Preparing the Systems Proposal

10

Systems Analysis and Design, 7e

Kendall & Kendall

Learning Objectives

- Inventory and appraise current and proposed hardware and software and the way it supports human interactions with technology
- Evaluate software by addressing the trade-offs among creating custom software, purchasing COTS software, and outsourcing to an application service provider
- Assist decision makers in choosing decision support systems, including recommendation systems and neural nets

Learning Objectives (Continued)

- Forecast tangible and intangible costs and benefits, and perform a cost-benefit analysis using a number of methods

- Professionally write and present an effective systems proposal, incorporating figures and graphs

Systems Proposal

- A distillation of all that the system analyst has learned about users, the business, and about what is needed to improve its performance
- Systematic methods to:
  - Acquire hardware and software
  - Identify and forecast costs and benefits
 - Perform a cost-benefit analysis

Major Topics

- Ascertaining hardware/software needs
- Tangible and intangible costs and benefits
- Systems proposal
- Using tables, graphs, and figures

Ascertaining Hardware and Software Needs

Steps used to determine hardware and software needs:

- Inventory computer hardware currently available

- Estimate current and future system workloads

- Evaluate available hardware and software

- Choose the vendor

- Acquire the computer equipment

Figure 10.1 Steps in choosing hardware and software
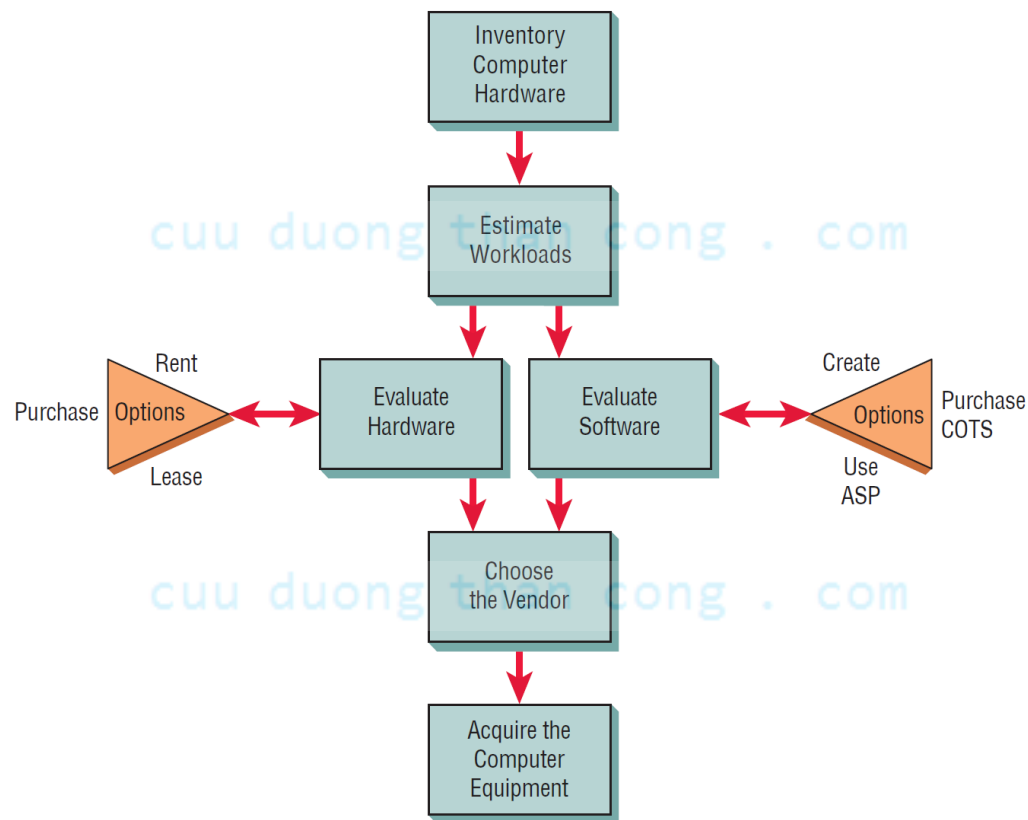
Inventorying Computer Hardware

- Type of equipment
- Operation status of the equipment
- Estimated age of equipment
- Projected life of equipment
- Physical location of equipment
- Department or person responsible for equipment
- Financial arrangement for equipment

Estimating Workloads

- Systems analysts formulate numbers that represent both current and projected workloads for the system so that any hardware obtained will possess the capability to handle current and future workloads

Figure 10.2 Comparisons of workloads between existing and proposed systems

Task	Existing System	Proposed System
	Compare performance of distribution warehouses by running the summary program.	Compare performance of distribution warehouses on the Web-based dashboard.
Method	Computer programs are run when needed; processing is done from the workstation.	Updates occur immediately; processing is done online.
Personnel	Distribution manager	Distribution manager
When and how	Daily: Enter shipments on Excel spreadsheet; verify accuracy of spreadsheet manually; and then write files to backup media. Monthly: Run program that summarizes daily records and prints report; get report and make evaluations.	Daily: Enter shipments on the Web-based system using drop-down boxes. Data are automatically backed up to remote location. Monthly: Compare warehouses online using the performance dashboard; print only if needed.
Human time requirements	Daily: 20 minutes Monthly: 30 minutes	Daily: 10 minutes Monthly: 10 minutes
Computer time requirements	Daily: 20 minutes Monthly: 30 minutes	Daily: 10 minutes Monthly: 10 minutes

Evaluating Hardware

- Time required for average transactions
- Total volume capacity of the system
- Idle time of the CPU or network
- Size of memory provided

People That Evaluate Hardware

- Management
- Users
- Systems analysts

Acquisition of Computer Equipment

- Buying

- Leasing

- Rental

Buying

	Advantages	Disadvantages
Purchasing	• Cheaper than leasing or renting over the long run • Ability to change system • Provides tax advantages of accelerated depreciation • Full control	• Initial cost is high • Risk of obsolescence • Risk of being stuck if choice was wrong • Full responsibility

Leasing

	Advantages	**Disadvantages**
Leasing	• No capital is tied up • No financing is required • Leases are lower than rental payments	• Company doesn't own the system when lease expires • Usually a heavy penalty for terminating the lease • Leases are more expensive than buying

Renting

	Advantages	Disadvantages
Renting	• No capital is tied up • No financing is required • Easy to change systems • Maintenance and insurance are usually included	• Company doesn't own the computer • Cost is very high because vendor assumes the risk (most expensive option)

Evaluating Vendor Support

- Hardware support
- Software support
- Installation and training support
- Maintenance support

https://fb.com/tailieudientucntt

Other Considerations

- Possibility of adding on to the system
- Interfacing with equipment from other vendors
- Adding more memory
- Corporate stability of the vendor

Software Alternatives

- Created custom software
- Purchased as COTS (commercial off-the-shelf) software
- Provided by an application service provider (ASP)

Creating Custom Software

	Advantages	Disadvantages
Creating Custom Software	• Specific response to specialized business needs • Innovation may give firm a competitive advantage • In-house staff available to maintain software • Pride of ownership	• May be significantly higher initial cost compared to COTS software or ASP • Necessity of hiring or working with a development team • Ongoing maintenance

Purchasing COTS Packages

	Advantages	Disadvantages
Purchasing COTS Packages	• Refined in the commercial world • Increased reliability • Increased functionality • Often lower initial cost • Already in use by other firms • Help and training comes with software	• Programming focused; not business focused • Must live with the existing features • Limited customization • Uncertain financial future of vendor • Less ownership and commitment

Using An ASP

	Advantages	Disadvantages
Using an ASP	• Organizations that do not specialize in information systems can focus on what they do best (their strategic mission) • There is no need to hire, train, or retain a large IT staff • There is no expenditure of employee time on nonessential IT tasks	• Loss of control of data, systems, IT employees, and schedules • Concern over the financial viability and long-run stability of the ASP • Security, confidentiality, and privacy concerns • Loss of potential strategic corporate advantage regarding innovativeness of applications

Software Evaluation

- Performance effectiveness
- Performance efficiency
- Ease of use
- Flexibility
- Quality of documentation
- Manufacturer support

Figure 10.7 Guidelines for evaluating software

Software Requirements	Specific Software Features
Performance Effectiveness	Able to perform all required tasks Able to perform all tasks desired Well-designed display screens Adequate capacity
Performance Efficiency	Fast response time Efficient input Efficient output Efficient storage of data Efficient backup
Ease of use	Satisfactory user interface Help menus available "Read Me" files for last-minute changes Flexible interface Adequate feedback Good error recovery
Flexibility	Options for input Options for output Usable with other software
Quality of Documentation	Good organization Adequate online tutorial Web site with FAQ
Manufacturer Support	Technical support hot line Newsletter/email Web site with downloadable product updates

Decision Support Tools

- AHP and other multiple-criteria software
- Expert systems and neural nets
- Recommendation systems
- Getting external information from the Web

AHP and Other Multiple-criteria Software

- Multiple-Criteria
  - The objective
  - Alternatives
  - Criteria
  - priority
- AHP compares all alternatives until all pairwise comparisons are made

Expert Systems and Neural Nets

- Expert systems are rule-based reasoning systems developed around an expert in the field

- Neural nets are developed by solving a number of problems of one type and letting the software get feedback on the decisions, observing what was involved in successful decisions

Recommendation Systems

- Software and database systems that reduce the number of alternatives by ranking, counting, or some other method

- Does not depend on numeric weights

- Simply counts the number of occurrences

Figure 10.9 Selected sources for external information available on the Web

Type of Service	Product	Web Site
Push technologies	BackWeb BMC Software	www.backweb.com www.bmc.com
Personalized home pages	My Yahoo! Google Home Page	www.my.yahoo.com www.google.com
Online newspapers	CNN Interactive London Times New York Times The Age USA Today	www.cnn.com www.timesonline.co.uk www.nytimes.com www.theage.com.au www.usatoday.com
Intelligent agents	WebQL	www.ql2.com

Identifying and Forecasting Costs and Benefits

- Judgment methods
  - Estimates from the sales force
  - Surveys to estimate customer demand
  - Delphi studies
  - Creating scenarios
  - Drawing historical analogies

Identifying and Forecasting Costs and Benefits (Continued)

- ## If historical data are available
  - ### Conditional
    - There is an association among variables in the model
  - ### Unconditional
    - Do not need to fine or identify any relationships

Estimation of Trends

- Graphical judgment
- The method of least squares
- Moving averages

Graphical Judgment

- Looking at a graph and estimating by freehand an extension of a line or curve

- Disadvantage
  - The extension of the line may depend too much on individual judgment

- Advantage
 - The ability to perform what-if analysis

The Method of Least Squares

- Find the best-fitting line by minimizing the sum of the deviations from the line
- Once the best-fitting line is found, it can be extended to forecast what will happen

Moving Averages

- Calculate the arithmetic mean of data from groups or periods, then calculate the next arithmetic mean by discarding the oldest period's data and adding the next period

- Advantage
  - Useful for its smoothing ability

- Disadvantage
  - Strongly affected by extreme values

Figure 10.11 Calculating a five-year moving average
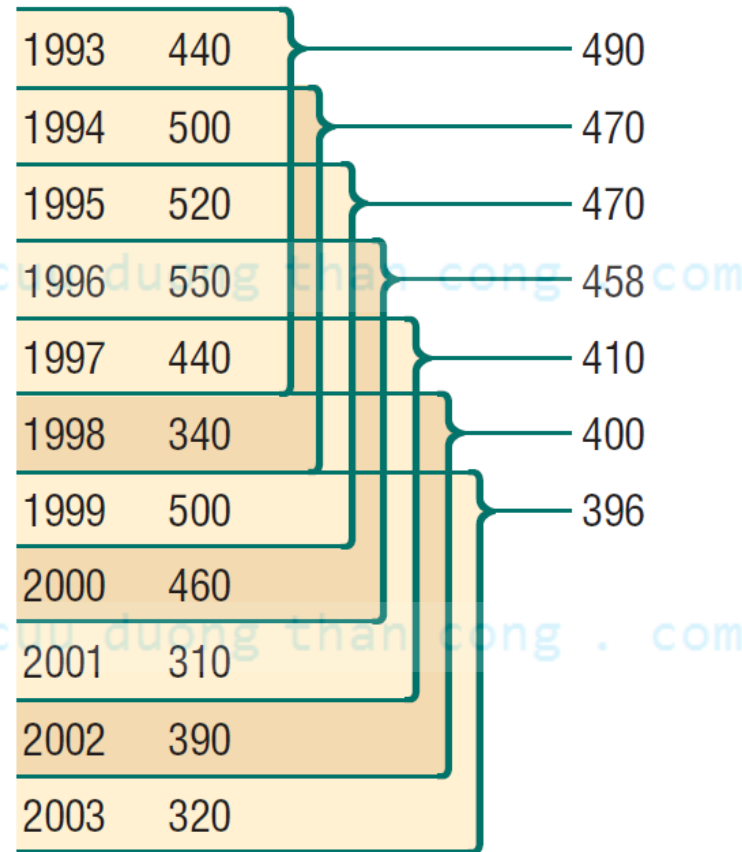
Identifying Benefits and Costs

- Tangible
- Intangible

Tangible Benefits

- Advantages measurable in dollars that accrue to the organization through the use of the information system
- Examples:
  - Increase in the speed of processing
  - Access to otherwise inaccessible information
  - Access to information on a more timely basis
  - The advantage of the computer's superior calculating power
  - Decreases in the amount of employee time needed to complete specific tasks

Intangible Benefits

- Intangible benefits are benefits from use of the information system that are difficult to measure

- Examples:
  - Improving the decision-making process
  - Enhancing accuracy
  - Becoming more competitive in customer service
  - Maintaining a good business image
  - Increasing job satisfaction

Tangible Costs

- Those that can be accurately projected by systems analysts and the business' accounting personnel

- Examples:
  - Cost of equipment
  - Cost of resources
  - Cost of systems analysts' time
  - Cost of programmers' time
  - Employees' salaries

Intangible Costs

- Those that are difficult to estimate, and may not be known

- Examples:
  - Losing a competitive edge
  - Losing the reputation for being first
 - Declining company image
  - Ineffective decision making

Comparing Costs and Benefits

- Break-even analysis

- Payback

- Cash-flow analysis

- Present value analysis

Break-Even Analysis

- The point at which the total cost of the current system and the proposed system intersect
- Useful when a business is growing and volume is a key variable in costs
- Disadvantage
  - Benefits are assumed to remain the same
- Advantage
  - Can determine how long it will take for the benefits of the system to pay back the costs of developing it

Figure 10.13 Break-even analysis showing a payback period of three and a half years
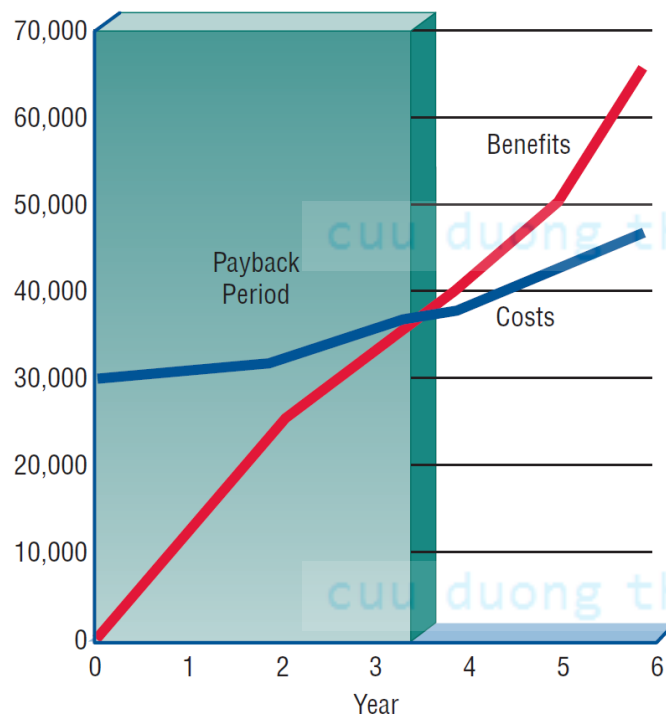
Year	Cost ($)	Cumulative Costs ($)	Benefits ($)	Cumulative Benefits ($)
0	30,000	30,000	0	0
1	1,000	31,000	12,000	12,000
2	2,000	33,000	12,000	24,000
3	2,000	35,000	8,000	32,000
4	3,000	38,000	8,000	40,000
5	4,000	42,000	10,000	50,000
6	4,000	46,000	15,000	65,000

Cash-Flow Analysis

- Examines the direction, size, and pattern of cash flow that is associated with the proposed information system

- Determine when cash outlays and revenues will occur for both not only for the initial purchase, but over the life of the information system

Figure 10.14 Cash-flow analysis for the computerized mail-addressing system

| | Year 1 | | | | Year 2 |
	Quarter 1	Quarter 2	Quarter 3	Quarter 4	Quarter 1
Revenue	$5,000	$20,000	$24,960	$31,270	$39,020
Costs					
Software development	10,000	5,000			
Personnel	8,000	8,400	8,800	9,260	9,700
Training	3,000	6,000			
Equipment lease	4,000	4,000	4,000	4,000	4,000
Supplies	1,000	2,000	2,370	2,990	3,730
Maintenance	0	2,000	2,200	2,420	2,660
Total Costs	26,000	27,400	17,370	18,670	20,090
Cash Flow	−21,000	−7,400	7,590	12,600	18,930
Cumulative Cash Flow	−21,000	−28,400	−20,810	−8,210	10,720

Present Value Analysis

- Way to assess all the economic outlays and revenues of the information system over its economic life, and to compare costs today with future costs and today's benefits with future benefits

- Presents the time value of the investment in the information system as well as the cash flow

Figure 10.16 Taking into account present value, the conclusion is that the costs are greater than the benefits. The discount rate, i, is assumed to be .12 in calculating the multipliers in this table

	Year						Total
	1	**2**	**3**	**4**	**5**	**6**	
Costs	$40,000	42,000	44,100	46,300	48,600	51,000	
Multiplier	.89	.80	.71	.64	.57	.51	
Present Value of Costs	35,600	33,600	31,311	29,632	27,702	26,010	183,855
Benefits	$25,000	31,200	39,000	48,700	60,800	76,000	
Multiplier	.89	.80	.71	.64	.57	.51	
Present Value of Benefits	22,250	24,960	27,960	31,168	34,656	38,760	179,484

Guidelines for Analysis

- Use break-even analysis if the project needs to be justified in terms of cost, not benefits
- Use payback when the improved tangible benefits form a convincing argument for the proposed system
- Use cash-flow analysis when the project is expensive, relative to the size of the company
- Use present value when the payback period is long or when the cost of borrowing money is high

The Systems Proposal

- Cover letter
- Title page of project
- Table of contents
- Executive summary
- Outline of systems study with appropriate documentation
- Detailed results of the systems study
- Systems alternatives
- Systems analysts recommendations
- Summary
- Appendices

Using Figures for Effective Communication

- Effective use of tables
- Effective use of graphs

Effective Use of Tables

- Integrate into the body of the proposal
- Try to fit the entire table vertically on a single page
- Number and title the table at the top of the page
- Label each row and column
- Use a boxed table if room permits
- Use footnotes if necessary to explain detailed information contained in the table

Figure 10.17 Guidelines for creating effective tables

Effective Use of Graphs

- Choose a style of graph that communicates your intended meaning well
- Integrate the graph into the body of the proposal
- Give the graph a sequential figure number and a meaningful title
- Label each axis, and any lines, columns, bars, or pieces of the pie on the graph
- Include a key to indicate differently colored lines, shaded bars, or crosshatched areas

Types of Graphs

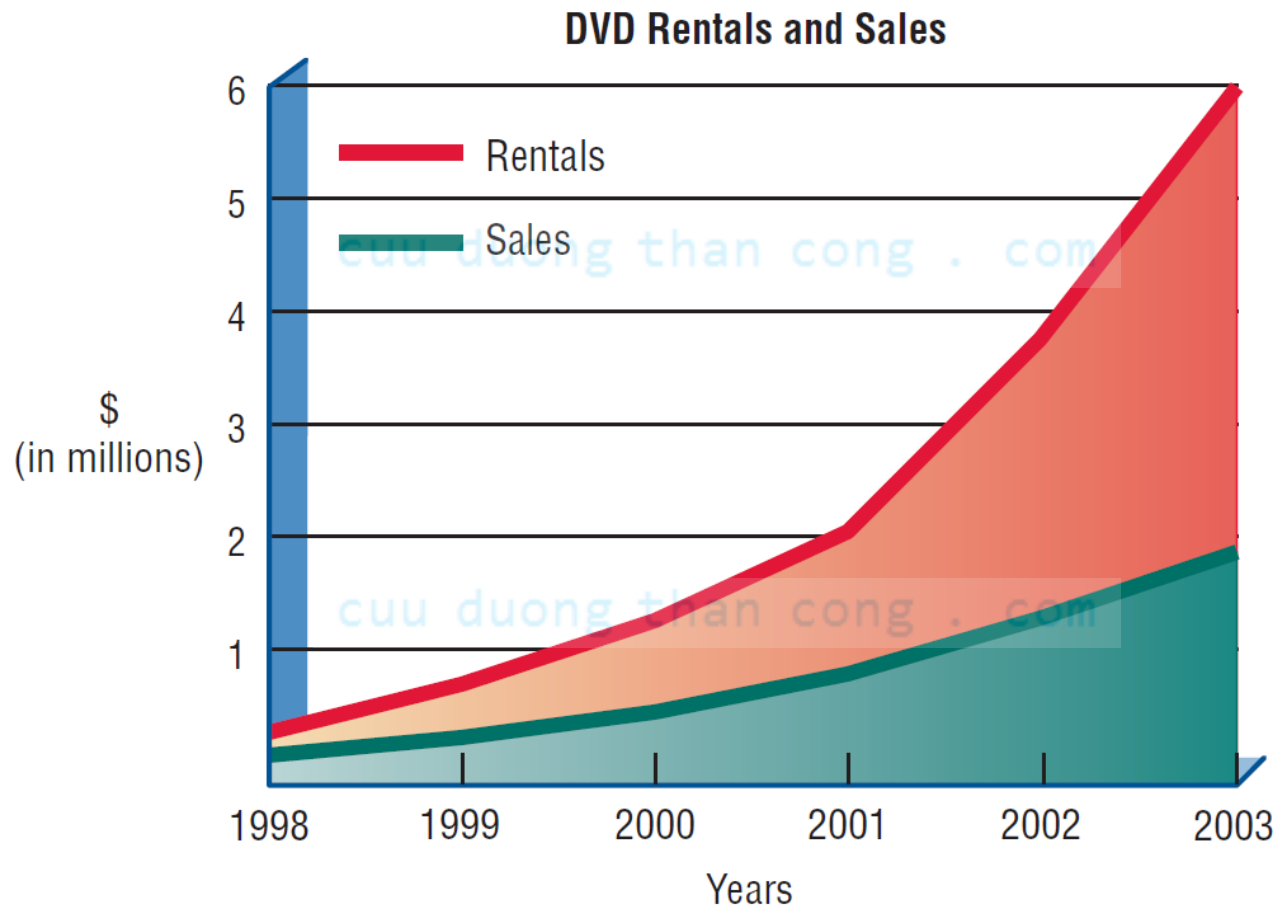- Line graphs
- Column charts
- Bar charts
- Pie charts

Line Graphs

- Used to show change over time
- Changes of up to five variables on a single graph
- May also show when lines intersect

Figure 10.20 An area is a form of line graph that may make more of an impact

DVD Rentals and Sales

Column Charts

- Can depict a comparison between two or more variables over time
- Used more often to compare different variables at a particular point in time
- Easier to understand than line graphs

Figure 10.21 More then one variable can be displayed on a column Chart by shading or coloring the column bars

Nebraska State Patrol Uniform Division
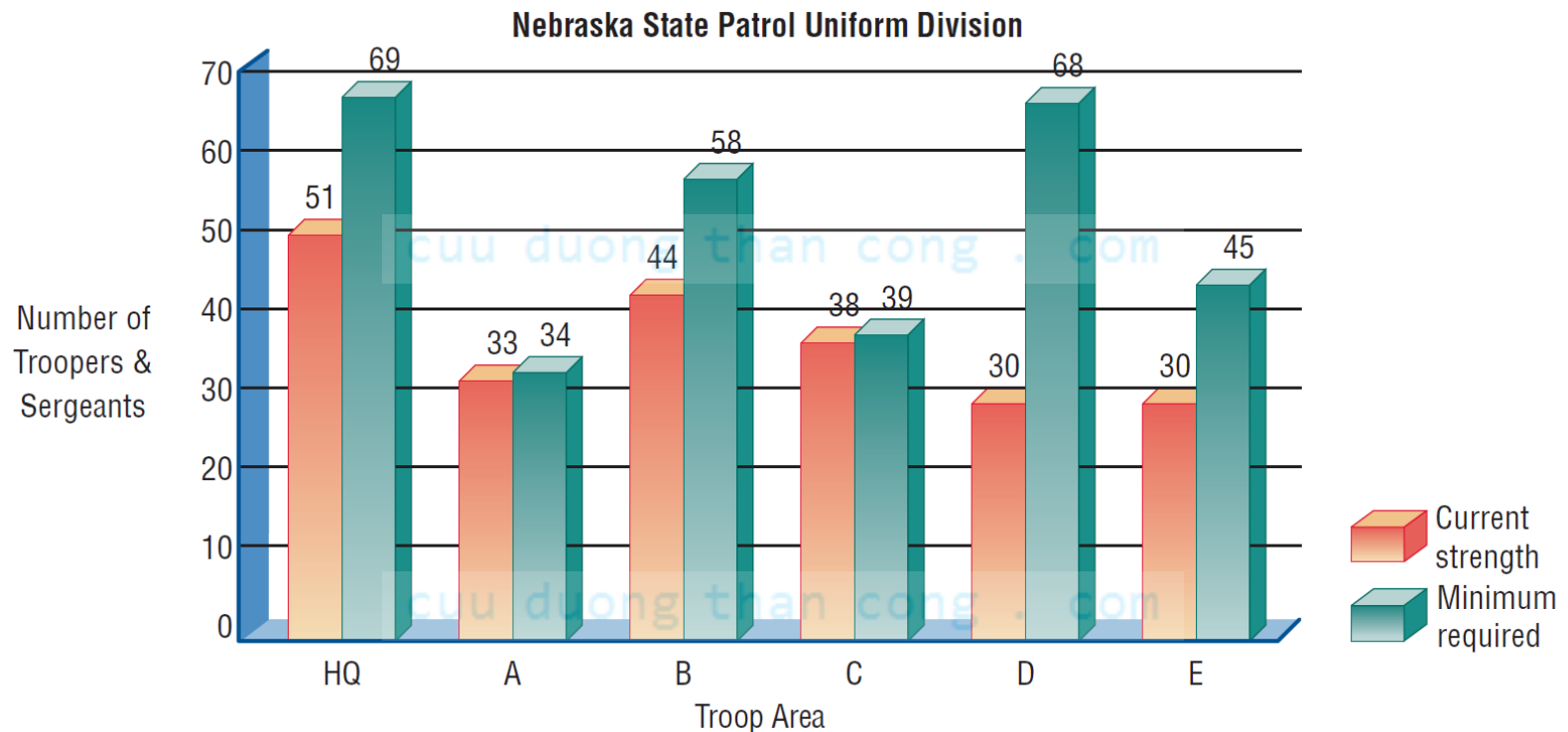
Special Forms of Column Charts

- 100 percent stacked column chart
  - Shows the relationship between variables that makes up 100 percent of an entity
- Deviation Column Chart
  - Useful for emphasizing years that show loss, or pointing out the year in which the company intends to break even

Bar Charts

- Used to show one or more variables within certain classes or categories during a specific time period

- Sorted or organized
  - Alphabetical
  - Numerical
  - Geographical
  - Progressive order
  - Magnitude

Pie Charts

- Used to show how 100 percent of a commodity is divided at a particular point in time

- Easier to read than 100 percent stacked column charts or 100 percent subdivided bar charts

- Disadvantage is they take a lot of room on the page

Figure 10.24 A pie chart is a visually appealing way to display how 100 percent of an entity is divided up at a particular time
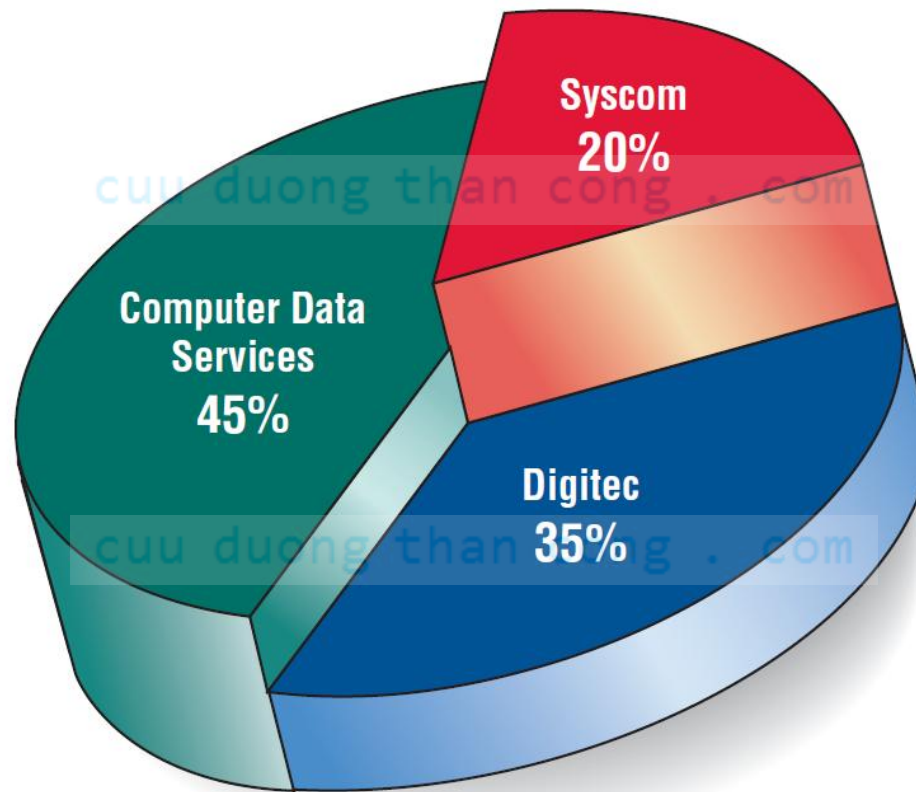
Presenting the Systems Proposal

- Understanding the audience
- Organizing the systems proposal presentation
- Principles of delivery

Understanding the Audience

- How formal to be
- What to present
- What type of visual aids to include

Organizing the Systems Proposal Presentation

- Introduction
- Four to six main points that capsulate the proposal
- Conclusion
- Questions

Principles of Delivery

- Project your voice loudly enough so that the audience can hear you

- Look at each person in the audience as you speak

- Make visuals large enough so that the audience can see them

- Use gestures that are natural to your conversational style

- Introduce and conclude your talk confidently

Summary

- Computer hardware
  - Purchase
  - Lease
  - Rental
- Software
  - Custom
  - COTS
  - Outsourced

Summary (Continued)

- Decision support tools
  - Multiple-criteria decision making
  - Expert systems
  - Neural nets
  - Recommendation systems

Summary (Continued)

- The systems proposal
  - Identifying costs and benefits
    - Break-even analysis
    - Cash-flow analysis
    - Present value analysis
  - Putting together an effective systems proposal
  - Visual considerations
  - Oral presentation