Managers from across organizations are involved in developing and acquiring information systems.
Combining Customized and Packaged software

- There are a variety of sources for information systems.
Chapter 9 Learning Objectives

Making the Business Case
• Describe how to formulate and present the business case for technology investments.

The Systems Development Process
• Describe the systems development life cycle and its various phases.

Acquiring Information Systems
• Explain how organizations acquire systems via external acquisition and outsourcing.
Making the Business Case

Describe how to formulate and present the business case for technology investments.

Cyberwar and Cyberterrorism

Describe and explain the differences between cyberwar and cyberterrorism.

Acquiring Information Systems

Explain how organizations acquire systems via external acquisition and outsourcing.
Productivity Gains

- Easy to identify costs with developing an IS
- How do you measure productivity gains?
- Why hasn’t productivity increased at the rate of IS investments?
The Productivity Paradox

• Give an example of how information systems may be used in unintended ways.
Measurement Problems

• Give an example of how the wrong things can be measured
Time Lags

- When can the benefits of an information system lag behind the realized benefits?
Redistribution

• If an information systems simply redistributes the pieces of the pie rather than make the pie bigger, does it create any value?
Mismanagement

• Can a good information system overcome a bad business model?
## Productivity Business Case

<table>
<thead>
<tr>
<th>Employees</th>
<th>20,000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average Salary</td>
<td>$42,523</td>
</tr>
<tr>
<td>Total Salary</td>
<td>$850,460,000</td>
</tr>
<tr>
<td>10% Productivity Increase</td>
<td>$85,046,000</td>
</tr>
<tr>
<td>Cost of Project</td>
<td>$4,000,000</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Employees</th>
<th>75</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average Salary</td>
<td>$37,520</td>
</tr>
<tr>
<td>Total Salary</td>
<td>$2,814,000</td>
</tr>
<tr>
<td>10% Headcount Reduction</td>
<td>$281,400</td>
</tr>
<tr>
<td>Cost of Project</td>
<td>$400,000</td>
</tr>
</tbody>
</table>
Making a Successful Business Case
Arguments Based on Faith

- Do you need a cost benefits analysis for an argument based on faith?
PROFS to cc:Mail Migration

• Manager struggled to make business case based on fact
  - Sticking with PROFS was less expensive than migrating to cc:Mail
• cc:Mail migration was necessary to gain support for migration from centralized to distributed world
• Made case on “Faith”, not “Fact”
Arguments Based on Fear

• Do you need a cost benefits analysis for an argument based on fear?

• Come on, how do you instill “fear” in an organization?
Scenario

• You are the CIO of a small to mid sized company
• You are meeting with an independent consultant who is trying to get you to hire him to develop a business continuity plan and a disaster recovery plan
• Is a business case based on “Fear” effective?
Business Continuity and Disaster Recovery

- Catastrophic loss of ability to deliver services from primary location
- Must resume services from alternate location
- Disaster recovery plan driven by the business’
  - Recover time objective (RTO)
  - Recovery point objective (RPO)
- Business Continuity – How you continue to provide essential business services between time of the disaster and the execution of DR plan
Sobering Statistics

- From the U.S. National Fire Protection Agency and the U.S. Bureau of Labor
  - Nearly 75% of all U.S. businesses have experienced a business interruption
  - 20% of small to medium size businesses suffer a major disaster every five years
  - 43% of US companies never reopen after a disaster and 29% close within three years
  - 93% of companies that suffer a significant data lose are out of business within five years
It’s not always what you expect
• It’s in not always an earthquake or a hurricane
Arguments Based on Fear

• Do you need a cost benefits analysis for an argument based on fear?
Arguments Based on Fact

• Do you need a cost benefits analysis for an argument based on fact?
Cost-Benefit Analysis Example

- Worksheet showing a simplified cost–benefit analysis for a Web-based order fulfillment system.

<table>
<thead>
<tr>
<th>Costs</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
<th>2013</th>
<th>2014</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nonrecurring</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hardware</td>
<td>$20,000</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Software</td>
<td>$7,500</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Networking</td>
<td>$4,500</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Infrastructure</td>
<td>$7,500</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Personnel</td>
<td>$100,000</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Recurring</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hardware</td>
<td>$500</td>
<td>$1,000</td>
<td>$2,500</td>
<td>$15,000</td>
<td></td>
</tr>
<tr>
<td>Software</td>
<td>$500</td>
<td>$500</td>
<td>$1,000</td>
<td>$2,500</td>
<td></td>
</tr>
<tr>
<td>Networking</td>
<td>$250</td>
<td>$250</td>
<td>$500</td>
<td>$1,000</td>
<td></td>
</tr>
<tr>
<td>Service fees</td>
<td>$250</td>
<td>$250</td>
<td>$250</td>
<td>$500</td>
<td></td>
</tr>
<tr>
<td>Infrastructure</td>
<td>$250</td>
<td>$500</td>
<td></td>
<td>$1,500</td>
<td></td>
</tr>
<tr>
<td>Personnel</td>
<td>$60,000</td>
<td>$62,500</td>
<td>$70,000</td>
<td>$90,000</td>
<td></td>
</tr>
<tr>
<td>Total costs</td>
<td>$139,500</td>
<td>$61,500</td>
<td>$64,750</td>
<td>$74,750</td>
<td>$110,500</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Benefits</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Increased sales</td>
<td>$20,000</td>
<td>$50,000</td>
<td>$80,000</td>
<td>$115,000</td>
<td>$175,000</td>
</tr>
<tr>
<td>Error reduction</td>
<td>$15,000</td>
<td>$15,000</td>
<td>$15,000</td>
<td>$15,000</td>
<td>$15,000</td>
</tr>
<tr>
<td>Cost reduction</td>
<td>$100,000</td>
<td>$100,000</td>
<td>$100,000</td>
<td>$100,000</td>
<td>$100,000</td>
</tr>
<tr>
<td>Total benefits</td>
<td>$135,000</td>
<td>$165,000</td>
<td>$195,000</td>
<td>$230,000</td>
<td>$290,000</td>
</tr>
<tr>
<td>Net costs/benefits</td>
<td>$(4,500)</td>
<td>$103,500</td>
<td>$130,250</td>
<td>$155,250</td>
<td>$179,500</td>
</tr>
</tbody>
</table>
The Systems Development Process

Making the Business Case
Describe how to formulate and present the business case for technology investments.

The Systems Development Process
Describe the systems development life cycle and its various phases.

Acquiring Information Systems
Explain how organizations acquire systems via external acquisition and outsourcing.
Steps in the Systems Development Process

- System Identification, Selection, and Planning
- System Analysis
- System Design
- System Implementation
- System Maintenance

Building my deck vs. a new sales system for Chuck’s Bikes
Phase 1: Systems Identification, Selection and Planning
Phase 2: Systems Analysis

- Collecting System Requirements
- Modeling Organizational Data
- Modeling Organizational Processes and Logic

System Identification, Selection, and Planning

System Analysis

System Design

System Implementation
Critical Success Factors
System Analysis

Requirements

Data

<table>
<thead>
<tr>
<th>Name</th>
<th>Class</th>
<th>GPA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patty Nicholls</td>
<td>Senior</td>
<td>3.7</td>
</tr>
<tr>
<td>Brett Williams</td>
<td>Grad</td>
<td>2.9</td>
</tr>
<tr>
<td>Mary Shide</td>
<td>Fresh</td>
<td>3.2</td>
</tr>
</tbody>
</table>

Processing Logic

```plaintext
i = read (number_of_classes)
total_hours = 0
total_grade = 0
total_gpa = 0
for j = 1 to i do
    begin
        read (course [j], hours [j], grade [j])
        total_hours = total_hours + hours [j]
        total_grade = total_grade + (hours [j] * grade [j])
    end
    current_gpa = total_grade / total_hours
```
JAD Session
Phase 3: System Design

- Designing Forms and Reports
- Designing Interfaces and Dialogues
- Designing Databases and Files
- Designing Processing and Logic

System Identification, Selection, and Planning

System Analysis

System Design

System Implementation
System Design

Databases

Interfaces

Sales summary report.

C:\MSOFFICE\ACCESS\STUDENT.MDB

Table: Students

Saturday, June 23, 2007
Page: 1

Properties
Date Created: 6/23/07 10:35:41 PM
Last Updated: 6/23/07 10:35:43 PM
Def. Updatable: Yes
Record Count: 0

Columns
Name                         Type         Size
-----------------------------------------
StudentID                    Number (Long) 4
FirstName                    Text         50
MiddleName                   Text         30
LastName                     Text         50
ParentsNames                 Text         255
Address                      Text         255
City                         Text         50
State                        Text         50
Region                       Text         50
PostalCode                   Text         20
PhoneNumber                  Text         30
EmailName                    Text         50
Major                        Text         50
Note                         Memo         -
Phase 4: System Implementation

- System Identification, Selection, and Planning
- System Analysis
- System Design
- System Implementation

- Software Programming and Testing
- System Conversion, Documentation, Training, and Support
# Testing

<table>
<thead>
<tr>
<th>Testing Type</th>
<th>Focus</th>
<th>Performed by</th>
</tr>
</thead>
<tbody>
<tr>
<td>Developmental</td>
<td>Testing the correctness of individual modules and the integration of multiple modules</td>
<td>Programmer</td>
</tr>
<tr>
<td>Alpha</td>
<td>Testing of overall system to see whether it meets design requirements</td>
<td>Software tester</td>
</tr>
<tr>
<td>Beta</td>
<td>Testing of the capabilities of the system in the user environment with actual data</td>
<td>Actual system users</td>
</tr>
</tbody>
</table>
# Training

<table>
<thead>
<tr>
<th>Training Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tutorial</td>
<td>One person taught at one time by a human or by paper-based exercises</td>
</tr>
<tr>
<td>Course</td>
<td>Several people taught at one time</td>
</tr>
<tr>
<td>Computer-aided instruction</td>
<td>One person taught at one time by the computer system</td>
</tr>
<tr>
<td>Interactive training manuals</td>
<td>Combination of tutorials and computer-aided instruction</td>
</tr>
<tr>
<td>Resident expert</td>
<td>Expert on call to assist users as needed</td>
</tr>
<tr>
<td>Software help components</td>
<td>Built-in system components designed to train users and troubleshoot problems</td>
</tr>
<tr>
<td>External sources</td>
<td>Vendors and training providers to provide tutorials, courses, and other training activities</td>
</tr>
</tbody>
</table>
System Conversion and Installation

(a) Parallel

Old System

New System

Description: Old and new systems are used at the same time.

(b) Direct

Old System

New System

Description: Old system is discontinued on one day, and the new is used on the next.

(c) Phased

Old System

New System

Description: Parts of the new system are implemented over time.

(d) Pilot (single location)

Old System

New System

Description: Entire system is used in one location.
System Maintenance

System Identification, Selection, and Planning

System Analysis

System Design

System Implementation

Maintenance Process

1. Obtain Maintenance Request

2. Transform Requests into Changes

3. Design Changes

4. Implement Changes
End-User Development

- End-user development is a commonly used practice by tech-savvy managers who want to enhance their decision making and business intelligence.

- Using tools such as Microsoft Access, a sales manager can develop an application to track sales.
Acquiring Information Systems

**Making the Business Case**
Describe how to formulate and present the business case for technology investments.

**The Systems Development Process**
Describe the systems development life cycle and its various phases.

**Acquiring Information Systems**
Explain how organizations acquire systems via external acquisition and outsourcing.
Steps in External Acquisition

• Competitive bid process—find the best system for lowest possible price.

1. Systems planning and selection
2. Systems analysis
3. Development of a request for proposal
4. Proposal evaluation
5. Vendor selection

• The first two steps are similar to SDLC.
Development of a Request for Proposal (RFP)

Areas covered in an RFP

1. Summary of existing systems and applications
2. System performance and features
3. Reliability, backup, and service requirements
4. Evaluation criteria
5. Timetable
6. Budget
Proposal Evaluation

• Proposal evaluation—An assessment of proposals received from vendors.
  – May include system demonstrations
  – System benchmarking
    • Standardized tests to compare different proposed systems
    • Common system benchmarks
      – Response time given a specified number of users
      – Time to sort records
      – Time to retrieve a set of records
      – Time to produce a given record
      – Time to read in a set of data
Vendor Selection

• Usually more than one system will meet the criteria.
• Determine the best fit
• Need to prioritize/rank the proposed systems
  – Best ranking system is chosen.
  – Formal approach—devise a scoring system for the criteria
  – Less formal approaches:
    • Checklists
    • Subjective processes
Multicriteria Analysis Example

- Alternative projects and system design decisions can be assisted using weighted multicriteria analysis.

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Weight</th>
<th>Alternative A</th>
<th>Alternative B</th>
<th>Alternative C</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Rating</td>
<td>Score</td>
<td>Rating</td>
</tr>
<tr>
<td>Requirements</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Real-time data entry</td>
<td>18</td>
<td>5</td>
<td>90</td>
<td>5</td>
</tr>
<tr>
<td>Automatic reorder</td>
<td>18</td>
<td>1</td>
<td>18</td>
<td>5</td>
</tr>
<tr>
<td>Real-time data query</td>
<td>14</td>
<td>1</td>
<td>14</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>50</td>
<td></td>
<td>122</td>
<td></td>
</tr>
<tr>
<td>Constraints</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Developer costs</td>
<td>15</td>
<td>4</td>
<td>60</td>
<td>5</td>
</tr>
<tr>
<td>Hardware costs</td>
<td>15</td>
<td>4</td>
<td>60</td>
<td>4</td>
</tr>
<tr>
<td>Operating costs</td>
<td>15</td>
<td>5</td>
<td>75</td>
<td>1</td>
</tr>
<tr>
<td>Ease of training</td>
<td>5</td>
<td>5</td>
<td>25</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>50</td>
<td></td>
<td>220</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
<td>342</td>
<td></td>
<td>415</td>
</tr>
</tbody>
</table>
Application Service Providers (ASP)

- **Problems**
  - Managing the software infrastructure is a complex task.
  - High operating costs
  - Scalability issues

- **ASPs provide software as a service (SaaS)**
  - Reduced need to maintain or upgrade software
  - Variable fee based on actual use of services
  - Ability to rely on a provider’s expertise
Outsourcing systems development—Turning over responsibility for some or all of an organization’s IS development and operations to an outside firm.

– Your IS solutions may be housed in their organization.
– Your applications may be run on their computers.
– They may develop systems to run on your existing computers (within your organization).
Why Outsourcing?

• **Cost and quality concerns**—higher quality or lower cost systems may be available through outsourcing.

• **Problems in IS performance**—IS departments might have problems meeting acceptable standards.

• **Supplier pressure**—aggressive sales force convinces senior management to outsource IS functions.

• **Simplifying, downsizing, and reengineering**—focusing on core competencies.
Why Outsourcing? (cont’d)

• **Financial factors** — liquidation of IT assets.

• **Organizational culture** — external IS groups are devoid of political ties.

• **Internal irritants** — external IS group may be better accepted by other organizational users.
Managing the IS Outsourcing Relationship

• Ongoing management of an outsourcing alliance is needed.
  1. Strong, active CIO and staff
  2. Clear, realistic performance measurements of the system
  3. Multiple levels of interface between customer and outsourcer

• Full-time relationship managers should be assigned.
Not All Outsourcing Relationships Are the Same

• Outsourcing relationships
  – No longer just a legal contract
  – Strategic, mutually beneficial partnership
  – Different types of outsourcing relationships
    • Basic relationship—“Cash & Carry”
    • Preferred relationship—Set preferential pricing
    • Strategic relationship—Share risks/rewards