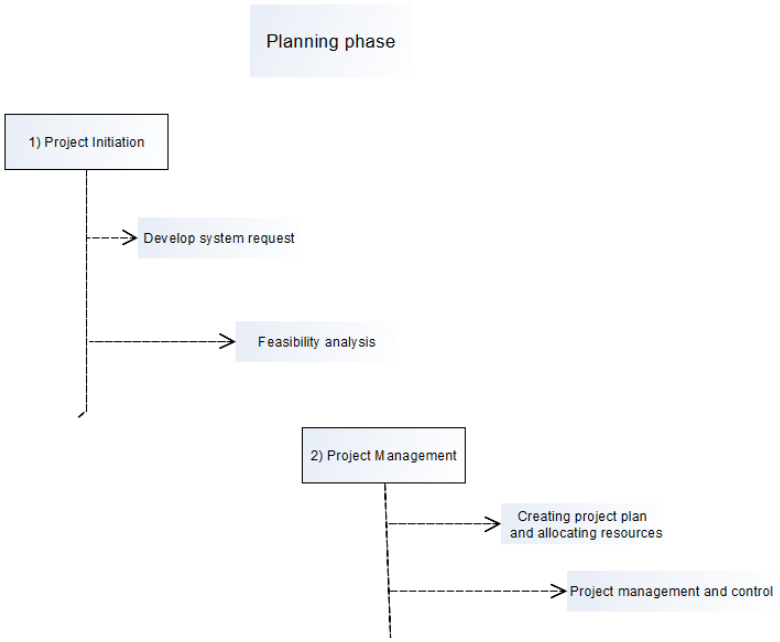
SDLC phase 1: PLANNING



The planning phase is divided into two steps.

i) Project Initiation:

This is the very first step of system development. We discuss this step by dividing it into two sub-steps: *Developing system request and Feasibility analysis.*

a. A system request presents a brief summary of a business need, and it explains how a system that supports the need will create business value. Most ideas for new systems come from outside the IS area (from the marketing department, accounting department etc.) in the form of a system request.

b. The IS department works together with the person or department generating the request (called the project sponsor) to conduct
a feasibility analysis. The feasibility analysis examines key aspects of the proposed project:
   - The technical feasibility (Can we build it?)
   - The economic feasibility (Will it provide business value?)
   - The organizational feasibility (If we build it, will it be used?)

ii) Project Management:

Once the project is approved, it enters project management. During project management, the project manager creates a work plan, allocates resources necessary for the project and staffs the project, puts techniques in place to

help the project team control and direct the project through the entire SDLC. The deliverable for project management is a project plan that describes how the project team will go about developing the system.

The brief description of **planning phase** is given above. Now we will discuss the details of **"Feasibility analysis"**.

FEASIBILITY ANALYSIS

- Feasibility analysis guides the organization in determining whether to proceed with the project. Feasibility analysis also identifies the important risks associated with the project that must be managed if the project is approved.

- As with the system request, each organization has its own process and format for the feasibility analysis, but most include techniques to assess three areas: technical feasibility, economic feasibility, and organizational feasibility (see Figure 1-7). The results of evaluating these three feasibility factors are combined into a feasibility study deliverable that is submitted to the approval committee at the end of project initiation.

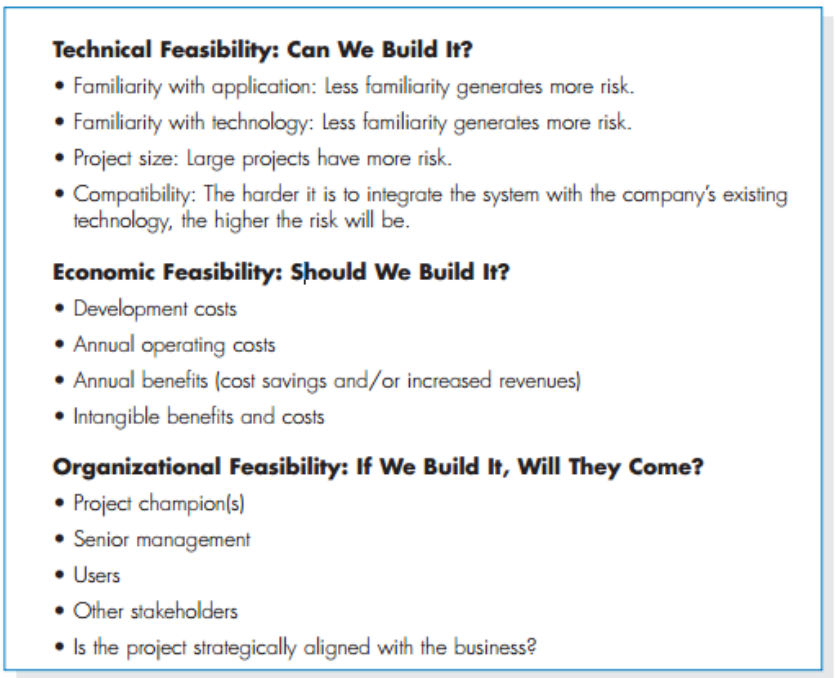


FIGURE 1-7
Feasibility Analysis Assessment Factors

i) Technical Feasibility: For details description, see: **System Analysis and Design (5th edition): chapter 1.**

ii) Economic Feasibility:

- Economic feasibility is determined by identifying costs and benefits associated with the system, assigning values to them, calculating future cash flows, and measuring the financial worthiness of the project.
- Organizations have limited capital resources and multiple projects will be competing for funding, so it is important to analyze the economic feasibility before starting a new project.
- We will discuss two different methods for economic feasibility analysis: Simple Cash Flow Method and discounted cash flow method.

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1. Identify Costs and Benefits	List the tangible costs and benefits for the project. Include both one-time and recurring costs.
2. Assign Values to Costs and Benefits	Work with business users and IT professionals to create numbers for each of the costs and benefits. Even intangibles should be valued if at all possible.
3. Determine Cash Flow	Forecast what the costs and benefits will be over a certain period, usually, three to five years. Apply a growth rate to the values, if necessary.
4. Assess Project's Economic Value	Evaluate the project's expected returns in comparison to its costs. Use one or more of the following evaluation techniques:
• **Return on Investment (ROI)**	Calculate the rate of return earned on the money invested in the project, using the ROI formula.
• **Break-Even Point (BEP)**	Find the year in which the cumulative project benefits exceed cumulative project costs. Apply the breakeven formula, using figures for that year. This calculation measures how long it will take for the system to produce benefits that cover its costs.
• **Net Present Value (NPV)**	Restate all costs and benefits in today's dollar terms (present value), using an appropriate discount rate. Determine whether the total present value of benefits is greater than or less than the total present value of costs.

FIGURE 1-10
Steps to Conduct an Economic Feasibility Analysis

Development Costs	Operational Costs
Development team salaries	Software upgrades
Consultant fees	Software licensing fees
Development training	Hardware repairs
Hardware and software	Hardware upgrades
Vendor installation	Operational team salaries
Office space and equipment	Communications charges
Data conversion costs	User training

Tangible Benefits	Intangible Benefits
Increased sales	Increased market share
Reductions in staff	Increased brand recognition
Reductions in inventory	Higher quality products
Reductions in IT costs	Improved customer service
Better supplier prices	Better supplier relations

FIGURE 1-11
Example of Costs and Benefits for Economic Feasibility

Once the costs and benefits are identified and monetary values are assigned, we need to determine the cash flow. Now what is **Cash Flow**?

- A formal cost–benefit analysis usually contains costs and benefits over a selected number of years (usually, three to five years) to show cash flow over time. In simple words, we predict or forecast the costs and benefits for next several years and project the flow of cash over time- this is called cash flow.

		Year 0	Year 1	Year 2	Year 3	Total
	Total Benefits		45,000	50,000	57,000	152,000
	Total Costs	100,000	10,000	12,000	16,000	138,000
③	Net Benefits (Total Benefits − Total Costs)	(100,000)	35,000	38,000	41,000	14,000
④	Cumulative Net Cash Flow	(100,000)	(65,000)	(27,000)	14,000	

FIGURE 1-8
Simple Cash Flow Projection

ROI, BEP, NPV:

$$\text{ROI} = \frac{\text{Total Benefits} - \text{Total Costs}}{\text{Total Costs}}$$

(*In the year in which Cumulative Cash Flow turns positive*):

$$\text{BEP} = \begin{matrix}\text{Number of}\\ \text{years of}\\ \text{negative}\\ \text{cash flow}\end{matrix} + \frac{\text{That year's Net Cash Flow} - \text{That year's Cumulative Cash Flow}}{\text{That year's Net Cash Flow}}$$

$$\text{NPV} = \sum \text{PV of Total Benefits} - \sum \text{PV of Total Costs}$$

We need to calculate the NPV to determine if a project is economically feasible or not. As long as the NPV is greater than zero, the project is considered economically acceptable.

What are the disadvantages of Simple Cash Flow method and how to overcome it?

Simple cash flow method does not recognize the time value of money. In these method, the timing of cash flows is ignored. A dollar in Year 3 of the project is considered to be exactly equivalent to a dollar received in Year 1.

Another method namely “Discounted cash flow method” eliminates this problem by using the concept of “rate of return”. It uses the following formula to calculate the present value of money.

$$PV = \frac{\text{Cash flow amount}}{(1 + \text{rate of return})^n}$$ where n is the year in which the cash flow occurs.

By the above formula, $100 received in 3 years with a required rate of return of 10% has a PV of $75.13.

	Year 0	Year 1	Year 2	Year 3	Total
Total Benefits		45,000	50,000	55,000	
PV of Total Benefits		40,909	41,322	42,825	125,056
Total Costs	100,000	10,000	12,000	16,000	
PV of Total Costs	100,000	9,091	9,917	12,021	131,029

FIGURE 1-9
Discounted Cash Flow Projection

Math example:

	2012	2013	2014	2015	2016	Total
Benefits						
Increased sales		500,000	530,000	561,800	595,508	2,187,308
Reduction in customer complaint calls[a]		70,000	70,000	70,000	70,000	280,000
Reduced inventory costs		68,000	68,000	68,000	68,000	272,000
Total Benefits[b]		**638,000**	**668,000**	**699,800**	**733,508**	**2,739,308**
Development Costs						
2 servers @ $125,000	250,000	0	0	0	0	250,000
Printer	100,000	0	0	0	0	100,000
Software licenses	34,825	0	0	0	0	34,825
Server software	10,945	0	0	0	0	10,945
Development labor	1,236,525	0	0	0	0	1,236,525
Total Development Costs	**1,632,295**	**0**	**0**	**0**	**0**	**1,632,295**
Operational Costs						
Hardware		50,000	50,000	50,000	50,000	200,000
Software		20,000	20,000	20,000	20,000	80,000
Operational labor		115,000	119,600	124,384	129,359	488,343
Total Operational Costs		**185,000**	**189,600**	**194,384**	**199,359**	**768,343**
Total Costs	**1,632,295**	**185,000**	**189,600**	**194,384**	**199,359**	**2,400,638**
Total Benefits − Total Costs	**(1,632,295)**	**453,000**	**478,400**	**505,416**	**534,149**	**338,670**
Cumulative Net Cash Flow	**(1,632,295)**	**(1,179,295)**	**(700,895)**	**(195,479)**	**338,670**	
Return on Investment (ROI)	**14.1%**	**(338,670/2,400,638)**				
Break-even Point	**3.37 years**	**(3 years of negative cumulative cash flow + [534,149 − 338,670]/534,149 = .37)**				

[a] Customer service values are based on reduced costs of handling customer complaint phone calls.

[b] An important yet intangible benefit will be the ability to offer services that our competitors currently offer.

FIGURE 1-12
Cost–Benefit Analysis — Simple Cash Flow Method

	2012	2013	2014	2015	2016	Total
Benefits						
Increased sales		500,000	530,000	561,800	595,508	
Reduction in customer complaint calls[a]		70,000	70,000	70,000	70,000	
Reduced inventory costs		68,000	68,000	68,000	68,000	
Total Benefits[b]		**638,000**	**668,000**	**699,800**	**733,508**	
Present Value Total Benefits		**601,887**	**594,518**	**587,566**	**581,007**	**2,364,978**
Development Costs						
2 Servers @ $125,000	250,000	0	0	0	0	
Printer	100,000	0	0	0	0	
Software licenses	34,825	0	0	0	0	
Server software	10,945	0	0	0	0	
Development labor	1,236,525	0	0	0	0	
Total Development Costs	**1,632,295**	**0**	**0**	**0**	**0**	
Operational Costs						
Hardware		50,000	50,000	50,000	50,000	
Software		20,000	20,000	20,000	20,000	
Operational labor		115,000	119,600	124,384	129,359	
Total Operational Costs		**185,000**	**189,600**	**194,384**	**199,359**	
Total Costs	**1,632,295**	**185,000**	**189,600**	**194,384**	**199,359**	
Present Value Total Costs	**1,632,295**	**174,528**	**168,743**	**163,209**	**157,911**	**2,296,686**
NPV (PV Total Benefits – PV Total Costs)						**68,292**

[a] Customer service values are based on reduced costs of handling customer complaint phone calls.

[b] An important yet intangible benefit will be the ability to offer services that our competitors currently offer.

FIGURE 1-13
Cost–Benefit Analysis—Discounted Cash Flow Method