Information System
ITEC-522
5th Semester Third Year
Information Technology

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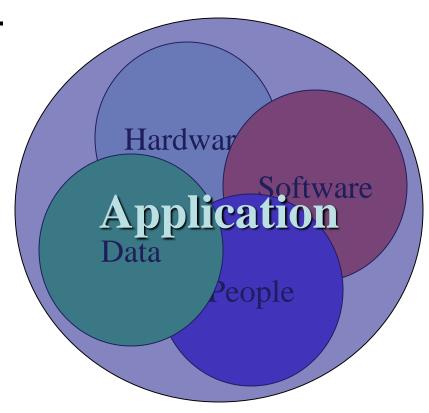## University of Sindh, Jamshoro
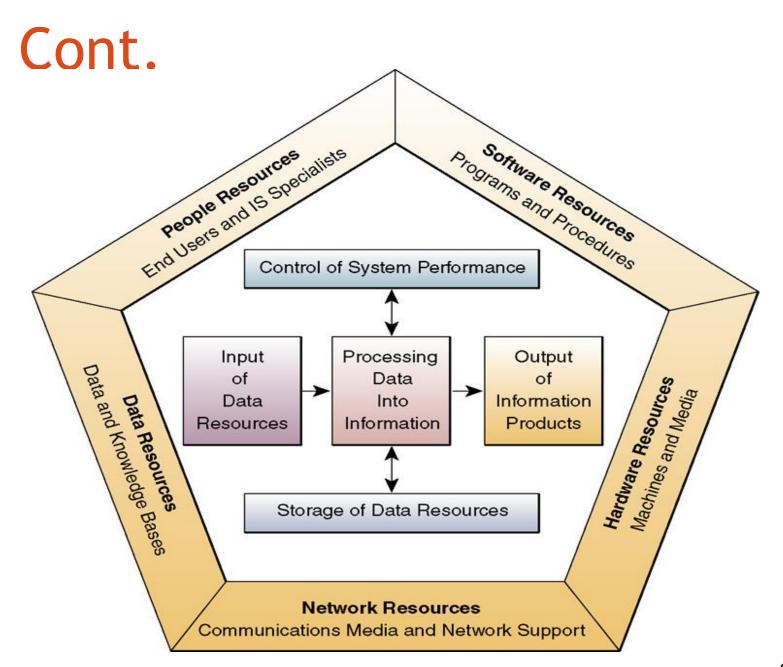
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Week-2

Information System - Elements

An information system (IS) collects, processes, stores, analyzes, and disseminates information for a specific purpose "Application".

- Hardware
- Software
- Data
- Network
- People

Cont.

People Resources — End Users and IS Specialists

Software Resources — Programs and Procedures

Data Resources — Data and Knowledge Bases

Hardware Resources — Machines and Media

Network Resources — Communications Media and Network Support

Control of System Performance

Input of Data Resources → Processing Data Into Information → Output of Information Products

Storage of Data Resources

Cont.

- The information system model shown on the slide highlights the relationships among the components and activities of information systems:

- **People Resources**. People are required for operation of all ISs. People resources include:

  - End Users. As mentioned, these people use the IS or the information it produces.

  - IS Specialists. These people develop and operate the IS.

- **Hardware Resources**. These include all the physical devices and materials used in information processing, including all machines and data media. Key components include:

  - Computer Systems. These are the CPUs and their related peripherals, such as terminals and networked PCs.

  - Computer Peripherals. These are input and output devices like keyboards, monitors, and secondary storage.

  - Telecommunications Networks. These are the computer systems interconnected by various telecommunications media such as modems.

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Cont.

- **<u>Software Resources</u>**. These include all sets of information processing instructions. Software resources include:

    - System Software. This controls the computer.

    - Application Software. These are for a specific end user task, such as word-processing.

    - Procedures. These are the operating instructions for the people who use the IS.

- **<u>Data Resources</u>**. Data is both the raw material of and among the most valuable organizational resources in the IS. Data can be in alphanumeric, text, image and/or audio form. Data are typically organized into either *Databases* - which hold processed and organized data; or *Knowledge bases* - which hold knowledge in a variety of forms such as facts and rules of inference about a given subject.

Data versus Information

- **<u>Data:</u>**
- Data is the plural of datum, though data commonly represents both singular and plural forms.

- Data are raw facts or observations, typically about physical phenomena or business transactions.

- Data should be viewed as raw material resources that are processed into finished information products.
- Data are usually subjected to a value-added process (data processing or information processing) where
  - Its form is aggregated, manipulated, and organized
  - Its content is analyzed and evaluated
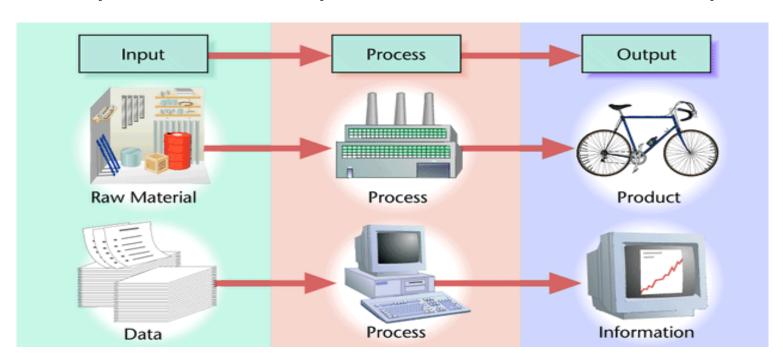 - It is placed in a proper context for a human user.

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Data versus Information

- **<u>Information:</u>**
- Information can be defined as data that have been converted into a meaningful and useful context for specific end users.

- Information should be viewed as processed data which has been placed in a context that gives it value for specific end users.
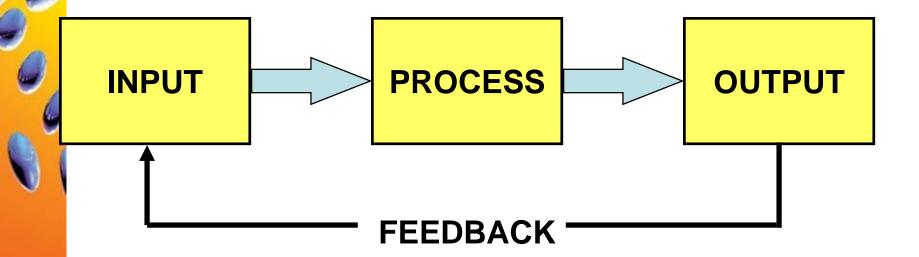
Cont.

- Generating Information
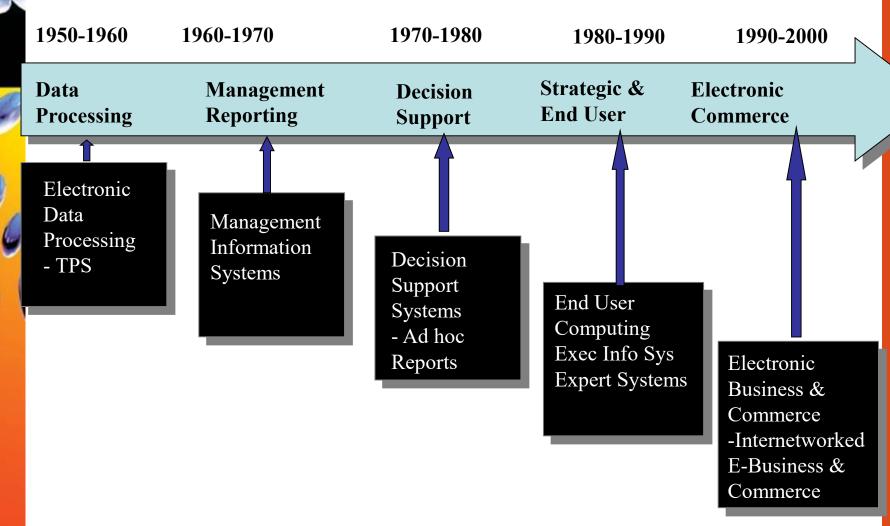 - Computer-based ISs take data as raw material, process it, and produce information as output.

Cont.

Monthly Sales Report for West Region

Sales Rep: Charles Mann
Emp No. 79154

Item	Qty Sold	Price
TM Shoes	1200	$100

Activities in an IS

INPUT → PROCESS → OUTPUT

FEEDBACK

History of the of information systems

1950-1960	1960-1970	1970-1980	1980-1990	1990-2000
Data Processing	**Management Reporting**	**Decision Support**	**Strategic & End User**	**Electronic Commerce**

Electronic Data Processing - TPS

Management Information Systems

Decision Support Systems - Ad hoc Reports

End User Computing Exec Info Sys Expert Systems

Electronic Business & Commerce -Internetworked E-Business & Commerce

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Cont.

- **Data Processing: 1950s - 1960's:**

  Electronic data processing systems. Transaction processing, record-keeping, and traditional accounting applications
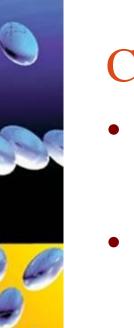
- **Management Reporting: 1960s - 1970's:**

  Management Information systems. Management reports of prespecified information to support decision making.

Cont.

- **Decision Support: 1970s - 1980s:**

  Decision Support systems. Interactive ad hoc support of the managerial decision-making process.

- **Strategic and End User Support: 1980s - 1990's:**

  End User computing systems. Direct computing support for end user productivity and work group collaboration.
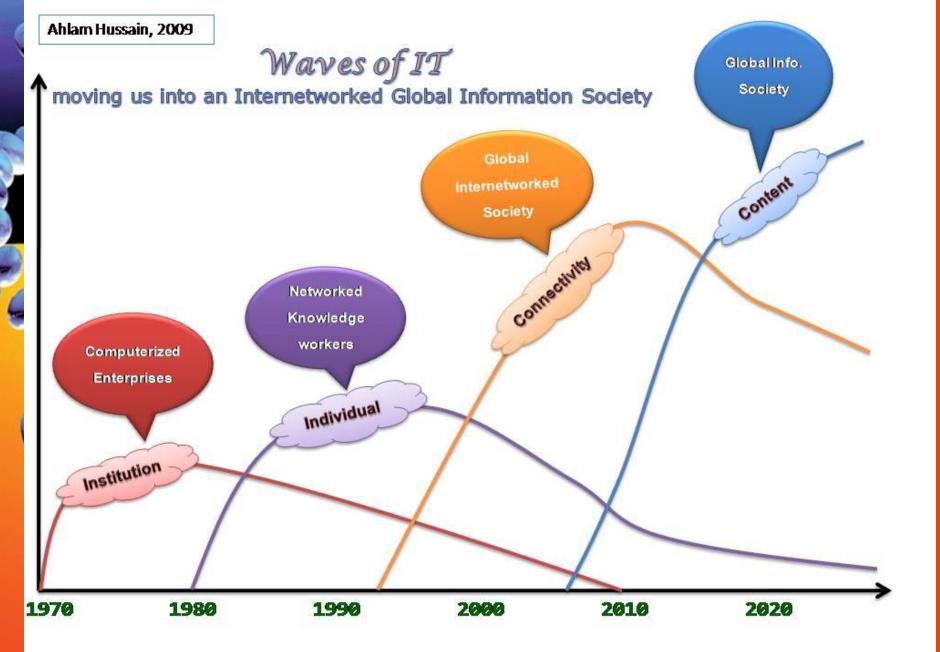
Cont.

- **Electronic Business and Commerce: 1990's - 2000's:**

- Internetworked e-business and e-commerce Systems. Internetworked enterprise and global e-business operations and e-commerce on the Internet, intranets, extranets, and other networks.
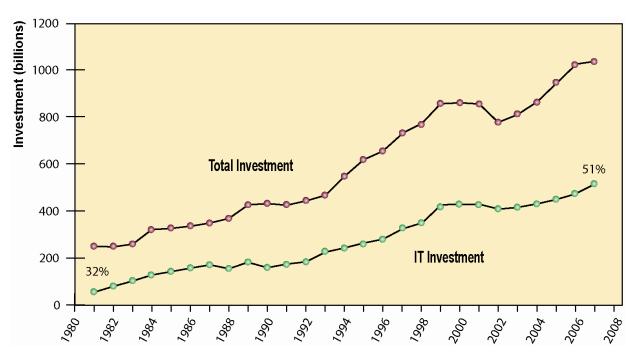
- **How information systems are transforming business**
  - Increase in wireless technology use, Web sites
  - Shifts in media and advertising
  - New federal security and accounting laws
- **Globalization opportunities**
  - Internet has drastically reduced costs of operating on global scale
  - Presents both challenges and opportunities

Ahlam Hussain, 2009

Waves of IT

moving us into an Internetworked Global Information Society

The Role of Information Systems in Business Today

Information Technology Capital Investment

Information technology investment, defined as hardware, software, and communications equipment, grew from 32% to 51% between 1980 and 2008.
Source: Based on data in U.S. Department of Commerce, Bureau of Economic Analysis, *National Income and Product Accounts*, 2008.

Figure 1-1

- **In the emerging, fully digital firm**
  - Significant business relationships are digitally enabled and mediated
  - Core business processes are accomplished through digital networks
  - Key corporate assets are managed digitally

- **Digital firms offer greater flexibility in organization and management**
  - Time shifting, space shifting

Virtual Meetings: Smart Management

Read the Interactive Session and then discuss the following questions:

- **What are the advantages of using videoconferencing technologies? What are the disadvantages?**

- **What is telepresence and what sorts of companies are best suited to use it as a communications tool?**

- **What kinds of companies could benefit from using videoconferencing? Are there any companies that might not derive any benefits from this technology?**

The Role of Information Systems in Business Today

- **Growing interdependence between ability to use information technology and ability to implement corporate strategies and achieve corporate goals**

- **Business firms invest heavily in information systems to achieve six strategic business objectives: IT Strategic Role**

    – Operational excellence
    – New products, services, and business models
    – Customer and supplier intimacy
    – Improved decision making
    – Competitive advantage
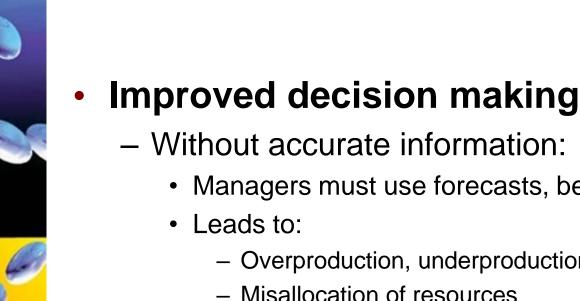   – Survival

- **Operational excellence:**
  - Improvement of efficiency to attain higher profitability
  - Information systems, technology an important tool in achieving greater efficiency and productivity
  - Wal-Mart's RetailLink system links suppliers to stores for superior replenishment system

- ## **New products, services, and business models**:

  – Business model: describes how company produces, delivers, and sells product or service to create wealth

  – Information systems and technology a major enabling tool for new products, services, business models

    - Examples: Apple's iPod, iTunes, and iPhone, Netflix's Internet-based DVD rentals

- **Customer and supplier intimacy:**
  - Serving customers well leads to customers returning, which raises revenues and profits
    - Example: High-end hotels that use computers to track customer preferences and use to monitor and customize environment

  - Intimacy with suppliers allows them to provide vital inputs, which lowers costs
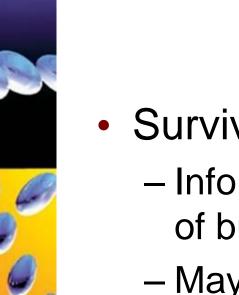   - Example: J.C.Penney's information system which links sales records to contract manufacturer

- **Improved decision making**
  - Without accurate information:
    - Managers must use forecasts, best guesses, luck
    - Leads to:
      - Overproduction, underproduction of goods and services
      - Misallocation of resources
      - Poor response times
    - Poor outcomes raise costs, lose customers
  - Example: Verizon's Web-based digital dashboard to provide managers with real-time data on customer complaints, network performance, line outages, etc.

- Operational excellence:
  - Improvement of efficiency to attain higher profitability
- New products, services, and business models:
  - Enabled by technology
- Customer and supplier intimacy:
  - Serving customers raises revenues and profits
  - Better communication with suppliers lowers costs
- Improved decision making
  - More accurate data leads to better decisions

- **Competitive advantage**
  - Delivering better performance
  - Charging less for superior products
  - Responding to customers and suppliers in real time
  - Example: Toyota and TPS (Toyota Production System) enjoy a considerable advantage over competitors – information systems are critical to the implementation of TPS

- Survival
  - Information technologies as necessity of business
  - May be:
    - Industry-level changes, e.g. Citibank's introduction of ATMs
    - Governmental regulations requiring record-keeping
      - Examples: Toxic Substances Control Act, Sarbanes-Oxley Act

Cont.

- **Today forward:**

- The increase in internet bandwidth over recent years has led to a substantial reliance on cloud computing, Internet of things and block chain technology.

- Today, practically any employee is now in a position to make informed decisions with tools that are readily available across multiple platforms.

Discussion

Questions?