Al-Mustaqbal University
College Of Engineering Technology
Department Of Cyber Security Techniques Engineering
Class: 1st
Subject: Computer Hardware Components
Lecturer: Dr. Zainab Abdullah Jasim
1st term – Lecture: 1- Introduction

1 – What is the Information System?

An information system (IS) is an interconnected set of components used to collect, store, process and transmit data and digital information. At its core, it is a collection of hardware, software, data, people and processes that work together to transform raw data into useful information. An IS supports a variety of business objectives, such as improved customer service or increased operational efficiency.

Typically, an IS comprises an integrated set of hardware and software, plus databases and communications networks that facilitate data collection, storage and use. People and processes are also vital components of an IS.

In other word, The field of information systems (IS) is a dynamic industry, evolving and depending on technological advancements. It intersects with business, computer science, and management, playing a critical role in enhancing organizational efficiency, productivity, and competitiveness. When organizations have robust information systems, they are more capable of planning strategically to gain a competitive edge and achieve success. Figure1 Information system components.

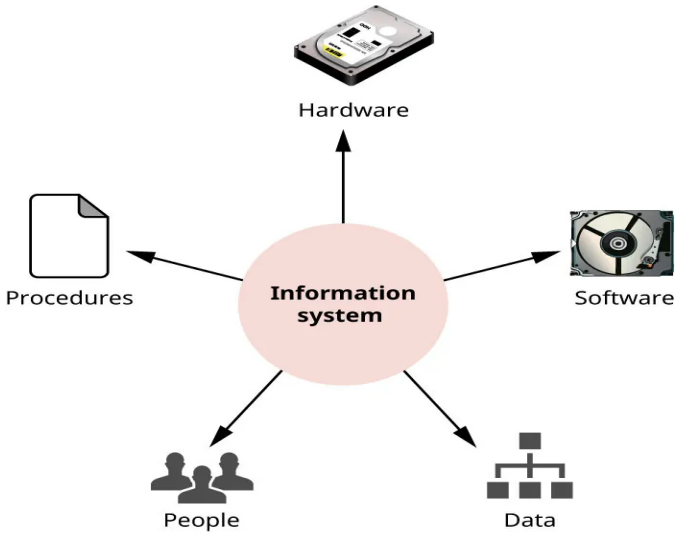

Figure 1 Information system components

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2 – An organization may implement **different types** with distinct purposes of ISes, such as the following:

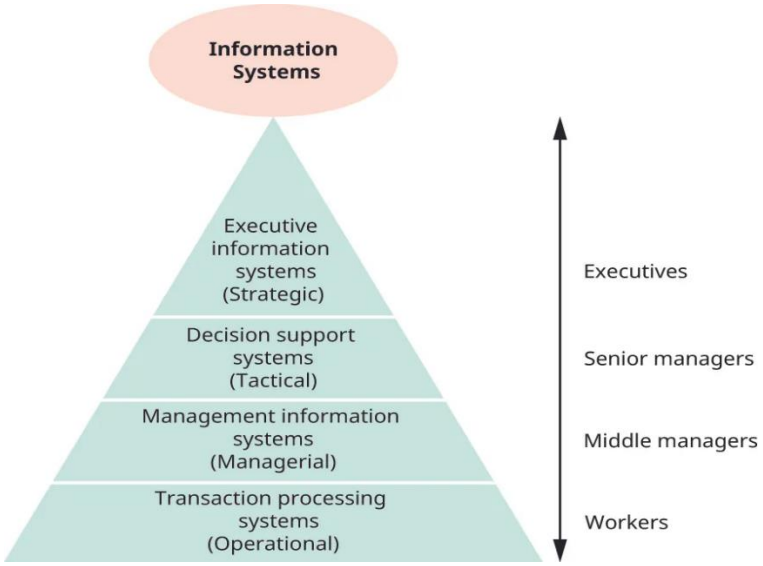

Figure 2 IS **several types of systems** with distinct purposes.

- An **executive information system (EIS)** supports the strategic information needs of top executives, providing the information needed to handle executive functions, such as developing an organization's strategic goals and objectives and plans for achieving them. This includes providing the information needed for managers to understand and manage their organization's supply chain and value chain, which can be helpful to streamline production processes and provide better customer service. Supply chain management is an example of how an EIS can be used as an interorganizational information system, which occurs when two or more organizations use IS to conduct business electronically.

  Note: The **supply chain** is **everything involved in getting a product made and delivered** to the customer. **It focuses on,** Getting **raw materials, Manufacturing** the product, **Transportation & storage and Distribution** to customers.

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- A **decision support system (DSS)** assists in decision-making by providing interactive tools and access to data analysis. Typically, senior managers use a DSS to obtain strategic information that helps them make routine, short-term decisions about an organization's operations. This helps ensure that organizations stay on track to achieve long-term goals and objectives. Interactive tools available through a DSS enhance these efforts by providing information and technology needed for activities such as project management and employee training.
- A **management information system (MIS)** provides middle managers with reports and summaries to support decision-making and managerial functions. For example, middle managers may use an MIS to generate reports, such as budgeting documents and cash flow statements, to understand an organization's financial status. In many organizations, this type of system provides the data for an organization's balanced scorecard (BSC), which is a performance metric used by strategic managers to identify an organization's various functions and monitor outcomes. By providing the data necessary for the BSC, an organization's MIS function provides invaluable support.
- A **transaction processing system (TPS)** handles day-to-day transactions, such as order processing and payroll. For frontline staff, a TPS provides information necessary to handle an organization's daily operations, such as inventory reports and customer service record.

3– Before looking at each components to understand what it entails and why it is importants in IS, let's start with a brief overview of the five components.

- **The physical devices,** such as computers, servers, networks, and storage devices, that are used to collect, process, and store data are called hardware.
- **The programs and applications** that run on the hardware, enabling users to perform specific tasks, are called software. Software can range from operating

systems and database management systems to specialized business applications.

- **The raw facts and figures** that are processed and turned into meaningful information are **called data**. The facts that we use to learn and understand people, places, and things make up information. Information is raw data that have been processed and manipulated to give context and meaning. Once data are processed into information, we can use that information personally and professionally. We read or listen to books, watch videos on social media, stream a television show, follow road signs, browse online shopping sites, and interact with information we find on the internet or in the world around us. We use databases to organize and store this data efficiently.
- **A Set of instructions and rules** that governs the use of the hardware, software, and data components is known as a procedure. Standard operating procedures ensure consistency and reliability in the use of information systems.
- **Individuals who use the information system**, including end users who input and retrieve data in the system, as well as information technology (IT) professionals who design, develop, and maintain the system, are the people who make up an information system.

4– Use of Frameworks and Industry Standards in Information Systems.

- **Frameworks** guide IS professionals in setting system goals and solving problems.
- They support **critical thinking**, **communication**, and **organization of ideas**.
- Frameworks provide a basis for **strategic planning** and system maintenance.
- They offer resources like **best practices, guidelines, and continuing education**.
- **Industry standards** ensure systems have proper **infrastructure and technology**.
- Standards help systems be **compatible with other organizations' systems**.

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- A main goal of IS is **internal and external information sharing**.
- **Industry standards** help IS professionals ensure that the system they develop has the appropriate infrastructure and technological components required to function efficiently. This includes ensuring the system is compatible with information systems used in other organizations. After all, an important objective of IS to enable information sharing internally and externally as organizations interact in the marketplace.

4– Why Information Systems Should Be Global

The global marketplace is an important resource worldwide. Countries trade goods and services, offering businesses around the world opportunities for growth and profit maximization. Organizations of all types in both the private and public sectors use globalization as a means to share information and resources, including technological knowledge.

IS supports globalization by providing the resources that organizations need to achieve success in the global marketplace. This includes enabling global communication and information sharing, as well as supporting the processes to manage data compiled from sources throughout the world. IS also gives organizations the tools to function at any time of day, eliminating the need for different time zones to be an obstacle in global operations. In addition, IS helps organizations develop the frameworks they need for strategic planning and decision-making on a global scale.

5– Managing information systems

To effectively manage and maintain an IS, IS professionals must understand the system's capabilities and be aware of the needs and requirements of the businesses and users that rely on it. They must also understand the following aspects:

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- **Security.** As with any technology-enabled or internet-connected system, information systems are also vulnerable to cyberthreats, like hacking, viruses, malware and unauthorized access. This is why IS administrators must make an effort to boost IS system and data security. They can do this by implementing extensive security tools and measures, like access control, firewalls, intrusion detection systems, intrusion prevention systems, antivirus and data encryption.

  It's also crucial to apply security patches and updates as they become available to fix vulnerabilities and prevent their exploitation by threat actors. Additionally, regular security audits, vulnerability assessments and penetration testing can reveal potential security risks before they can result in damaging attacks or data breaches.

- **Data management.** Proactive and ongoing data management is needed to maintain the accuracy, consistency and integrity of the data stored in the IS. IS administrators must implement data backup processes to prevent data loss in case of system failures or disasters. Admins must also ensure that data is stored in a structured and organized manner so that it can be easily accessed and analyzed as needed.

- **Network management.** IS administrators must implement systematic network management processes to monitor and maintain the IS network infrastructure. They must ensure that network devices -- routers, switches, servers, etc. -- are correctly configured, network traffic is managed properly to avoid congestion and delays, and network security measures, like firewalls, to block malicious traffic and prevent unauthorized access are implemented and maintained.

- **System updates and upgrades.** IS administrators must regularly update and upgrade the IS and implement a patch management process to ensure that all components in the IS continue to run smoothly. They must also monitor

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system performance metrics, such as CPU and memory usage, to identify and troubleshoot performance issues as early as possible.

- **User support.** IS administrators must provide the necessary training and job-appropriate data so users can use the system effectively. Help desk support is also useful in assisting users with troubleshooting problems. Easy access to a knowledge base with articles, FAQs and chatbots can also help resolve user queries without overburdening the help desk team.

Figure 3 Managing information systems infographic