the menu bar by positioning the selection bar on that command and pressing [Enter] or by pressing the first letter of the command.

After you select the command you want from the menu bar, a pull - down menu that contains specific action options will appear. If there are additional choices of action, additional pull down menus, called submenus, will appear, the pull down menu

approach provided in the assist mode should permit you to achieve your specific goals with minimal effort.

4.3 CREATING A DATABASE FILE

Before you begin to create your database file, turn the [capslock] key on. When you create a database in dBASE III Plus, you begin with these three steps:

(1) Naming the file

(2) Determing a record structure

(3) Entering data.

To create the database master file

1) Highlight create on the menu bar or press C to select the create menu.

2) Highlight database file and press [Enter]

3) Highlight A: to select drive A and press [Enter] when the prompt ask you to enter the name of the file:

4) Type master and press [Enter]

Once you have named the database, the system will request information about the first field in the database you will assign a name to this field, and describe the format of the data to be stored in it.

To create the record structure for the master database, you will enter the information below:

FIELD NO	FIELD NAME	FIELD TYPE	FIELD LENGTH	FIELD DEC.
1	ACC_NUM	N	6	0
2	CUST_NAME	C	20	0
3	STREET	C	20	0
4	CITY-STATE	C	15	0
5	ZIP	C	9	0
6	BEGIN-BAL	N	10	2
7	UPDATE-BAL	N	10	2
8	CR-LIMIT	N	10	2

(1) Field Name - Represent the field contents e.g customers ZIP code.

(2) Type - Indicated whether the field contents are alphabetic (C), numeric (N), a date (D), Logic (L), or a memo (M).

(3) Width - An alphabetic field can contain from 1 - 254 characters, a numeric field 1 - 19 digits etc.

(4) Dec. - Allow you to specify the number of decimal places 0 - 15 that you want in a numeric field.

4.4 LIST OF PROGRAMS

```
*** MENU.PRG **
SET TALK OFF
SET STATUS OFF
SET ECHO OFF
set date to british
rr = .T.
DO WHILE rr
STORE 0 TO CHOICE
CLEA
@1,10 say "DATE"
```

```
@1,50 SAY "TIME"
@2,10 say date()
@2,50 say time()
@5,10 TO 7,60 DOUB
@6,30 SAY "THE MAIN MENU"
@8,10 TO 22,60
@10,20 SAY "[1] SIMPLE INTERST PROGRAM "
@12,20 SAY "[2] TEMPERATURE PROGRAM    "
@14,20 SAY "[3] DISCOUNT AND AMOUNT PROGRAM"
@16,20 SAY "[4] WAGES PROGRAM          "
@18,20 SAY "[5] EXIT          "
@20,25 SAY "Enter Choice (1 - 5)" GET CHOICE
READ
IF CHOICE = 1
   DO INTEREST
ENDIF
IF CHOICE = 2
  DO TEMP
ENDIF
IF CHOICE = 3
   DO AMOUNT
ENDIF
IF CHOICE = 4
   DO WAGE
ENDIF
IF CHOICE = 5
   CLEA
   EXIT
```

```
   ENDIF
IF CHOICE < 1 .OR. CHOICE > 5
 CLEA
 @12,28 SAY "WRONG CHOICE TRY AGAIN (1 - 5)"
 @22,2 SAY ""
 WAIT
 DO MENU
ENDIF
STORE .F. TO rr
ENDDO
SET TALK ON
SET STATUS ON
SET ECHO ON

*** AMOUNT.PRG***
rr = .T.
DO WHILE rr
STORE 0 TO SALES
mm =' '
CLEA
@2,2 TO 4,60 DOUBLE
@3,10 SAY "PROGRAM TO CALCULATE DISCOUNT AND AMOUNT"
@5,5 TO 20,55
@8,10 SAY "Enter Sales Value" GET SALES
READ
IF SALES < 50000
  DISCOUNT = (10/100)* SALES
ELSE
```

```
  DISCOUNT = SALES - DISCOUNT
ENDIF
AMOUNT = SALES - DISCOUNT
@12,10 SAY "SALES ="
@12,22 SAY SALES
@14,10 SAY "DISCOUNT ="
@14,22 SAY DISCOUNT
@16,10 SAY "AMOUNT ="
@16,22 SAY AMOUNT
@22,10 SAY "More Calculation (Y/N)?" GET mm
READ
mm = UPPER(mm)
IF mm <> "Y"
STORE .F. TO rr
ENDIF
ENDDO
DO MENU

*** INTEREST.PRG ***
 rr = .T.
DO WHILE rr
STORE 0 TO P , R, T,I
mm = ' '
 CLEA
@2,2 TO 4,60 DOUBLE
@3,10 SAY "PROGRAM TO CALCULATE SIMPLE INTEREST"
@5,2 TO 20,60
```

```
@8,10 SAY "Enter Principal" GET P
@10,10 SAY "Enter Rate" GET R
@12,10 SAY "Enter Time" GET T
READ
I=(P*R*T)/100
@14,10 SAY "INTEREST ="
@14,24 SAY I
@22,10 SAY "More Calculation (Y/N)?" GET mm
READ
mm = UPPER(mm)
IF mm <> "Y"
  STORE .F. TO rr
ENDIF
ENDDO
DO MENU

*** TEMP.PRG ***
rr = .T.
SET COLOR TO W+/B+
DO WHILE rr
CLEA
@2,2 TO 4,70 DOUBL
@3,5 SAY "PROGRAM TO CALCULATE TEMPERATURE"
@5,2 TO 22,70
@6,8 SAY "MONTH"
@6,20 SAY "DEGREE IN FAHRENHEIT"
@6,45 SAY "CENTIGRADE"
P = 8
```

```
@1,10 SAY "EMPLOYEE'S NAME"
@1,31 SAY "GROSS WAGE"
@1,47 SAY "TAX PAID"
@1,61 SAY "NET WAGE"
R = 2
KOUNT = 0
DO WHILE .NOT. EOF()
     R = R + 1
     KOUNT = KOUNT + 1
     *******
     MNAME = NAME
     MHOURS = HOURS
     MRATE = RATE
     *CALCULATION OF GROSS WAGE*
     IF HOURS <= 35
        GROSSWAGE = RATE * HOURS
     ENDIF
     IF HOURS > 35 .AND. HOURS <= 55
        GROSSWAGE = RATE * 35 +(HOURS-35)*RATE*1.2
     ENDIF
     IF HOURS > 55
        GROSSWAGE = RATE *35*RATE*20*1.2+(HOURS-55)*1.5
     ENDIF
     *CALCULATING TAX*
     IF GROSSWAGE <= 600
        TAX = (10/100)*GROSSWAGE
     ENDIF
     IF GROSSWAGE > 600 .AND. GROSSWAGE <= 900
```

```
 F = 100
 M = 1
 DO WHILE F >-19
 C = (5/9)*(F-32)
 @P,2 SAY M
 @P,18 SAY F
 @P,41 SAY C
 F = F - 10
 IF F = 0
   F = F - 10
 ENDIF
 M = M + 1
 P = P + 1
 ENDDO
 STORE .F. TO rr
 ENDDO
 @23,10 SAY ""
 WAIT
 DO MENU
 *** WAGE.PRG ***
 rr = .T.
 DO WHILE rr
 STORE SPACE(10) TO MNAME
 STORE 0 TO MHOURS
 STORE 0.0 TO MRATE
 USE WAGE
 CLEA
 *DISPLAY THE COLUMN HEADINGS
```

```
        TAX = (10/100*600)+(GROSSWAGE-900)*(20/100)
     ENDIF
     IF GROSSWAGE > 900
           T A X    =    ( 1 0 / 1 0 0 ) * 6 0 0    +
(15/100)*300+(GROSSWAGE-900)*(20/100)
     ENDIF
     NETWAGE = GROSSWAGE - TAX
     *REPLACE NAME WITH MNAME
     *REPLACE HOURS WITH MHOURS
     *REPLACE RATE WITH MRATE
     *DISPLAY RECORDS**
     @R,10 SAY NAME
     @R,31 SAY GROSSWAGE
     @R,46 SAY TAX
     @R,60 SAY NETWAGE
     *TEST FOR THE FIRST 20 RECORDS*
     IF KOUNT = 20
        WAIT
        @2,00 CLEAR TO 24,79
        R = 5
     ENDIF
     *MOVE TO THE NEXT RECORD IN THE DBASE FILE*
     SKIP
ENDDO
STORE .F. TO rr
ENDDO
USE
DO MENU
```

4.4 OUTPUT

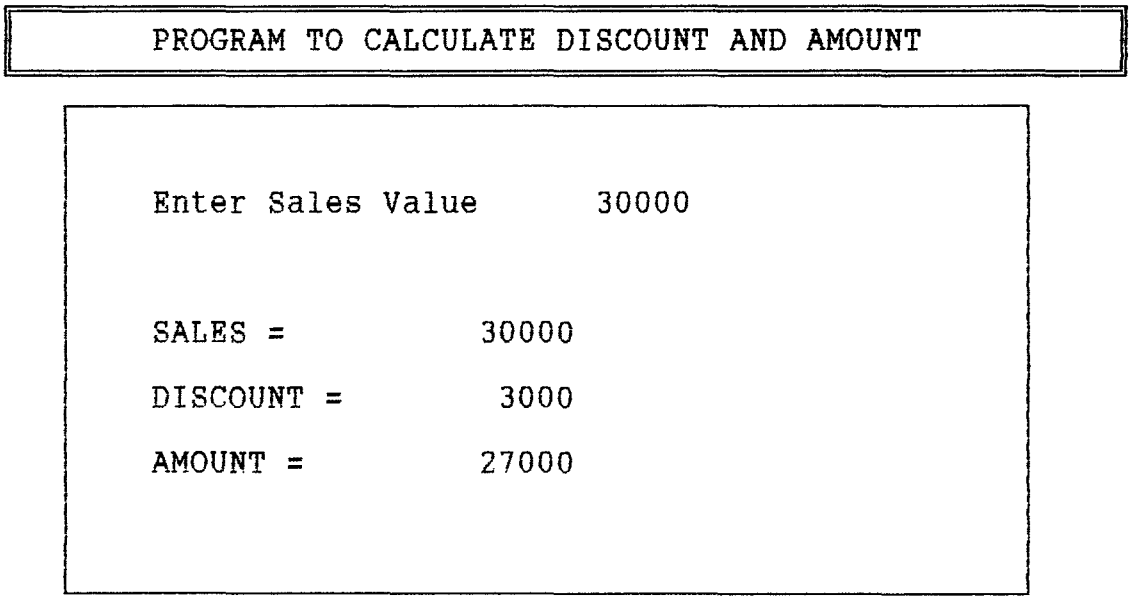
```
DATE                                        TIME
21/10/91                                    23:43:47

                    THE MAIN MENU

          [1] SIMPLE INTERST PROGRAM

          [2] TEMPERATURE PROGRAM

          [3] DISCOUNT AND AMOUNT PROGRAM

          [4] WAGES PROGRAM

          [5] EXIT

               Enter Choice (1 - 5)          0
```

```
      PROGRAM TO CALCULATE SIMPLE INTEREST

Enter Principal       3000
Enter Rate            5
Enter Time            2
INTEREST =             300


More Calculation (Y/N)?
```

PROGRAM TO CALCULATE TEMPERATURE

MONTH	DEGREE IN FAHRENHEIT	CENTIGRADE
1	100	37.78
2	90	32.22
3	80	26.67
4	70	21.11
5	60	15.56
6	50	10
7	40	4.44
8	30	-1.11
9	20	-6.67
10	10	-12.22
11	-10	-23.33

Press any key to continue...



More Calculation (Y/N)?

EMPLOYEE'S NAME	GROSS WAGE	TAX PAID	NET WAGE
SHADE KURUKERE	2112	347.40	1764.60
KULIKULI AKAMU	2068	338.60	1729.40
KETEMA DILEBO GAMEBO	27200	5365	21835
AUDU ISAH	0	0	0
PROF. OGBOLE EMMS	444412.50	88807.50	355605
TEMITOPE A. DELE	12	1.20	10.80
DANLAMI WEREWERE	33966	6718.20	27247.80
SULEIMAN ABU	33996.60	6724.32	27272.28
QQQQQQKQJQK	6216	1168.20	5047.80
BABA NDAGI	2449492.50	489823.50	1959669
UGWOKE KENNETH C.	1242	173.40	1068.60
TUWON RICE MIYANWAKE	270050794.50	54010083.90	216040710.60
FATIMA NNAWODU	19304.52	3785.90	15518.62
AMALA EWEDU KPOMO	2634258	526776.60	2107481.40
MASARA EGUSI SALT	276	27.60	248.40
TEA BREAD EGG	989.99	123.00	866.99
FUFU BITTERLEAF	10962.72	2117.54	8845.18
TUWON DAWA KUKA	143	14.30	128.70
GARI SUGAR KULIKULI	27	2.70	24.30
IRISHCHIPS EGG STEW	11	1.10	9.90

ress any key to continue...

CHAPTER FIVE

SUMMARY/CONCLUSION

A system consists of parts which belong together because of a purpose. The basic model is input, process, and output, but this can be expanded to include storage as well. The hardware, software and control procedures available to support an information system are constraints on the system design and operation. The Law of requisite variety is important in designing control systems because it states the need for a method of obtaining a control response for every state variable being controlled

Planning sets the cause of action an organisation will take; control causes events and activities to conform to the plans. The planning process requires future expectations to be quantified and classified. A planning model is prepared as a method of structuring, manipulating, and communicating expectations and plans. Although a budget model can be prepared with manual worksheets, the coding of the model for computer processing expands its usefulness. Computational support for the planning process consists of financial planning computations.

The preparation and testing of organizational plans can be aided by the use of a computer-based planning model generator. The generator consists of a language for writing modelling statements and report specifications, instructions for use, and computer software to generate and execute the model. The control process utilizes the planning model to generate the performance standard. Variance are then computed as a basis for

understanding why deviations have occurred and what should be done to bring the process back into acceptable limits. An advantage of computer system as a support for planning and control is the capability to monitor performance continuously rather than periodically.

The computer's ability to present information in graphic is another great thing, that is, computer does not only calculate but can also represent the calculations in graphical form. Computer can successfully audit an organizations account through its audit trail facility.

Computer is so effective, efficient and instrumental to every successful organization and work. The organizations interviewed also emphasised the need for computerization in every organizational set up. "Computerization is real".

RECOMMENDATION

In view of all the above information obtained from the survey, I strongly recommend information (computer) system. Support for planning and control in every organization (financial industries). It is effective and efficient.

All the staff should be given adequate computer training to enable them work with the computer effectively.

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APPENDIX

MODEL SHOWING COMPOSITION OF RETURN ON INVESTMENT

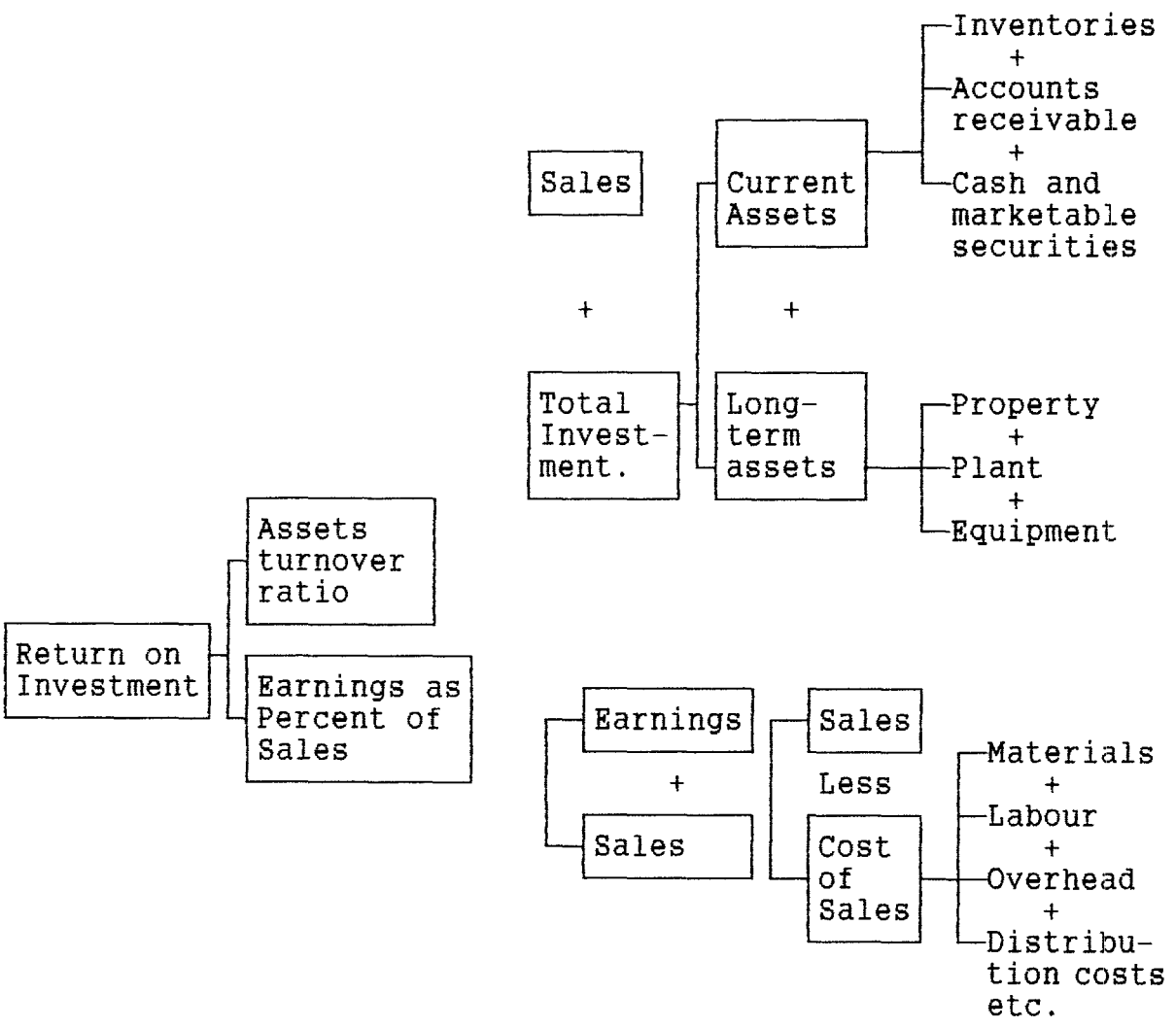

Fig. 2.2 - 5.