## CHAPTER TWO (2)

## 2.0 INTRODUCTION TO INFORMATION SYSTEM

The effective coordination of people and information technology in solving problems of humanity creates a conducive environment devoid of hardship. This perfected system is only achieved when individuals, organizations and governments are committed into the development and the usage of information systems. This unit introduces you to the concept of information systems and its impact on us as people.

***Objectives:***

By the end of this unit you will be able to:

Explain Information system.

List types of media.

- Identify differences between manual and computerized Information.
- State types of information system.
- Identify the attributes of a good information system.
- Outline the process (building blocks) for the development of Information.
- Distinguish among different types of information.
- Indicate the role of information in society.



***Unit Outline:***

- Definition of Information System
- Media Types use in Presenting Information
- Difference between Manual and Computerized Information System
- Types of Information System
- Attributes of good information system
- Information System Development Process
- Types of Information
- The Role of Information in Society.
- Examination questions

## 2.1 Definition of Information System

A set of interrelated component working together to collect, retrieve, process, store and disseminate information for the purpose of facilitating planning, controlling, coordination and decision making.

Or

An information system is any combination of information technology and people's activities that support operations, management, and decision making.

## 2.2 Components of Information System

Information system consists of five basic resources, namely:

1. People, which consists of IT specialists (such as Database Administrator or Network Engineer) and end users (such as Data Capture Clerks).
2. Hardware, which consist of all the physical aspects of an information system, ranging from peripherals to computer parts and servers.
3. Software, which consist of system software, Application Software and Utility Software.
4. Data, which consists of all the knowledge and databases in the IS.
5. Networks, which consists of communication media and network support.

## 2.3 Media types use in Presenting Information

The data or information in any information system is presented as information for decision making in any one or combination of the following media types;

Text: Text is a collection of words or letters that are understandable by the reader. On a computer text can be created, viewed, edited, and modified using a text editor or word processing program

Picture:It is a visual capture of an object.Pictures can be created using devices such as a digital camera, scanner, smartphone, or are works of art created on the computer. It can either be moving pictures (video) or still pictures ( picture/image)

Sound

Sound: It refers to a vibration that is picked up by the human ear.

Computer graphics: They are pictures and films created using computers. Usually, the term refers to computer-generated image data created with the help of specialized graphical hardware and software.

Images that are generated by a computer are called computer graphics. Examples are photographs, drawings, Line art, graphs, diagrams, typography, numbers, symbols, geometric designs, maps, engineering drawings, or other images. Graphics often combine text, illustration, and color.

Statistics: It is a term used to summarize a process that an analyst uses to characterize a data set. If the data set depends on a sample of a larger population, then the analyst can develop interpretations about the population primarily based on the statistical outcomes from the sample.

Animation: It is a dynamic medium in which images or objects are manipulated to appear as moving images(sequence of images creating an illusion of movement).



## 2.4 Differences between Manual and Computerize Information System

Basically a manual-based information system is one that does not rely on any computerized systems and a computerized information system is the one that involves the use of computerized systems in its operations. The table below shows the differences between manual information systems and computerized information system.

| **Manual Information System** | **Computerized Information System** |
|---|---|
| . Business process is manually operated. | Business process involves the use of |

| | |
|---|---|
| | information systems |
| . Information is recorded in files in paper format. | Information is recorded in computer programs including databases, word documents, and spreadsheet documents in electronic form. |
| . Information is stored in paper folders, boxes and in cabinets. | Information is stored in databases on electronic storage devices such as hard disk, optical disk and memory cards and servers. |
| . In terms of cost, it is cheaper. | Computerized information systems implementation is costly. |
| . Low level staff productivity | High level staff productivity. |
| . Low accuracy, fairly reliable system | High accuracy and highly reliable system |

## 2.5 Types of Information System

For most businesses, there are a variety of requirements for information. Senior managers need information to help with their business planning. Middle management needs more detailed information to help them monitor and control business activities. Employees with operational roles need information to help them carry out their duties.

As a result, businesses tend to have several "information systems" operating at the same time. This revision note highlights the main categories of information system and provides some examples to help you distinguish between them.

***Transaction processing system, management Information System, Decision support systems and Executive Support System.***

It should however, be noted that due to the advancement of technology other types of Information Systems have developed, some of which really don't fit into the four level pyramid model of information systems. These other types of information systems include: ***office automation systems, knowledge work systems, enterprise system, data warehouses***, etc. The four level pyramid models along with the other types of information system is shown and discussed below:

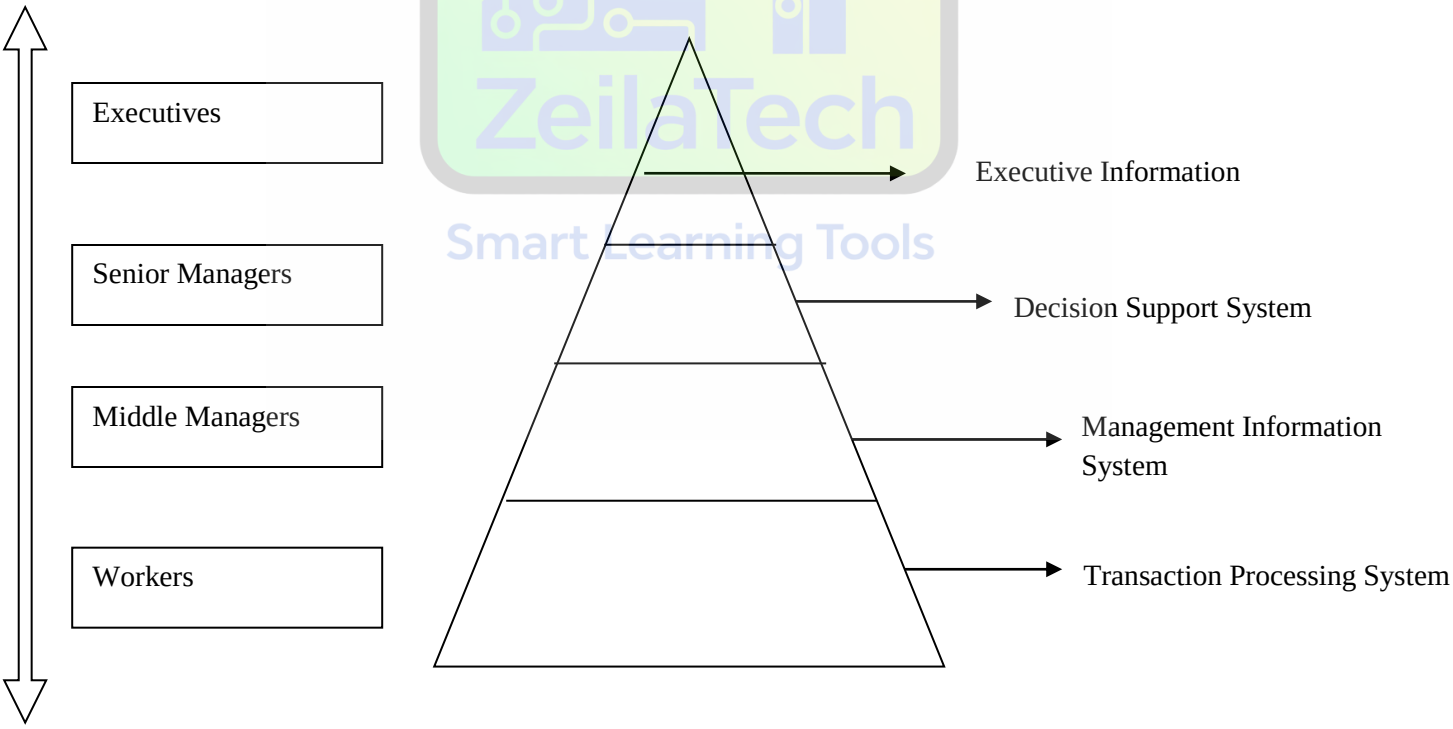


**Figure 1.0A four levels Pyramid Model of different types of Information Systems based on the different levels of hierarchy in an organization.**

**Transaction Processing Systems (TPS):**

1. A computerized system that are designed to perform and records daily routine transactions necessary to the conduct of a business as the name implies, TPS are designed to process routine transactions efficiently and accurately. A business will have several (sometimes many) TPS; for example:

   - Billing systems to send invoices to customers
   - Systems to calculate the weekly and monthly payroll and tax payments
   - Production and purchasing systems to calculate raw material requirements
   - Stock control systems to process all movements into, within and out of the business.

A ***transaction*** is an event that generates or modifies data that is eventually stored in an information system. Examples of transaction processing systems include: *Electronic Payment Systems, Online Reservation Systems, Electronic Purchasing Systems and Journaling File Systems*. It is highly recommended that every transaction system passes the ACID (atomicity, consistency, isolation, durability) test which is a set of properties that guarantee that database transactions are processed reliably.

**2. Management Information System (MIS):** This system provides information that is needed to manage organizations efficiently and effectively. This system produce fixed, regularly scheduled reports based on data extracted and summarized from the firm's underlying transaction processing systems to middle and operational level managers to identify and inform structured or semi-structured decision problems. E.g. Transaction Monitoring Systems, Performance Monitoring Systems.

**3. Decision Support Systems (DSS):** These are computer programs or applications used by middle manager to compile information from a wide range of sources to support problem solving and decision making. It is an interactive information system that provides information, models, and data manipulation tools to help make decisions in semi-structured and unstructured situations. Decision-support systems ("DSS") are specifically designed to help management make decisions in situations where there is uncertainty about the possible outcomes of those decisions. DSS comprise tools and techniques to help gather relevant information and analyze the options and alternatives. DSS often involves use of complex spreadsheet and databases to create "what-if" models.

**4. Executive Support System ("ESS")** is designed to help senior management make strategic decisions. It gathers analyses and summarizes the key internal and external information used in the business. A good way to think about an ESS is to imagine the senior management team in an aircraft cockpit - with the instrument panel showing them the status of all the key business activities. ESS typically involves lots of data analysis and modelling tools such as "what-if" analysis to help strategic decision-making. This is a reporting tool that provides quick access to summarized reports coming from all company levels and departments such as accounting, human resources and operations.

**5. Office Automation System (OAS):** This system support communication and productivity in the enterprise by automating work flow and eliminating bottlenecks. OAS may be implemented at any and all levels of management. Office Automation Systems handle and manage documents (through word processing, desktop publishing and digital filling), scheduling (through electronic calendars) and communication (electronic mail, voice mail and video conferencing).

**6. Knowledge Work Systems (KWS): T**hese are systems designed to assist knowledge workers in creating new information and knowledge. Knowledge work systems such as scientific or engineering design workstations promote the creation of new knowledge and ensure that new knowledge and technical expertise are properly integrated into the business. Knowledge Workers are people who hold formal university degrees and are often members of a recognized profession, like engineers, doctors, lawyers, teachers etc. Data workers have less formal, advanced educational degrees and tend to process rather than create information.



## 2.6 Attributes of a Good Information System

A good information system must have the following attributes: ***Completeness and Timeliness, Accuracy, Clarity and Concise, Relevance, Trustworthiness, Cost and Relevance for it purpose.***

1. **Completeness and Timeliness*:*** Fast performance with rapid response time is critical. The turnaround time from the input of the transaction to the production of the output must be few seconds or less. Good information System should always be able to generate complete results or information with the necessary input it is fed within few seconds.

2. **Accuracy:** Information generated by an information system must be accurate and devoid of errors. Inaccurate information or erroneous data generated by an information system is irrelevant to users and creates confusion among stakeholders, senior level and middle level managers who may depend on the information for further reporting.

3. **Clarity and concise:** Every good information system should be able to produce clear and concise output. It should be able to clear and concise for users to understand and meaningfully adapt to its use. If it is a reporting system, it should be able to generate results that are brief and easily understood without loss of meaning.

4. **Relevance**: Basically, the main aim of designing an Information system is to solve a problem which concerns people. If the designed information system is unable to solve that problem, it is irrelevant and even serves as a nuisance for the users, stakeholders and the people. For example, with the introduction of cell phones, communication booths and call centers is gradually becoming irrelevant to people. The introduction of IPhones is also gradually removing internet cafes out of business.

5. **Trustworthiness**: A good information system should be able to remove any issue of doubt that was with the old system. Its failure rate must be very low and it should be able to process every transaction in the same way regardless of the user, the customer or the time for the day. It should be able to recover to its original state in case of failure or crash.

6. **Cost:** The cost of implementing an information system should be relatively moderate. High cost information systems deter customers or stakeholders from fully using the system to solve their problems. It rather worsens their plight. Also any business organization or firm that charges exorbitant fees for services delivered by its information system loses customers.

7. **Controlled Processing:** The processing in an information system, e.g. TPS, must support an organization's operations. For example if an organization allocates roles and responsibilities to particular employees, then the TPS should enforce and maintain this requirement. An example of this is an ATM transaction.

**Processes for the development and presentation of Information**

The process for the development and presentation of information follows a cycle. The major processes are Creating, Collecting, Organizing, Manipulating, (Storing, Retrieving, Communicating). The process is clearly illustrated in the cycle below:

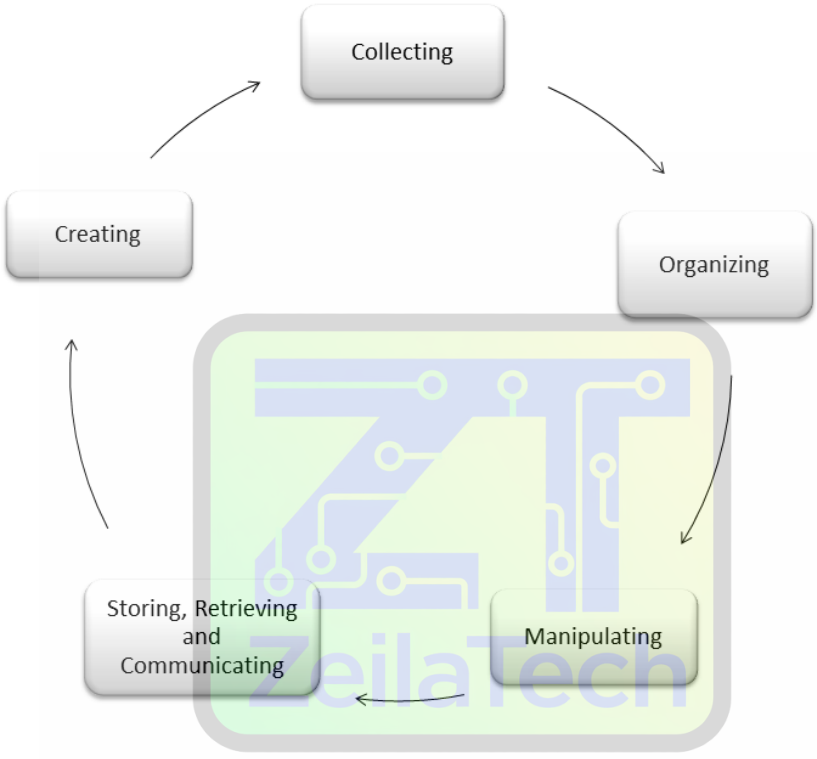


Fig 1.1 Process for the development and Presentation of Information



It begins by identifying a need or a problem. The identification of the need is immediately followed by the creation of necessary information concerning that need. Facts, figures and ideas which would be needed to create the information is collected from credible sources using information and communication tools. These facts and figures are then organized to into a meaningful one. The Organized information undergoes manipulation by comparisons or contrasting for the necessary meaning to be made from. The information is then stored for future retrieval and reporting. In each of these processes information technology plays vital role in them.

## Types of Information

Information can be classified by the framework within which the data is used, by business categorization, by time and by quantifiable. Let's discuss the different classification and the types of information under each classification.

a) **Classification by the Framework within Which the Data is used:** The types of Information under this classification are determined by the level of the world political scene that the information given would be relevant.

There are five types of information under this category: **International, National, Corporate, Departmental** and **Individual** Information.

For example, world news broadcasted by the BBC, CNN and VOA are all considered as international information whereas Information about the total number of SHS students or number of Ghanaians suffering from HIV/AIDS in Ghana are considered as national information. Also, information about the total profit made by Barclays bank in a month can be considered as corporate information whereas information about a department work plan in an organization is considered as departmental information. Individual information is the information such as credit card number, bank account number, blood type or biometric data of a person.



**b) Classification by Business Categorization:** The types of information under this category depend on the level of the organization in a business that uses or creates such information. This kind of information is generally created and used by Chief Executive, Top Level Managers and Workers. Three types of information can be considered here:

**1. Strategic Information**: This type of information is used at the very top level of management within an organization. These are chief executives or directors who have to make decisions for the long term. Strategic information used to help plan the objectives of the business as a whole and to measure how well those objectives are being achieved.

Examples of strategic information include:

- Profitability of each part of the business
- Size, growth and competitive structure of the markets in which a business operates
- Investments made by the business and the returns (e.g. profits, cash inflows) from those investments

**2. Tactical Information:** Tactical information is used by middle management (employees) when managing or planning projects. Tactical information have a medium level of detail and will be very specific. This is used to decide how the resources of the business should be employed. Examples include:

- Information about business productivity (e.g. units produced per employee; staff turnover)
- Profit and cash flow forecasts in the short term
- Pricing information from the market

**3. Operational Information:** Operation information is used by workers or staff. this information is used to make sure that specific operational tasks are carried out as planned/intended (i.e. things are done properly). For example, a production manager will want information about the extent and results of quality control checks that are being carried out in the manufacturing process.



**c) Classification by Time: Classification by Time:** The type of information under this category is generally determined by the time the information would be relevant. The three types of information under this category are **Past**, **Present, and Future**. For instance, information about the last time solar eclipse occurred in Ghana can be considered as past whereas information about the present state of the Ghanaian economy is considered as present. The information from the UN on population which depicts that the world population would double in the next fifty years is future information. Also, the information that water would be the most essential asset in the next twenty years in Africa is future.

d) **Classification by Quantifiable:** Information in this category is determined by quantity or quality of the items present in the information. **Quantitative Information** and **Qualitative Information** are the two types of Information here. For instance, information about the total number of comments one gets when he or she posts something on Facebook can be considered as Quantitative Information but the actual content of each post can be considered as qualitative information.

**The Role of Information in Society**

The major role of information in a society is to inform people on current issues, past issues and future issues. People need information to help them in planning, organizing, directing, controlling, coordinating and decision making.

**Likely Examination Questions**

1. An information system is a collection of hardware, software, procedures, data, databases and:
   a. People
   b. Functions
   c. Managers
   d. Accounting systems
2. The department finds and hires people and handles such matters as sick leave and retirement benefits:
   a. Accounting
   b. Production
   c. Human resources
   d. Research
3. The level of manager who deals with control and planning:
   a. Executive
   b. Top manager
   c. Middle manager
   d. Supervisor
4. This system records day-to-day activities such as customer orders and inventory levels:
   a. Management Information Systems
   b. Transaction Processing Systems
   c. Decision support Systems

d. Executive support systems

5. This system is specially designed and simplified for top-level executives.
    a. Management Information Systems
    b. Transaction Processing Systems
    c. Decision support systems
    d. Executive Information System
6. The information system that provides tool for managing the organization efficiently and effectively.
    a. Database information system
    b. Transaction processing system
    c. Management information system
    d. Executive information system
7. Which level of system is used to monitor an organization's transactions and elementary activities?
    a. Operational-Level
    b. Organizational-Level
    c. Management-Level
    d. Decision-Making Level
8. A system that would provide information to help managers decide how many products should be produced to fulfill customer orders is an example of a:
    a. Manufacturing and Production system
    b. Finance and accounting systems
    c. Sales and Marketing systems
    d. Transaction Systems
9. The term server refers to
    a. The networking software used on the computer
    b. The physical computer on which the networking software runs
    c. Both
    d. None of the Above
10. Which of the following is not one of the ways that information system can promote quality for the organization?
    a. Simplifying products
    b. Increasing design precision

c. Increasing the speed of production

d. None of the above

11. Which of the following is a medium for presenting information:

a. Text

b. Sound

c. Chart and graph

d. All of the above.

12. One of the following is not part of the four level types of information system.

a. Management Information Systems

b. Transaction Processing Systems

c. Decision support Systems

d. Office Automation System

13. _____ is the capability of an information system to continue as if nothing has happened, even after a major component failure.

a. Redundancy

b. Interoperability

c. Fault tolerance

d. Backup

14. Which type of information system would be used typically by middle managers.

a. Transaction Processing systems

b. Management Information systems

c. Decision Support systems

d. Executive support systems

16. Information systems designed to assist knowledge workers in creating new information and knowledge is called:

a. Transaction Processing systems

b. Management Information systems

c. Decision Support systems

d. Knowledge Work System

17. Which kind of test should Transaction Processing Systems pass in order to ensure that transactions are processed reliably?
    a. ACID Test
    b. Accuracy Test
    c. Reliability Test
    d. None of the above
18. Which type of technology allows you to send information from one computer to another?
    a. Output
    b. Telecommunication
    c. Connecting
    d. CPU
19. When data is organized in a meaningful way, the results are called:
    a. An expert system
    b. Artificial intelligence
    c. A database
    d. Information
20. Which of these statements best describes a computer-based information system?
    a. It consists of the hardware and the software which the company has acquired
    b. It consists of the people and procedures who interact with the system
    c. It consists of the data or information that people put into the system
    d. It consists of the people, hardware, software, infrastructure and procedures a company uses to collect, transform and distribute data and information
21. One element in the hardware component of a computer system is:
    a. Data
    b. The input devices
    c. The Internet
    d. Windows software
22. A computer-based system in a hospital which gathers information from several departments within the hospital about patients' medical history and current treatments is an example of which kind of system?
    a. Individual

b. Organizational
c. Inter-organizational
d. Departmental

23. In terms of a system, finished products and information are examples of
a. Processing.
b. outputs.
c. input
d. control

24. Information is
a. Data
b. Processed Data
c. Manipulated input
d. Computer output

25. Data by itself is not useful unless
a. It is massive
b. It is processed to obtain information
c. It is collected from diverse sources
d. It is properly stated

26. For taking meaningful decisions data must be
a. Very minimal
b. Massive
c. Processed correctly
d. Collected from diverse sources

27. Strategic information is required by
a. Middle Level managers
b. Line Level managers
c. Top Level managers
d. All workers

28. Operational information is needed for
a. Day to day operations
b. Meet government requirements

c. Long range planning

d. Short range planning

30. In hospital information system the following type of information is operational.

a. Opening a new children's' ward

b. Data on births and deaths

c. Preparing patients' bill

d. Buying an expensive diagnostic system such as CAT scan

30. A computer based information system is needed because

I. The size of organization have become large and data is massive

II. Timely decisions are to be taken based on available data

III. Computers are available

IV. Difficult to get clerks to process data

a. I , II and III

b. I, II and IV

c. I , III and IV

d. III and IV

31. Which of the following terms is used to describe the computer-based tools used by people in an organization to support their information processing needs?

a. Information Technology

b. User Systems

c. Artifacts

d. Computer Tools



1. (a) Define the term Information system. (5 marks)

(b) Give five media types used in presenting information. (5 marks)

(c) Briefly explain five (5) major types of Information System. (10 marks)

2. (a) State five (5) attributes of a good Information System. (5 marks)

(b) List the procedures for developing and presenting information (5 marks)

(c)Write five (5) differences between manual information system and computerized information system.