# Feasblity Analysis-System Analysis and Design-Lecture Slides

System Analysis and Design

Pakistan Institute of Engineering and Applied Sciences, Islamabad (PIEAS)

29 pag.

CHAPTER

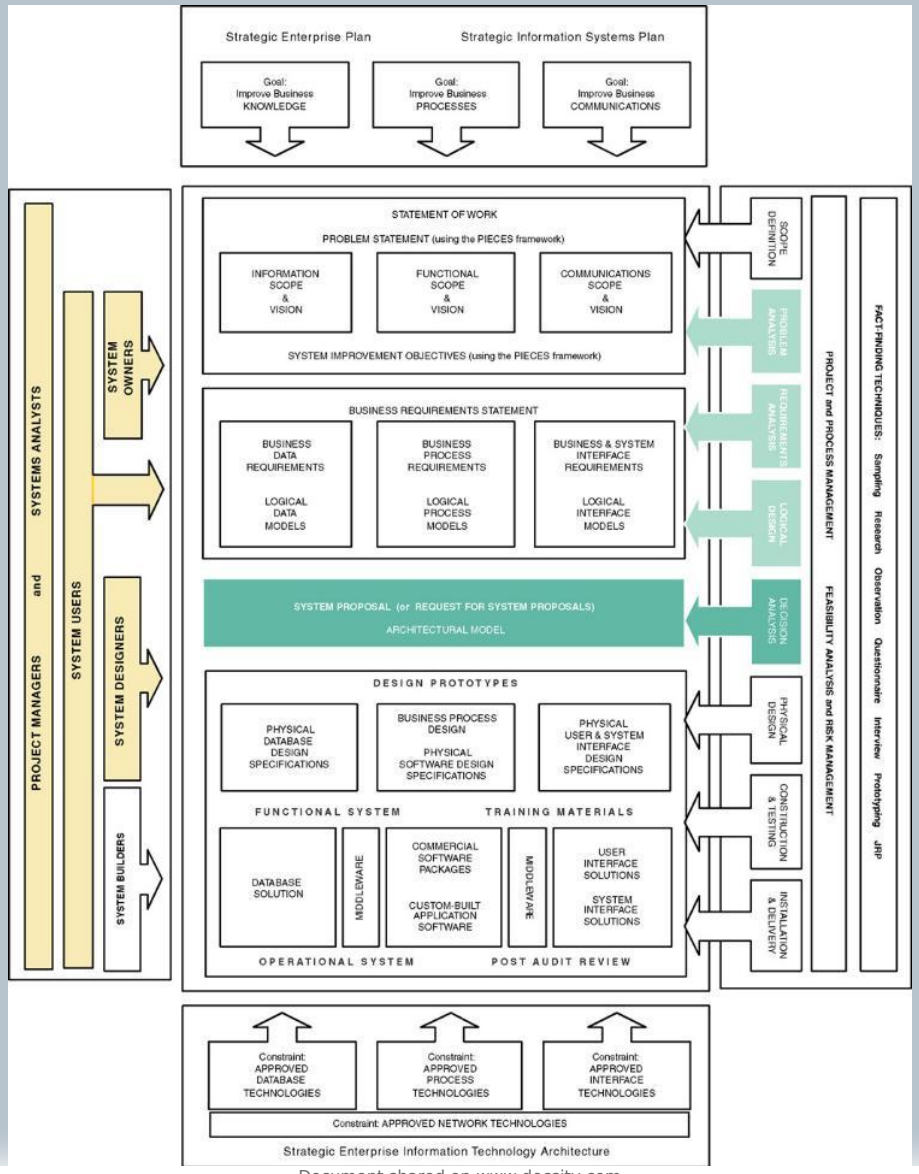
# 10

# FEASIBILITY ANALYSIS AND THE SYSTEM PROPOSAL

# Chapter Ten Feasibility Analysis and the System Proposal

- Identify feasibility checkpoints in the systems life cycle.
- Identify alternative system solutions.
- Define and describe four types of feasibility and their respective criteria.
- Perform various cost-benefit analyses using time-adjusted costs and benefits.
- Write suitable system proposal reports for different audiences.
- Plan for a formal presentation to system owners and users.

# Chapter Map



# Feasibility Analysis

**Feasibility** – the measure of how beneficial or practical an information system will be to an organization.

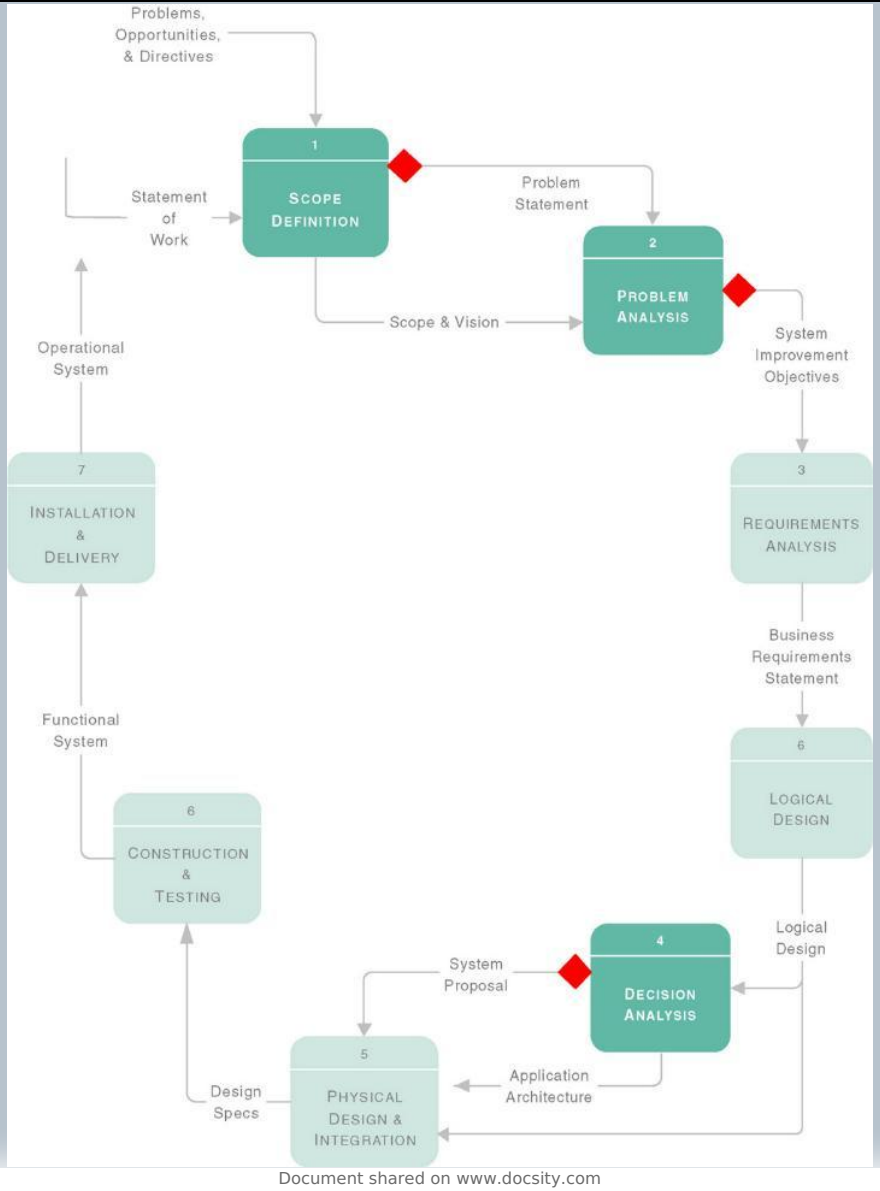
**Feasibility analysis** – the process by which feasibility is measured.

**Creeping Commitment** – an approach to feasibility that proposes that feasibility should be measured throughout the life cycle.

# Feasibility Checkpoints

- Systems Analysis — Scope Definition
- Systems Analysis — Problem Analysis
- Systems Design — Decision Analysis

# Feasibility Checkpoints During Systems Analysis



# Four Tests For Feasibility

**Operational feasibility** – a measure of how well a solution will work or be accepted in an organization.

- **Usability analysis** – a test of the system's user interfaces.

**Technical feasibility** – a measure of the practicality of a technical solution and the availability of technical resources and expertise.

**Schedule feasibility** – a measure of how reasonable the project timetable is.

**Economic feasibility** - a measure of the cost-effectiveness of a project or solution.

# Cost-Benefit Analysis Techniques

## Costs:

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

## Benefits:

- Tangible benefits are those that can be easily quantified.
- Intangible benefits are those benefits believed to be difficult or impossible to quantify.

# 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 |

**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**

# Three Popular Techniques to Assess Economic Feasibility

- Payback Analysis
- Return On Investment
- Net Present Value

The **Time Value of Money** 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** – a technique for determining if and when an investment will pay for itself.

**Payback period** – the period of time that will lapse before accrued benefits overtake accrued and continuing costs.

# Present Value Formula

**Present value** – the current value of a dollar at any time in the future.

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

Where ***n*** is the number of years and **i** is the discount rate.

**Discount rate** – a percentage similar to interest rates that you earn on your savings.

In most cases the discount rate for a business is the **opportunity cost** of being able to invest money in other projects or investments

# 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) | ($51,611) | $70,501 | $190,138 | $306,748 | |
| 17 | | | | | | | | | |
| 18 | | | | | | | | | |
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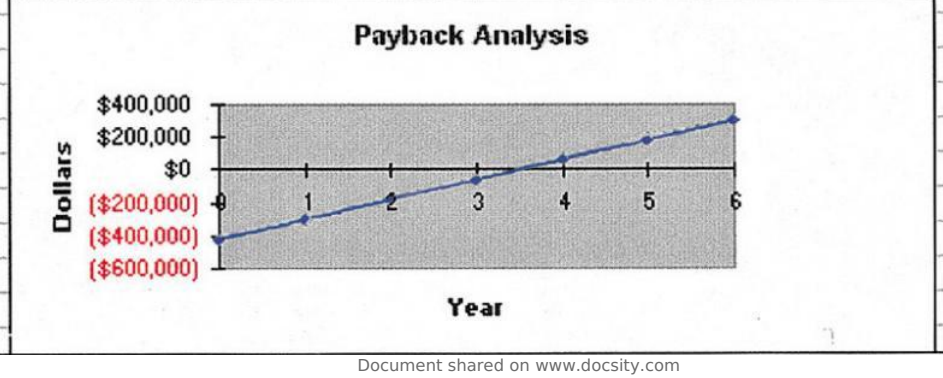


# Return-on-Investment Analysis (ROI)

**Return-on-Investment (ROA) analysis** – a technique that compares the lifetime profitability of alternative solutions.

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.

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

**Annual ROI** = lifetime ROI / lifetime of the system

# Net Present Value (NPV) Analysis

**Net present value** – an analysis technique that compares the annual discounted costs and benefits of alternative solutions.

| | A | B | C | D | E | F | G | H | I | J |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Net Present Value Analysis for Client-Server System Alternative | | | | | | | | | |
| 2 | (Numbers rounded to nearest $1) | | | | | | | | | |
| 3 | | | | | | | | | | |
| 4 | **Cash flow description** | **Year 0** | **Year 1** | **Year 2** | **Year 3** | **Year 4** | **Year 5** | **Year 6** | **Total** | |
| 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 | **Present value of annual costs:** | ($418,040) | ($13,435) | ($12,752) | ($12,104) | ($11,448) | ($10,773) | ($10,140) | | |
| 9 | **Total present value of lifetime costs:** | | | | | | | | ($488,692) | |
| 10 | | | | | | | | | | |
| 11 | **Benefits derived from operation of new** | $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 | **Present value of annual benefits:** | $0 | $133,950 | $135,490 | $135,280 | $133,560 | $130,410 | $126,750 | | |
| 14 | **Total present value of lifetime benefits:** | | | | | | | | $795,440 | |
| 15 | | | | | | | | | | |
| 16 | **NET PRESENT VALUE OF THIS ALTERNATIVE:** | | | | | | | | $306,748 | |
| 17 | | | | | | | | | | |

# Candidate Systems Matrix

**Candidate Systems Matrix** – a tool used to document similarities and differences between candidate systems;.

| | Candidate 1 Name | Candidate 2 Name | Candidate 3 Name |
|---|---|---|---|
| Stakeholders | | | |
| Knowledge | | | |
| Processes | | | |
| Communications | | | |

# Sample Candidate Systems Matrix

| Characteristics | Candidate 1 | Candidate 2 | Candidate 3 |
|---|---|---|---|
| **Portion of System Computerized**<br>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. |
| **Benefits**<br>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. |
| **Servers and Workstations**<br>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. |
| **Software Tools Needed**<br>Software tools needed to design and build the candidate (e.g., database management system, emulators, operating systems, languages, etc.). Not generally ap[illegible]ble if applications software pa[illegible]s 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<br>System Architect 2001<br>Internet Explorer | MS Visual Basic 5.0<br>System Architect 2001<br>Internet Explorer |

(Continued)

# Sample Candidate Systems Matrix (continued)

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

(Continued)

# Sample Candidate Systems Matrix (concluded)

| Characteristics | Candidate 1 | Candidate 2 | Candidate 3 |
|---|---|---|---|
| **Input devices and Implications**<br>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<br>(15) PSC Quickscan laser bar-code scanners<br>(1) HP Scanjet 4C Flatbed Scanner<br>Keyboard and mouse | Same as candidate 2. |
| **Storage Devices and Implications**<br>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** – a tool used to rank 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 |
|---|---|---|---|---|
| **Operational Feasibility**<br><br>**Functionality.** A description of to what degree the candidate would benefit the organization and how well the system would work.<br><br>Political. 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.<br><br>**Score: 60** | Fully supports user required functionality.<br><br>**Score: 100** | Same as candidate 2.<br><br>**Score: 100** |
| **Technical Feaasibility**<br><br>**Technology.** An assessment of the maturity, availability (or ability to acquire), and desirability of the computer technology needed to support this candidate.<br><br>**Expertise.** 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.<br><br>Required to hire or train C++ expertise to perform modifications for integration requirements.<br><br>**Score: 50** | 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.<br>**Score: 95** | Although current technical staff is comfortable with Powerbuilder, management is concerned with recent acquisition of Powerbuilder by Sybase Inc.<br>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.<br>**Score: 60** |
| **Economic Feasibility**<br><br>**Cost to develop:**<br><br>**Payback period (discounted):**<br><br>**Net present value:**<br><br>**Detailed calculations:** | **30%** | <br><br>Approximately $350,000.<br><br>Approximately 4.5 years.<br><br>Approximately $210,000.<br><br>See Attachment A.<br><br>**Score: 60** | <br><br>Approximately $418,040.<br><br>Approximately 3.5 years.<br><br>Approximately $306,748.<br><br>See Attachment A.<br><br>**Score: 85** | <br><br>Approximately $400.000.<br><br>Approximately 3.3 years.<br><br>Approximately $325,500.<br><br>See Attachment A.<br><br>**Score: 90** |
| **Schedule Feasibility**<br><br>A[illegible]sment of how long the solution wi[illegible]to design and implement. | **10%** | Less than 3 months.<br><br>**Score: 95** | 9-12 months.<br><br>**Score: 80** | 9-12 months.<br><br>**Score: 85** |
| **Ranking** | **100%** | **60.5** | **92** | **85** |

# The System Proposal

**System proposal** – a report or presentation of a recommended solution.

- Usually formal written report or oral presentation
- Intended for system owners and users

# Formats for Written Reports

| Factual Format | Administrative Format |
| --- | --- |
| 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. Appendixes with facts and details |

# Organization of the Written Report

- **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.
- Formats:
  - The **factual format** is traditional and best suited to readers who are interested in facts and details as well as conclusions.
  - The **administrative format** is a modern, result-oriented format preferred by managers and executives.

# Secondary Elements for a Written report

Letter of transmittal

Title page

Table of contents

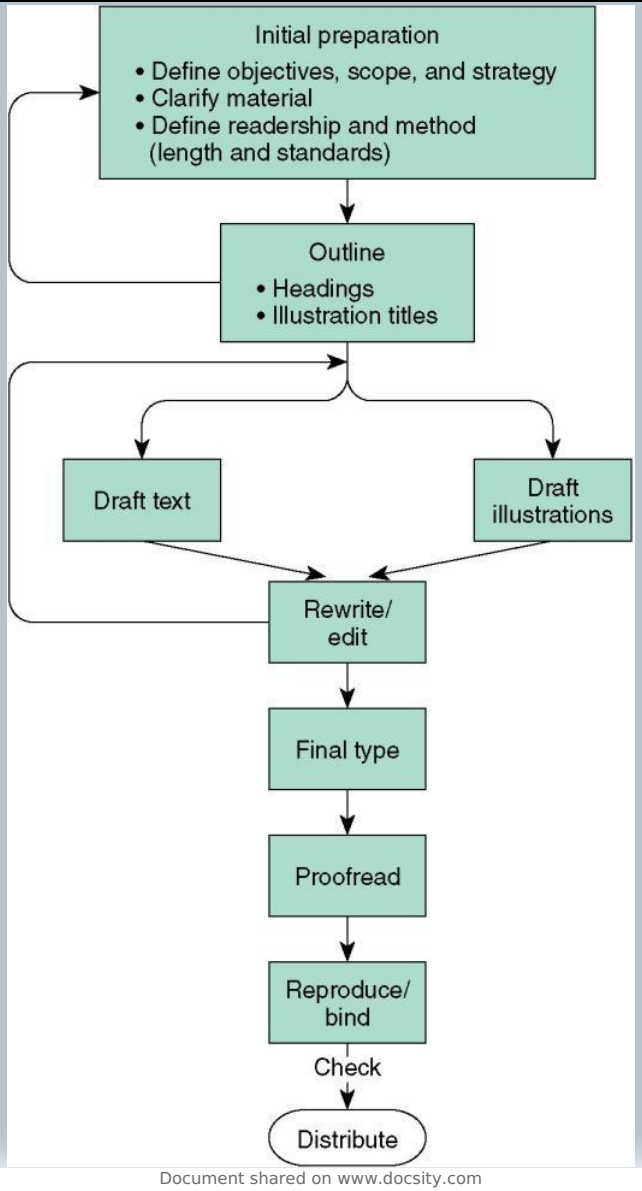
List of figures, illustrations, and tables

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

# Steps in Writing a Report



# System Proposal – formal presentations

**Formal presentation** – a special meeting 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

# Typical 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)

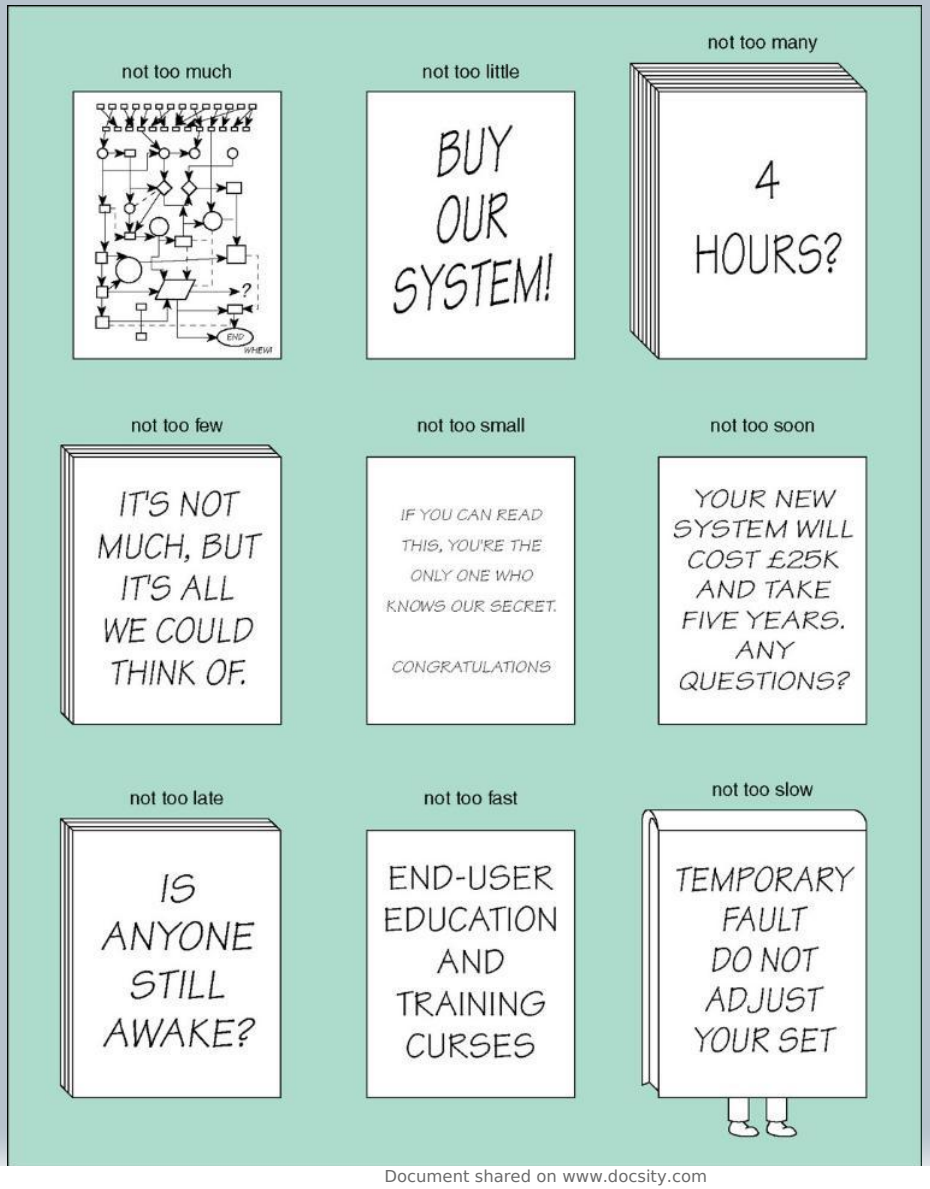
- A. Summary of existing problems and limitations
- B. Summary description of the proposed system
- C. Feasibility analysis
- D. Proposed schedule to complete project

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

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