



西安电子科技大学  
XIDIAN UNIVERSITY

# 09

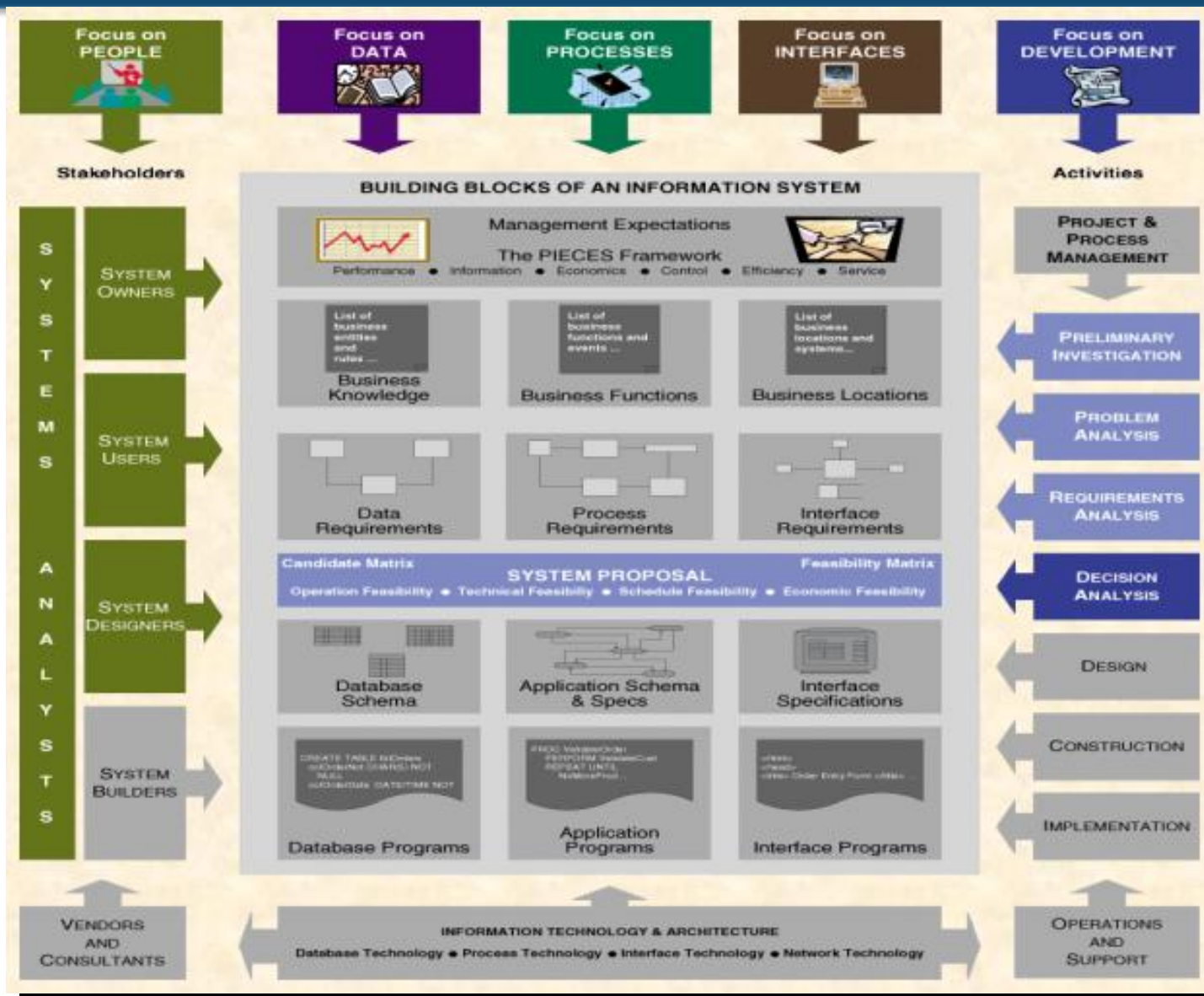
## 系统分析与设计 (SYSTEM ANALYSIS AND DESIGN)

### Feasibility Analysis and the System Proposal

# Content Structure

- ✿ Feasibility Analysis and the System Proposal
- ✿ **Four Tests for Feasibility**
  - 操作可行性；技术可行性；时间可行性；经济可行性。
- ✿ **Cost-Benefit Analysis Techniques**
- ✿ **Feasibility Analysis of Candidate Systems**
  - 对比与分析。
- ✿ **The System Proposal**
  - 撰写和提交系统建议书。

# Chapter Map



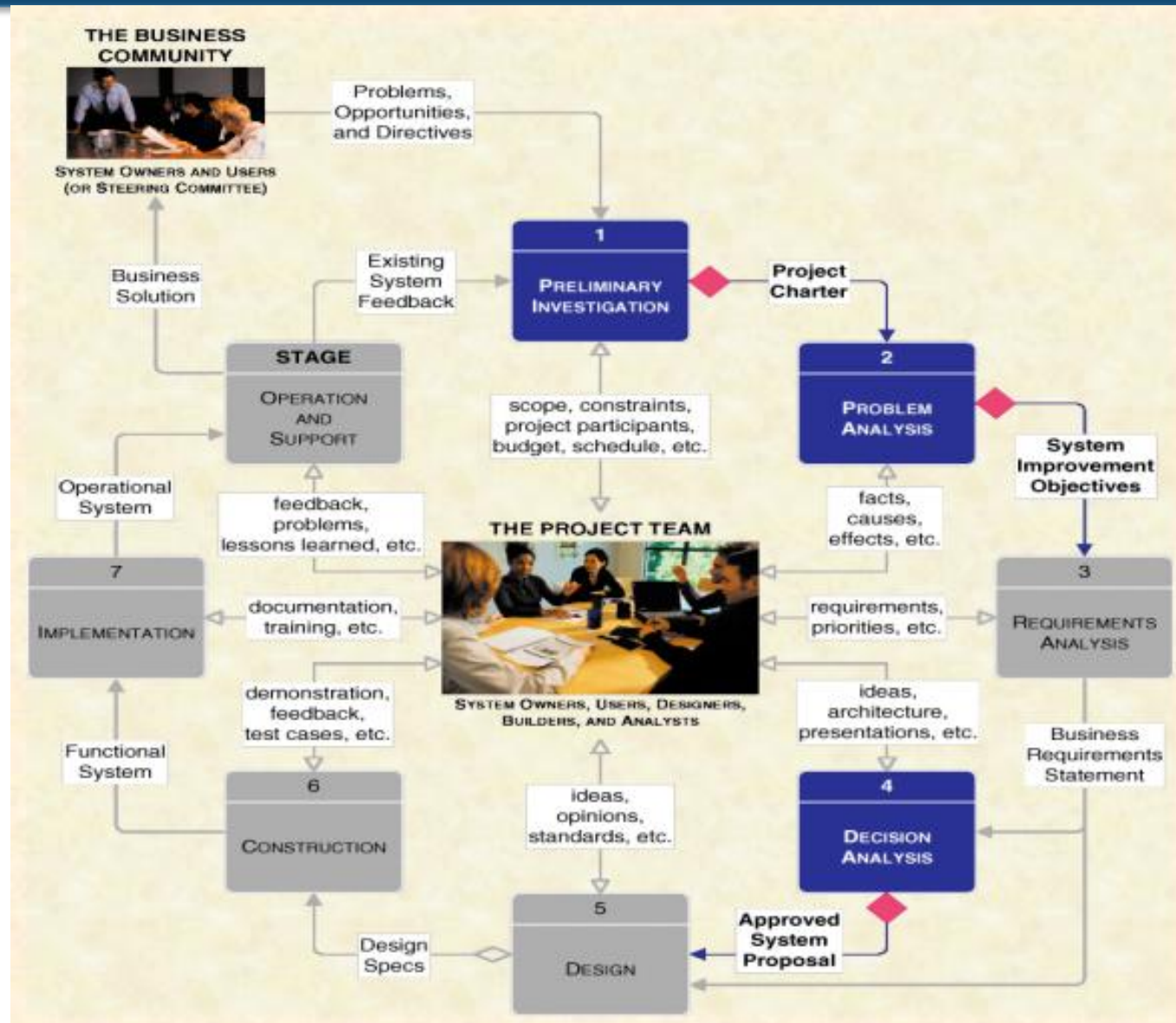


# Feasibility Analysis and the System Proposal

# Feasibility Analysis

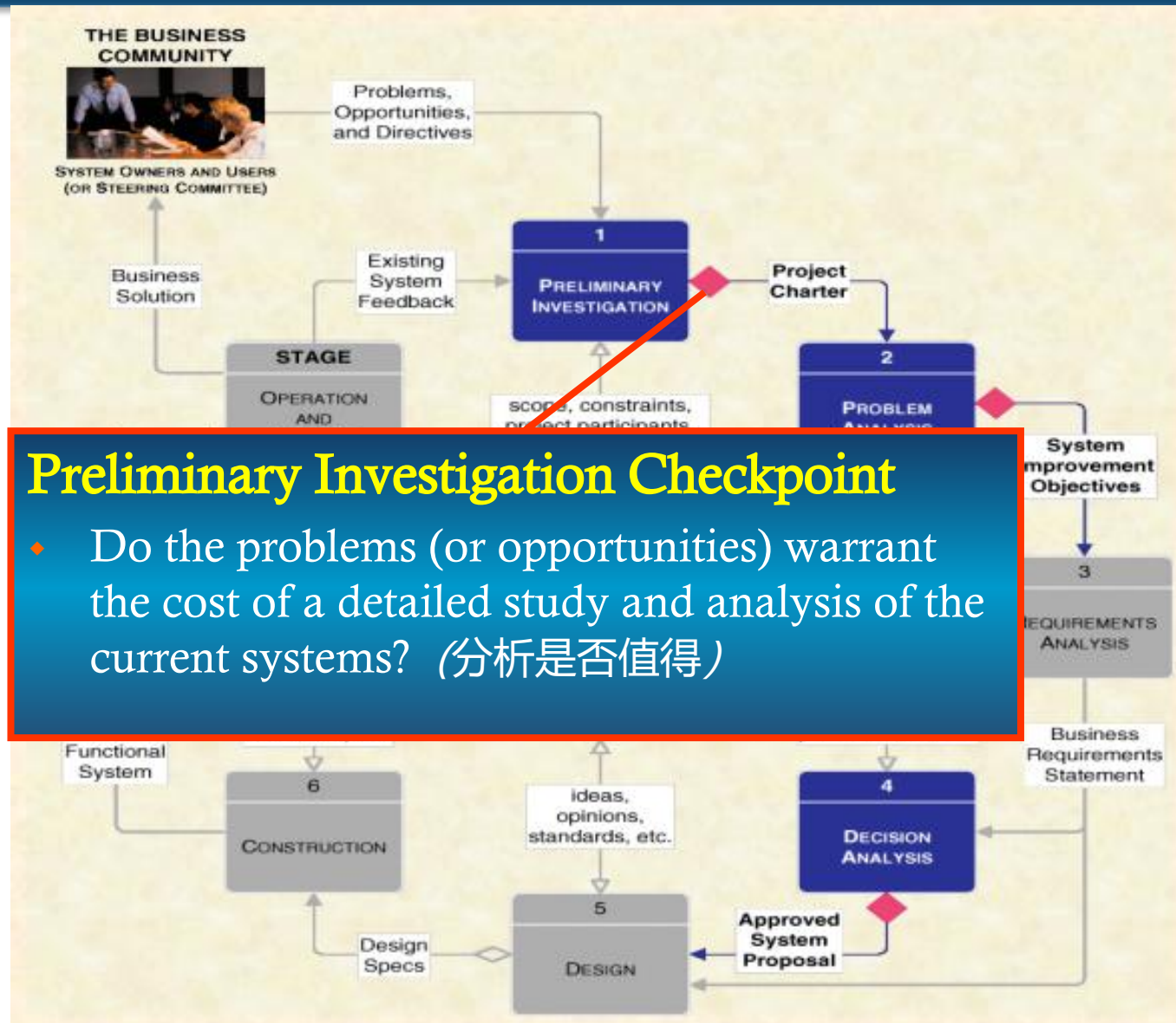
- ✿ **Feasibility** is the measure of how beneficial or practical the development of an information system will be to an organization.
- ✿ **Feasibility analysis** is the process by which feasibility is measured.
  - **Creeping Commitment** approach (see Chapter 3) to feasibility proposes that feasibility should be measured throughout the life cycle.

# Feasibility Checkpoints During Systems Analysis





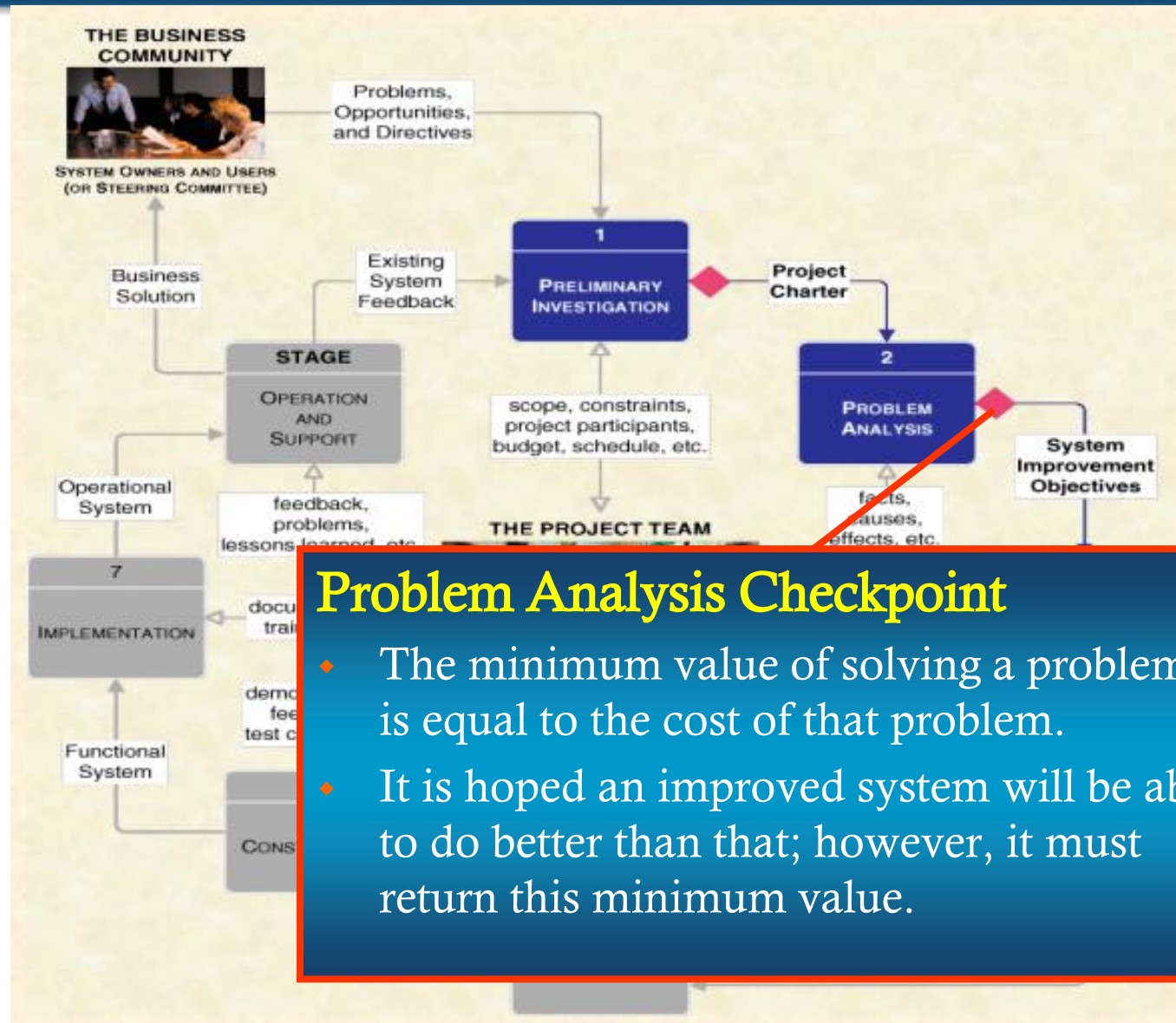
# Feasibility Checkpoints During Systems Analysis



## Preliminary Investigation Checkpoint

- Do the problems (or opportunities) warrant the cost of a detailed study and analysis of the current systems? (分析是否值得)

# Feasibility Checkpoints During Systems Analysis

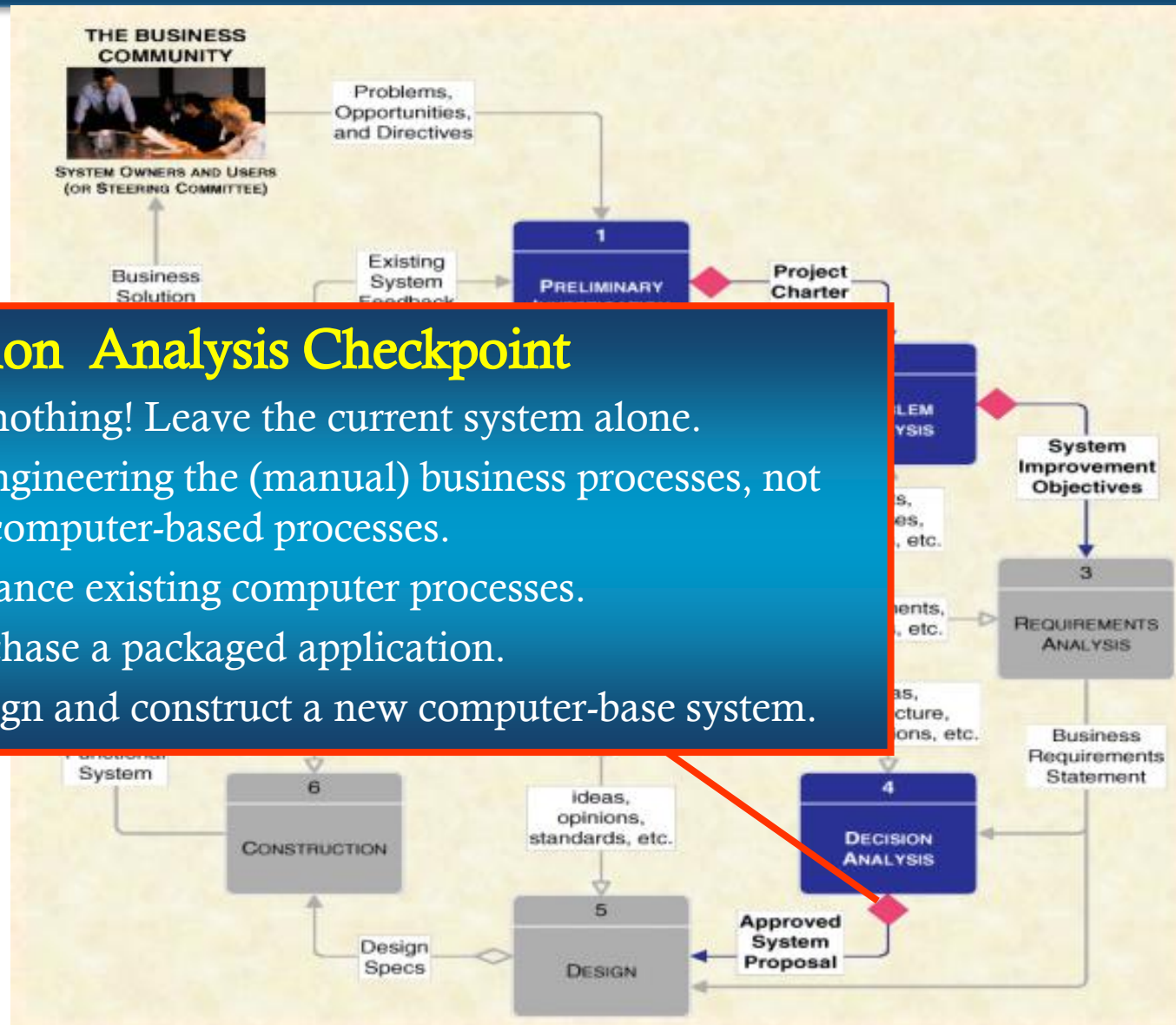




# Feasibility Checkpoints During Systems Analysis

## Decision Analysis Checkpoint

- Do nothing! Leave the current system alone.
- Reengineering the (manual) business processes, not the computer-based processes.
- Enhance existing computer processes.
- Purchase a packaged application.
- Design and construct a new computer-base system.





# Six Tests for Feasibility



# Six Tests For Feasibility

- ❁ **Operational feasibility** is a measure of how well the solution will work in the organization. It is also a measure of how people feel about the system/project.
- ❁ **Technical feasibility** is a measure of the practicality of a specific technical solution and the availability of technical resources and expertise.
- ❁ **Schedule feasibility** is a measure of how reasonable the project timetable is.
- ❁ **Economic feasibility** is a measure of the cost-effectiveness of a project or solution.
- ❁ **Cultural (or political) feasibility.**
- ❁ **Legal feasibility.**

# Operational Feasibility – answer these questions

- ✿ Is the problem worth solving, or will the solution to the problem work?
  - PIECES (recall Chapter 3) can be used as the basis.
- ✿ How do the end-users and management feel about the solution?
  - Does management support the system?
  - How do the end-user feel about their role in the new systems?
  - What end-users or managers may resist or not use the system?
  - People tend to resist change. Can this problem be overcome? If so, how?
  - How will the working environment of the end-users change? Can or will end-users and management adapt to the change?

Essentially, these questions address the political acceptability of solving the problem or the solution

# Operational Feasibility – usability analysis

✿ This is a test of the system's user interfaces and is measured in how easy they are to learn and to use and how they support the desired productivity levels of the users.

- Ease of learning – How long it takes to train someone to perform at a desired level.
- Ease of use – You are able to perform your activity quickly and accurately.
- Satisfaction – You, the user, are favorably pleased with the interface and prefer it over types you are familiar with.

# Technical Feasibility – answer these questions

- ❁ Is the proposed technology or solution practical?
  - Whether or not the technology for any defined solution is **mature (成熟)** **enough** to be easily applied to our problems.
- ❁ Do we currently possess the necessary technology?
  - Is the technology available in our information systems shop?
  - Can we get this technology if the technology is not available?
- ❁ Do we possess the necessary technical expertise, and is the schedule reasonable?
  - We may have the technology, but that doesn't mean we have the skills required to properly apply that technology.
  - It is true that all information systems professionals can learn new technologies, but that learning curve will impact the technical feasibility of the project; specifically, it will impact the schedule



# Schedule Feasibility

- ❁ Given our technical expertise, are the project deadlines reasonable?
  - You need to determine whether the deadlines are mandatory or desirable. If the deadlines are desirable rather than mandatory, the analyst can propose alternative schedules.
- ❁ Missed schedules are bad. Inadequate systems are worse! It's a choice between the lesser of two evils.
  - It is preferable (unless the deadline is absolutely mandatory) to deliver a properly functioning information system two months late than to deliver an error-prone, useless information system on time!

# Economic Feasibility

- ✿ The bottom line in many projects is economic feasibility.
- ✿ As soon as specific requirements and solutions have been identified, the analyst can weigh the costs and benefits of each alternative (cost-benefit analysis).



# Cost-Benefit Analysis Techniques

# Costs

✿ Development costs are one time costs that will not recur after the project has been completed.

- Personnel cost
- Computer usage
- Training
- Supply, duplication, and equipment costs
- Cost of any new computer equipment and software

✿ Operating costs are costs that tend to recur throughout the lifetime of the system. Such costs can be classified as:

- Fixed costs — occur at regular intervals but at relatively fixed rates.
- Variable costs — occur in proportion to some usage factor.

# Operating Costs

## ☼ Fixed costs:

- Lease payment (软件租借费用) and software license payments.
- Prorated salaries (按比例分摊的工资) of information systems operators and support personnel.

## ☼ Variable costs:

- Costs of computer usage (e.g., CPU time used, terminal connect time used, storage used).
- Supplies (e.g., preprinted forms, printer paper used, punched cards, floppy disks, magnetic tapes, and other expendables).
- Prorated overhead costs (e.g., utilities, maintenance, and telephone service).

# Costs for a Proposed Systems Solution

## Estimated Costs for Client-Server System Alternative



### DEVELOPMENT COSTS:

#### **Personnel:**

2	Systems Analysts (400 hours/ea \$50.00/hr)	\$40,000
4	Programmer/Analysts (250 hours/ea \$35.00/hr)	\$35,000
1	GUI Designer (200 hours/ea \$40.00/hr)	\$8,000
1	Telecommunications Specialist (50 hours/ea \$50.00/hr)	\$2,500
1	System Architect (100 hours/ea \$50.00/hr)	\$5,000
1	Database Specialist (15 hours/ea \$45.00/hr)	\$675
1	System Librarian (250 hours/ea \$15.00/hr)	\$3,750

#### **Expenses:**

4	Smalltalk training registration (\$3,500.00/student)	\$14,000
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#### **New Hardware & Software:**

1	Development Server	\$18,700
1	Server Software (operating system, misc.)	\$1,500
1	DBMS server software	\$7,500
7	DBMS Client software (\$950.00 per client)	\$6,650

#### **Total Development Costs:**

\$143,275

### PROJECTED ANNUAL OPERATING COSTS

#### **Personnel:**

2	Programmer/Analysts (125 hours/ea \$35.00/hr)	\$8,750
1	System Librarian (20 hours/ea \$15.00/hr)	\$300

#### **Expenses:**

1	Maintenance Agreement for Server	\$995
1	Maintenance Agreement for Server DBMS software	\$525
	Preprinted forms (15,000/year @ .22/form)	\$3,300

#### **Total Projected Annual Costs:**

\$13,870



# Benefits

❁ Tangible benefits (切实/有形收益) are those that can be easily quantified.

- Fewer processing errors
- Increased throughput
- Decreased response time
- Elimination of job steps
- Increased sales
- Reduced credit losses
- Reduced expenses

❁ Intangible benefits are those benefits believed to be difficult or impossible to quantify.

# Benefits

✿ Intangible benefits are those benefits believed to be difficult or impossible to quantify.

- Improved customer goodwill (友善)
- Improved employee morale (士气)
- Better service to community
- Better decision making

# Three Popular Techniques for Economic Feasibility

- ☼ Payback Analysis (偿还分析)
  - ☼ Return On Investment (投资回报率)
  - ☼ Net Present Value (净现值)
- ☼ The **Time Value of Money** (货币时间价值) is a concept that should be applied to each technique. The time value of money recognizes that a dollar today is worth more than a dollar one year from now.

# Payback Analysis

- ❁ **Payback analysis** (偿还分析) is a simple and popular method for determining if and when an investment will pay for itself.
- ❁ Payback period is the period of time that will lapse before accrued benefits overtake accrued and continuing costs (在自然增长的收益赶上自然增长和持续付出的成本之前的那一段时间, 就是偿还期) .

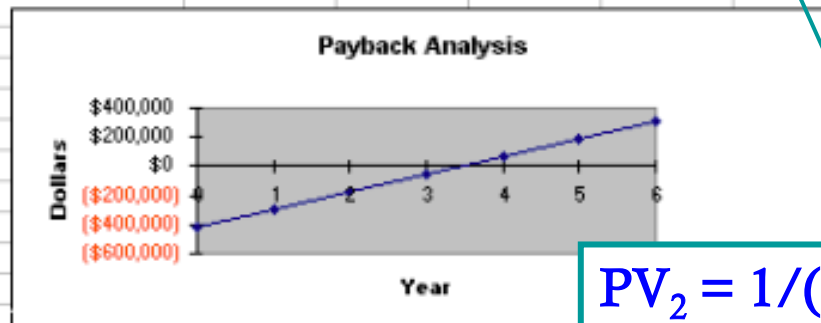
# Present Value Formula

$$PV_n = 1/(1 + i)^n$$

✿ Where  $n$  is the number of years and  $i$  is the discount rate (贴现率, 使一定数额的金钱折算成现值的年百分率) .

# Payback Analysis for a Project

	A	B	C	D	E	F	G	H	I
4	Cash flow description	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	
5	Development cost:	(\$418,040)							
6	Operation & maintenance cost:		(\$15,045)	(\$16,000)	(\$17,000)	(\$18,000)	(\$19,000)	(\$20,000)	
7	Discount factors for 12%:	1.000	0.893	0.797	0.712	0.636	0.567	0.507	
8	Time-adjusted costs (adjusted to present value):	(\$418,040)	(\$13,435)	(\$12,752)	(\$12,104)	(\$11,448)	(\$10,773)	(\$10,140)	
9	Cumulative time-adjusted costs over lifetime:	(\$418,040)	(\$431,475)	(\$444,227)	(\$456,331)	(\$467,779)	(\$478,552)	(\$488,692)	
10									
11	Benefits derived from operation of new system:	\$0	\$150,000	\$170,000	\$190,000	\$210,000	\$230,000	\$250,000	
12	Discount factors for 12%:	1.000	\$0.893	\$0.797	\$0.712	\$0.636	\$0.567	\$0.507	
13	Time-adjusted benefits (current of present value):	\$0	\$133,950	\$135,490	\$135,280	\$133,560	\$130,410	\$126,750	
14	Cumulative time-adjusted benefits over lifetime:	\$0	\$133,950	\$269,440	\$404,720	\$538,280	\$668,690	\$795,440	
15		0	1	2	3	4	5	6	
16	Cumulative lifetime time-adjusted costs + benefits:	(\$418,040)	(\$297,525)	(\$174,787)	(\$51,811)	\$70,501	\$190,138	\$306,748	
17									
18									
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$$PV_2 = 1/(1 + 0.12)^2 = 0.797$$



# Return-on-Investment Analysis (ROI)

- ✿ The **return-on-investment** analysis technique compares the lifetime profitability (全生存期收益率) of alternative solutions or projects.
- ✿ The ROI for a solution or project is a percentage rate that measures the relationship between the amount the business gets back from an investment and the amount invested.

# ROI Formulas

Lifetime ROI = (estimated lifetime benefits –  
estimated lifetime costs) / estimated lifetime costs

Annual ROI = lifetime ROI / lifetime of the system

# Net Present Value (NPV) Analysis

- ✿ The net present value (净现值) of an investment alternative is considered the preferred cost-benefit technique by many managers, especially those who have substantial business schooling. Once again, you initially determine the costs and benefits for each year of the system's lifetime. And once again, we need to adjust all the costs and benefits back to present dollar values.
- ✿ After discounting all costs and benefits, subtract the sum of the discounting costs from the sum of the discounting benefits to determine the net present value. If it is **positive**, the investment is **good**, else **bad**.

# Net Present Value (NPV) Analysis

[illegible]



# Feasibility Analysis of Candidate Systems

# Candidate Systems Matrix

✿ **Candidate Systems Matrix** documents similarities and differences between candidate systems; however, it offers no analysis.

	Candidate 1 Name	Candidate 2 Name	Candidate 3 Name
Interfaces			
Data			
Processes			
Geography			



# Candidate Systems Matrix

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	Candidate 1 Name	Candidate 2 Name	Candidate 3 Name
Interfaces			
Data			
Processes			
Geography			

Identify how the system will interact with people and other systems.

# Candidate Systems Matrix

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	Candidate 1 Name	Candidate 2 Name	Candidate 3 Name
Interfaces			
Data			
Processes			
Geography			

Identify how data stores will be implemented, how inputs will be captured, how outputs will be generated.

# Candidate Systems Matrix

✿ **Candidate Systems Matrix** documents similarities and differences between candidate systems; however, it offers no analysis.

	Candidate 1 Name	Candidate 2 Name	Candidate 3 Name
Interfaces			
Data			
Processes			
Geography			

Identify how (manual) business process will be modified, how computer processes will be implemented.

# Candidate Systems Matrix

✿ **Candidate Systems Matrix** documents similarities and differences between candidate systems; however, it offers no analysis.

	Candidate 1 Name	Candidate 2 Name	Candidate 3 Name
Interfaces			
Data			
Processes			
Geography			

Identify how process and data will be distributed.

# Sample Candidate Systems Matrix

Characteristics	Candidate 1	Candidate 2	Candidate 3
<b>Portion of System Computerized</b> Brief description of that portion of the system that would be computerized in this candidate.	COTS package Platinum Plus from Entertainment Software Solutions would be purchased and customized to satisfy Member Services required functionality.	Member Services and warehouse operations in relation to order fulfillment.	Same as candidate 2.
<b>Benefits</b> Brief description of the business benefits that would be realized for this candidate.	This solution can be implemented quickly because it's a purchased solution.	Fully supports user required business processes for SoundStage Inc. Plus more efficient interaction with member accounts.	Same as candidate 2.
<b>Servers and Workstations</b> A description of the servers and workstations needed to support this candidate.	Technically architecture dictates Pentium III, MS Windows 2000 class servers and workstations (clients).	Same as candidate 1.	Same as candidate 1.
<b>Software Tools Needed</b> Software tools needed to design and build the candidate (e.g., database management system, emulators, operating systems, languages, etc.). Not generally applicable if applications software packages are to be purchased.	MS Visual C++ and MS Access for customization of package to provide report writing and integration.	MS Visual Basic 5.0 System Architect 2001 Internet Explorer	MS Visual Basic 5.0 System Architect 2001 Internet Explorer

(Continued)

# Sample Candidate Systems Matrix (continued)

Characteristics	Candidate 1	Candidate 2	Candidate 3
<b>Application Software</b> A description of the software to be purchased, built, accessed, or some combination of these techniques.	Package solution	Custom solution	Same as candidate 2.
<b>Method of Data Processing</b> Generally some combination of: on-line, batch, deferred batch, remote batch, and real-time.	Client/Server	Same as candidate 1.	Same as candidate 1.
<b>Output Devices and Implications</b> A description of output devices that would be used, special output requirements, (e.g., network, preprinted forms, etc.), and output considerations (e.g., timing constraints)	(2) HP4MV department laser printers (2) HP5SI LAN laser printers	(2) HP4MV department laser printers. (2) HP5SI LAN laser printers (1) PRINTRONIX bar-code printer (includes software & drivers)  Web pages must be designed to VGA resolution. All internal screens will be designed for SVGA resolution.	Same as candidate 2.

# Sample Candidate Systems Matrix (continued)

Characteristics	Candidate 1	Candidate 2	Candidate 3
<b>Input devices and Implications</b> A description of input methods to be used, input devices (e.g., keyboard, mouse, etc.), special input requirements (e.g., new or revised forms from which data would be input), and input considerations (e.g., timing of actual inputs).	Keyboard & mouse.	Apple "Quick Take" digital camera and software (15) PSC Quickscan laser bar-code scanners (1) HP Scanjet 4C Flatbed Scanner Keyboard and mouse	Same as candidate 2.
<b>Storage Devices and Implications</b> Brief description of what data would be stored, what data would be accessed from existing stores, what storage media would be used, how much storage capacity would be needed, and how data would be organized.	MS SQL Server DBMS with 1000GB arrayed capability.	Same as candidate 1.	Same as candidate 1.

# Feasibility Analysis Matrix

✿ **Feasibility Analysis Matrix** is intended to complement the candidate systems matrix with an analysis and ranking of the candidate systems.

	Candidate 1 Name	Candidate 2 Name	Candidate 3 Name
Description			
Operational Feasibility			
Technical Feasibility			
Schedule Feasibility			
Economic Feasibility			
Ranking			



# Sample Feasibility Analysis Matrix

Feasibility Criteria	Wt.	Candidate 1	Candidate 2	Candidate 3
<b>Operational Feasibility</b> <b>Functionality.</b> A description of to what degree the candidate would benefit the organization and how well the system would work. <b>Political.</b> A description of how well received this solution would be from both user management, user, and organization perspective.	30%	Only supports Member Services requirements and current business processes would have to be modified to take advantage of software functionality.  <b>Score: 60</b>	Fully supports user required functionality.  <b>Score: 100</b>	Same as candidate 2.  <b>Score: 100</b>
<b>Technical Feasibility</b> <b>Technology.</b> An assessment of the maturity, availability (or ability to acquire), and desirability of the computer technology needed to support this candidate. <b>Expertise.</b> An assessment of the technical expertise needed to develop, operate, and maintain the candidate system.	30%	Current production release of Platinum Plus package is version 1.0 and has only been on the market for 6 weeks. Maturity of product is a risk and company charges an additional monthly fee for technical support.  Required to hire or train C++ expertise to perform modifications for integration requirements.  <b>Score: 50</b>	Although current technical staff has only Powerbuilder experience, the senior analysts who saw the MS Visual Basic demonstration and presentation have agreed the transition will be simple and finding experienced VB programmers will be easier than finding Powerbuilder programmers and at a much cheaper cost. MS Visual Basic is a mature technology based on version number.  <b>Score: 95</b>	Although current technical staff is comfortable with Powerbuilder, management is concerned with recent acquisition of Powerbuilder by Sybase Inc. MS SQL Server is a current company standard and competes with SYBASE in the client/server DBMS market. Because of this we have no guarantee future versions of Powerbuilder will "play well" with out current SQL Server.  <b>Score: 60</b>
<b>Economic Feasibility</b> <b>Cost to develop:</b> <b>Payback period (discounted):</b> <b>Net present value:</b> <b>Detailed calculations:</b>	30%	Approximately \$350,000. Approximately 4.5 years. Approximately \$210,000. See Attachment A.  <b>Score: 60</b>	Approximately \$418,040. Approximately 3.5 years. Approximately \$306,748. See Attachment A.  <b>Score: 85</b>	Approximately \$400,000. Approximately 3.3 years. Approximately \$325,500. See Attachment A.  <b>Score: 90</b>
<b>Schedule Feasibility</b> An assessment of how long the solution will take to design and implement.	10%	Less than 3 months.  <b>Score: 95</b>	9-12 months.  <b>Score: 80</b>	9 months.  <b>Score: 85</b>
<b>Ranking</b>	100%	<b>60.5</b>	<b>92</b>	<b>85</b>



# The System Proposal



# Length of the Written Report

✿ Report size is an interesting issue. After many bad experiences, we have learned to use the following general guidelines to restrict report size:

- To executive-level managers – 1 or 2 pages.
- To middle-level managers – 3 to 5 pages.
- To supervisory managers – less than 10 pages.
- To clerk-level personnel – less than 50 pages.

✿ From my experiences, however, it needs at least 150 pages in a bidding in China.

# Organization of the Written Report

- ✿ Each report consists of both primary and secondary elements.
  - **Primary elements** present the actual information that the report is intended to convey.
  - **Secondary elements** package the report so the reader can easily identify the report and its primary elements. Secondary elements also add a professional polish to the report.

# Formats for Written Reports

✿ The primary elements can be organized in one of two formats: factual and administrative.

- The **factual format** is very traditional and best suited to readers who are interested in facts and details as well as conclusions. It is appropriate for system users, but not for most managers and executives.
- The **administrative format** is a modern, result-oriented format preferred by many managers and executives. This format is designed for readers who are interested in results, not facts.

# Formats for Written Reports

	<b>Factual Format</b>		<b>Administrative Format</b>
I.	Introduction	I.	Introduction
II	Methods and procedures	II	Conclusions and recommendations
III	Facts and details	III	Summary and discussion of facts and details
IV.	Discussion and analysis of facts and details	IV.	Methods and procedures
V.	Recommendations	V.	Final conclusion
VI.	Conclusion	VI.	Appendices with facts and details

# Secondary Elements for a Written report

- ❁ Letter of transmittal
  - ❖ State what type of action is needed on the report.
  - ❖ Call attention to any features of the project or report that deserve special attention.
  - ❖ Acknowledge the help received.
- ❁ Title page
- ❁ Table of contents
- ❁ List of figures, illustrations, and tables
- ❁ Abstract or executive summary
- ❁ (The primary elements--the body of the report, in either the factual or administrative format--are presented in this portion of the report.)
- ❁ Appendices

# Writing the Report

- ✿ This is not a writing textbook.
- ✿ Guidelines:
  - Paragraphs should convey a single idea.
  - Sentences should not be too complex (the average sentence length should not exceed 20 words).
  - Write in active voice.
  - Eliminate jargon, big words, and deadwood (废话)



# System Proposal – formal presentations

- ✿ Formal presentations are special meetings used to **sell** new ideas and gain approval for new systems.
- ✿ They may also be used for any of these purposes:
  - Sell new system
  - Sell new ideas
  - Head off criticism
  - Address concerns
  - Verify conclusions
  - Clarify facts
  - Report progress

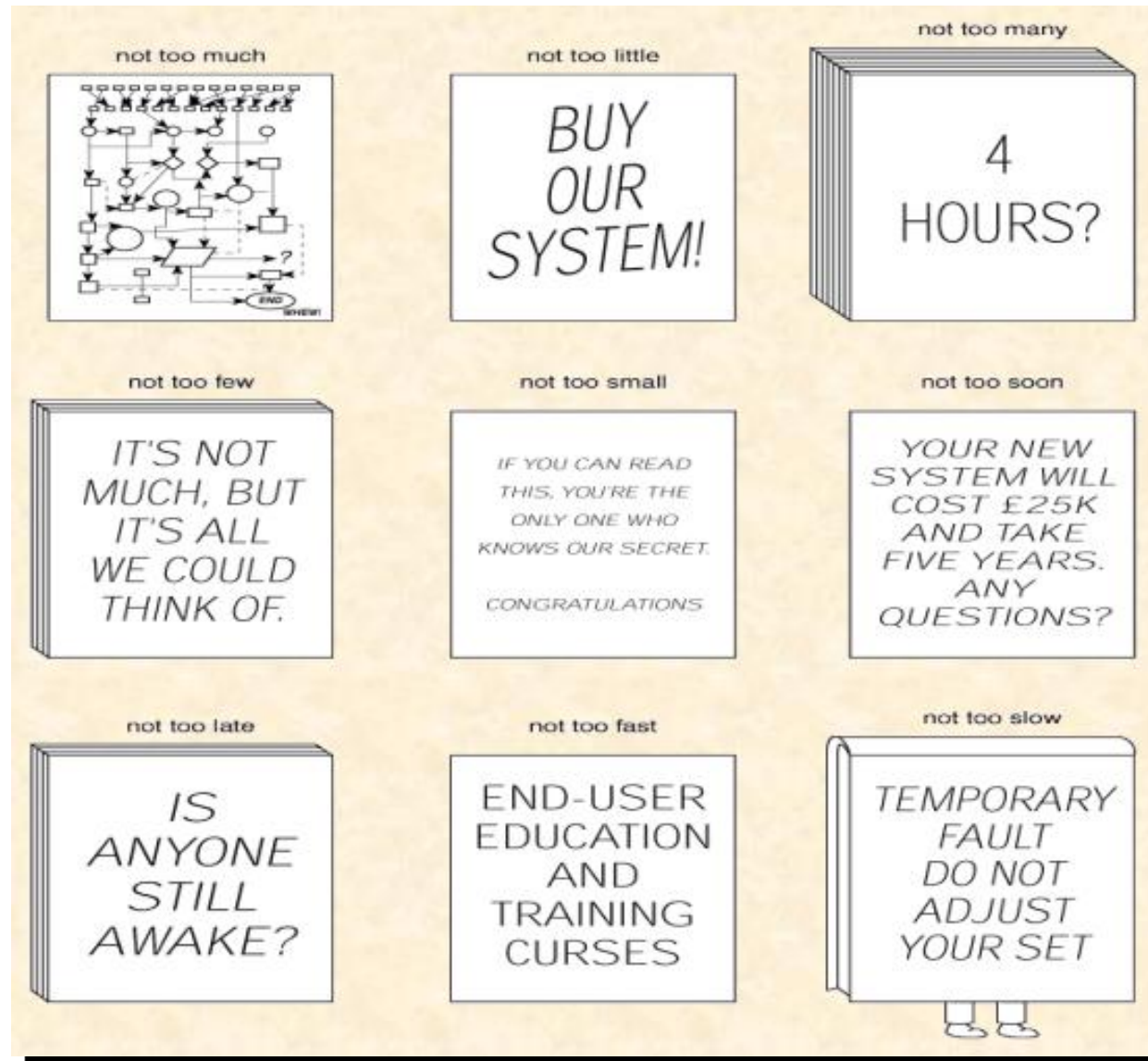
# Preparing for the Formal Presentations

- ✿ Define your expectations of the presentation.
- ✿ The presentation should be carefully organized around the allotted time.
- ✿ Use visual aids – predrawn flipcharts, slides, and the like – to support your position. Each visual aid should convey a single idea.
- ✿ Practice the presentation in front of the most critical audience you can assemble.

# Outline and Time Allocation for an Oral Presentation

- ❧ I. Introduction (**one-sixth** of total time available)
  - ❧ A. Problem statement
  - ❧ B. Work completed to date
- ❧ II. Part of the presentation (**two-thirds** of total time available)
  - ❧ A. Summary of existing problems and limitations
  - ❧ B. Summary description of the proposed system
  - ❧ C. Feasibility analysis
  - ❧ D. Proposed schedule to complete project
- ❧ III. Questions and concerns from the audience (time here is **not to be included** in the time allotted for presentation and conclusion; it is determined by those asking the questions and voicing their concerns)
- ❧ IV. Conclusion (**one-sixth** of total time available)
  - ❧ A. Summary of proposal
  - ❧ B. Call to action (request for whatever authority you require to continue systems development)

# Guidelines for Visual Aids



# Conducting the Formal Presentations

- ❁ Dress professionally.
- ❁ Avoid using “I” when making the presentation (using “you” and “we”).
- ❁ Maintain eye contact with the group and keep an air of confidence.
- ❁ Be aware of your own mannerisms (个人习惯) .
- ❁ To keep people listening:
  - Stop talking
  - Ask a question
  - Try a little humor
  - Use some props (小道具)
  - Change your voice level
  - Do something totally unexpected

# Answering Questions

- ❁ Always answer a question seriously, even if you think it is a silly question.
- ❁ Answer **both** the individual who asked the question and the entire audience.
- ❁ Summarize your answers.
- ❁ Limit the amount of time you spend answering any one questions.
- ❁ Be honest (不要不懂装懂) .

# 要点与引申

- ❁ 作为一个职业化的系统分析与设计人员：
  - 最可悲的莫过于盲目地执行一个不可行的项目；
  - 最可笑的莫过于在发生这种局面后还自我感觉良好。
- ❁ 可行性的判断是一个理性的过程。
- ❁ 本章给出的关于撰写技术报告的一些准则，对于写论文也是适用的：你总是要设法说服读者来承认你的论点，而不是其他。
- ❁ 在有限时间内阐述既定的内容、达到既定的目标，是受过高等教育的人必备的素质（自信、诚实、不哗众取宠）。