

Course Code: CSC 317

Course Title: Computer Centre Management

Course Unit: 2

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UNIT 1: Organization of a Computer Centre

1.0 Introduction

Organization is the aggregated body that makes up the whole labour force. It is also refers to as arrangement of the workforce in a team in order to function effectively.

2.0 Objectives

At the end of this unit, you should be able to

- define organization
- explain the areas of organization
- mention two methods of recruiting staff

3.0 Main Content

3.1 Areas of Organization

There are five areas of organization in which data processing manager must give adequate attention to. These are:

- Planning the Installation
- Establishing Objectives
- Company Education Policy
- Physical Installation
- Staffing Policy

3.1.1 Planning the installation

Before a computer is received at the user's premises the data processing manager must give many man- hours of thought to the preliminaries and must draw up detailed plans for the three major phases, viz:

- Pre installation
- Installation and
- Productive running

Beside, there are also (i) Detailed planning (sitting, systems and programming, staffing etc) and (ii) Policy planning (The definition of objectives, budgeting and resources allocation)

All company's personnel must be involved for successful installation of computer system.

A steering committee must be appointed for a fairly high- level control of the planning. The compositions are: the most senior executive of the company's the chairman, the manager of the computer department, a representative from the computer manufacturer, and other representative from the various departments within the company. The committee should be given specifies terms of reference.

3.1.2 Establishing Objective

The aims and objectives of establishing a data processing department must not be left out. The senior executive should have the following questions in mind which explain both short term and long term objectives. Why is the company considering a computer? What would be the benefit to the company of these applications? What are the long term implications? What major role will the computer play in the company activities? The usefulness of computer in any firm comes under the objectives like keeping records accurately, forecasting, and simulation among others.

3.1.3 Company Education Policy

Management must play emphasis on how computer are used, the stages in applying a computer, the difficulties in problem definition, data collection and communication. The education programme should not be rushed simply because it is for busy men. In short, the education programme policy must made adequate provisions for formal training progrmme, and formal lecture on the effect of introducing computer into the organization.

The purpose of a company education policy is to motivate staff at every level to think about using computer and not leave it to the next man.

3.1.4 Physical Installation

The environmental conditions of a computer are important to trouble -free running. All necessary conditions must be met before installation exercise. The layout of the computer room should be design with work flow in mind as we have in figure 1 below:

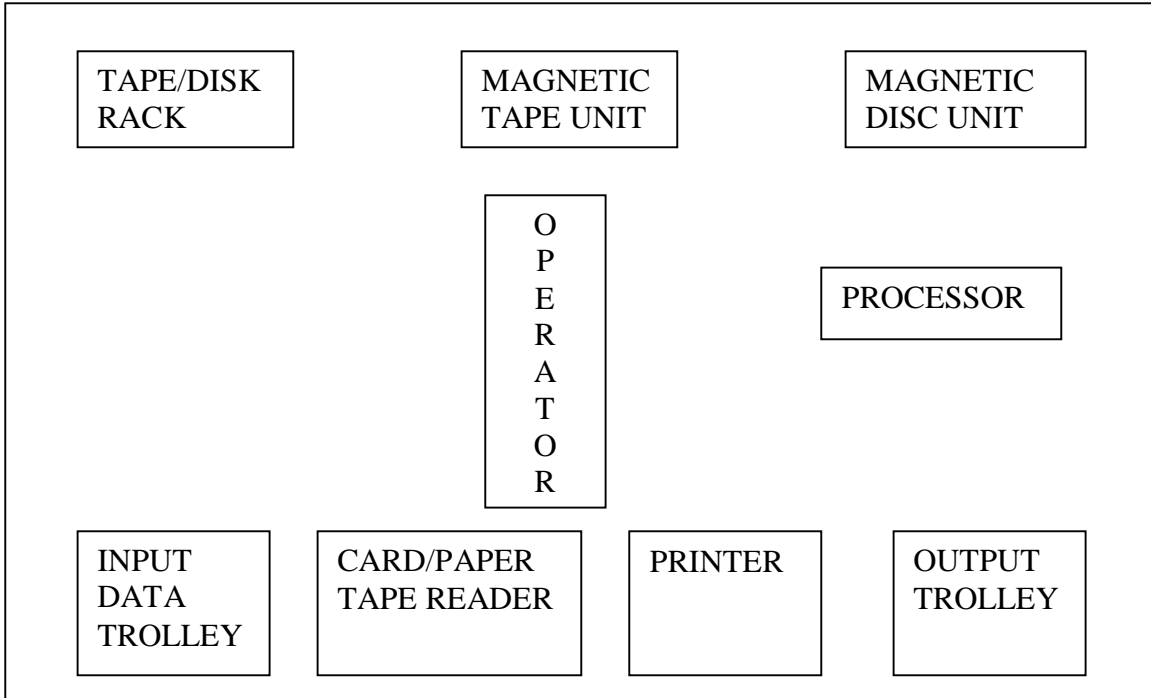
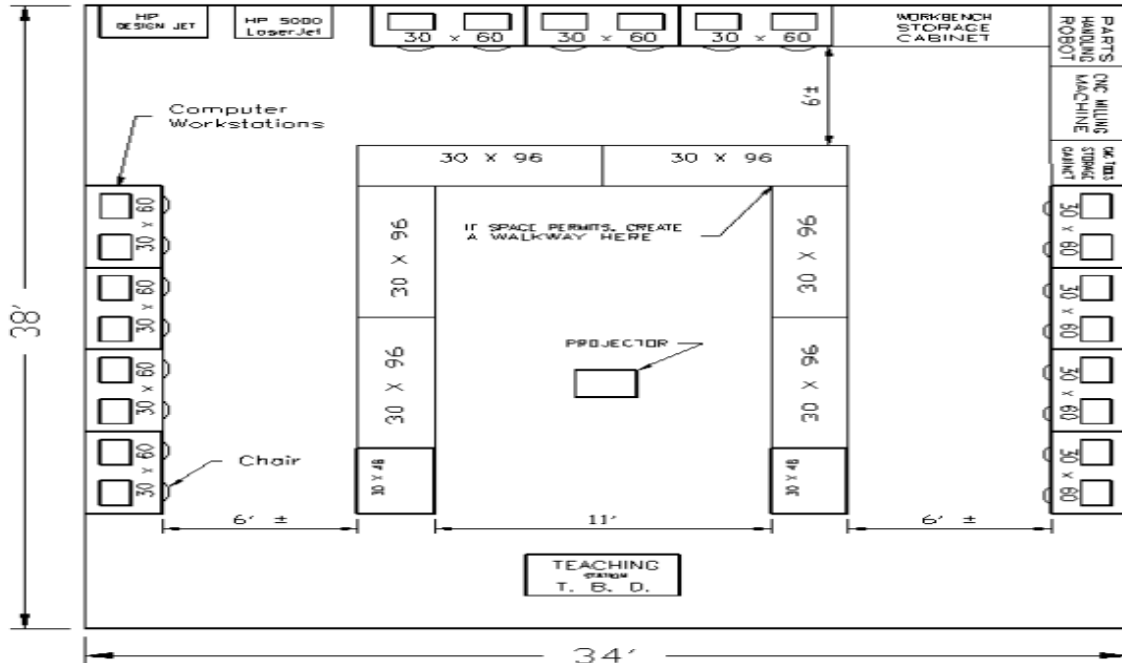


Figure 1: Computer Room Layout

The operator should be near to the input and output units which are most in use e.g. card or tape reader, printer, and tape or disc unit. The room must have air condition used for dust filtration, temperature control and humidity control.



3.1.5 Staffing Policy

A typical computer centre team consist of the operations team who performs daily management of the computer centre including 7/24 operator coverage, logistical planning for the computer centre, hardware movements and warranty/escalation follow-up for the system.

There are obviously two choices open to management. They can recruit experience personnel and thus reap the benefit of that experience or they can re-train existing staff in computer techniques.

In doing this, a number of factors used to be considered or the advantages and disadvantages of each option.

(a) Recruitment of Experience Personnel

Advantages

- (i) Benefit of the experience.
- (ii) Little or no computer training required.

(iii) A fresh eye often sees weakness in a system.

Disadvantages:

- (i) Demand exceeds supply, therefore high salary levels.
- (ii) No knowledge of company perhaps even industry.
- (iii) No company loyalties.
- (iv) Problem of interaction with existing staff.
- (v) Gamble of recruiting an unknown person.

(b) Re – Training of Present Staff

Advantages:

- (i) Retain existing loyalties.
- (ii) No need to spend time in teaching company operation
- (iii) Personality and ability already known.
- (iv) Acceptance to existing staff (assuming right people selected).

Disadvantages:

- (i) Computer training necessary.
- (ii) Over familiarities with the way thing are done and reluctant to change the present methods.

4.0 Conclusion

This unit has introduced you to the organization of a computer centre. You have also been informed on how staffs are recruited.

5.0 Summary

There are five areas of organization in which data processing manager must give adequate attention to. These are:

- Planning the Installation
- Establishing Objectives
- Company Education Policy
- Physical Installation
- Staffing Policy

6.0 Tutor-Marked Assignment

Discuss five areas of organization in which data processing manager must give adequate attention to.

UNIT 2: Administrative Structure of a Computer Centre

1.0 Introduction

The administrative structure is being organized in such a way that a skilled professional personnel is put in place to oversee the administration of the computer centre who in turn reports to the executives or the directors board on the necessary protocols needed in putting the computer department in such a way that it would be in line with the company objective.

The size of the data processing department of an organization and the degree of separation of functions within it depend on the size of the organization and the extent of computerization within it. Another factor that determined the size of an organization's data processing department is the financial considerations. That is the capital cost of the equipment. The major items to be considered here are:

One Time cost: (i) Hardware.

(ii) Site preparation (building work, air conditioning).

(iii) Staff recruitment (agency fees, advertising).

(iv) File creation (data gathering and preparation cost).

(v) Change over cost (parallel running, overtime for staff).

(vi) Education and training.

Recruiting cost: - Staff salaries

- Maintenance of equipment

- Light, heat and power

- Stationery

- Replacement recruitment

- Further education

2.0 Objectives

At the end of this unit, you should be able to

- mention the factors that determine the size of an organization
- list the personnel's in a computer centre
- State the function of each personnel in a computer centre
- Illustrate with a diagram the administrative structure of a computer centre

3.0 Main Content

3.1 Personnel's in a Computer Centre

In the department various staff with different computer skills is being employed. The data processing manager is the head of the department under which you have the computer analyst, programmer, operation manager, etc. There is probably no standard structure for data processing department. Precise responsibilities and reporting procedures vary. Figure 2 and 3 show some alternatives.

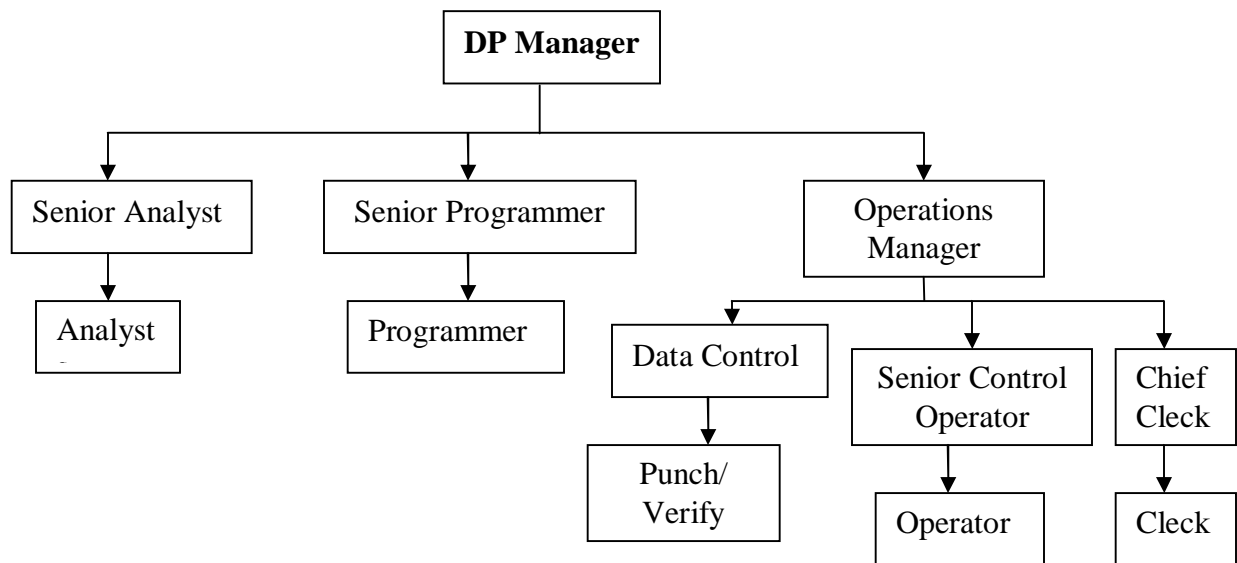


Figure 2 DP Department Structure I

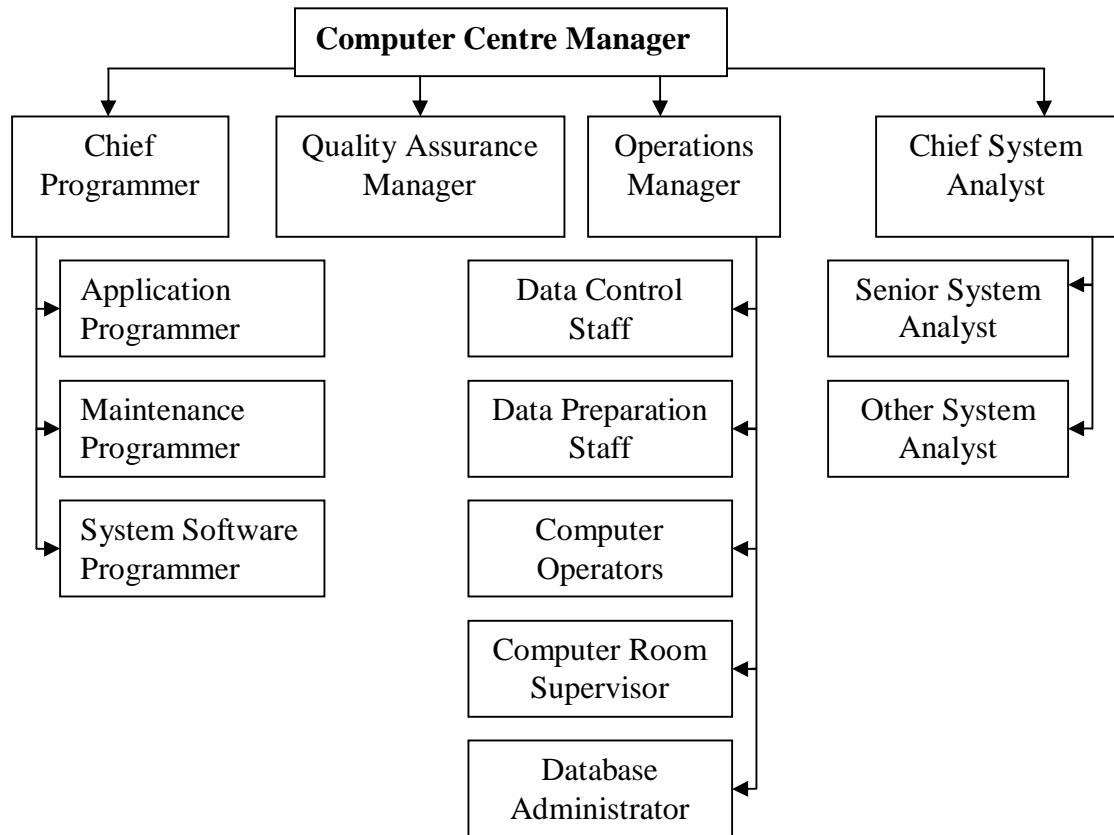


Figure 3: DP department Structure II

3.2 FUNCTION WITHIN DP

3.2.1 The Data Processing Manager (DPM)

The DPM is responsible for both research and development and for production. He is also in charge of the following responsibilities

- co-ordination of the developmental objectives.
- responsible for development policy
- establishment of an effective communications within the department including documentation and other standards
- provision, utilization and control of resources required within the department.

3.2.2 Project Leader

The project leader is:

- responsible for the overall control and coordination of a particular project.
- responsible for the allocation of functions within the project.

3.2.3 Chief System Analyst

A system analyst carries out feasibility study on a system. He works with other individuals within an organization to evaluate their information needs, design computer software and hardware to meet those needs and then implement the information system. He defines error messages to be incorporated and checks to be embedded into the system. He functions as project team leader and supervisor to the system analyst

The duties are to:

- (i) Collect, records and analysis details of existing procedure and systems
- (ii) Develop ideals for computerized systems superior to the current and existing system.
- (iii) Prepare computer operating instructions.
- (iv) Define error messages to be incorporated.
- (v) Estimate run timing
- (vi) Specified check and control to be embedded in the new system.
- (vii) Define actions required to deal with various conditions arising in the system.

3.2.4 Chief Programmer

Chief Programmers work closely with a system analyst to either create new software or to review existing programs. He supervises application programmers, maintenance programmers and system

software programmers. The programmers are in charge of programming (applications) and perform the following functions:

- preparation of program flowcharts and coding
- program documentation
- program testing
- preparation of operating instrument
- program maintenance and modification

3.2.5 Computer Operations Manager

He is responsible for the day- to –day running of the computer, control and flow of work, data preparation and distribution, and computer operation and also liaise with the engineers during maintenance procedure. He will be required to schedule the workload so as to obtain the best use of the resources to ensure that work progress through the department (receipt of data, data preparation, operation, dispatch and control at all stages) and to maintain all the necessary files. The following specialists work with the operation manager: the data control staff, data preparation staff, database administrators, computer room supervisor and computer operators. To assist him, he may have control clerks, punch operator, and a librarian.

He may also have under his control certain auxiliary machines such as decollators, sorters, tabulators, busters, and the appropriate operators. He will act as liaison between the operations department and the systems programming functions and as new systems are completed, he will absorb them into his programme of work.

Operation manager is a person who runs the day- to- day operations of the computer systems. He maintains records on equipment utilization and ensuring that data is received on time from user department.

3.2.5.1 Computer Operators

Operators are the professionals that make use of the computers to do their jobs. They make judicious use of both the hardware and the software, which includes the utility programs e.g. file conversion, file copy, file maintenance and reorganization, sorting, back up files, etc.

He is in charge of:

- (i) operating equipment in the computer areas.
- (ii) cleaning equipments as laid down,
- (iii) processing data as required,
- (iv) performing program compilation and tests,
- (v) maintenance of log book in respect of machine performance, utilization and failures,
- (vi) liaison with engineers during maintenance period

3.2.6 Other Staff

A full description of other rules is not given here as most of them will already be familiar to us as student.

- (i) Punch Operators: punch data into card or paper tape. Required skill-manual dexterity, rhythm, concentration.
- (ii) Verifier Operators: verifies work of punch operators, frequently a senior punch operator.

- (iii) Control Clerks: verify flow of work, maintain totals to ensure no data loss or incorrectly processed. It required skill normal clerical ability, accuracy and numeracy.
- (iv) Librarian: maintains library of tapes or card files in use usually also library of programs in use. It required skill clerical ability, accuracy and dependability.

4.0 Conclusion

In this unit, you have learnt on the administrative structure of a computer centre and the roles of each personnel in a computer centre.

5.0 Summary

In this unit you have learnt that the data processing manager is the head of the department under which you have the computer analyst, programmer, operation manager, etc.

6.0 Tutor-Marked Assignment

- (a) Illustrate with a diagram an administrative structure of a computer centre.
- (b) Write five responsibilities for each of the following personnel's in Computer Centre
 - (i) Data Processing Manager (DPM)
 - (ii) System Analyst
 - (iii) Programmer
 - (iv) Computer Operator

UNIT 3: Computer Centre

1.0 Introduction

The Computer Centre is a service unit that utilizes computing resources to provide diverse computer services to the general public. It is an institution which contains one or more computers being operated upon by specialized set of people. A computer centre is a data processing centre where various data are being processed and turned to reliable information.

Every organization has an objective of setting up a computer centre, this is to ascertain the extend of relevance of the computer centre to an organization. The organization must put in place a good detail planning and layout of how the computer department should be. The manager must give detail planning to productive running, equipment selection, types of programs to be used, sitting arrangement and employment of qualified staff.

2.0 Objective

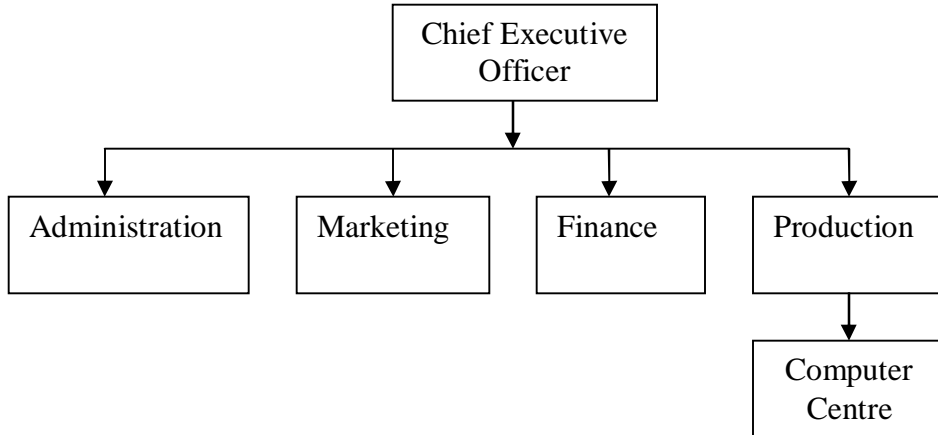
At the end of this unit, you should be able to

- State the various naming convention of a computer centre
- Mention the services provided by a computer centre
- discuss the types of computer centre
- Outline the factors to be considered when installing computer system

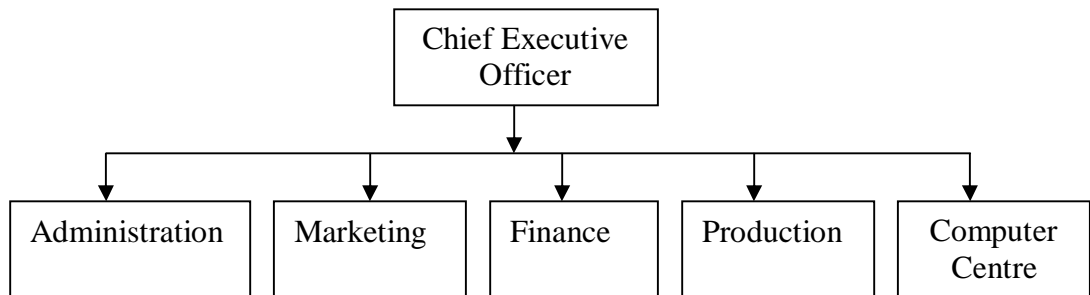
3.0 Main Content

3.1 Computer Centre and its presence in an organization

- A computer centre may simply be a single unit within each department



- A computer centre can provide services to other department as a company's centre



- Computer centre may be, instead, a separated unit under chief executive officer at the same level of authority as other functional departments.

3.2 Various Names of Computer Centre

Normally, all computer centres are responsible for virtually similar tasks in all organizations; however, their focuses may not be the same. Using a certain name would identify its focused responsibilities, and the following are examples of such naming convention.

- **Data Processing Centre:** To provide business data (Sales, Deposit/Withdrawal, Airline Ticketing, Student Registration, etc.) and produce summary report or other business documents.
- **MIS Centre:** To provide information for managers and executives for making timely and quality decisions (usually continuing the work of data processing).
- **Data Centre:** To provide data for use by all departments (e.g. centre to provide criminal records, population records, etc.)
- **Office Automation and Internet Centre:** To provide services to all departments with office automation and communication system.
- **Computing Service Centre (or Computer Centre or IT Service Centre):** Basically, to provide services of all types related to business data processing, business applications, and maintenance services to all departments in the organization.

3.3 Services provided by Computer Centre

- To provide computer-related services to personnel and customers
- To provide advice and consultancy for users
- To provide systems development services to users
- To provide data entry services for user
- To create and maintain IT standards and procedures
- To provide IT acquisition services to users
- To keep and protect IT and data assets
- To ensure that the organization has adequate/advanced IT progress, which is in line with the organization's vision

- To ensure that services provided are meeting with users' requirements

3.4 Types of Computer Centre

The nature of data being processed and level of computerization determined the type of computer centre an organization will operate.

Basically, there are two types of computer centre, viz:

- Centralized data processing (DP) centre.
- Decentralized data processing centre.

3.4.1 Centralized DP



Centralized computing is computing done at a central location, using terminals that are attached to a central computer. The computer itself may control all the peripherals directly (if they are physically connected to the central computer), or they may be attached via a terminal server. Alternatively, if the terminals have the capability, they may be able to connect to the central computer over the network. The terminals may be text terminals or thin clients, for example.

At this centre, all the data under processing must pass through the central location. All the facilities and staffs are concentrated in a place. There is a complete standardization at this centre. Besides, the centre ensures efficient utilization of the system throughout the day (24 hours service).

It offers greater security over decentralized systems because all of the processing is controlled in a central location. In addition, if one terminal breaks down, the user can simply go to another terminal and log in again, and all of their files will still be accessible. Depending on the system, they may even be able to resume their session from the point they were at before, as if nothing had happened.

Advantages

- **Sharing resources:** A well-planned centralized system holds data used across the organization in one place, allowing all staff to access it. This makes it both faster and easier to undertake organization-wide activities. Central planning and operation also allows compatible technology and skills to be introduced. Exchange of hardware, software and staff between organizational systems and units therefore becomes much easier.
- **Avoidance of duplication:** One main intention of centralized approaches is to have a single version of any particular information system for the whole organization, and to store any item of data once and only once. As a result, there is no wasted effort, no wasted storage capacity, and no inconsistency of data
- **Learning and Control:** A centralized approach to information systems provides an organizational focus for learning and for control. This is likely to produce higher quality information systems and can also reduce costs by:
 - avoiding the decentralization problems of non-functioning or malfunctioning systems,

- avoiding the decentralization problems of inadequate security, maintenance and documentation, and by
- allowing technology purchases and system developments that are not organizational
- **Achievement of scale economies:** Centralized approaches allow most activities to be undertaken more cheaply per unit. Items purchased externally – computers, software packages, consumables, staff training, etc. can be decided upon once and then bought in greater bulk. Activities undertaken internally-from system development to implementation and maintenance, and management of all these processes – cover a greater number of staff.
- Easy to manage
- Less personnel cost

Disadvantages

- **Resource Constraints:** Centralized approaches require the commitment of four key resources: money, time, people and skills.
- The central computer performs the computing functions and controls the remote terminals. This type of system relies totally on the central computer. Should the central computer crash, the entire system will "go down" (i.e. will be unavailable).

3.4.2 Decentralized DP

Decentralized computing is a trend in modern day business environments. This is the opposite of centralized computing, which was prevalent during the early days of computers. Decentralized computing is the allocation of resources, both hardware and software, to each individual workstation, or office location. In contrast, centralized computing exists when the majority of functions are carried out, or obtained from a remote centralized location.

Unlike the centralized centre, each location has its own data processing equipments and staffs. The system can operate independently but may be linked to bigger systems for enhanced operations i.e. the centre can operate on their own but may be affiliated to larger systems for enhanced performance. The method used here is otherwise called distributed data processing.

Advantages of Decentralized DP

- Users receive reports at system rate.
- Job priority is determined by local management.
- The centre is much easier to control.
- There is a relief on central computer work load.

Disadvantages of Decentralized DP

- Specialize DP staffs are distributed at each location.
- The system may not be large enough to justify employment of specialize DP staff therefore more profitable applications may not be considered.
- Duplication of effort: it tends to be very costly because units will often duplicate what others are doing. Duplication may cover analysis, design and implementation of information systems, gathering and administration of data, and system operation, support and maintenance.
- Since data of similar entities are held simultaneously in two or more different locations, it tends to become inconsistent. No one knows which, if any, version of the data is the most accurate or up-to-date.

Centralization versus Decentralization

A centralized computer centre handles all processing at a single computer site, maintains a single central database, has centralized development of applications, provides central technical services, sets development priorities centrally, and allocates computer resources centrally. The system's remote users are served by transporting input and output data physically or electronically.

A decentralized computer centre may have no central control of system development, no communication links among autonomous computing units, and stand-alone processors and databases at various sites. Each unit funds its own information processing activities and is totally responsible for all development and operation.

An advantage of centralized computer centre is that they provide for standardization in the collection of data and the release of information. There are also some economies of scale. Centralized computer centre reduces the need for multiple hardware's, software's, space, personnel and databases. It may be possible to recruit more qualified personnel in a central facility.

User motivation and satisfaction are increased under a decentralized environment. This is attained because users feel more involved and more responsible, systems are better customized to their specific needs, and they usually get better response time in routine operations as well as in requests for changes.

3.5 Factors to be considered when installing Computer System

Depending on the type of computer centre, certain factors have to be considered when installing computer system. The factors are:

- a) **Local Support:** It is important to discover the level of support available locally from different manufactures of hardware. In most cases, the availability of such support would be a major factor in preferring a particular make of machine, even if initial cost are higher.
- b) **Hardware Security:** Physical security around computer centres and laboratories need to be stepped up because of the activities of looters. Security attention should be given to the computer hardwares because of their small sizes; if the physical security is slack valuable and costly component of the system might be lost.
- c) **Dust:** It is almost always advisable to provide dust cover on computer equipment when not in use, and in some areas special dust filters may be needed to prevent dust penetrating the casing.
- d) **Heat:** Because of the heat been produced by the computer, full air conditioned office is highly imperative. It is advisable to buy portable air condition unit or install cooling fan in micro itself.
- e) **Power Supply:** Computers can not function without electricity. Electric generators must be provided at the centre incase of the public power supply failure. In addition, the generator should be supported with power stabilizer and uninterruptible power supply (UPS). Power stabilizer protect the computer the harmful effects of fluctuations while UPS maintain the continuity of power supply in the gap between the switch over public supply to in- house generator or vise – versa.
- f) **Humidity:** An unusually assemble of humidity can also be a problem, leading to corrosion of electric contact; it may be advisable to use non- corrodible plugs and socket or to use a contact less keyboard for example.
- g) **Accessories:** It is essential to have a supply of computer accessories and part of a micro and all peripheral equipments.

- h) **Workshop:** Basic maintenance facilities will be needed. It is not necessary to be an electronic engineer to do routine maintenance such as disc head alignment, to change board in the computer, or to run the diagnostics programs which will at least help to locate a fault.
- i) **Communication Facilities:** These facilities must be provided to provide a link between the main computer centre and its terminals.
- j) **Space Requirement:** From 400sq. ft. to several hundred thousand sq. ft; length-to-width ratio should be approximately 2:3; no long, narrow rooms.
- k) **Floor loading:** should be sufficient, preferably with a sound-absorbent and antistatic covering.

3.6 Computer Centre Designs: Physical Computer Centre Setup

1. Site Selection
2. Designing office and rooms
3. Designing the whole centre
4. Detailing the facilities
 - Raised floor: let the wind blow under the floor
 - False ceiling
 - Air conditioner
 - Smoke and heat detectors
 - Rooms to be designed
 - Machine room
 - Operator working area
 - Storage for paper, tapes, disks and outputs
 - Customer engineer working area

- Technician area
- System development areas: for system analysts and programmers
- Library: for storing books, journals and software
- Conference and meeting rooms
- Training rooms
- Director rooms
- Secretary rooms
- Operator and guest areas
- Toilet
- Rest rooms
- Areas for storing power units and air conditioners: such areas are needed to be designed so that there will be no harm in case of power supply shortage.

3.7 Planning should take into account the following special conditions:

- Separation into air-conditioned and non air-conditioned areas
- Floor preparation for equipment installation in the air condition areas
- Quiet zone in personnel areas (management offices, system support, operations scheduling, visiting programmers, library, conference room, coffee room).
- Solid and soundproof walls (over 40 dB in passage ways to separate air conditioned from non air-conditioned and noisy from quiet areas)
- Extensive use of moveable walls to allow for ongoing adjustments to technical and task-related developments
- Inclusion of reserve space in air conditioned and non air conditioned areas

- Provisions for visitors so that they do not disturb operations: (Many computer centers no longer permit machine room tours for security reasons, but portion of the operation may be viewed through safety glass from a gallery)

4.0 Conclusion

The Computer Centre is a service unit that utilizes computing resources to provide diverse computer services to the general public. The two types of computer centre are: centralized computer centre and decentralized computer centre.

5.0 Summary

In this unit you have learnt that depending on the type of computer centre, certain factors have to be considered when installing computer system. These factors are: Local Support, Hardware Security, Dust, Heat, Power Supply, Humidity Accessories, Workshop, Communication Facilities, Space Requirement, Floor loading

6.0 Tutor-Marked Assignment

- (a) Discuss the two types of Computer Centre
- (b) Outline any ten factors to be considered when installing Computer System
- (c) Highlight six services provided by a computer centre
- (d) State any five naming convention of Computer Centre

Unit 4: Recruitment Techniques

1.0 Introduction

Employment, recruitment and selection of personnel depend on the position of the economy of a country. These account for situations where people tend to remain in a particular job for many years while in some cases, people move to another job for better offer, hence recruitment exercise is necessary. Therefore recruitment is a way of hiring people and their skills in particular field or industry. Recruitment thus opens the window for skill evaluation and a quality control over services provided by the company that is adopting the recruitment process.

This exercise may involve the use of appointment consultants or direct employment into an organization called selection.

It is important to state that 'recruitment is more than the literal meaning employment'. It means and refers to the following:

- Things to be in place before employing labour
- Expectation or recruiting officer before the process
- Techniques to carry out recruitment of labour
- Help for applicants
- Number of labour needed and to what capacity they hold
- Experiences attached to each capacity
- Duration of services
- Wages and general cost performance

2.0 Objectives

At the end of this unit, you should be able to:

- define recruitment

- explain the types of recruitment techniques
- discuss the main sources of recruitment
- state the procedures for recruiting staffs
- mention the policy for recruiting staff

3.0 Main Content

3.1 Main Source of Recruitment

In the recruitment of staff, firms may look at the following:

- (i) **Advertisements:** This can be done through, media houses like newspapers, journals, radio, television, internet and so on. Advertising agencies could be used to execute this task. Correct choice of media is highly necessary. Emphasis should be laid on the quality of the placed adverts. Such advertisement must be carefully worded, neatly set out, and stressing the main features. On the other hand, a poor advertisement may raise doubts about the company's ability and efficiency. Salary range, name of the company, prospects and box numbers should be stated when advertising.
- (ii) **Employment Services Agency:** The method is used to recruit manual worker and clerical staff. A register is maintained which shows the reward of the people seeking jobs.
- (iii) **Employee Recommendations:** These have the advantage that applicants will know a lot about the firm when they arrive and employee may have more interest in their work if allowed to recommend workers. This can be done by employee or by other personalities that have a good knowledge about the job and its state. It helps to acquire scarce skills at reduced prices.
- (iv) **Professional Organizations:** Usually keep record of vacancies.
- (v) The use of staff notice board

- (iv) Private employment bureaus which charge fees for every employee supplied.
- (v) Universities, technical colleges, schools and other training centres can be used as a source of recruitment. This avenue gives an opportunity to employ the best from bodies.

3.2 Recruitment Techniques

3.2.1 Appointment Consultants

The aims and objective of management development is to get the right man, with the right equipment, in the right place at the right time. Many organizations tend to use consultants for the following reason:

- i) Assessment of candidate is impartial.
- ii) Cost implication, the cost is low
- iii) Information about the candidates, the abilities and experience acquired will be known.

3.2.2 Use of Selection

This is a method of recruiting workers whereby a panel is set up in an organization to carry out the exercise. When the short list of candidates for interview is drawn up. A time table should be prepared allocating specific periods for each interview so that there is sufficient time to interview each person properly.

3.2.2.1 The objectives of interview are:

- i) to assess personality of applicants.
- ii) to obtain further details of certain matters
- iii) to agree on terms of employment

iv) to provide candidates with more information about the job.

3.3 Procedure for Recruiting and Selection of Staffs

- a) A staff requisition form is required to be completed by the department where the vacancy arises, noting full details of the vacancy, job title date of commencement. This form can then be given to personnel department for advertisement.
- b) Advertisement is placed using any of the method discussed above.
- c) Shortlist drawn up and interview arranged.
- d) References can be taken up before the interviews and are used to determine the final selection of the interviews.
- e) Interviewing of the candidates. This may be structured using standard procedures and techniques or unstructured.
- f) Test for specific skill often come up during interview. Professional qualifications claimed should be checked.
- g) Medical examination is also necessary to determine those that are fit or otherwise for the job.
- h) Unsuccessful candidates are informed of the decision.
- i) Successful candidates are informed and company records updated.

3.4 Recruitment Policies

The nature of job in consideration determines what policy is used. The management of the company can decide to perform any of the following:

(a) **Recruitment of Experienced Personnel:** Some jobs don't allow for inexperienced personnel. The employ of experienced personnel could be more expensive but it will provide a good ground for success in any particular field of reference.

Advantages:

- Benefit of the experience
- No intense training is further required
- To avoid the incapability of the inexperienced

Disadvantages

- Could be more expensive
- Personnel's coping ability to new work environment

(b) **Retraining of present staff**

Staff of the present company could be asked to go for training courses to build the necessary skill required. This would be cheaper than recruitment of experienced personnel.

Advantages

- No change of personnel
- Versatility of personnel
- Less expensive

Disadvantages

- Absence of personnel during the training period
- Necessity for promotion and increase in wage

4.0 Conclusion

In this unit, you have learnt on recruitment techniques, main source of recruitment, procedure for recruiting staffs and the recruitment policy.

5.0 Summary

In this unit you have learnt that recruitment is a way of hiring people and their skills in particular field or industry. The main sources of recruitment are advertisement, employment service agency, employee recommendation, professional Organizations, the use of staff notice board, private employment bureaus and universities, technical colleges, schools and other training centres.

6.0 Tutor-Marked Assignment

- (a) Explain briefly the two types of recruitment techniques
- (b) Discuss the main sources of recruitment
- (c) What are the procedures for recruiting staffs?
- (d) State the policy for recruiting staff

Unit 5: Performance Measurement

1.0 Introduction

During all phases of the production of a real - time system it is necessary to be able to measure the performance of those parts of the system already constructed or to be built, this will enable the designer to know how to gauge whether the system is going to meet the performance requirements or in some point during the system development, a decision must be made as to what computing hardware will be used in the final system being constructed.

Once the system is constructed, it is possible to obtain an accurate measure of system performance. From this, it is possible that the system will meets its requirement and to highlight any areas needing further optimization.

2.0 Objectives

At the end of this unit, you should be able to

- explain the techniques used to model system performance
- discuss the monitoring techniques for obtaining performance information
- state the limitations experienced when observing the system

3.0 Main Content

3.1 Hardware Assessment Models

Hardware performance is usually modeled as a set of parameters like clock cycle rates, instruction execution times, store access time, bus speed and direct memory access speeds. The magnitude of these parameters will have a fundamental effect on the ultimate performance of the system. Great care must be taken when using any given parameters to compare the efficiency of two difference pieces of hardware. The parameters cannot be taken in isolation; they must be viewed in light of

overall system behavior. Other techniques that can be used to model system hardware including the following:

- i) **Instruction Mixes:** These are mathematical models (models of programs) formed by calculating a figure of merit and this model are expected in running system. This figure is determined by adding together the execution times of each instruction weighted by the relative frequency with which the particular instruction is expected to appear in the systems software.
- ii) **Synthetic Program:** This involves an act of writing a program to emulate the behavior expected of typical programs in the final system rather than making assumptions as to the expected instruction mix. This is called a synthetic program. The program simply exercises the hardware in a way thought to be typical of the future system software. Again, a figure of merit is calculated by summing the instruction execution times.
- iii) **Benchmark:** A benchmark is a complete program, written to be representative of class of a program in a complete system. This program forms part of the system. It runs on the hardware and the performance is measured, hence the method provides a more realistic workload. The method is limited to existing system; the hardware must be available and the program written.

3.2 Monitoring Techniques

Modeling techniques are used during preliminary stages of system design and development, when the system and its facilities are not yet in operation. However, once the system reaches the construction stage, performance information can be obtained by observing the actual system. This can be done in two ways;

- (i) By monitoring the hardware.
- (ii) By monitoring the software.

(i) Hardware Monitors

These consist of hardware devices design for data performance with an analysis program which summarizes the data collected. Hardware monitor have great advantages of being totally independent of the system under examination. The monitor can be used to measure clock cycles, values in any part of the hardware as well as event occurring simultaneously in different part of the system.

Limitation

The monitor can only provide information as to data bus and address bus values, register values, etc, but can not translate information derived from a hardware monitor into meaningful behavior system data.

(ii) Software Monitors

A software monitor is program whose job is to collect and store data concerning the state of the system pre- determined times. The major advantage of software is that it can be given knowledge of the variable names, process and other logical items in the system. It can monitor the system as it is seen by designer.

Limitation

Software monitors have inherent disadvantages. Running a software performance monitor can be disturb and may even bias the behavior of the system under observation. This is especially true in a real- time environment where the timing of process activity is so important. Software monitors can be standing or embedded.

Properties of Performance Monitor

- (a) At the prime requirements, the monitor must be able to extract the necessary performance characteristics from the system it is measuring, that is, the monitor should access information associated with the status of the various system entities. Again, it implies that the sampling rate is sufficiently rapid to recognize every occurrence of all significant events and that some timing effect is not making any event.
- (b) The monitor must not cause minimum interference to the system being measured. That is, the monitor must use the minimum of processing time and take up a small area of memory as possible.
- (c) The monitor must be convenient to use. It must be easily incorporated in the system; the user must be able to adjust the fineness of observation and the events when triggering the measurements. Most importantly, the out put must be meaningful.

4.0 Conclusion

This unit explains the modeling techniques used to predict system behavior and the monitoring techniques that can be used to measure the performance of an existing system.

5.0 Summary

In this unit, you learnt that:

- Hardware performance is usually modeled as a set of parameters like clock cycle rates, instruction execution times, store access time, bus speed and direct memory access speeds.
- Other techniques that can be used to model system hardware including the following: instruction mixes, synthetic program and bench mark.

- Performance information can be obtained by observing the actual system and this can be done in two ways; by monitoring the hardware and by monitoring the software.

6.0 Tutor-Marked Assignment

Meeting the performance requirements on a real-time system production required accurate decisions, modeling techniques and performance metrics. As a designer, what are

- (a) the techniques used to model system performance?
- (b) the monitoring techniques for obtaining performance information?
- (c) the limitations experienced when observing the system?

UNIT 6: Backup Processing Alternatives

1.0 Introduction

For security and other reasons like cost effectiveness, there is a need to plan for an alternative centre. This unit describes the alternatives that are currently available and provide guidance on developing selection criteria.

2.0 Objectives

At the end of this unit, you should be able to

- explain contingency planning
- state the actions that are necessary to develop a successful backup processing strategy
- discuss on the backup alternatives

3.0 Main Content

3.1 Contingency Planning

Contingency planning involves the preparation of procedures that will facilitate a timely recovery from events that disrupt data processing and recovery action procedures.

Planning an alternative processing strategy requires an understanding and identification of critical processing requirements. These document specifies requirement categories that planner may use as a guide for defining site-specific requirements. This requirement will serve as criteria for selecting the most suitable alternative processing support.

Selection of any alternative depends upon the severity and longevity of a harmful effect. No matter what circumstances arise, it is prudent to develop backup procedures and to select alternative

processing support in advance. A well documented, thoroughly tested and workable strategy will help reduce long delays and hasten a rapid return to normal operations. Depending on the size of an organization, a workable capability can affect successful recovery from disaster.

Senior management must take responsibility for planning, funding, implementation, testing and certification of an alternate processing strategy. He should also recognize the important of a workable, cost effective alternate processing strategy.

A summary of the action necessary to develop a successful backup processing strategy is as follows:

- i) Conduct risk analysis, that is, the process of identifying, either quantitatively or qualitatively, the impact of potential threats to an organization's operating computer facilities.
- ii) Identify critical applications. These are those without which the organization could not function. Prior identification of applications which support major business functions will help reduce delays and hasten the prompt start of critical processing. These critical applications and software should be sufficiently protected against loss.
- iii) Rank critical applications based on their importance to the mission of the organization. This hasten implementation with fewer delays and loses that can result in interrupt data processing may be significantly reduced.
- iv) Defined critical time delays that can be tolerated without degrading the mission.
- v) Store critical data, programs and documentation off –site.
- vi) Ensure the backup site can provide sufficient computer resources to handle the critical work load.

- vii) Ensure the site being considered will be available within sufficient time to meet processing schedules.
- viii) Ensure the backup site can provide a compatible hardware configuration.
- ix) Ensure the operation system software at the alternate facility is compatible.
- x) Ensure the alternate site can provide enough space to accommodate essential staff.
- xi) Ensure the adequacy of the environmental systems at the alternate facility.
- xii) Determine telecommunications requirement, ensuring minimal communications support can be provided by the alternate facility.
- xiii) Evaluate the location of the backup facility, planning resolutions for possible problems that can occur when using a remote facility.
- xiv) Develop a comprehensive test plan ensuring the backup facility will allow adequate time for testing.
- xv) Ensure that security controls at the alternate facility provide a sufficient level of protection for data and equipment.
- xvi) Understand all pricing agreements, allocating funds for backup supporting advance of an emergency.
- xvii) Ensure that all agreements are well documented.

3.2 Description of the Alternatives

The preceding section discussed the requirements and criteria for evaluating alternate processing methods. This section describes the alternatives and discusses the criterion that is significant for each alternative.

All these backup alternatives help to recover from disaster and prevent the occurrence of such. The alternatives described in this section include:

- Passive approach method
- Application backup
- Service bureaus
- Time brokers
- Dedicated contingency centre
- Membership in shared contingency facilities
- Empty shells
- Reciprocal agreements
- Separate facilities under the same management
- Fortress concept with full redundancy
- Reversion to manual processing
- Use of micro computers
- Portable sites
- Empty buildings

(i) Passive Approach Method

The company orders new equipment: hardware, software and prepare for the physical facilities set up. On delivery, the equipments will be used to establish another centre.

(ii) Application Backup

The Company goes into agreement with a vendor who will supply the detail computing facilities to establish another one.

(iii) Service Bureaus

Service bureaus provides contingency for a fee that are primarily used for production processing.

In a time – share environment, supported by batch and interactive programming systems.

Transmission of work to the service bureaus is by means of telecommunications.

A contract is generally negotiated which requires subscribers to pay a monthly membership fee for a predetermined period of time.

Advantages

- It provides immediate access.
- The service is moderately priced.

Disadvantages

- It provides a short time access.
- Limited security is provided for the equipment.
- Support given to these service bureaus may change with normal business.

(iv) Time Brokers

These serve as a resource for obtaining backup support. Time brokers fine, for a fee, available processing time on other systems. Processing arrangements are made entirely through this third-party service. Advantages and disadvantages are same as that of the service bureaus.

(v) Dedicated Contingency Centres (Or Hot Sites)

These are fully equipped computer centres which include one or more computer and standard peripheral equipment. These centres are equipped with that of a large number of subscribing organizations.

Subscribers are expected to notify the contingency centre through

- Telephone
- Writing

Services are provided to the subscribers based on the order in which the notifications are received.

The centres provide compatible hardware and software configurations and additional peripheral equipment are provided at an added cost.

Advantages

- The centres are operationally ready for the immediate occupancy.
- The centres are environmentally controlled.
- Some communications capabilities are provided.

Disadvantage

The contingency centres are difficult to maintain.

(vi) Membership in Share Contingency Facilities

Shared contingency facilities are essentially the same as dedicated contingency centres. The differences is in the fact that membership is typically formed by a group of similar organizations which used or could use identical hardwares. Limited members are involved and as a result of this;

the use of facility is reduced. Again shared costs by members reduce budget impact on each organization.

(vii) Empty Shells

These are large unfurnished space which can be leased to house computers and telecommunications equipment. Clients must provide hardware, prepare the shell for processing and test the air condition, power and other facilities provided for effective use.

NOTE: that users are required to restore the site to its original state before leaving.

Advantages

- The shell provides immediate occupancy as soon as an organization experiences disaster.
- The shell also provides a long – term occupancy.

Disadvantages

- The shell requires delivery and installation of equipment.
- It also requires a great time frame before becoming operational.

(viii) Reciprocal Agreement

Reciprocal agreements are formally written, signed document between two or more facilities. Each as agreed to allow other use of its computer resources during an emergency. A reciprocal agreement requires that both organizations recognized that during an emergency both will operate in a reduced mode if resources are shared simultaneously.

Advantages

- It provides some processing support
- It is less expensive

Disadvantages

- Agreements are unenforceable
- The method promotes feeling of false security

(ix) Separate Locations under the same Management

The method consists of two or more data processing installations which are managed by the same organization but are geographically located far enough so that they are not likely to be physically affected by the same disaster. The hardware must be sufficient at each location to support the critical work load.

Advantages

- It provide immediate backup
- The approach proves effective provided such firm has means of establishing this centre.

(x) Fortress Concept with Full Redundancy

Here all resources are put in one location. There is complete duplication of all hardware, software and environmental systems. This method is viable in areas where there is no danger from floods, tornados, hurricanes, earth faults and like conditions. Heavy security needs to be put in place.

Advantages

- Redundant hardware and environmental control under one roof.
- If the centre is secured, it provides a viable option.

Disadvantages

- It is very expensive
- The centre is subject to total outage.

(xi) Reversion to Manual Processing

This approach reverts back to a manual operation: It may be workable choice if manual procedures that duplicate the automated processes are documented otherwise the method may be impractical to rewrite them. This approach can be used with another alternative. Although the completion of work is slow.

(xii) Uses of Microcomputers

This approach to backup processing, integrates operations that can be supported by microcomputers or intelligent terminals. Integration of microcomputers into the organization may ensure less dependence on the central host for computing power because of the jobs that can be done using microcomputers.

Advantages

- There is less depending upon host.
- The approach will allow processing of selected application.

Disadvantages

- Database Inconsistence

(xiii) Portable Sites

Trailers can be equipped with minimal hardware and environmental control and brought to a designated location for backup processing. It provides some processing support and may be necessary to limit the hardware configuration.

(xiv) Empty Building

These are warehouses or other buildings which can be wired, equipped, furnished and environmentally prepared.

Advantages

- It can be converted into data facility and later used for overload operations.
- It can provide office space when it is not available at the alternate facility.

Disadvantages

- The building must be environmentally controlled.
- It requires installation and delivery of hardware.
- Greater time frame becomes operational.

(xv) Insurance

Insurance is neither a method nor a substitute for developing an alternate processing strategy. It is a method for obtain financial reimbursement for the loss of hardware and the physical facility but it make no allowances for the information contained on tapes and discs.

4.0 Conclusion

This unit explains the action necessary for developing a successful backup processing strategy and also describes the alternatives and the criterion that is significant for each alternative.

5.0 Summary

In this unit, you learnt that:

- Contingency planning involves the preparation of procedures that will facilitate a timely recovery from events that disrupt data processing and recovery action procedures.
- Selection of any alternative depends upon the severity and longevity of a harmful effect.
- All these backup alternatives help to recover from disaster and prevent the occurrence of such.
- The alternatives described in this section include: Passive approach method, Application backup, Service bureaus, Time brokers, Dedicated contingency centre, Membership in shared contingency facilities, Empty shells, Reciprocal agreements, Separate facilities under the same management, Fortress concept with full redundancy, Reversion to manual processing, Use of micro computers, Portable sites and Empty buildings.

6.0 Tutor-Marked Assignment

An effective system requires a steady backup processing alternatives and good plan. For the security and cost effectiveness of the laboratory under care, briefly discuss the followings:

- (a) Contingency planning
- (b) Five actions that are necessary to develop a successful backup processing strategy
- (c) Backup alternative considered the best for the laboratory and why?

UNIT 7: Equipment Selection

1.0 Introduction

Equipment selection involves the selection of a set of equipment to be used in production based on technical and economical criteria. It involves the types and quantity of equipment required to perform a variety of operation. Equipment selection should be undertaken by the data processing committee upon the completion of the basic systems design. Recommendations are made by this committee; this is usually presented in a report called Feasibility Report.

2.0 Objectives

At the end of this unit, you should be able to

- state the two basic approaches used in selecting computer equipment.
- discuss the steps involved in equipment selection.

3.0 Main Content

3.1 Approaches to Equipment Selection

There are two basic methods of selecting equipment but only one is recommended. These are:

- Recommended approach
- Alternative approach.

Recommended Approach: The recommended approach to the equipment selection is submitting detailed systems information to each equipment manufacturer.

Alternative Approach: An alternative approach to equipment selection is having each equipment manufacturer conduct a length systems review on the firm's premises. The approach is not

recommended because it disregards the data compiled by the feasibility study to date and requests that the equipment manufacturers start from scratch. This approach consumes a lot of time and a huge amount of money must have been expended before carrying out the exercise.

3.2 Steps involve in Equipment Selection

Basically, there are four steps to be taken when selecting equipments for an organization, namely:

- Determine equipment manufacturers
- Submit bid invitation to manufacturers
- Evaluate manufacturers proposal
- Select equipment manufacturer(s)

3.2.1 Determine Equipment Manufacturers

An equipment manufacture is determined on the basis of his interest in receiving a bid invitation. Each manufacture should indicate in writing whether he wishes to receive a bid invitation. There is no need to prepare a packet of specifications, flowchart, decision table, and comparable material if the manufacturer has no interest in bidding on the newly designed system.

3.2.2 Submit an invitation to manufacturers

Having shown interest in receiving invitation the company submits bid invitation to the interested equipment supplies. In this case, the same set of data is sent to all competing manufacturers. Data submitted to these manufacturers must be complete and self explanatory. Bid invitations submitted to equipment manufacturers include:

- list of new system

- design of new system
- conferences with manufacturers

(a) **List of New System Specifications:**

This is taken directly from the system analysis and system design phases. The contents of the bid invitation include these areas:

(i) Company's general information such as :

- Description of the company and its activities
- Overview of the present data processing equipment and applications.
- Unusual data processing exceptions and problems.
- Other important general information.

(ii) Future data processing plan

- Target data of information of new system
- Equipment decision date by the company.
- Deadline date for submitting proposal.
- Criteria to employ in analyzing and comparing manufacturers proposal.
- Listing of areas covers by the new system.

(iii) List of new system specifications

- Planned inputs.
- Methods and procedure for handling data.
- Output needs.

- Other requirement and considerations.
- New system flowchart
- Data to be forwarded by each manufacturer including the proposal.

(b) Design of New System

The use of flowchart and decision tables accompanying each bid invitation is necessary. They depict the new system design for each functional areas as well as interrelationships among new systems.

© Conferences with Manufacturers

During the conference, legitimate questions will be raised by the various firms. Many of questions centre on those areas which may have need of modification.

3.2.3 Evaluate Manufacturer's Proposal

After submission of the proposal by each manufacturer, the next step is oral presentation. Which will hit the important point of the proposal and the representatives then compel to answer questions? After the completion by all manufacturers, the data processing committee then evaluates the information contained in the various proposals.

There are many criteria that can be developed for evaluating manufacturer's proposal. Among these are : extent of automation proposed, evaluating of throughput performance (though analysis of the equipment time required to process the data), type of equipment, method for acquiring equipment, delivery of equipment , installation requirements, manufacturer's assistance, programming assistance contracts, compliance with terms of bid invitation among others.

3.2.4 Select Equipment Manufacturer(s)

This is a difficult task for the data processing committee. The selection process is much easier. If the equipment proposed is identical for all practical purpose. The choice is that this situation is based on lowest cost equipment. In most cases, this approach is not generally used since most manufacturers have certain equipment features that differ from their competitors. Hence various methods have been developed for evaluating and selecting equipment.

(a) Decision Table for Evaluation Process

A decision table for a final evaluation not only defines the important criteria in compact notation, but also permits an objective evaluation, since the value has been determined before the acceptance of the manufacturers. At the end of the exercise, a table is then prepared where high scores are allocated for those manufacturers that perform well, the highest manufacturer is selected. The method is realistic and precise approach in making this final decision for a real-time management information system.

(b) Weighting Method for Evaluation Process

This consists of assigning different weighting factors to each criterion. Each manufacturer is given a score for each for weighting factor. In most cases, the score is lower than the absolute value of the weighting factor. The values of all criteria are totaled which represent the total point for each manufacturer. As with decision table, the competitor with the highest score is selected.

© Performance Method for Evaluation Process

This involves evaluation of equipment superiority and performance. All aspect of the machines performance must be included including those with various hardware speeds, reliability of the

equipment, efficient software and similar considerations. Having looked through various methods the next step is to select best approach for evaluating process. The purpose of spending so much time, effort and expense on the feasibility study is to obtain the best data processing equipment for the firm. Having selected a manufacturer, the contract is signed by a top-level executive, who has been the guiding force for both committees (executive and data processing). This brings the feasibility study to a formal close.

(d) Cost Performance for Equipment Selection.

Many financing plans are available to the firm when acquiring data processing equipment. These include rental, outright purchase, option to buy and third party leasing (lease back arrangements).

(i) Rental Contracts: is the most common method of acquiring equipment which state the specific monthly rate and the number of hours for operating on one, two or three shift basis with rate adjustment for excessive down- time. Down- time is the time when the system is not working. The terms of the contract including renewal, cancellation and manufacturer's policy or even rental are subject to careful evaluation by the data processing team. The policy of over time rental can be a significant factor in the cost of the computer.

(ii) Purchase: The decision to purchase must take into account two important factors:

- Obsolescence
- Availability of capital funds.

By obsolescence, we mean a situation where equipment becomes outdated. Most firms that purchase equipment do so just after a new generation of computers have been announced. Once

another generation is announced, the problem of disposal can be significant since the firm will get a better trade on a new system with current manufacturer versus another one. This may prevent the study group from selecting the best equipment for the proposed system because of the financial factors involved.

The decision to purchase or lease is resolved sometimes by the number of shifts. An evaluation of two or three shift operation gives a much higher return on investment resulting in a buy decision.

4.0 Conclusion

This unit explains the equipment selection, approaches to equipment selection and the necessary steps involved in selecting equipment.

5.0 Summary

In this unit, you learnt that:

- Equipment selection involves the selection of a set of equipment to be used in production based on technical and economical criteria.
- The two basic methods of selecting equipment are recommended approach and alternative approach.
- The four steps involved in equipment selection for an organization are: determine equipment manufacturers, submit bid invitation to manufacturers, evaluate manufacturers proposal and select equipment manufacturer(s)

6.0 Tutor-Marked Assignment

- (a) State the two basic approaches used in selecting computer equipment.
- (b) Describe the steps involved in equipment selection.

UNIT8: Management Information System

1.0 Introduction

Management Information System (MIS), sometimes referred to as Information Management and Systems, is the discipline covering the application of people, technologies and procedures - collectively called information systems – to solve business problems.

To manage effectively, the team needs some information that summarizes the activities of other people in and outside the organization and show their effects, activities and functions individually and collectively in the pursuits of the organization goals. Such information needed by management for effective decision making and control is “Management Information”.

The management information is needed as to who reports what to whom and what is to be done with information generated from the basic activities of the business. As there is going to be both vertical and horizontal movement of information, a system has evolved. There should be a realistic system to handle management information.

2.0 Objectives

At the end of this unit, you should be able to

- define management information system
- state the objective of management information system
- mention the benefit of management information system
- discuss in details the types of management information system

3.0 Main Content

3.1 Meaning of Management Information System

In defining MIS, many authors did not fail to send a note of warning that there is no universally accepted definition. It will hand on a good start if we look at this component of this compound word – Management Information System.

- Management
- Information and
- System

Management can mean:

- A process by which scarce resources are combined to achieve given ends. This described an activity which can be better described by the word managing.
- The Management referring to those people carrying out thje activity. This should really be the Managers.
- The body of knowledge about the activity of Managing, regarded here as a special field of study, i.e. a profession.

The aspect of management we need for our purpose is one use in describing the body of decision makers from supervisors and line managers, at the lower levels, to the Board of Directors. Management in this sense is responsible for planning, organizing, implementing and evaluating the policies for the organization. It uses tools available to it to control, coordinate, communicate and motivate the entire workforce to achieve desired objective.

For policies to be formulated and for these policies to be translated into actions, the management would require concise and up to date information.

Information: is whatever is communicated in form of a processed data for effective planning and control of organizations activities. It is the output element of data processing systems. It is derived from data which has been subjected to an umber of data processing operations converting related groups of related but meaningless data into a useful form for its recipients.

System: may be defined as a combination of interrelated elements, or sub-systems, organized in such a way as to ensure the efficient functioning of the system as whole, necessitate a high degree of co-ordination between the sub-systems, each of which is designed to achieve a specific purpose. A system is the detailed plan of management for interrelationship and interaction of available resources to accomplish a given task.

Management information system is a system using formalized procedures to provide management at all levels in all functions with appropriate information, based on data from both internal and external sources, to enable them to make timely and effective decisions for planning, directing and controlling the activities for which they are responsible.

3.2 Objectives of MIS

The objectives of MIS include the provision of information to all levels of management at the most relevant time, at an acceptable level of accuracy and at an economical cost. An essential requirement of an MIS is the provision of feedback.

3.3 Benefits of MIS

Faster decision making and control through provision of timely information.

Better decision making and control through provision of relevant information

3.4 Types of systems

Management information systems can be used as a support for managers to provide a competitive advantage which must support the goals of the organization. Most organizations are structured along functional lines and the systems are identified as follows:

- (i) **Accounting management information systems:** All accounting reports are shared by all levels of account managers. The emphasis of public sector MIS has been on money i.e. on monitoring how much has been spent; on comparing this with budget; and on controlling expenditure to bring it in as close as possible to budget at year-end.
 - Statement of account: month-end, year-end, year-to-date, etc.; these will generally have to be designed to fit the existing regulatory or legislative standards for public sector accounting.
 - Warnings of budget head over or under spend against target; variance from planned budget can be shown either in absolute or in percentage terms.
 - Statements of cash requirements in the month ahead based on payments still owed within accounts payable data.

- (ii) **Financial management information systems:** The financial management information system provides financial information to all financial managers within an organization including the chief financial officer. The chief financial officer analyzes historical and

current financial activity, projects future finances and monitors and controls the use of funds over time using the information developed by the MIS department.

- (iii) **Manufacturing management information systems:** More than any functional area, operations have been impacted by great advances in technology. As a result, manufacturing operations have changed. For instance, inventories are provided just in time so that great amounts of money are not spent for wanting huge inventories. In some instances, raw materials are even processed on railroad cars waiting to be directed to the factory. Thus there is no need for warehousing.
- (iv) **Marketing management information systems:** A marketing management information systems support managerial activity in the area of product development, distribution, pricing, decisions, promotion effectiveness, and sales forecasting. More than any other functional areas, marketing systems rely on the external source of data. These sources include competition and customers, for example.
- (v) **Human resources management information systems:** Human resources management information systems are concerned with activities related to workers, managers and other individuals employed by the organization. Because the personnel function relates to all other areas in business, the human resources management information system plays a valuable role in ensuring organizational success. Activities performed by the human resources management information systems include work-force analysis planning, hiring,

training, and job assignments. Management information systems are used in the entire human resource lifecycle from recruitment to termination or retirement.

- Recruitment and selection: for example, a summary report on the ethnic origin and sex of all job applicants and recruits for use in equal opportunities monitoring.
- Staff performance: for example, an exception report on only those secretarial staff that is able to take shorthand dictation and type at over 50 words per minute.
- Training: for example, an ad hoc report on all those staff who have received training in gender awareness.
- Staff promotion: for example, a detail report on all performance assessments for a potentially-promotable member of staff.
- Staff departure: for example, a comparative report on turnover rates and reason of departure in the information systems and accounting departments
- Pensions: for example, a summary report on recent annual pension funds growth rates.

4.0 Conclusion

This unit explains the meaning, objectives and benefit of management information system and also the types of management information system.

5.0 Summary

In this unit, you learnt that:

- Management information system is a system using formalized procedures to provide management at all levels in all functions with appropriate information, based on data from both

internal and external sources, to enable them to make timely and effective decisions for planning, directing and controlling the activities for which they are responsible.

- The benefits of MIS are: faster decision making and control through provision of timely information; and better decision making and control through provision of relevant information
- The five types of MIS are: accounting management information system, financial management information system, manufacturing management information system, marketing management information system and human management information system.

6.0 Tutor-Marked Assignment

Discuss in details the five types of Management Information System