

System Implementation

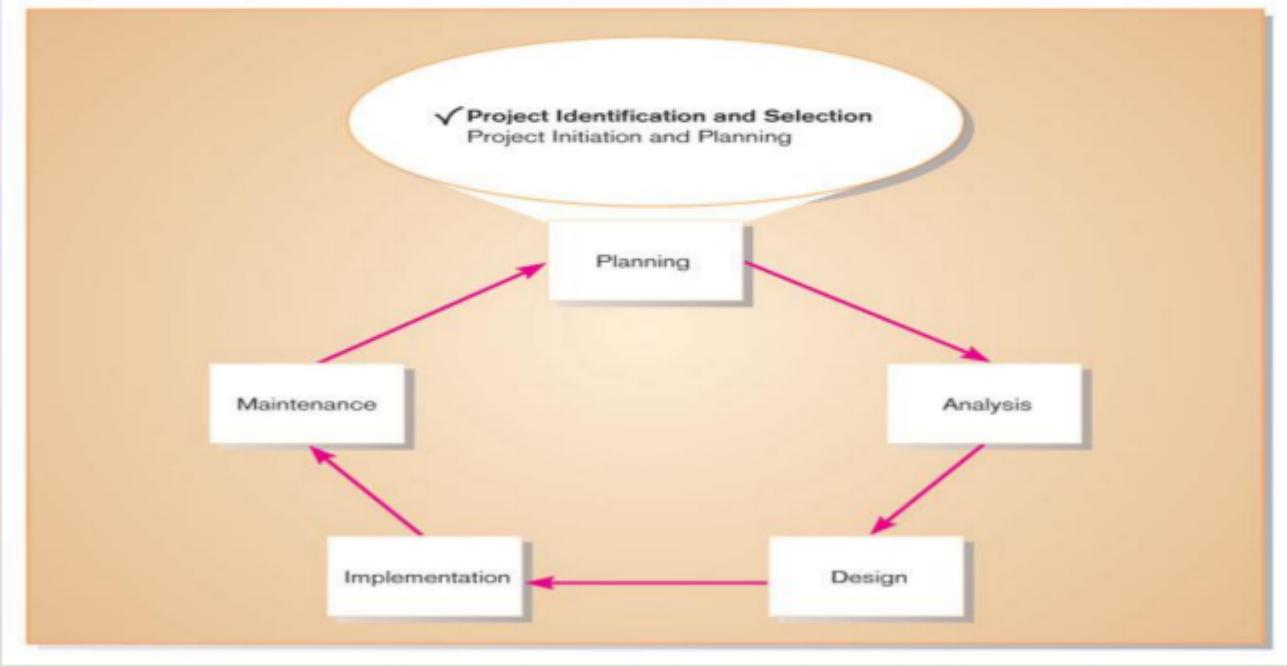
Notes

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IDENTIFYING AND SELECTING SYSTEMS DEVELOPMENT PROJECTS

Figure 4-1 Systems development life cycle with project identification and selection highlighted



Identifying and Selecting Systems Development Projects

- *Identifying potential development projects.*
 - Identification from a stakeholder group.
 - Each stakeholder group brings their own perspective and motivation to the IS decision
- The Process activities of identifying and selecting IS a **identifying** potential project, **classifying**, and **selecting** the project.
- Sources of projects (**who?**)
 - Management and business units
 - Managers who want to make a system more efficient or less costly
 - Formal planning groups

IDENTIFYING AND SELECTING IS DEVELOPMENT PROJECTS

- Projects are identified by
 - Top management
 - Steering committee
 - User departments
 - Development group or senior IS staff
- Bottom-up Identification
 - Business unit or IS group
 - Don't reflect overall goals of the organization
- Top-Down Identification
 - Senior management or steering committee
 - Focus is on **global needs** of organization

THE PROCESS OF IDENTIFYING AND SELECTING IS DEVELOPMENT PROJECTS

Table 4-1 Characteristics of Alternative Methods for Making Information Systems Identification and Selection Decisions

<i>Selection Method</i>	<i>Characteristics</i>
Top Management	Greater strategic focus Largest project size Longest project duration
Steering Committee	Cross-functional focus Greater organizational change Formal cost-benefit analysis Larger and riskier projects
User Department	Narrow, nonstrategic focus Faster development
Development Group	Fewer users, management layers, and business functions Integration with existing systems focus Fewer development delays Less concern with cost-benefit analysis

(Source: Adapted from McKeen, Guimaraes, and Wetherbe, 1994.)

IDENTIFYING AND SELECTING IS DEVELOPMENT PROJECTS

■ Classifying and Ranking IS Development Projects

- Performed by top management, steering committee, business units of IS development group
- Value chain analysis is often used
 - Method to analyze an organization's activities to determine where value is added and costs are incurred
- Other Approaches are
 - Stages of Growth
 - Critical Success Factors
 - Competitive Forces Model

IDENTIFYING AND SELECTING IS DEVELOPMENT PROJECTS

- Some criteria should be considered when classifying and ranking projects are:
 - Value chain analysis.
 - Strategic alignment
 - Potential benefits.
 - Resource availability.
 - Project size and duration.
 - Technical difficulties and risks.

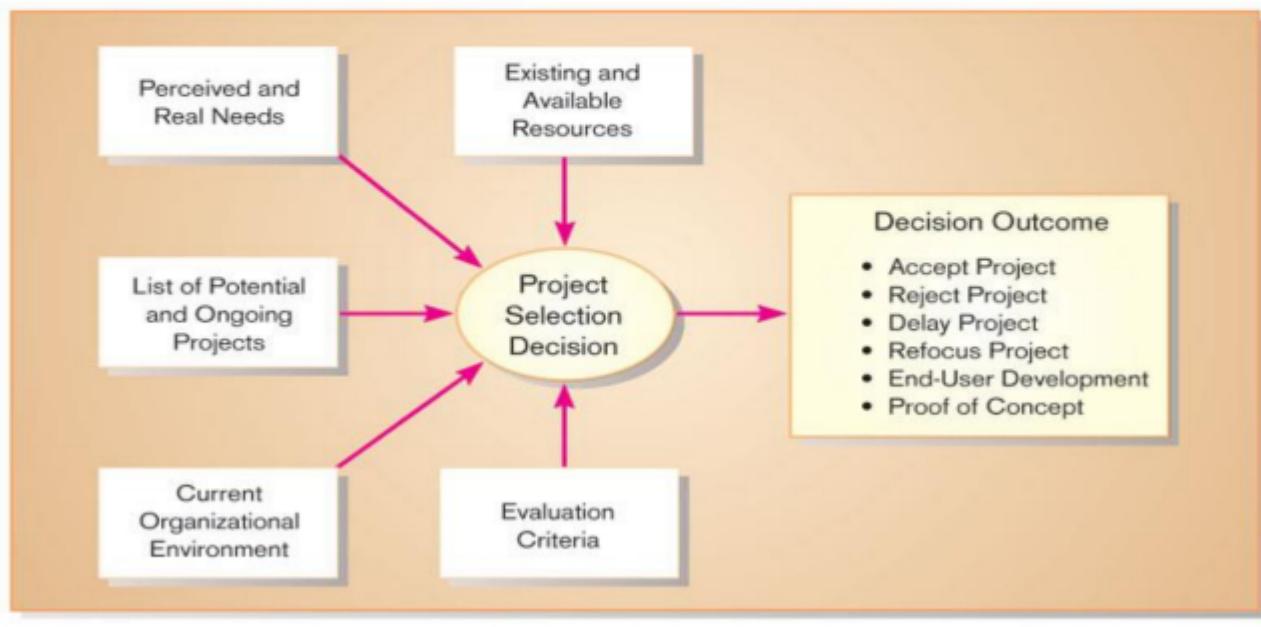
IDENTIFYING AND SELECTING IS DEVELOPMENT PROJECTS

■ Selecting IS Development Projects

- Based on various factors.
- Consider both short- and long-term projects.
- Select those most likely to achieve business objectives.
- Is a very important and ongoing activity.
- Projects most likely to achieve business objectives are selected
- Decision requires consideration of:
 - Perceived and **real needs**
 - Potential and **ongoing projects**
 - Current organizational **environment**
 - Existing and available **resources**
 - **Evaluation criteria**

THE PROCESS OF IDENTIFYING AND SELECTING IS DEVELOPMENT PROJECTS

Figure 4-3 Project selection decisions must consider numerous factors and can have numerous outcomes.



IDENTIFYING AND SELECTING IS DEVELOPMENT PROJECTS

- Selecting IS Development Projects decision outcomes:

- Project Acceptance
- Project Rejection
- Delay
- Refocus
- End-User Development
- Proof of Concept

THE PROCESS OF IDENTIFYING AND SELECTING IS DEVELOPMENT PROJECTS

TABLE 4-2 Possible Evaluation Criteria When Classifying and Ranking Projects

<i>Evaluation Criteria</i>	<i>Description</i>
Value Chain Analysis	Extent to which activities add value and costs when developing products and/or services
Strategic Alignment	Extent to which the project is viewed as helping the organization achieve its strategic objectives and long-term goals
Potential Benefits	Extent to which the project is viewed as improving profits, customer service, and so forth and the duration of these benefits
Resource Availability	Amount and type of resources the project requires and their availability
Project Size/Duration	Number of individuals and the length of time needed to complete the project
Technical Difficulty/Risks	Level of technical difficulty to successfully complete the project within given time and resource constraints

THE PROCESS OF IDENTIFYING AND SELECTING IS DEVELOPMENT PROJECTS

Figure 4-4 Alternative projects and system design decisions can be assisted using weighted multicriteria analysis.

Criteria	Weight	Alternative A		Alternative B		Alternative C	
		Rating	Score	Rating	Score	Rating	Score
Requirements							
Real-time data entry	18	5	90	5	90	5	90
Automatic reorder	18	1	18	5	90	5	90
Real-time data query	14	1	14	5	70	5	70
	50		122		250		250
Constraints							
Developer costs	15	4	60	5	75	3	45
Hardware costs	15	4	60	4	60	3	45
Operating costs	15	5	75	1	15	5	75
Ease of training	5	5	25	3	15	3	15
	50		220		165		180
Total	100		342		415		430

IDENTIFYING AND SELECTING IS DEVELOPMENT PROJECTS

- Knowledge of overall **organizational business strategy** will:
 - Improves project selection and identification process
 - Provides sound guidance throughout the systems development life cycle

Notes

Need a



CORPORATE AND INFORMATION SYSTEMS PLANNING

- Traditional Project Identification and Selection
 - Solves isolated problems
 - Focuses on business processes
 - Does not easily allow for organizational change
- Planning-Based Approach to Project Identification and Selection
 - Focuses on present and future information needs
 - Information needs change slower than business processes

Corporate and Information Systems Planning

- Need for planning
 - Improperly planned projects result in systems that **cannot** be shared across an organization
 - As business processes change, lack of integration will hamper strategy and business process changes

Corporate and Information Systems Planning

■ Corporate Strategic Planning

- An ongoing Process of developing and refining models of the current and future enterprise as well as a transition strategy
- CSP results in several outcomes
 - Mission Statement
 - Objective Statement
 - Competitive Strategy

Corporate and Information Systems Planning

■ Corporate Strategic Planning

Mission Statement

- A statement that makes it clear what business a company is.

Statement of Objectives

- A series of statements that express an organization's qualitative and quantitative goals for reaching a desired future position
- Objectives are critical success factors

Corporate and Information Systems Planning

■ Corporate Strategic Planning

□ Competitive Strategy

- The method by which an organization attempts to achieve its mission and objectives in a way better than its competitors (such as lower cost producer, product differentiation, or product focus)

Corporate and Information Systems Planning

- **Information Systems Planning (ISP)**
 - An orderly means of assessing the **information needs** of an organization and defining the **systems**, **databases** and **technologies** that will best satisfy those needs
 - Three key activities:
 - Describe the Current Situation
 - Describe the Target (or Future) Situation
 - Develop a Transition Plan and Strategy

Corporate and Information Systems Planning

■ Information Systems Planning

I. Describing the Current Situation

□ Top-down Planning

- Generic methodology that attempts to gain a broad understanding of the information system needs of the entire organization, **advantages of this approach are broader perspective, improved integration, improved management support, and better understanding.**

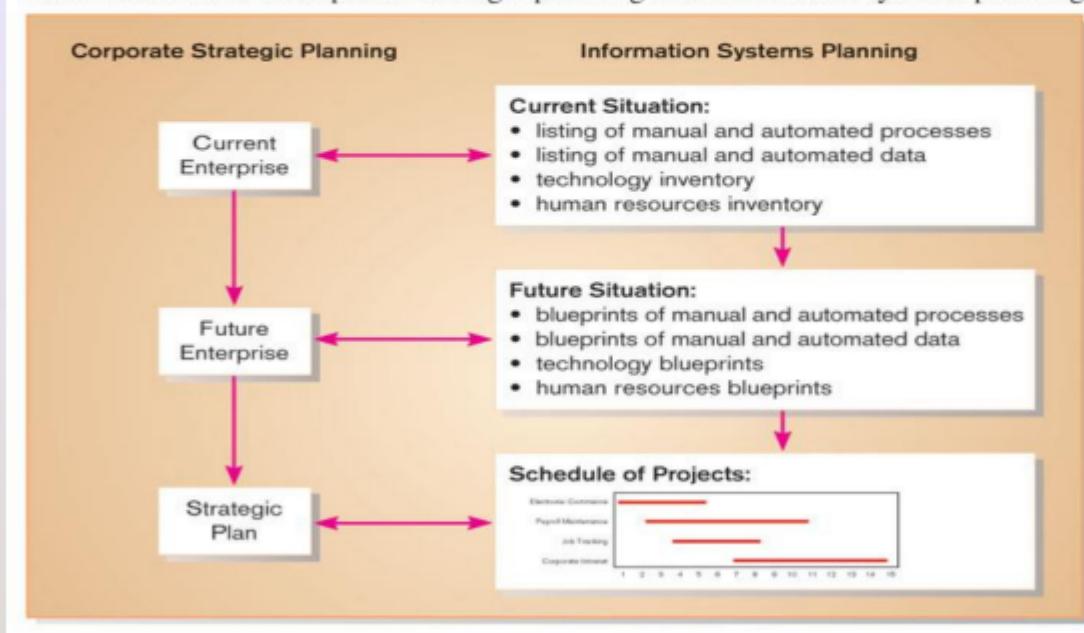
□ Bottom-up Planning

- Generic methodology that identifies and defines IS development projects based upon solving operational business problems or taking advantage of some business opportunities

INFORMATION SYSTEMS PLANNING

Figure 4-10

Parallel activities of corporate strategic planning and information systems planning



Corporate and Information Systems Planning

- Describing the Current Situation
 - Planning team is chartered to model existing situation
 - Identification of Organizational:
 - Locations
 - Units
 - Functions
 - Processes
 - Data
 - Information Systems
 - Prepare Metrics

Corporate and Information Systems Planning

2. Describing the Target Situation

- Update list of organizational locations, functions, etc. to reflect desired locations, functions, etc.
- Matrices are updated to reflect future states
- Planners focus on differences between current lists and matrices and future lists and matrices

Corporate and Information Systems Planning

3. Developing a Transition Strategy and Plans

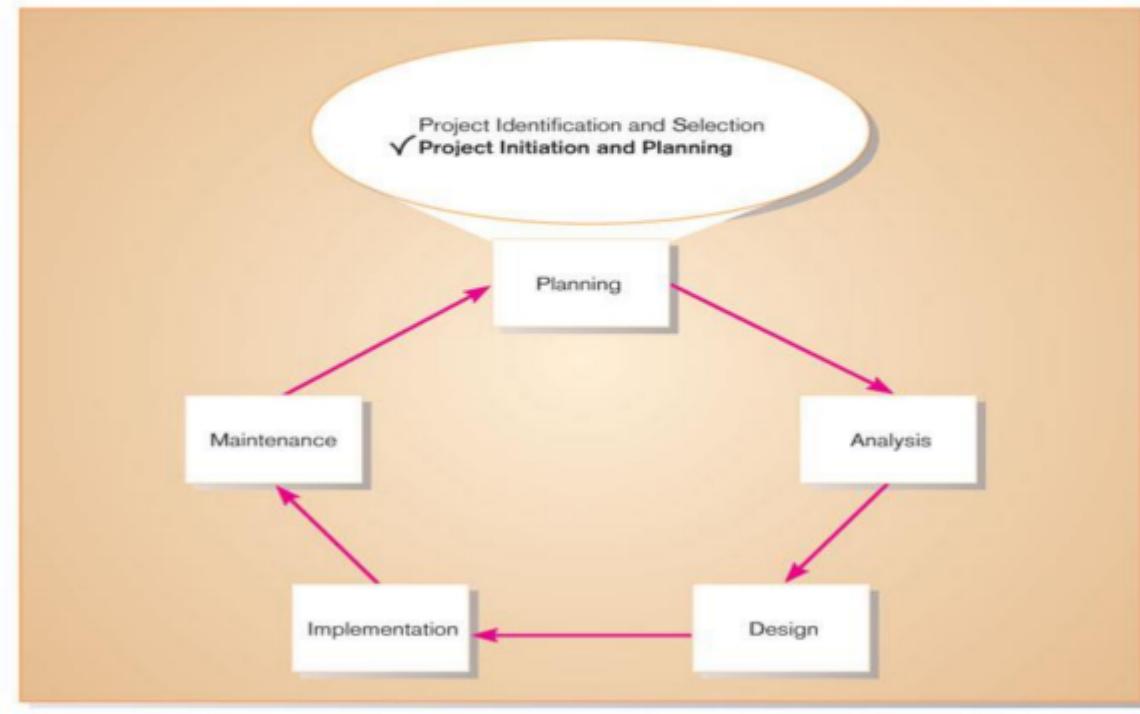
- Broad, comprehensive document that looks at both short and long-term organizational development needs
- Consists of a series of projects

INITIATING AND PLANNING SYSTEMS DEVELOPMENT PROJECTS

- What must be considered when making the decision on the division between project initiation and planning (PIP) and analysis.
- How much effort should be expended on the PIP process?
- Who is responsible for performing the PIP process?
- Why is PIP such a challenging activity?

THE PROCESS OF INITIATING AND PLANNING IS DEVELOPMENT PROJECTS

Figure 5-1 Systems development life cycle with project initiation and planning highlighted



The Process of Initiating and Planning IS Development Projects

- Project initiation focuses on activities designed to assist in organizing a team to conduct project planning.
- *Establishing the Project Initiation Team.*
- *Establishing a Relationship with the Customer*

The Process of Initiating and Planning IS Development Projects

- Elements of Project Initiation
 - Establishment of project **team**
 - Development of **relationship** with customer
 - Establishing the project **Initiation Plan**
 - Establishment of Management **Procedures**
 - Establishment of Project **Workbook** and Project Management Environment

The Process of Initiating and Planning IS Development Projects

- The key activity of project initiation is the development of the *project charter*.
 - A short document that is prepared for both internal and external stakeholders.
 - Provides a high-level overview of the project.
 - Useful communication tool that helps to assure that the organizations and other stakeholders understand the initiation of a project

The Process of Initiating and Planning IS Development Projects

- A project charter typically contains:
 - Project title and date of authorization
 - Project manager name and contact information
 - Customer name and contact information
 - Projected start and completion dates

The Process of Initiating and Planning IS Development Projects

- Key stakeholders, project role, and responsibilities
- Project objectives and description
- Key assumptions or approach
- Signature section for key stakeholders

The Process of Initiating and Planning IS Development Projects

- The key activity of project planning is the process of defining clear, discrete activities and the work needed to complete each activity within a single project.
- The objective of the project planning process is the development of a *Baseline Project Plan (BPP)* and the *Project Scope Statement (PSS)*

PROJECT PLANNING

- Is the process of defining clear, discrete activities and the work needed to complete each activity, the elements are:
 - describe the project scope, alternative, and feasibility.
 - Divide project into manageable tasks.
 - Estimate resources, and create resource plan.
 - Developing a preliminary schedule.
 - Developing a communication plan.
 - Determining project standards and procedures.
 - Identifying and assessing risks.
 - Creating a preliminary budget.
 - Developing a Statement Of Work.
 - Setting a Baseline Project Plan.

INITIATING AND PLANNING SYSTEM DEVELOPMENT PROJECTS

■ Major Deliverables and Outcomes of the plan:

Business Case

- Justification for an information system.
- Presented in terms of the tangible and intangible economic benefits and costs.
- The technical and organizational feasibility of the proposed system

Project Scope Statement (PSS)

- A document prepared for the customer.
- Describes what the project will deliver.
- Outlines at a high level all work required to complete the project.

Baseline Project Plan (BPP), contains the best estimates of :

- A major outcome and deliverable from the PIP phase.
- Contains the best estimate of a project's scope, benefits, costs, risks, and resource requirements.

Statement of Work (SOW)

- Describes deliverables
- Outlines work needed to be performed

ASSESSING PROJECT FEASIBILITY

- **Categories of feasibility:**

- Economic**
- Technical**
- Operational**
- Schedule**
- Political**

Assessing Project Feasibility

Economic Feasibility

- A process of identifying the financial benefits and costs associated with a development project.
 - Cost estimation
 - Cost Benefit Ratio
 - Net Present Value
 - Internal Rate of Return

Assessing Project Feasibility

Economic Feasibility

- Cost estimation
 - Expert Judgement
 - Estimation by previous projects
 - Pricing to win
 - Algorithmic modeling

Assessing Project Feasibility

Algorithmic modeling- COCOMO Model

- COnstructive COst MOdel
- based on KLoC
- project category: organic, semi-detached and embedded
- types:
 - Basic COCOMO
 - Intermediate COCOMO
 - Detailed COCOMO

Assessing Project Feasibility

Basic COCOMO

$$E = a_b (KLOC \text{ or KDSI})^{\frac{b}{b}}$$

$$D = c_b (E)^{\frac{d}{b}}$$

$$P = E/D$$

Software project	a_b	b_b	c_b	d_b
Organic	2.4	1.05	2.5	0.38
Semi-detached	3.0	1.12	2.5	0.35
Embedded	3.6	1.20	2.5	0.32

where **E** is the effort applied in person-months, **D** is the development time in chronological months, **KLOC / KDSI** is the estimated number of delivered lines of code for the project (expressed in thousands), and **P** is the number of people required. The coefficients a_b , b_b , c_b and d_b are given in next slide.

Assessing Project Feasibility

Basic COCOMO

We have determined our project fits the characteristics of **Semi-Detached** mode

We estimate our project will have **32,000** Delivered Source Instructions.
Using the formulas, we can estimate:

$$\text{Effort} = 3.0 * (32)^{1.12} = 146 \text{ man-months}$$

$$\text{Schedule} = 2.5 * (146)^{0.35} = 14 \text{ months}$$

$$\begin{aligned}\text{Productivity} &= 32,000 \text{ DSI} / 146 \text{ MM} \\ &= 219 \text{ DSI/MM}\end{aligned}$$

$$\begin{aligned}\text{Average Staffing} &= 146 \text{ MM} / 14 \text{ months} \\ &= 11\end{aligned}$$

Assessing Project Feasibility

Intermediate COCOMO

- Intermediate COCOMO computes software development effort as function of program size
- Along with set of "cost drivers" that include subjective assessment of **product, hardware, personnel** and **project** attributes
- These cost drivers are used to calculate Effort Adjustment Factor (EAF)



Assessing Project Feasibility

Intermediate
COCOMO

Cost Drivers	Ratings					
	Very Low	Low	Nominal	High	Very High	Extra High
Product attributes						
Required software reliability	0.75	0.88	1.00	1.15	1.40	
Size of application database		0.94	1.00	1.08	1.16	
Complexity of the product	0.70	0.85	1.00	1.15	1.30	1.65
Hardware attributes						
Run-time performance constraints			1.00	1.11	1.30	1.66
Memory constraints			1.00	1.06	1.21	1.56
Volatility of the virtual machine environment	0.87	1.00	1.15	1.30		
Required turnabout time	0.87	1.00	1.07	1.15		
Personnel attributes						
Analyst capability	1.46	1.19	1.00	0.86	0.71	
Applications experience	1.29	1.13	1.00	0.91	0.82	
Software engineer capability	1.42	1.17	1.00	0.86	0.70	
Virtual machine experience	1.21	1.10	1.00	0.90		
Programming language experience	1.14	1.07	1.00	0.95		
Project attributes						
Application of software engineering methods	1.24	1.10	1.00	0.91	0.82	
Use of software tools	1.24	1.10	1.00	0.91	0.83	
Required development schedule	1.23	1.08	1.00	1.04	1.10	

Assessing Project Feasibility

Intermediate COCOMO

The Intermediate Cocomo formula now takes the form:

$$E = a_i (KLoC)^{b_i} (EAF)$$

E --> effort applied in person-months,

KLoC --> estimated number of thousands of delivered lines of code

EAF --> effort adjustment factor

The coefficient a_i

Software project	a_i	b_i	n in the table
Organic	3.2	1.05	
Semi-detached	3.0	1.12	
Embedded	2.8	1.20	

Assessing Project Feasibility

Detailed COCOMO

The Intermediate COCOMO formula now takes the form:

Notes

Nepal

THE TIME VALUE OF MONEY

■ Net Present Value (NPV)

- Determines present value of cash outflows and inflows during the course of project life cycle

$$NPV = \sum_{t=0}^n \frac{R_t}{(1+i)^t}$$

where:

R_t = Net cash inflow-outflows during a single period t

i = Discount rate or return that could be earned in alternative investments

t = Number of timer periods

THE TIME VALUE OF MONEY

For example, imagine a project that costs \$1,000 and will provide three cash flows of \$500, \$300, and \$800 over the next three years. Assume there is no salvage value at the end of the project and the required rate of return is 8%. The NPV of the project is calculated as follows:

THE TIME VALUE OF MONEY

$$NPV = \frac{-\$1000}{(1 + 0.08)^0} + \frac{\$500}{(1 + 0.08)^1} + \frac{\$300}{(1 + 0.08)^2} + \frac{\$800}{(1 + 0.08)^3}$$
$$= \$355.23$$

THE TIME VALUE OF MONEY

■ Internal Rate of Return (IRR)

Determines estimate the profitability of potential investments

$$\sum_{t=0}^n \frac{R_t}{(1+i)^t} = 0$$

where:

R_t = Net cash inflow-outflows during a single period t

i = Internal rate of return

t = Number of timer periods

Assessing Project Feasibility

-
- **Technical Feasibility**, a process of assessing the development organization's ability to construct a proposed system.
 - The potential consequences of not assessing and managing risks can include the following:
 - Failure to attain expected benefits from the project,
 - Inaccurate project cost estimates,
 - Inaccurate project duration estimates,
 - Failure to achieve adequate system performance levels, and
 - Failure to adequately integrate the new system with existing hardware, software, or organizational procedures.

Assessing Project Feasibility

■ **Operational**

- Does the proposed system solve problems or take advantage of opportunities?

■ **Scheduling**

- Can the project time frame and completion dates meet organizational deadlines?

■ **Political**

- Feasible under rules and regulations of state/country?
- Feasible under norms and values of society?

BUILDING THE BASELINE PROJECT PLAN

- **Baseline Project Plan (BPP)** is a document intended primarily to guide the development team.
- Sections:
 - Introduction
 - System description
 - Feasibility assessment
 - Management issues

Building the Baseline Project Plan

(CONT..)

-
- Project Scope statement is part of the BPP introduction.
 - Sections:
 - Problem statement
 - Project objectives
 - Project description
 - Business benefits
 - Deliverables
 - Expected duration

Building the Baseline Project Plan

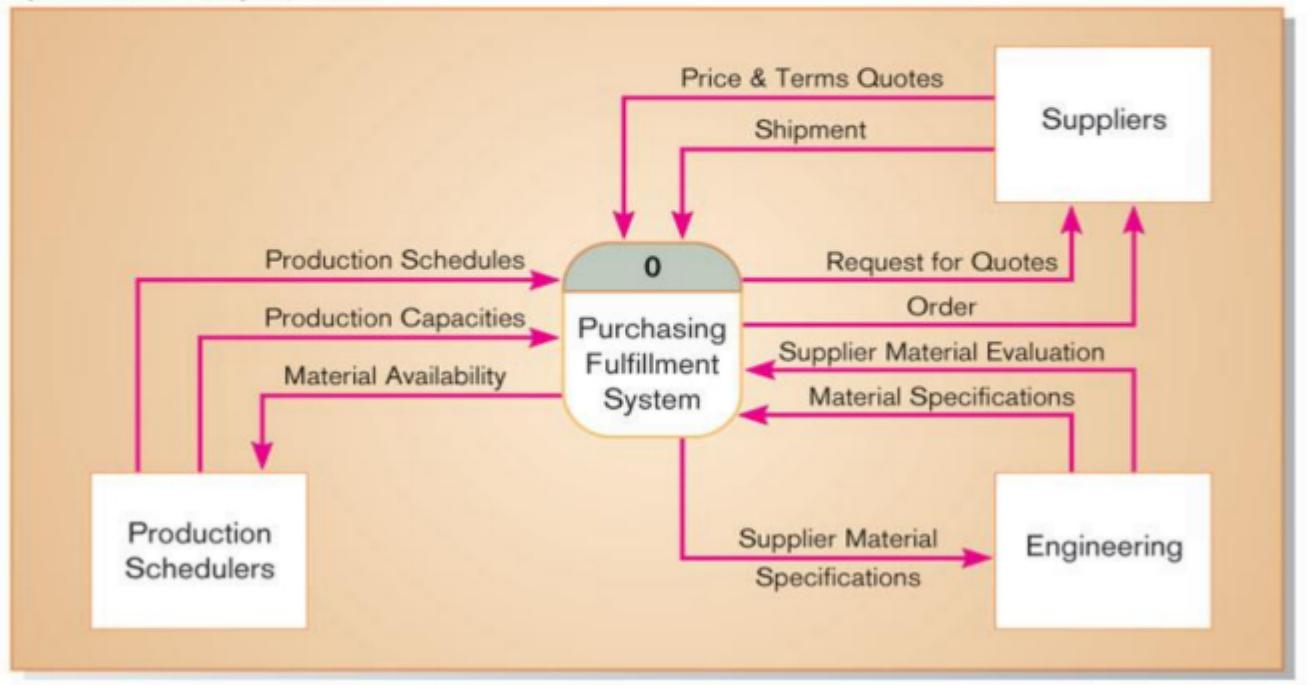
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Factors in Determining Scope

- Organizational units affected by new system
- Current systems that will interact with or change because of new system
- People who are affected by new system
- Range of potential system capabilities

Building the Baseline Project Plan (CONT..)

Figure 5-12 Context-level data flow diagram showing project scope for Purchasing Fulfillment System (Pine Valley Furniture)



BUILDING THE BASELINE PROJECT PLAN (CONT..)

- *System description* section outlines possible alternative solutions.
- *Feasibility assessment* section outlines issues related to project costs and benefits, technical difficulties, and other such concerns.
- *Management issues* section outlines a number of managerial concerns related to the project

REVIEWING THE BASELINE PROJECT PLAN

- **Structured Walkthroughs:** a peer-group review of any product created during the system development process
- Roles: coordinator, presenter, user, secretary, standard-bearer, maintenance oracle
- Can be applied to BPP, system specifications, logical and physical designs, program code, test procedures, manuals and documentation
- **Objectives**
 - Assure conformity to organizational standards
 - All parties agree to continue with project

