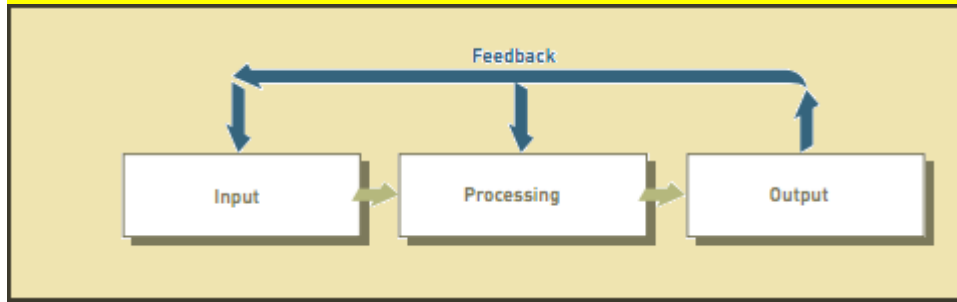


# UNIT 153 – UPSC - Conceptual Foundations of Information Systems

Information is an augmentation in knowledge. It adds to the general structure of concepts and facts that people know. Information depends on the context and the recipient's general knowledge for its importance. Information systems emerged as a discipline that is concerned with the design, construction and use of artefacts based on information technology (IT) (Weber, 1987). Information systems are extremely critical for the expansion and survival of business organizations in competitive world. All sectors of the industry are entirely dependent on these for the management of important information and data. Small organizations to large, powerful businesses such as high street banks and central and local government need assistance of information systems to control their data. An information system is a software system to capture, convey, store, retrieve, manipulate, or exhibit information, thus supporting people, organizations, or other software systems. Basically, Information systems capture data from the organization (internal data) and its environment (external data). They store the database items over an extensive period of time. When particular information is required, the suitable data items are manipulated as necessary, and the user receives the resulting information. Depending on the type of information system, the information output may take the form a query response, decision outcome, expert-system advice, transaction document, or a report. Prescribed information systems rely on procedures for collecting, storing, manipulating, and accessing data in order to obtain information.



In management literature, it is explained that an information system is a specific type of system in general. A system is a set of components (subsystems) that function together to accomplish certain objectives. The objectives of a system are realized in its outputs. Mainly, the objective of an information system is to offer the appropriate outputs to the members of the organization. All organizations exist as part of a big system. Information systems are used to help management through giving feedback on the firm's performance. Feedback is described as the outputs of a system that are transformed back into inputs in order to control the system's operation. Information systems are used to compare the data on the actual performance with the standards developed earlier. Based on the information about the discrepancies, managers can devise remedial actions, which are then fed back into the firm's operations.



**Input:** In information systems, input is the activity of collecting and capturing raw data.

**Processing:** In information systems, processing means transforming data into useful outputs. Processing include activities like making calculations, comparing data and taking alternative actions, and storing data for future use. Processing data into valuable information is critical in business situations. Processing can be done manually or with computer assistance.

**Output:** In information systems, output involves producing useful information, usually in the form of documents and reports. For example, Outputs can include reports for managers, and information supplied to stockholders, banks, government agencies, and other groups. In some cases, output from one system can become input for another.

**Feedback:** In information systems, feedback is information from the system that is used to make modifications to input or processing activities. Feedback is also important for managers and decision makers.

**Manual and Computerized Information Systems:** An information system can be manual or computerized. Currently, many excellent computerized information systems follow stock indexes and markets and suggest when large blocks of stocks should be purchased or sold to take advantage of market discrepancies.

**Computer-Based Information Systems:** A computer-based information system (CBIS) is a single set of hardware, software, databases, telecommunications, people, and procedures that are configured to collect, manipulate, store, and process data into information.

Bulk of theoretical studies reveals that there are numerous theories use in the information systems field alone (Schneberger and Wade, 2006). These vary in approach from strictly technological propositions, for example the Technology Acceptance Model (Wixom & Todd, 2015), to more organisational perspectives such as Organizational Knowledge Creation theory (Cook & Brown, 1999), to more human centred approaches like Critical Social Theory (Benoit, 2001). A broad treatise of these theories can be found in the Theories Used in IS Research website (Schneberger & Wade, 2006).

Information systems are used in all types of imaginable profession. Entrepreneurs and small business owners use information systems to approach clientele at international level. Sales representatives use information systems to advertise products, communicate with customers, and analyse sales trends. Managers use information system to make important decisions, such as to build a manufacturing plant. Financial advisors use information systems to counsel their clients to support them save for retirement or their children's education.

Main features of a system are as follows:

1. All systems are made up of component parts and/or subsystems, and can only be described in terms of the whole.
2. The components/subsystems of a system work towards a collective goal.
3. The subsystems are arranged in a hierarchy, where moving up the structure provides a wider view and descending the structure provides greater detail.
4. No part of the system can be changed without some effect being felt throughout the whole system.

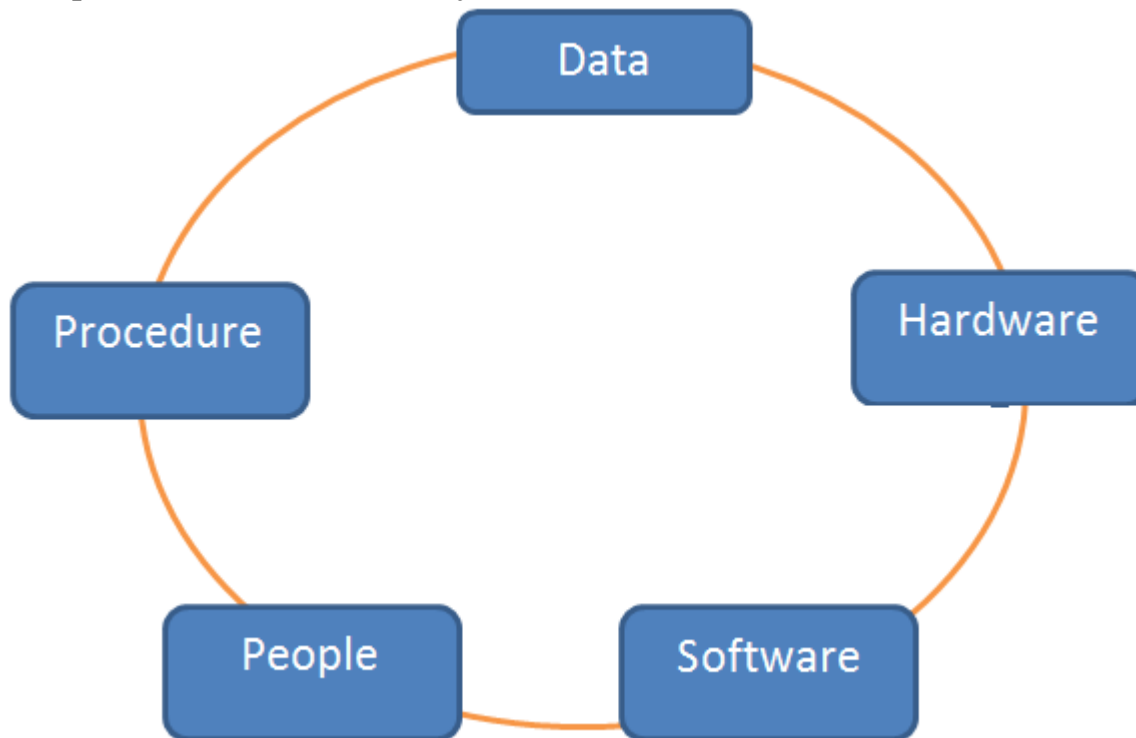
A systems approach provides a framework to appraise the various systems that surround us. It is an approach that stresses the connections between the various parts of the system and is essentially about relationships and processes.

Functional areas of Information systems in business:

1. Accounting
2. Finance
3. Marketing
4. Human resources
5. Manufacturing
6. Retail
7. Customer services

**Components of Information Systems:** Information systems comprises of the following general components:

1. Hardware
2. Software
3. Databases
4. Human resources
5. Procedures

**Components of Information Systems**

**Databases:** Data are facts that are used by programs to give valuable information. Data are normally stored in machine- readable form on disk or tape until the computer needs them. A database is an organized collection of facts and information which comprises of two or more related data files. An organization's database can contain facts and information on customers, personnel, inventory, competitors' sales, online purchases, and much more. In institutions like banks, a database manager develops a patented security process that generates a random numeric code from a customer's bank card that can be verified by a computer system through a customer database (Dearne, 2009). Once the bank card and customer have been verified, the customer can make financial transactions. Most managers and executives consider a database to be one of the most valuable parts of a computer-based information system. Data can be stored in large data centres, within computers of all sizes, on the Internet, and in smart cell phones and small computing devices (Weier, 2009). For example, The New York Stock Exchange (NYSE) and other exchanges are using database systems to get useful business information and intelligence to help them to be successful and profitable operations (Lai, 2009). The enormous increase in database storage requirements often requires more storage devices, more space to house the additional storage devices, and additional electricity to operate them. Most organizations using database systems have seen storage requirements increase more than 10 percent every year. Major issue for any organization is to store huge database in secure and safe way from the online miscreants and outside individuals and groups.

**Hardware:** In information system, hardware is the machinery and often referred to as the central processing unit (CPU), and all of its support equipment. Among the support equipment are input and output devices, storage devices and communications devices, and it consists of the physical components of a computer that perform the input, processing, storage, and output activities of the computer. Input devices include keyboards, mice, and other pointing devices, automatic scanning devices, and equipment that can read magnetic ink characters. Processing devices include

computer chips that contain the central processing unit and main memory. Advances in chip design allow faster speeds, less power consumption, and larger storage capacity.

**Software:** It is Computer programs and the manuals that support them. Computer programs are machine-readable instructions. Software include the computer programs that govern the operation of the computer. These programs permit a computer to process payroll, send bills to customers, and provide managers with information to increase profits, reduce costs, and provide better customer service. For example, Fab Lab software controls tools such as cutters, milling machines, and other devices. There are two types of software that include Microsoft Windows Vista and Windows which controls basic computer operations, including start-up and printing, and applications software, such as Microsoft Office 2010, which allows user to accomplish particular tasks, including word processing or tabulating numbers. Software is required for computers of all sizes, from small handheld computers to large supercomputers. For example The Android operating system by Google and Microsoft's Mobile 6.5 are operating systems for cell phones and small portable devices.

**People:** People are the most vital element in most computer-based information systems. They are responsible for success and failure for most organizations. Information systems employees include all the people who manage, run, program, and maintain the system, including the CIO, who manages the IS department (Staff, 2009). Users are people who work with information systems to get results. Users include financial executives, marketing representatives, manufacturing operators, and many others. Certain computer users are also IS personnel.

**Procedures:** These are the policies that run the operation of a computer system. Procedures can be in the form of guidelines in the user manuals. Procedures include the strategies, policies, methods, and rules for using the CBIS, including the operation, maintenance, and security of the computer. For example, some procedures describe when each program should be run. Effective procedures can support companies to exploit new opportunities and avoid potential disasters. Poorly developed and imperfectly implemented procedures can cause people to waste their time on useless rules or result in insufficient responses to disasters, such as hurricanes or tornadoes.

## Principles of Information System

The information in organization is very useful as it directly links to how it helps decision makers realise the organization's goals. Computers and information systems assist organizations to improve the business operations. If management has good knowledge of the potential impact of information systems and having the ability to put this knowledge to work, it can result in a successful personal career and in organizations that reach their goals. System users, business managers, and information systems professionals must work together to develop a successful information system. Information systems must be applied considerately and carefully so that society, businesses, and industries can gain benefits.

Information systems have been developed to fulfil the requirement of various organizations and people. The speed and pervasive use of information systems, creates numerous threats from immoral people, Computer criminals and terrorists (Conlin, 2009). Although information systems can provide huge benefits, they have many drawbacks. Some drawbacks are minor, such as receiving unwanted e-mail (Staff, 2009). Barriers to Information systems:

1. Privacy of customers
2. Privacy of employees
3. Social imbalance
4. Language challenge
5. Time and distance challenges

Other problems using information system can be severe, where people's personal data, including Social Security and credit card numbers, can be lost or stolen that results in credit card fraud and ruined credit. In the United States, reports of the Privacy Rights Clearinghouse estimates that since early 2015, about 150 million computer records have been stolen or exposed to fraud. This type of data loss can cost companies hundreds of dollars per lost record. Some companies have spent huge money to examine and counteract stolen computer records. Computer-related errors and waste are also a major issue in information system.

There are many global challenges in information systems. Changes in society due to increased international trade and cultural exchange, known as globalization, have a significant impact on organizations and their information system.

To summarize, Information systems is vital part of contemporary organisations and businesses and are designed to support management activities and making wise decision for the success and gaining competitive advantage. It is described by management theorists as an information system that can be any organized combination of people, hardware, software, communications network, and data resources that collects, transforms, and disseminates information in an organization. It can be established that the information system has imperative role in the organization by satisfying the various needs through a variety of systems such as Query systems, Analysis systems, Modelling systems and Decision support systems. Although, effective use of information systems in management decision making enable managers to perform successfully and help organisation succeed, but there is not equate management empirical studies and results that scrutinise the role of information systems technology in decision making.