The Components And Types Of Information Systems

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Information systems can be defined as a collection of software, hardware and other telecommunication networks that people use to both create and collect useful information, mostly in an organizational setting (Chatterjee, 2010). Based on our definition, there are two ways in which an information system can be described: one is by the components that make up an information system, and the other is by the roles played by those components in an organization. Primarily, an information system is made up of five elements (Oz, 2009). They include data, people, software, hardware, and process. When people think about information systems, what comes to their minds first is data, hardware, and software. However, the other two components, which are people and process, separate the field of information systems from other technical fields like computer science (McLeod, 2009). Let's first consider these components that make up information systems and how they help an organization in problem-solving and decision-making.

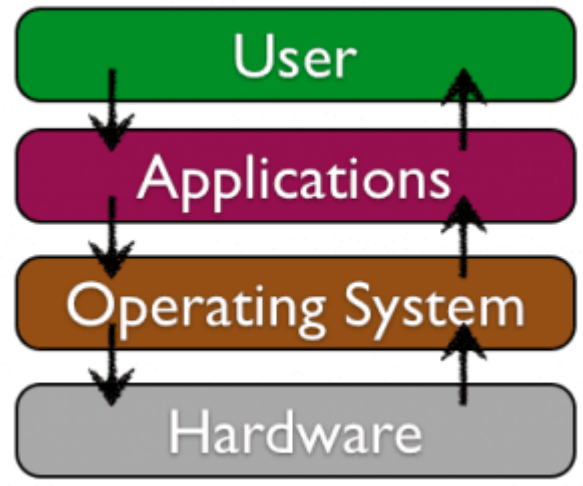
Technology

Technology is where scientific knowledge gets to be applied practically. Technology has always been part of our lives for many centuries. Discoveries in this field started when the wheel was invented, followed by the invention of electricity for artificial use. Some of the components of information systems can be classified under technology. They include data, hardware, and software.

Hardware

Hardware consists of the components of technology that can be physically touched. They include iPads, disk drives, keyboards, computers, and flash drives. All these fall under the category of information system hardware.

Software



Software involves a set of instructions that directs the hardware. Software cannot be physically touched. Programmers come up with software programs, meaning they create instructions to direct the hardware on what to do. Software can be categorized into operating systems, which make it easy to use hardware. It can also be classified into application software, which is also very significant (Chatterjee, 2010). There are various examples of operating systems like Google Android, which is mostly found in smartphones, and Microsoft Word, primarily used in computers and laptops. What consists of application software are Microsoft Excel and game applications.

Data

The third component of the information system is data. It merely means a collection of facts. Just like software, data cannot be physically touched. For data to be more useful in an organization, it must be indexed, organized and aggregated together (McLeod, 2009). It becomes a potent tool for decision-making in business. If you check keenly, all the information we have been discussing focuses more on how an individual can manage data. The decisions made from analyzing data can be used by an organization to improve its effectiveness and productivity.

Other than software, hardware, and data, which we have considered as components of the information system that fall under technology, there has been a massive debate on whether to include communication as part of the elements that make up information systems. However, this has not been successful because it has been argued that a computer can exist even without communicating. In recent times, it is difficult to find a computer that does not easily connect to other devices or even networks. So, communication is also a vital component of the information system.

People

When talking about information technology, one can easily consider the technological factors and forget people and processes. However, we must understand how technical factors such as software,

hardware, and data help an organization achieve its goal (Chatterjee, 2010). Therefore, it is necessary to understand those people who handle information systems and how they use the information from these systems. Mainly, information systems are commonly used by managers to make decisions. There are other users of information systems in an organization. They may include analysts, programmers, or even help desk workers.

Process

This happens to be the last component of information systems. A process can be defined as steps undertaken to achieve a particular goal or outcome. In recent times, information systems have been connected to organizational processes, therefore making the organization more productive, whereas management gains better control of the business (McLeod, 2009). The goals of very many companies are to be able to control and manage the business using technology both internally and externally with suppliers and customers (Chatterjee, 2010). This gives businesses that use technology a competitive advantage over their rivals.

Types of information systems

Most organizations have six kinds of information systems, each attached to a specific organizational level or department (Chatterjee, 2010). These systems include enterprise resource planning systems, decision support systems, virtual information systems, management information systems, transaction information systems and knowledge information systems.

Transaction information system

A business's day-to-day activities involve carrying out transactions. A transaction can be described as an event or activity which affects a company. Transaction types depend on the business that a company is involved in. For example, various transactions are carried out in a manufacturing unit. They include shipping, receipt of goods and order entry. On the other hand, transactions in the banking sector involve the cashing of cheques, deposits, and withdrawals. However, various transactions are common in many organizations. They include employee record keeping, the hiring of employees, billing customers and placing orders. For an organization to run smoothly in the areas of offering transactions, a transaction information system is necessary.

Virtual information system

It is made up of a collection of computers, communication technology and persons to perform various tasks in an organization. It helps in supporting official activities and executing office transactions. Official activities can be categorized into managerial and clerical activities. Most of the administrative

activities carried out using the virtual information system include calendar keeping, mailing, typesetting, scheduling meetings, written communication and printing. On the other hand, most of the managerial activities carried out using virtual information systems include controlling the performance of an organization, creating messages and conferencing. Applications like electronic email filing and word processing are also connected to the virtual information system.

- Word processing

This application is used to prepare memos, reports, letters or other materials that can be printed using electronic means. Texts are written using the keyboard, and later, they are displayed on the computer display unit. This text is usually edited, stored and can easily be reproduced. The application is also supported by other facilities that help in counting words, checking grammar, inserting the header, index creation and numbering.

- Email

Under the virtual information system, we also have email, which helps in sending messages by using communication lines or computers. It is a fast method of delivering information, and it also reduces cost and time (Chatterjee, 2010). It also gives options through which one can send a message either in the form of a video, audio or images.

- Voicemail

It is unique and vital because it helps in storing and recording telephone messages in computer memory. It is also effortless to retrieve messages from voicemail.

Knowledge information system

It is a unique kind of information system that promotes the creation of knowledge in an organization and ensures that technical skills and expertise are well-connected in business. It motivates workers to propagate and create new information by providing them with document management tools, graphics, analysis and communication (Oz, 2009). When workers need external data to gain more details, this information system gives them easy access to external data. Moreover, this kind of information system must have a user-friendly interface to help workers get information easily and quickly. Examples of knowledge information systems are financial workstations, virtual reality

systems, and computer-aided design (CAD).

- Computer-aided design systems

It mostly uses graphics software to automate the creation and revision of designs. It efficiently provides design specifications that are used in the manufacturing process. This is time-saving when one is developing a manufacturing process.

Virtual reality systems

It is stronger than CAD in simulation, visualization, and rendering. It uses interactive graphics software to come up with a computer-generated simulation that appears real. Virtual information systems are mostly used in business, scientific and educational work.

- Financial workstation

They are used to integrate a wide range of external and internal sources of data. This data may comprise market data, research reports and contact management data. It is mostly used to analyze a significant amount of financial data and support trading stations. It is also necessary when doing portfolio management.

Management information system

A management information system is usually developed for controlling, decision-making and planning by middle managers. A management information system gets data from transaction information systems. It later compiles this data and produces information in the form of reports, responses, and displays (Oz, 2009). This information is used by managers to make decisions in a firm. This type of information system uses comparisons and summaries, which help the manager make proper decisions in a firm since the procedure for having the best solution is always outlined by these information systems. Most of the reports produced by this information system are usually summary reports, for example, average sales made by sales executives (Chatterjee, 2010). Other types of reports generated by this information system include exception reports that give some specific conditions or exceptions. A management information system produces reports either annually, semi-annually, quarterly or monthly. However, if managers want to view this information on a daily basis, they can do so as well. Managers can also retrieve data from records using this type of information system.

Decision support systems

It is a very interactive information system, and just like MIS, decision support systems are used at the management level in an organization. The difference between a management information system and a decision support system is that DSS processes information that is used by managers to make appropriate decisions in a firm (Oz, 2009). An example of a decision support system in a bank helps managers know changing trends in loans and deposits so they can set annual bank targets. Decision support systems are made to help every manager execute a specific task (McLeod, 2009). Through these information systems, managers are always able to come up with structured decisions. With this, they can quickly solve the problem or task logically. However, DSS can also be used in making a complex decision. Such complex decisions must be supported by information collected from transaction information systems and virtual information systems (Chatterjee, 2010). This type of information system is considered better in decision-making compared to the rest of the information systems. This is because it uses a lot of decision-making models in analyzing and summarizing data. It summarises this data into tables and charts that help managers make decisions efficiently. It is also very interactive because those using this kind of information system can ask each other questions or even adjust the information to fit their requirements.

Enterprise resource planning systems

It happens to be an executive information system that helps make decisions at the top level in an organization. It can also be regarded as an improvement in MIS. The decisions made using this type of information system are extraordinary decisions (McLeod, 2009). Usually, they have a significant effect on the entire organization. Therefore, managers using this type of information system are always keen (Oz, 2009). The enterprise resource planning system has useful display options, computing capabilities, and better telecommunications compared to DSSs. When displaying relevant information in the form of charts and tables, it makes use of graphics software. It is meant to help senior managers make better and wiser decisions. For better decisions to be reached, they also use summarised internal data from MIS and DSS. To make their decisions more effective, they also have to consider other external sources to provide information, mainly on new competitors and tax laws.

Management information systems and decision-making

The type of information necessary for decision-making is usually related to the level of management that is making decisions. There are various management levels in an organization that must be supported with information systems without considering the participants, size, and shape of the organization (Oz, 2009). The levels are strategic management, operational management, and tactical management.

Strategic management

Top executives in the strategic planning process come up with organizational policies, strategies, and goals. They also help in monitoring the performance of the organization and where it is headed considering political, economic, and social environments.

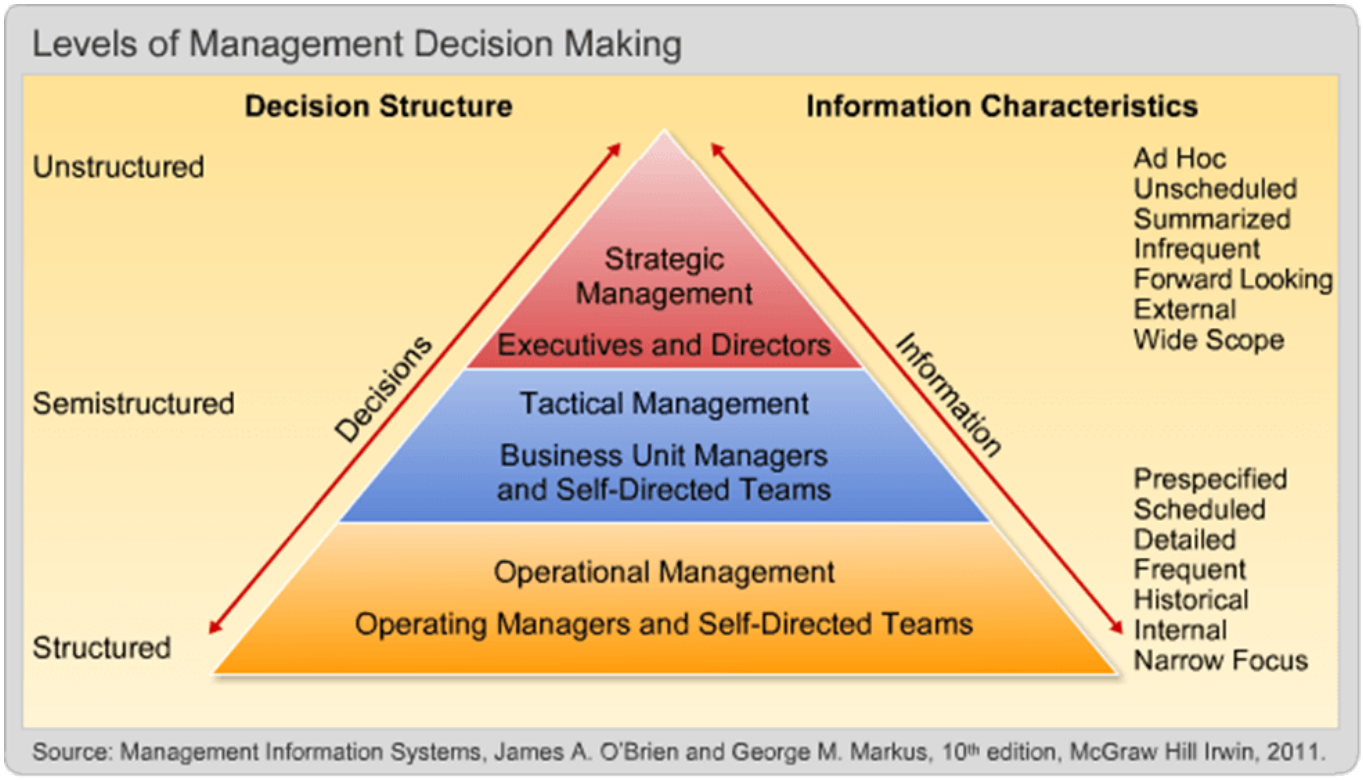
Tactical management

It consists of self-directed teams, business professionals, and business unit managers (McLeod, 2009). They help in developing short- and medium-term plans based on procedures, objectives, schedules, and budgets. They also assist in monitoring the performance of the sub-units in the organization, which include project teams, divisions, departments, and workgroups.

Operational management

It consists of members of self-directed teams and operating managers (Oz, 2009). They help in coming up with short-range plans. They also give directions on the procedures that need to be followed when performing tasks.

The figure below shows levels of decision-making.



Roles of managers

The following table shows an in-depth category of roles played by managers.

TABLE 1 Mintzberg's Set of Ten Roles

Category	Role	Activity
Informational	Monitor	Seek and receive information; scan periodicals and reports; maintain personal contact with stakeholders.
	Disseminator	Forward information to organization members via memos, reports, and phone calls.
	Spokesperson	Transmit information to outsiders via reports, memos, and speeches.
Interpersonal	Figurehead	Perform ceremonial and symbolic duties, such as greeting visitors and signing legal documents.
	Leader	Direct and motivate subordinates; counsel and communicate with subordinates.
	Liaison	Maintain information links both inside and outside organization via mail, phone calls, and meetings.
Decisional	Entrepreneur	Initiate improvement projects; identify new ideas and delegate idea responsibility to others.
	Disturbance handler	Take corrective action during disputes or crises; resolve conflicts among subordinates; adapt to environments.
	Resource allocator	Decide who gets resources; prepare budgets; set schedules and determine priorities.
	Negotiator	Represent department during negotiations of union contracts, sales, purchases, and budgets.

Knowledge management

It is where the organization’s knowledge assets are organized systematically to meet tactical and strategic requirements. It is made up of systems, initiatives, processes and strategies that assist in the creation, refinement, assessment and sharing of information. It helps to define where one can find knowledge and in what form it exists. It also teaches how to come up with the right environment that promotes knowledge creation. It also helps to make sure that the proper knowledge is known to the right people on time (McLeod, 2009). All these factors must be considered to ensure appropriate performance and achievement of short-term goals and strategic goals. Knowledge management mainly relies on the management of its creation, organization, conversion, and even retrieval.

Computer-based information System model

Processing, being part of the components that make up information system management, implies that information systems must be brought together into the dynamics and structures of the functions they support. Therefore, a computer-based information system must be put in place with all the arrangements and dynamics that are needed in the organization (Oz, 2009). In coming up with such a computer-based information system, one must use conceptual tools to come up with the various features of the structures and dynamics of the organization and a methodology that brings together these features into the architecture of its supporting information system (McLeod, 2009). Through this, a modeling and simulation environment is created that has an extensive model base that is used for simulation analysis of all functions in an organization apart from being used in system development.

References

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