“You can’t just ask people what they want and then try to give it to them. By the time you get it built, they’ll want something else”

Steve Jobs, Apple Computer (on pleasing customers)
Learning Objectives

1. Explain what an information system is, contrasting its data, technology, people, and organizational components.

2. Describe types of jobs and career opportunities in information systems and in related fields.

3. Describe the dual nature of information systems in the success and failure of modern organizations.
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Characteristics of the Digital World

• The Knowledge Worker
  o Term coined by Peter Drucker in 1959
  o An individual who is relatively well educated and who creates, modifies and/or synthesizes knowledge as a fundamental part of a job

• Knowledge Society
  o New Economy/Digital World
    • Digital Divide
The Knowledge Society

Information is now as important as land, labor and capital.
Globalization

• Globalization is the integration of economies throughout the world, enabled by technological progress.

• Globalization manifests itself through changes in economy, cultures and technology.
Globalization: Economic Changes

- Economic Changes
  - Increase in international trade of goods and services
Globalization: Cultural Changes

- Cultural Changes
  - Increased access to other cultures (through TV, Internet, etc.)
Globalization: Technological Changes

- Technological Changes
  - Availability of low cost communication systems
Information Systems: Definition

• Combination of five key elements:
  - People
  - Hardware
  - Software
  - Data
  - Telecommunications networks
Data: The Root and Purpose of Information Systems (I)

• Distinction between:
  o **Data** – raw, unformatted information
    • E.g.: 5433333353
  o **Information** – data that is transformed to have a meaning
    • E.g.: (543) 333-3353
  o **Knowledge** – body of governing procedures used to organize or manipulate data
  o **Wisdom** – accumulated knowledge
## Data: The Root and Purpose of Information Systems (II)

<table>
<thead>
<tr>
<th>Data</th>
<th>Information</th>
<th>Knowledge</th>
<th>Wisdom</th>
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<tbody>
<tr>
<td>465889727</td>
<td>465-88-9727</td>
<td>465-88-9727 → John Doe</td>
<td>465-88-9727 → John Doe</td>
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<tr>
<td></td>
<td>Formatted Data</td>
<td>Data Relationships</td>
<td>Employment Records</td>
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<td></td>
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<td>Medical Records</td>
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<tr>
<td>Unformatted</td>
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<td>Data Relationships for Multiple Domains</td>
</tr>
<tr>
<td>Data</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Meaning:</td>
<td>Meaning:</td>
<td>Meaning:</td>
<td>Meaning:</td>
</tr>
<tr>
<td>???</td>
<td>A SSN</td>
<td>SSN → Unique Person</td>
<td>SSN → Unique Person → Any information about</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>the Person</td>
</tr>
</tbody>
</table>
IT: The Components of Information Systems

- Relationship of computer-based information systems to information technology and technology
IT: The Components of Information Systems - Technology

• Any machine that can supplement or replace human manual work
  • E.g.:
    • Heating system
    • Surgical laser
IT: The Components of Information Systems – Information Technology

- A type of technology that is controlled by or uses information
  - E.g., manufacturing robot
IT: The Components of Information Systems – Computer-based IS

- Systems using computers to provide useful data to people
  - E.g., specific software used to analyze data
Learning Objectives

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People: The Builders and Managers of IS

• Career opportunities are strong and expected to grow
  - Computer/IT analyst and Computer & IS Manager both in the top 10 best jobs for the next decade
  • Median earnings for managers $102,360 (May 2005)
# Best Jobs for the Next Decade

<table>
<thead>
<tr>
<th>Rank</th>
<th>Career</th>
<th>Job Growth (10-year forecast)</th>
<th>Average Pay (salary and bonus)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Software engineer</td>
<td>46.07%</td>
<td>$80,427</td>
</tr>
<tr>
<td>2</td>
<td>College professor</td>
<td>31.39%</td>
<td>$81,491</td>
</tr>
<tr>
<td>3</td>
<td>Financial adviser</td>
<td>25.92%</td>
<td>$122,462</td>
</tr>
<tr>
<td>4</td>
<td>Human resources manager</td>
<td>23.47%</td>
<td>$73,731</td>
</tr>
<tr>
<td>5</td>
<td>Physician assistant</td>
<td>49.65%</td>
<td>$75,117</td>
</tr>
<tr>
<td>6</td>
<td>Market research analyst</td>
<td>20.19%</td>
<td>$82,317</td>
</tr>
<tr>
<td>7</td>
<td><strong>Computer/IT analyst</strong></td>
<td><strong>36.10%</strong></td>
<td><strong>$83,427</strong></td>
</tr>
<tr>
<td>8</td>
<td>Real estate appraiser</td>
<td>22.78%</td>
<td>$66,216</td>
</tr>
<tr>
<td>9</td>
<td>Pharmacist</td>
<td>24.57%</td>
<td>$91,998</td>
</tr>
<tr>
<td>10</td>
<td>Psychologist</td>
<td>19.14%</td>
<td>$66,359</td>
</tr>
</tbody>
</table>

### Careers and Salaries in the IS Field (National Average)

<table>
<thead>
<tr>
<th>IS Activities</th>
<th>Typical Careers</th>
<th>Salary Ranges in Percentiles (25%–75%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Develop</td>
<td>Systems analyst</td>
<td>$50,000–$85,000</td>
</tr>
<tr>
<td></td>
<td>Systems programmer</td>
<td>$50,000–$80,000</td>
</tr>
<tr>
<td></td>
<td>Systems consultant</td>
<td>$80,000–$120,000</td>
</tr>
<tr>
<td>Maintain</td>
<td>Information systems auditor</td>
<td>$45,000–$75,000</td>
</tr>
<tr>
<td></td>
<td>Database administrator</td>
<td>$75,000–$100,000</td>
</tr>
<tr>
<td></td>
<td>Webmaster</td>
<td>$55,000–$80,000</td>
</tr>
<tr>
<td>Manage</td>
<td>IS manager</td>
<td>$60,000–$90,000</td>
</tr>
<tr>
<td></td>
<td>IS director</td>
<td>$85,000–$120,000</td>
</tr>
<tr>
<td></td>
<td>Chief information officer (CIO)</td>
<td>$150,000–$250,000</td>
</tr>
<tr>
<td>Study</td>
<td>University professor</td>
<td>$70,000–$180,000</td>
</tr>
<tr>
<td></td>
<td>Government scientist</td>
<td>$60,000–$200,000</td>
</tr>
</tbody>
</table>

Sources: [www.salary.com](http://www.salary.com); [cnnmoney.com](http://cnnmoney.com).
Careers in IS: Evolution of the CIO

- Chief Information Officer (CIO) – job title became popular in 1980s

- Early 1990s – people joked that CIO stands for “Career Is Over”
The CIO Today

• Most large and midsize organizations have a CIO

• Rob Carter of FedEx – CIO of the year (2006)
IS Personnel

• Changing trends
  o Higher prestige
  o More women
What Makes IS Personnel Valuable?

• Integrated knowledge and skills in three areas:
  - **Technical Competency** - skills in hardware, software, networking and security
  - **Business Competency** — understanding of the nature of the business; this is key in addition to the technical competency
  - **System Competency** — understanding of how to build and integrate large scale systems
Organizations: The Context of IS

- Many different types of systems are used in organizations
  - E.g.: transaction processing systems, decision support systems, intelligent systems, etc.
- These systems used to be cleanly categorized – now the boundaries are fading due to:
  - Internetworking
  - Systems integration
Organizing the IS Function

• Early History: Poor Service and Worse Attitudes
  - Early systems were cumbersome to use, over budget and late

• The Rise and Fall of End-User Development
  - Users developing their own applications or improve existing systems
  - Today’s complex systems designed by professionals (see Chapter 9)

• The Modern Information Systems Organization
  - Attitudes changed and service mentality emerged
End User Development

- The advent of the IBM PC and early applications packages led to end-user development
Other Issues Facing the IS Function

• The spread of technology in organizations
• Downsizing (rightsizing) and Outsourcing
• Career prospects and opportunities
  - Need for people within organizations with analyst skills
Learning Objectives

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The Dual Nature of IS

• IS can make you or break you

• U.S. Navy – The failure
  o $1 billion wasted on 4 different ERP applications

• FedEx – The success
  o $32 billion family of companies – largest express transportation company
  o “Information hub for business where managing information is the business”
IS for Competitive Advantage

- Both FedEx and the U.S. Navy were developing **strategic** information systems
- Only strategic information systems can help sustain **competitive advantage**
Why Information Systems Matter

• Nicholas Carr article – “IT Doesn’t Matter”
  o IT no longer a source of advantage on the firm level
  o Companies should focus IT on cost reduction and risk mitigation

• Many experts disagreed with his arguments
  o Abbie Lundberg – Interview with Carr
  o Don Tapscott – “The Engine That Drives Success: The Best Companies Have the Best Business Models Because They Have the Best IT Strategies”
    • Many successful companies use IT to support a unique business strategy
End of Chapter Content
Opening Case

- Apple changed the way in which everyday people use computers
- Success of iPod based on availability of customizable features
Online Rights Not Always Universal

- Governments in some countries regulate access to information on the web (e.g. China)
- Reporters Without Borders calls this behavior unethical
- What is the role of companies such as Microsoft in dealing with these governments?
- Who owns Web-posted data?
- Should the Internet create its own laws?
Spintronics

- Role of semiconductors in computer chips
  - 0 or 1 represented by electron’s charge
- Spintronics – an alternative to semiconductors
  - Electrons can spin “up” or “down” to represent 0s and 1s
  - The electrons’ “spin” properties can hold their states for a longer period of time
    - Emergence of new storage devices
    - Use in embedded devices
    - Improved performance
Steve Jobs, Cofounder and CEO of Apple Computers

• “I want to put a ding in the universe.”
• “You can’t just ask people what they want and then try to give it to them. By the time you get it built, they’ll want something else.”
Worldwide Internet Usage

- In 2006 about 20% of active Internet users were located in the US
- The Internet usage
  - Highest - North America: 70% of population
  - Lowest – Africa: 2.6% penetration of use

<table>
<thead>
<tr>
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<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Africa</td>
<td>915,210,928</td>
<td>14.1%</td>
<td>23,649,000</td>
<td>2.6%</td>
<td>2.3%</td>
<td>423.9%</td>
</tr>
<tr>
<td>Asia</td>
<td>3,667,774,066</td>
<td>56.4%</td>
<td>380,400,713</td>
<td>10.4%</td>
<td>36.5%</td>
<td>232.8%</td>
</tr>
<tr>
<td>Europe</td>
<td>807,289,020</td>
<td>12.4%</td>
<td>294,101,844</td>
<td>36.4%</td>
<td>28.2%</td>
<td>179.8%</td>
</tr>
<tr>
<td>Middle East</td>
<td>190,084,161</td>
<td>2.9%</td>
<td>18,203,500</td>
<td>9.6%</td>
<td>1.7%</td>
<td>454.2%</td>
</tr>
<tr>
<td>North America</td>
<td>331,473,276</td>
<td>5.1%</td>
<td>227,470,713</td>
<td>68.6%</td>
<td>21.8%</td>
<td>110.4%</td>
</tr>
<tr>
<td>Latin America/ Caribbean</td>
<td>553,908,632</td>
<td>8.5%</td>
<td>79,962,809</td>
<td>14.7%</td>
<td>7.8%</td>
<td>350.5%</td>
</tr>
<tr>
<td>Oceania/ Australia</td>
<td>33,956,977</td>
<td>0.5%</td>
<td>17,872,707</td>
<td>52.6%</td>
<td>1.7%</td>
<td>134.6%</td>
</tr>
<tr>
<td>World Total</td>
<td>6,499,697,060</td>
<td>100.0%</td>
<td>1,043,104,886</td>
<td>16.0%</td>
<td>100.0%</td>
<td>189.0%</td>
</tr>
</tbody>
</table>
ChoicePoint Inc.

- Identity theft – the crime of the 21st century
  - 8.9 million victims in the first 7 months of 2006
- ChoicePoint maintains 19 billion pieces of information on virtually every adult in the US
  - 2005 – identity thieves bought more than 100,000 records from ChoicePoint
    - 750 of these became victims of identity theft
  - In 2006 ChoicePoint was fined $10 million for the security breach
    - $5 million was paid to consumers affected by this
    - Security audits implemented
 MTV Europe  

- The most international television network in the world
- Now working to break into a new medium: mobile television screens
  - MTV-Europe: testing ground
Business Career Outlook

• Globalization trend is increasing the need for “Global Skills” – What can you do?
  o Gain international experience
  o Learn more than one language
  o Sensitize yourself to global cultural and political issues

• In Addition – Immerse yourself into the culture:
  o Learn about local food
  o Watch locally produced television
  o Read books and newspapers