INTRODUCTION TO INFORMATION SYSTEMS AND TECHNOLOGY

Key Concepts

Information systems are integrated elements that gather, process, save, and disseminate information to support an organization's decision-making and management. With that said, information systems are universal. Be it desktop computers, laptops, or smartphones, information systems are all around us, whether visible or not.

Basic applications of information systems are as follows:

Traditional Applications

1. Supermarket retailers such as Walmart in the USA utilize information systems from optimizing supply chains to recording purchases and analyzing customer tastes and preferences.

2. Shipping companies like FedEx and UPS use information systems to dispatch trucks and track packages.

3. Cities use information systems for adaptive traffic control systems or irregular speed limits; and

4. Cars use information systems from ignition control to airbags for distance control and parking systems.

Advanced Applications

1. Online registrations for schools during enrollments.

2. E-learning systems to complete and submit assignments online, such as the eLMS portal; and

3. The use of Facebook to stay connected with friends and family, Instagram for uploading images, and Spotify and Apple Music for streaming music.

Technology is the outcome of acquired scientific knowledge, skills, procedures, and processes for applied purposes. Technology has become an integral part of our daily life from the creation of the wheel to the use of electricity.

Technology can be seen as an activity that forms and changes culture. Moreover, technology is implementing science, math, and the arts to benefit life as it is known. As a cultural activity, technology precedes science and engineering, each formalizing some aspects of technological ventures.

Information systems and technology are fundamental to our social, academic, and work environment.

Essential Components of Information Systems

Information systems have five major components: *hardware*, *software, data, people,* and *processes*.

Source: https://plextrac.com/what-is-an-information-system-defined-and-outlined/

Figure 1. Components of information systems

To fully grasp information systems, it is necessary to understand how these components work together to bring value to an organization.

Technology Components

The first three (3) components of information systems – *hardware, software,* and *data* – all fall under the technology category.

Hardware

Hardware is the physical component of an information system – tangible parts to users. Computer, keyboard, system unit, and mouse are all examples of information systems hardware.

Software

The software includes a set of commands that instruct the hardware what to do. Software is intangible compared to hardware. Programmers design software by coding a series of commands instructing the hardware what to do.

Two main categories of software are **operating systems** and **application software**.

Operating systems software gives the interface between the hardware and the Application software, such as Microsoft Windows and Ubuntu Linux for computers and Google Android and Apple iOS for smartphones.

Application software allows the user to accomplish tasks such as creating documents, encoding data in a spreadsheet, or messaging a friend. Examples include Microsoft Excel, Zoom, and Facebook.

Data

It is a collection of indisputable raw facts. Home addresses, phone numbers, and social networking accounts are examples of pieces of data. Companies collect all kinds of data and use it to make decisions which can then be examined for effectiveness. The analysis of data is then used to improve the company's performance.

Networking Communication

Information systems can exist without the capability to communicate. Although in today's interconnected world, it is rare for a computer not to connect to another device or to a network. The *People* and *Process* components of information systems fall under this category.

People

It is easy to focus on the technology components alone, but focusing on the people involved in information systems is essential. From the front-line user support staff to systems analysts to developers, the people engaged in information systems are an indispensable element.

Process

It is a series of steps taken to accomplish the desired goal. Information systems are becoming more integrated with organizational processes that bring greater productivity and better control. Nonetheless, simply automating activities using technology is not enough; companies wishing to gain an advantage over their competitors should focus highly on this aspect of their information systems.

All these components need to work together to be considered and function as information systems.

To show the application of these components working together, take the traditional application of information systems used by FedEx as an example. The technology components working together are the *data* collected from the sender of the package, including the receiver's details, and application software for monitoring the package route, which is then accessed through a *hardware* device such as a smartphone. And the networking communication includes the *people* who are the couriers to complete all the *processes* required to deliver the package.

Brief History of Information Systems

Changes in technology have allowed ways of working and socializing. Though people were bound to a stationary PC to do necessary tasks in the past, they are no longer tied to any location.

Peter Drucker

In 1959, he said that information and information systems would become increasingly important, which led him to coin the term "*knowledge worker."* Knowledge workers are the professionals who make and modify knowledge as a fundamental part of their jobs.

Drucker also predicted that a knowledge society would emerge with the growth of knowledge workers and their rise in importance. Others have referred to this phenomenon as the *knowledge economy*, the *new economy*, the *digital society*, the *network era*, and the *internet era*. Nowadays, it is called the *digital world.*

First Era (The mid-1960s to Mid-1970s): Mainframe and Minicomputer

During the early years, information systems were centralized and concerned solely with governance and the needs of management. Most information systems and their reports were under the control of accounting departments.

Technology at the time included third-generation mainframe computers such as the IBM 360 and minicomputers. Languages used include Assembler, Fortran, COBOL, and Database. Ethernet networks were developed during this time.

Second Era (The mid-1970s to Mid-1980s): Personal Computer

While information systems were still concerned with governance and the needs of management, more departments were beginning to benefit from the technology.

In many companies, steering committees and user-led initiatives determine the scope of additional information systems projects. Technology included the first personal computers (PCs) and mid-range computers.

Third Era (The mid-1980s to Late 1990s): Client/Server

In this era, concentrated information systems started to spread, and information became deconcentrated. Technological difficulties and costs decreased, and an enterprise's need to share information grew.

During this era, a new position arose in many companies to oversee the procurement and management of multiple information systems: the Chief Information Officer or CIO. Technology during this era included internetworking and the emergence of the Internet.

Fourth Era (the Late 1990s to today): Enterprise

During this era, information systems are still tied to governance and management, although the systems are widely distributed to every employee who needs them across multiple platforms.

This era combined all aspects of the business enterprise, offering rich information access surrounding the complete management structure. Technology now includes social media, search engines, and various computing through a variety of platforms, including laptops and smartphones.

Fifth Era (Moving Forward): Cloud Computing

This era uses networking technology that delivers applications and data storage independent of the configuration or location of the hardware. Along with high-speed smartphones and Wi-Fi networks, this era has led to new levels of flexibility, such as cloud computing, in which managers may access information systems anywhere with a laptop, tablet, or smartphone.

Rising global competitiveness has forced companies to find better and more cost-effective ways. The solution for companies continues to be to use information systems to accomplish tasks better, faster, and cheaper.

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