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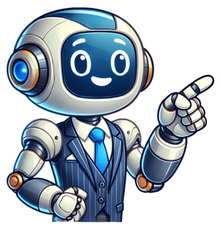

Any business, big or small, must have a system in place to collect, process, store and share data. In the past, these tasks required a lot of time and paperwork. Today, companies use modern technology to streamline and automate these operations. Information systems are now playing a crucial role in data processing and decision making. When used correctly, they can positively impact an organization's overall performance and revenue. At the most basic level, an information system (IS) is a set of components that work together to manage data processing and storage. Its role is to support the key aspects of running an organization, such as communication, record-keeping, decision making, data analysis and more. Companies use this information to improve their business operations, make strategic decisions and gain a competitive edge. Information systems typically include a combination of software, hardware and telecommunication networks. For example, an organization may use customer relationship management systems to gain a better understanding of its target audience, acquire new customers and retain existing clients. This technology allows companies to gather and analyze sales activity data, define the exact target group of a marketing campaign and measure customer satisfaction. Modern technology can significantly boost your company's performance and productivity. Information systems are no exception. Organizations worldwide rely on them to research and develop new ways to generate revenue, engage customers and streamline time-consuming tasks. With an information system, businesses can save time and money while making smarter decisions. A company's internal departments, such as marketing and sales, can communicate better and share information more easily. Since this technology is automated and uses complex algorithms, it reduces human error. Furthermore, employees can focus on the core aspects of a business rather than spending hours collecting data, filling out paperwork and doing manual analysis. Thanks to modern information systems, team members can access massive amounts of data from one platform. For example, they can gather and process information from different sources, such as vendors, customers, warehouses and sales agents, with a few mouse clicks. There are different types of information systems and each has a different role. Business intelligence (BI) systems, for instance, can turn data into valuable insights. This kind of technology allows for faster, more accurate reporting, better business decisions and more efficient resource allocation. Another major benefit is data visualization, which enables analysts to interpret large amounts of information, predict future events and find patterns in historical data. Organizations can also use enterprise resource planning (ERP) software to collect, manage and analyze data across different areas, from manufacturing to finance and accounting. This type of information system consists of multiple applications that provide a 360-degree view of business operations. NetSuite ERP, PeopleSoft, Odoo and Intacct are just a few examples of ERP software. Like other information systems, ERP provides actionable insights and helps you decide on the next steps. It also makes it easier to achieve regulatory compliance, increase data security and share information between departments. Additionally, it helps to ensure that all of your financial records are accurate and up-to-date. In the long run, ERP software can reduce operational costs, improve collaboration and boost your revenue. Nearly half of the companies that implement this system report major benefits within six months. At the end of the day, information systems can give you a competitive advantage and provide the data you need to make faster, smarter business decisions. Depending on your needs, you can opt for transaction processing systems, knowledge management systems, decision support systems and more. When choosing one, consider your budget, industry and business size. Look for an information system that aligns with your goals and can streamline your day-to-day operations.  Depending on who you ask, there may be five or six elements to a computer-based information system. In "Fundamentals of Information Systems," Ralph Stair and George Reynolds define a computer-based information system (CBIS) as a "single set of hardware, software, databases, telecommunications, people, and procedures configured to collect, manipulate, store, and process data into information." Some experts list five basic elements of a CBIS: hardware, software, data, procedures and people. Others add a sixth element, communications, to the list. Hardware is the most obvious part of a computer-based information system. Hardware refers to the computers themselves, along with any and all peripherals, including servers, routers, monitors, printers and storage devices. A CBIS may use a single computer or thousands. Without software, the hardware wouldn't be very useful. Software, the second element of a CBIS, is what tells the hardware how to function. It gathers, organizes and manipulates data and carries out instructions. Everything you do using a computer is done by the software. Data, or information, is the third element of a CBIS. Just as hardware cannot function without software, software cannot function without data. This is the information part of an information system, and whether that is statistical data, sets of instructions, lists of names or even graphics and animations, it is all key to a CBIS. It is commonly said that "procedures are to people what software is to hardware." The fourth element of CBIS, procedures are the rules, descriptions and instructions for how things are done. In computer-based information systems, procedures are frequently covered in instruction or user manuals that describe how to use the hardware, software and data. People are the most often overlooked and most important part of a computer-based information system. It is people who design and operate the software, input the data, build the hardware and keep it running, write the procedures and it is ultimately people who determine the success or failure of a CBIS. Communication is left out of some lists of CBIS elements, but for a CBIS that involves more than one piece of hardware to function, communication or connectivity is a necessity. This is, in part, because parts of it are covered under hardware. The components that allow one computer to communicate with another are hardware and are controlled by software. If communication between people is included in this element, though, it is an important element. In today’s technology-driven world, information systems have become an integral part of businesses, organizations, and daily life. An information system is a collection of hardware, software, data, and people that work together to process and manage information. In this article, we will explore the six components that make up an information system and their importance. 1. Hardware Hardware refers to the physical components that make up an information system. These include computers, servers, printers, scanners, and other electronic devices. Hardware provides the processing power, storage capacity, and input/output capabilities needed for an information system to function. 2. Software Software is a set of instructions that tells the computer what to do. It includes application software, which performs specific tasks, and system software, which manages the hardware and provides a platform for the application software to run. The most common example of software in an information system is an operating system such as Windows or MacOS. 3. Data Data is the raw material used by an information system. It can include business data like customer information or financial records, as well as non-business data like social media posts or weather forecasts. Data needs to be collected, stored, and processed properly to be useful for decision-making and analysis. 4. Procedures Procedures are the rules and guidelines that govern how an information system is used. They include policies for data security, backup and recovery, and software updates. Procedures are important for making sure that the system runs smoothly and that data is protected. 5. People People are the users and stakeholders of an information system. They include employees, customers, suppliers, and managers. People interact with the system through user interfaces and are responsible for producing, processing, and consuming the data that the system generates. 6. Network The network is the communication channel that connects the hardware components of the information system. It includes wired or wireless connections, routers, switches, and other networking devices. Networks are essential for transporting data between components and enabling remote access to the system. Conclusion: Information systems are complex entities that require careful planning and management. By understanding the six components of an information system and their interdependencies, businesses and organizations can optimize their use of technology and leverage the power of data for better decision-making. Whether you are a CEO or an end-user, having a basic understanding of information systems is critical in today’s digital age. WE WANT YOU (Note: Do you have knowledge or insights to share? Unlock new opportunities and expand your reach by joining our authors team. Click Registration to join us and share your expertise with our readers.) Speech tips: Please note that any statements involving politics will not be approved. An information system is a software, hardware, and telecommunications network that collects relevant data, typically within an organization. Many companies utilize information systems to complete and manage their operations and engage with their customers. What is an Information System?An Information system is a combination of hardware and software and telecommunication networks that people build to collect, create, and distribute useful data, typically in an organization. It defines the flow of information within the system. The objective of an information system is to provide appropriate information to the user, gather the data, process the data, and communicate information to the user of the system.  Components of Information System1. Computer HardwarePhysical equipment used for input, output and processing. The hardware structure depends upon the type and size of the organization. It consists of an input and an output device, operating system, processor, and media devices. This also includes computer peripheral devices.  2. Computer SoftwareThe application program used to control and coordinate the hardware components. It is used for analysing and processing of the data. These programs include a set of instruction used for processing information.  Software is further classified into three types:  System SoftwareApplication SoftwareProcedures3. DatabasesData are the raw facts and figures that are unorganized that are later processed to generate information. Softwares are used for organizing and serving data to the user, managing physical storage of media and virtual resources. As the hardware can't work without software the same as software needs data for processing. Data are managed using Database management system. Database software is used for efficient access for required data, and to manage knowledge bases.  4. NetworkNetworks resources refer to the telecommunication networks like the intranet, extranet and the internet.These resources facilitate the flow of information in the organization.Networks consists of both the physical devices such as networks cards, routers, hubs and cables and software such as operating systems, web servers, data servers and application servers.Telecommunications networks consist of computers, communications processors, and other devices interconnected by communications media and controlled by software.Networks include communication media, and Network Support.5. Human ResourcesIt is associated with the manpower required to run and manage the system. People are the end user of the information system, end-user use information produced for their own purpose, the main purpose of the information system is to benefit the end user. The end user can be accountants, engineers, salespersons, customers, clerks, or managers etc. People are also responsible to develop and operate information systems. They include systems analysts, computer operators, programmers, and other clerical IS personnel, and managerial techniques. Types of Information SystemsOperations Support Systems: This type of information system is primarily designed to assist a certain business process. Management Information Systems: Management information systems (MIS) are computerized systems that gather, store, process and display data that help in making decisions for management. Decision Support Systems: Decision support systems enable an organization to make decisions with regard to its operations. It can be employed in both fully automated and human-operated systems. However, for optimal efficiency, a combination of human and computer-operated devices is advised. Executive Information Systems: The final type of management support system is the executive support system (EIS). They assist in making senior-level choices for an organization. How does an Information System Work?Input: The system takes data and information from a variety of sources, including sensors, keyboards, scanners, and databases.Processing: The system converts raw data into useful information using a variety of techniques such as sorting, classifying, calculating, analyzing, and synthesizing. Storage: The system stores the processed data in a structured and safe manner, such as in a database, file system, or cloud storage. Output: The system displays information to users such as reports, graphs, charts, or dashboards. Feedback: The system requests feedback from users and other stakeholders to assess its effectiveness and enhance its design and functioning.Facts of Information SystemsNecessary for Business GrowthBetter Data Storage and Success.Improved Decision Making IntroductionProliferation of information technology has increased in the last decade. Today’s organizations are acknowledging the importance of information systems. It has been accepted worldwide that information system provides competitive edge and are the bedrock for innovation. The six basic functions of information systems are capture data, transmit data, store data, retrieve data, manipulate data and display information.The elements of an information system are customers, business processes, product services and communication technology. Design of an information system is done based on elements of the model.CustomersEvery information system has end users or customers. An information system can have internal as well as external. Customers are beneficiaries of products and services provided by an information system. Here external customers could be people visiting a website for shopping or e-commerce transaction, people searching for cooking recipe, searching for tax saving tools, etc.Internal customer of an information system could be employee receiving salary from payroll system, employee checking inventory and stock, etc. Sometimes these employees could be the customer for the product and services, for example, employee working with a computer manufacturer could be customer of manufactured product.For a manufacturing organization, production department would be customer for supply department. Therefore, information system requirements of each department would be different. Information systems are design to service what is best for external customers. However, information systems should be flexible enough to support internal requirements also.Products and ServicesThe result of data transformation is products and services. An information system can generate products as well as service depending upon industry it is developed for. In clothing industry designer clothes are produced based customer’s requirement. Here completed garments are product and custom design is a service. In internet banking, customer can accomplish the entire banking task, without visiting the bank. Internet banking, therefore, is a service.An information system can generate various types of services and products based on its design. An effective information system needs to satisfy customer expectation. An information system should provide product and service based on customer’s needs and requirements.Business ProcessesBusiness activity consists of various processes. These processes include talking to customer, understanding her requirements, manufacturing product as per requirement, provide post sales service, etc. A business process may not be structured all the time and may not be formal. An improvement in the business process directly impacts business performance. An information system can improve a business process, by providing relevant information, increasing a step in business process or eliminating a step in a business process.Communication TechnologyCommunication technology and computers are the central pieces of an information system model. Their presence is required to deliver efficient business process and customer delighting products and services. Infusion of technology within business creates win-win situations. Technology improves internal communication via email chat, etc. and improve external communication through website, webinar etc. Access to valuable information is quicker through information system, and this can provide a competitive edge in digital age.Information system model highlights the pivot role information system plays in bringing efficiency in any work system. Let’s use your experience as users to understand the above definitions. For example, let’s say you work for a small business, and your manager asks you to track the expenses of the business and send her the list so that she can see where the money has gone. You decide to use a spreadsheet on your laptop to enter the list of expenses you have collected and then email the spreadsheet to her once you are done. You will need to have a system, a laptop, a spreadsheet running and connect to email, and an internet connection. All these components must work together perfectly! In essence, you are using the interrelated components in an IS to allow it to collect, process, store, and disseminate information. The role of this IS system is to enable you to create new value (i.e., expense tracker) and for your manager to use the information you disseminate “to support decision making, coordination, control, analysis, and visualization in an organization.” (Laudon et al., 2011) You and your manager have obtained your goals through the processes you have created to capture the data, calculate it, check it, and how and when your manager receives the new information you created to make her decision to manage her company. Hence, information systems can be viewed as having six major components: hardware, software, network communications, data, people, and processes. Figure \(\PageIndex{1}\): Components of Information Systems. Image by Ly-Huong Pham is licensed under CC BY NC Each has a specific role, and all roles must work together to have a working information system. In this book, we group the first four components as Technology. People and Processes are the two components that deliver value to organizations in how they use the collection of technologies to meet specific organizations’ goals. Technology can be thought of as the application of scientific knowledge for practical purposes. From the invention of the wheel to the harnessing of electricity for artificial lighting, technology is a part of our lives in so many ways that we tend to take it for granted. As discussed before, the first four components of information systems – hardware, software, network communication, and data, are all technologies that must integrate well together. Each of these will get its own chapter and a much lengthier discussion, but we will take a moment to introduce them to give you a big picture of what each component is and how they work together. Hardware represents the physical components of an information system. Some can be seen or touched easily, while others reside inside a device that can only be seen by opening up the device's case. Keyboards, mice, pens, disk drives, iPads, printers, and flash drives are all visible examples. Computer chips, motherboards, and internal memory chips are the hardware that resides inside a computer case and not usually visible from the outside. Chapter 2 will go into more details to discuss how they function and work together. For example, users use a keyboard to enter data or use a pen to draw a picture. Figure \(\PageIndex{2}\): Keyboard and iPad by Firmbee from Pixabay, Pen by athree23 from Pixabay, Printer by Steve Buissinne from Pixabay, Keyboard by Gerd Altmann from Pixabay. All images are licensed under CC BY 2.0 Software is a set of instructions that tell the hardware what to do. Software is not tangible – it cannot be touched. Programmers create software programs by following a specific process to enter a list of instructions that tell the hardware what to do. There are several categories of software, with the two main categories being operating-system and application software. Figure \(\PageIndex{3}\): This image is a derivative work from David Bourgeois is licensed under CC BY 2.0. This work “Hardware, Software, Users - Interrelated” by Ly-Huong Pham is licensed under CC BY-NC Operating system software provides an interface between the hardware and application to protect the programmers from learning about the underlying hardware's specifics. Chapter 3 will discuss Software more thoroughly. Here are a few examples: Examples of Operating Systems and Applications by Devices Devices Operating Systems Applications Desktop Apple macOS, Microsoft Windows Adobe Photoshop, Microsoft Excel, Google Map Mobile Google Android, Apple iOS Texting, Google Map Data The third component is data. You can think of data as a collection of non-disputable raw facts. For example, your first name, driver's license number, the city you live in, a picture of your pet, a clip of your voice, and your phone number are all pieces of raw data. You can see or hear your data, but by themselves, they don’t give you any additional meanings beyond the data itself. For example, you can read a driver's license number of a person, you may recognize it as a driver's license number, but you know nothing else about this person. They are typically what IS would need to collect from you or other sources. However, once these raw data are aggregated, indexed, and organized together into a logical fashion using software such as a spreadsheet, or a database, the collection of these organized data will present new information and insights that a single raw fact can’t convey. The example of collecting all expenses (i.e., raw data) to create an expense tracker (new information derived) discussed earlier is also a good example. In fact, all of the definitions presented at the beginning of this chapter focused on how information systems manage data. Organizations collect all kinds of data, processed and organized them in some fashion, and use it to make decisions. These decisions can then be analyzed as to their effectiveness, and the organization can be improved. Chapter 4 will focus on data and databases and their uses in organizations. The components of hardware, software, and data have long been considered the core technology of information systems. However, networking communication is another component of an IS that some believe should be in its own category. An information system can exist without the ability to communicate. For instance, the first personal computers were stand-alone machines that did not have access to the Internet. Information Systems, however, have evolved since they were developed. For example, we used to have only desktop operating system software or hardware. However, in today’s environment, the operating system software now includes mobile OS, and hardware now includes other hardware devices besides desktops. It is extremely rare for a computer device that does not connect to another device or a network. Chapter 5 will go into this topic in greater detail. Figure \(\PageIndex{4}\): Network by Gerd Altmann from Pixabay is licensed under CC BY-SA 2.0 People built computers for people to use. This means that there are many different categories in the development and management of information systems to help organizations to create value and improve productivity, such as: Users: these are the people who actually use an IS to perform a job function or task. Examples include: a student uses a spreadsheet or a word processing software program. Technical Developers: these are the people who actually create the technologies used to build an information system. Examples include a computer chip engineer, a software programmer, and an application programmer. Business Professionals: these are the CEOs, owners, managers, entrepreneurs, employees who use IS to start or expand their business to perform their job functions such as accounting, marketing, sales, human resources, support customers, among others. Examples include famous CEOs such as Jeff Bezos of Amazon, Steve Jobs of Apple, Bill Gates of Microsoft, and Marc Benioff of Salesforce. Figure \(\PageIndex{5}\): Jeff Bezos, by Seattle City Council via Flicker, Steve Jobs and Bill Gates by Joi Ito via Flickr, Marc Benioff by Global Climate Action Summit 2018 via Flicker, All images are licensed under CC BY-SA 2.0 IT Support: These specialized professionals are trained to keep the information systems running smoothly to support the business and keep it safe from illegal attacks. Examples include network analysts, data center support, help-desk support. These are just some of the key people; more details will be covered in Chapters 9 and 10. The last component of information systems is Process. A business process is a series of steps undertaken to achieve a desired outcome or goal. Businesses have to continually innovate to either create more revenues through new products and services that fulfill customers’ needs or to find cost-saving opportunities in the ways they run their companies. Simply automating activities using technology is not enough. Information systems are becoming more and more integrated with organizational processes to deliver value in revenue-generating and cost-saving activities that can give companies competitive advantages over their competitors. Specialized standards or processes such as “business process reengineering,” “business process management,” “enterprise resource planning,” and “customer relationship management” all have to do with the continued improvement of these business procedures and the integration of technology with them to improve internal efficiencies and to gain a deeper understanding of customers’ needs. Businesses hoping to gain an advantage over their competitors are highly focused on this component of information systems. We will discuss processes in Chapter 8. Laudon, K. C., & Laudon, J. P. (2011). Management information systems. Upper Saddle River, NJ: Prentice-Hall.