# Lecture 1

## FOUNDATIONS OF INFORMATION SYSTEMS IN BUSINESS

# LEARNING OBJECTIVES

Chapter 1

1. Know the basics of computers timeline.
2. Discuss how Moore's Law creates infinite opportunities for innovation.
3. Understand the concept of a system and how it relates to information systems.
4. Components of information systems.
5. Information technology (IT) versus IS.
6. Data versus Information.
7. Information systems Activities.
8. Information systems model.

# 1. COMPUTERS TIMELINE

Chapter 1

- **E**lectronic **N**umerical **I**ntegrator and **C**alculator (**ENIAC**) was developed in **1946** (University of Pennsylvania)
- **U**ni-**V**ersal **A**utomatic **C**omputer (**UNIVAC I**), installed first at US Census Bureau **1951.**
- **IBM** (**I**nternational **B**usiness **M**achine), complete product system/360 (***multitasking***) in the mid-**1960s.**
- Multitasking refers to the fact that more than one user *appears* to be working on the computer at the same time. Types of multitasking: **preemptive** & **cooperative**
- **Minicomputers** appeared in the **1970s.**
- **Microcomputers** emerged in the science in the early **1980s.**

# COMPUTERS TIMELINE

Chapter 1

Computers are often classified into for sizes:

1. Microcomputers – personal computers (PC)
   - Apple and Tandy Corporation were pioneered in the microcomputer market
   - IBM introduced the Personal Computer in 1982
   - used for business & personal application
2. Minicomputers.
3. Mainframe computers (need to *Information Specialists.* have the similar structure of PC
4. Supercomputers.

# 2. MOORE'S LAW



The power of computer doubles about every 18 months for a given cost.

Refers to the increased of storage density of integrated circuits on a silicon chip.

*Example:*

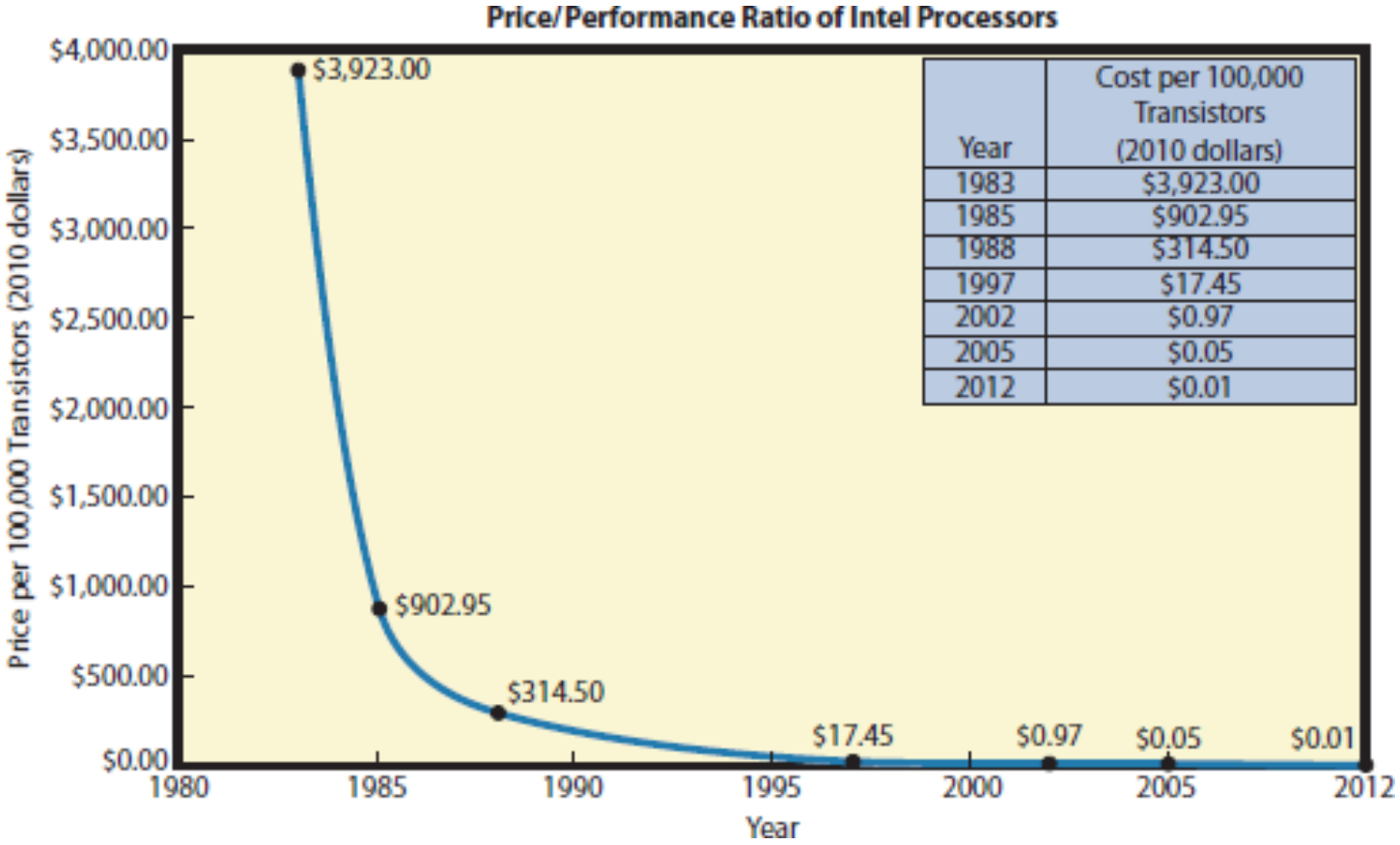
Say that your friend takes a job with a starting salary of $40000, and a guaranteed raise of 20 percent every year. You take a job with a starting salary of $5000 but your salary doubles every year and half (based on Moore's law).

# MOORE'S LAW (CONT'D)

| Year | Friend | You |
|---|---|---|
| 0 | $40,000 | $5,000 |
| 1 | $48,000 | |
| 1.5 | | $10,000 |
| 2 | $57,600 | |
| 3 | $69.120 | $20,000 |
| 4 | $82,944 | |
| 4.5 | | $40,000 |
| 5 | $99,533 | |
| 6 | $119,439 | $80,000 |
| 7 | $143,327 | |
| 7.5 | | $160,000 |
| 8 | $171,993 | |
| 9 | $206,391 | $320,000 |
| 10 | $247,669 | |
| 10.5 | | $640,000 |
| 11 | $297,203 | |
| 12 | $356,644 | $1,280,000 |
| 13 | $427,973 | |
| 13.5 | | $2,560,000 |
| 14 | $513,567 | |
| 15 | $616,281 | $5,120,000 |

# MOORE'S LOW (CONT'D)

Moore's law states that the "number of **transistors** per square inch on an integrated chip doubles every 18 months."




| Year | Cost per 100,000 Transistors (2010 dollars) |
|---|---|
| 1983 | $3,923.00 |
| 1985 | $902.95 |
| 1988 | $314.50 |
| 1997 | $17.45 |
| 2002 | $0.97 |
| 2005 | $0.05 |
| 2012 | $0.01 |

Graph shows that the ratio of price to performance of Intel processors has fallen from about $4,000, in 1984, to a penny per 100,000 transistors today

# CONSEQUENCES MOORE'S LAW

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- YouTube
- iPad
- Facebook
- Pandora
- Twitter
- LinkedIn
- Foursquare

What happens when data storage and communications costs are essentially zero?

All of these companies, created since 2005, exist because of Moore's Law.

# 3. WHAT IS A SYSTEM?



- A system is defined as
  - a set of interrelated components
  - With a clearly defined boundary
  - Working together to achieve a common set of objectives
  - By accepting inputs and producing outputs in an organized transformation process

# SYSTEMS HAVE THREE BASIC FUNCTIONS:



- **Input** involves capturing and assembling elements that enter the system to be processed
- **Processing** involves transformation process that convert input into output
- **Output** involves transferring elements that have been produced by the transformation process to their ultimate destination

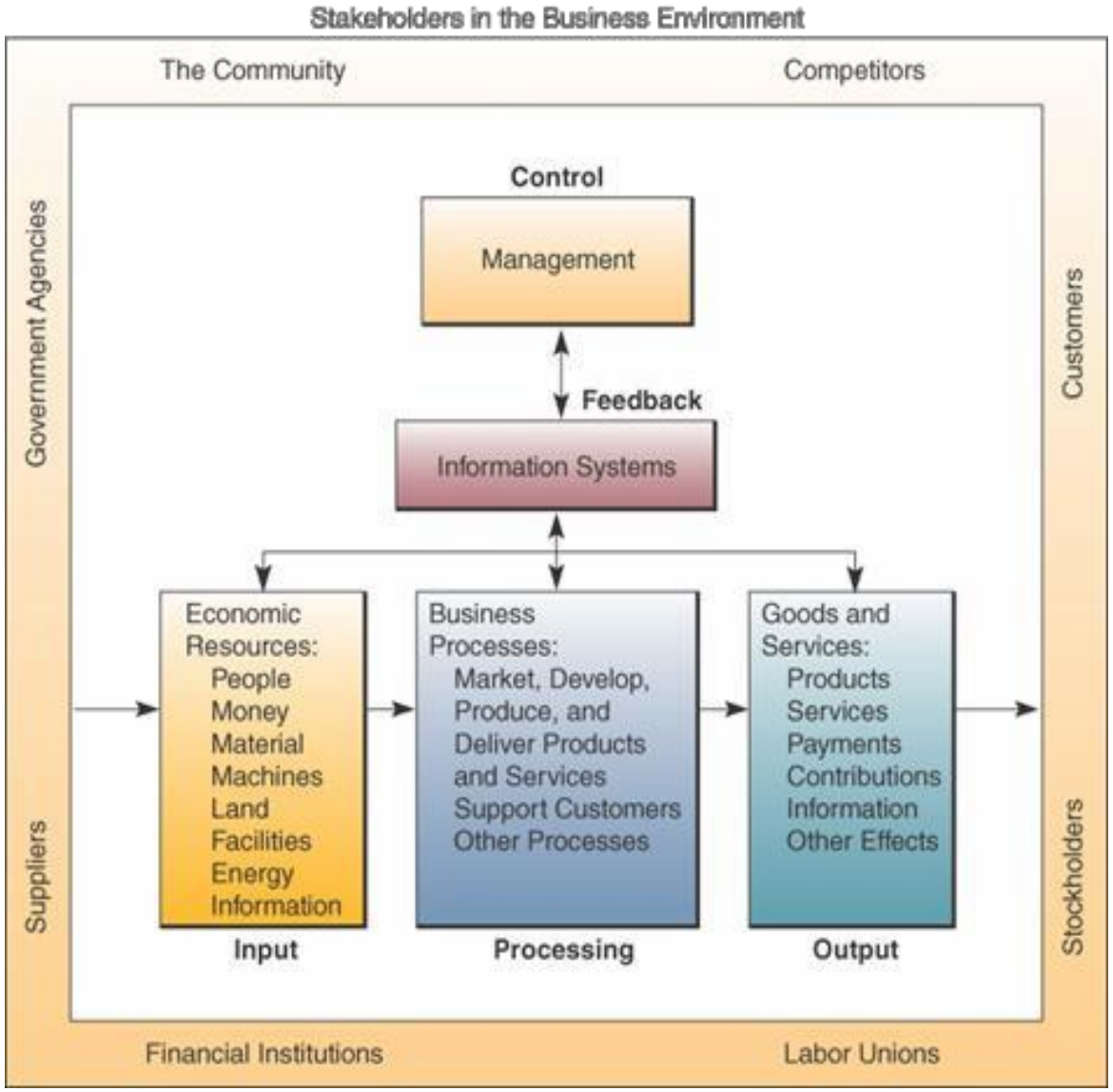
# CYBERNETIC SYSTEM



- All systems have input, processing and output
- **A cybernetic system**, a self-monitoring, self-regulating system, adds feedback and control:
  - **Feedback** is data about the performance of a system
  - **Control** involves monitoring and evaluating feedback to determine whether a system is moving towards the achievement of its goal

# A BUSINESS AS A SYSTEM

Chapter 1



# WHAT IS AN INFORMATION SYSTEM?

Chapter 1

- An organized combination of
  1. People
  2. Hardware
  3. Software
  4. Communications networks
  5. Data resources
  6. Policies and procedures
- That stores, retrieves, transforms, and disseminates information in an organization

# 4. COMPONENTS OF AN IS



- People
  - End users: the people who use the IS or the information from the IS.
  - IS specialists: the people who develop and operate IS.
- Hardware Resources
  - All physical devices used in information processing
  - Machines, data media, PCs.
- Software Resources
  - All information processing instructions including programs and procedures.
  - System software, application software and procedures.

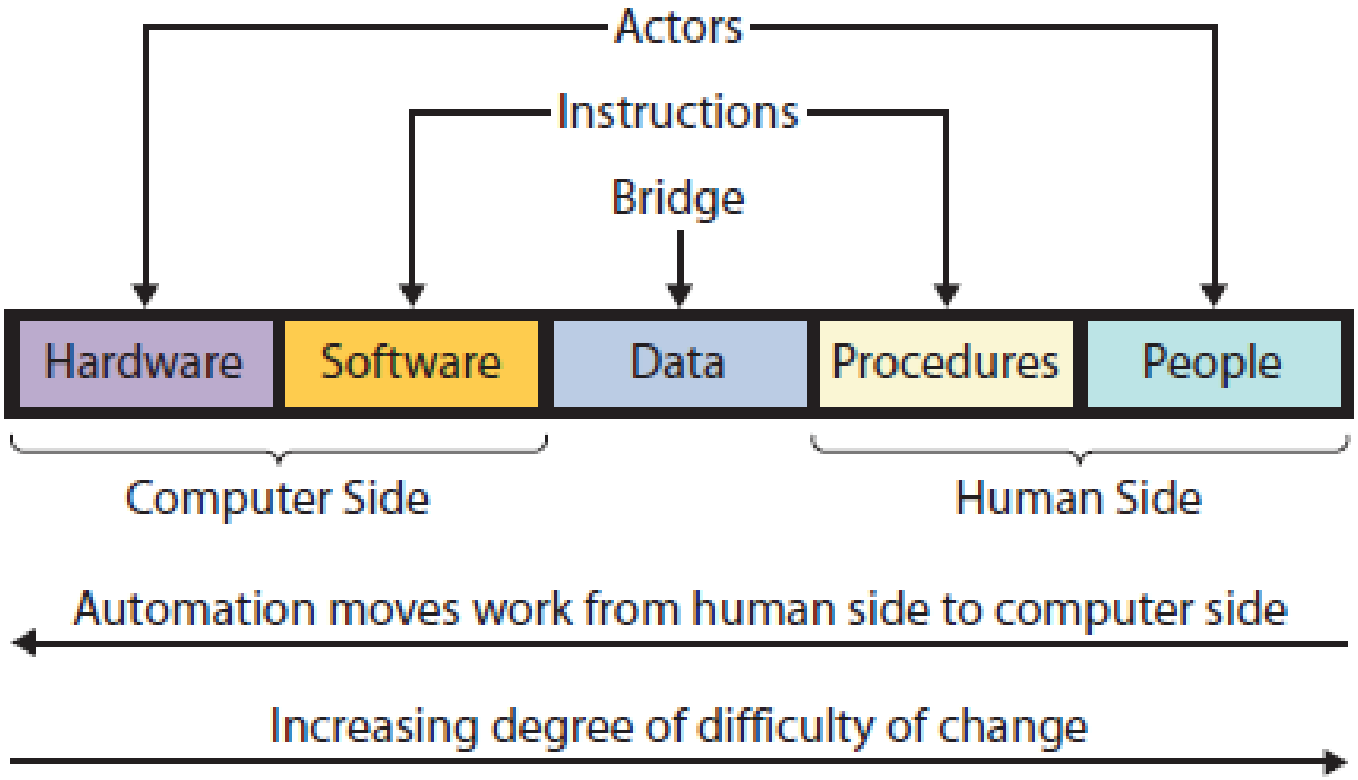
# COMPONENTS OF AN IS *(CONT.)*



- Data Resources
  - Facts about the business transactions
  - Processed and organized information
  - Databases of organized data
- Network Resources
  - Communications media
  - Network infrastructure: hardware and software
  - The Internet, intranets and extranets

# COMPONENTS OF AN IS *(CONT.)*





# 5. INFORMATION SYSTEM (IS) VERSUS INFORMATION TECHNOLOGY (IT)



- IS is all the components and resources necessary to deliver information and functions to the organization.
- IT is hardware, software, networking and data management
- In theory, IS could be paper based,but we will focus on Computer-Based Information Systems (CBIS)
- IS and IT play vital roles in business and improve the effectiveness and efficiency of business processes, managerial decision making.

# INFORMATION SYSTEM (IS) VERSUS INFORMATION TECHNOLOGY (IT)



**IS = IT + Procedures + People**

## Avoid common mistake: You cannot buy an IS

- Can buy or lease hardware, software licenses, databases and predesigned procedures.
- People require training, overcoming employees' resistance to change, managing employees using new system.

# 6. DATA VERSUS INFORMATION



- Data are raw facts about physical phenomena or business transactions.
- Information is data that has been converted into meaningful and useful context for end users.
- Example:
  - Sales data is names, quantities and dollar amounts
  - Sales information is amount of sales by product type, sales territory or salesperson.

# DATA VERSUS INFORMATION

Chapter 1

## Does this graph contain information?

# DATA VERSUS INFORMATION

Chapter 1

## Does this graph contain information?


This graph does not contain information. The graph is data that humans perceive and, in turn, conceive information.

# DATA CHARACTERISTICS

## Data Characteristics Required for Good Information:

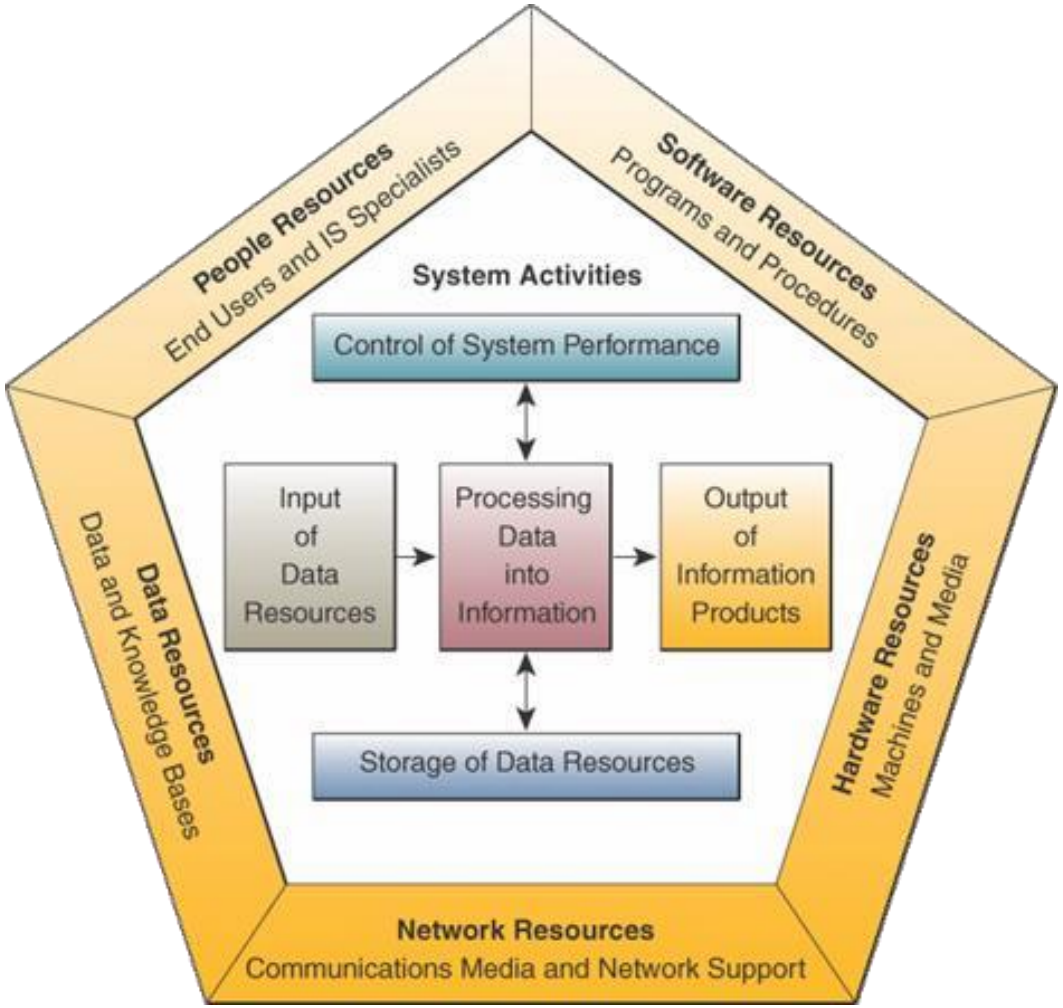
- Accurate
- Timely
- Relevant to subject
- Sufficient
- Worth its cost

# 7. IS ACTIVITIES



- Input of data resources
  - Data entry activities
- Processing of data into information
  - E.g., calculate, compare, sort, classify, summarize
- Output of information products
  - Messages, reports, forms and graphic images
- Storage of data resources
  - Data elements and databases
- Control of system performance
  - Monitoring and evaluating feedback

# 8. INFORMATION SYSTEMS MODEL 1




Chapter

# THANK YOU