

The background features several circular gauges and arrows. One large gauge on the left has a scale from 140 to 260. Other gauges are smaller and partially visible. Arrows indicate a clockwise direction of rotation for the gauges.

# PROJECT MANAGEMENT PART 2

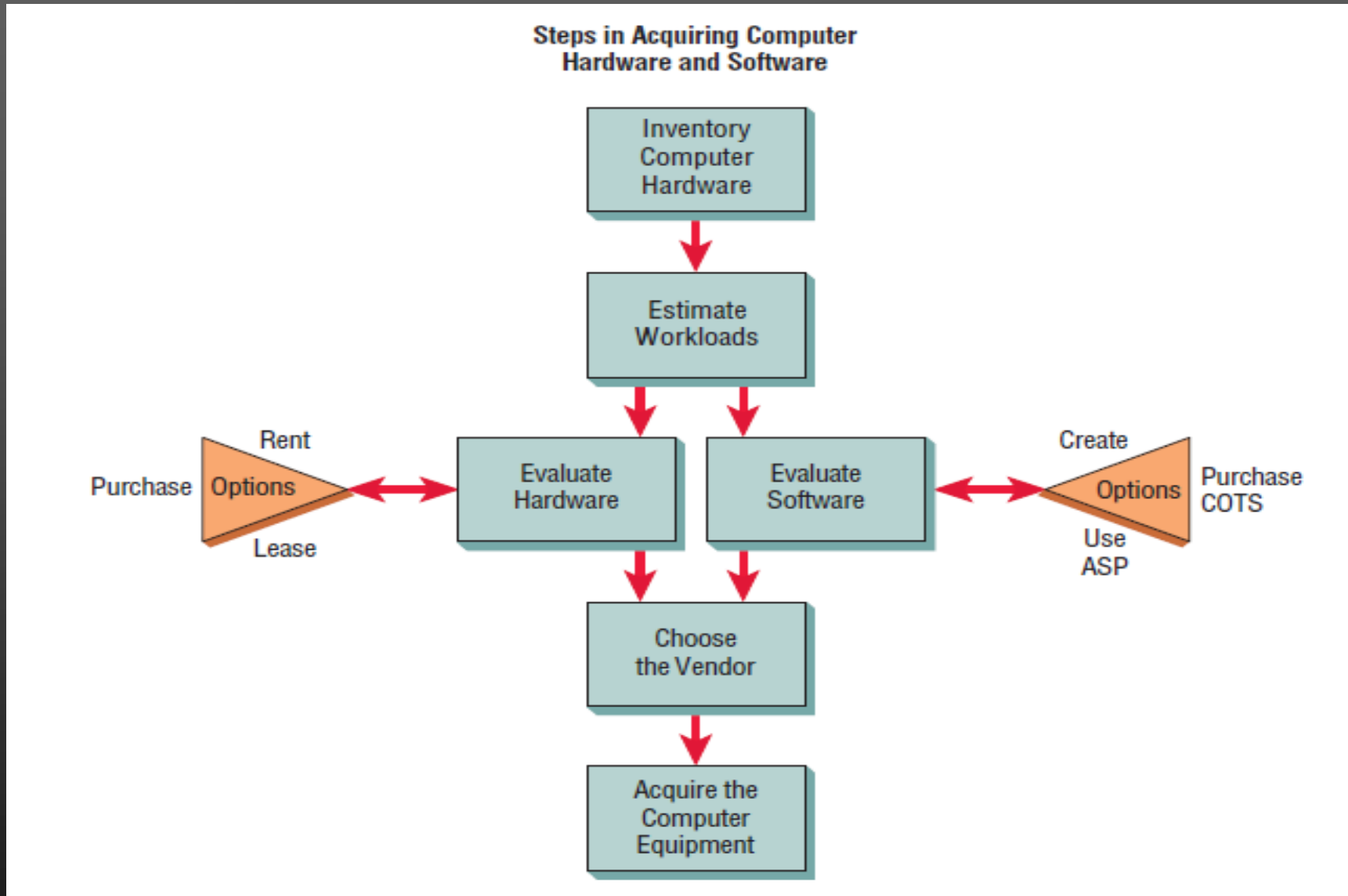
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# ASCERTAINING HARDWARE AND SOFTWARE NEEDS



# Comparison of Workload between Existing and proposed Systems

	Existing System	Proposed System
Task	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	<p>Daily: Enter shipments on Excel spreadsheet; verify accuracy of spreadsheet manually; and then write files to backup media.</p> <p>Monthly: Run program that summarizes daily records and prints report; get report and make evaluations.</p>	<p>Daily: Enter shipments on the Web-based system using drop-down boxes. Data are automatically backed up to remote location.</p> <p>Monthly: Compare warehouses online using the performance dashboard; print only if needed.</p>
Human time requirements	<p>Daily: 20 minutes</p> <p>Monthly: 30 minutes</p>	<p>Daily: 10 minutes</p> <p>Monthly: 10 minutes</p>
Computer time requirements	<p>Daily: 20 minutes</p> <p>Monthly: 30 minutes</p>	<p>Daily: 10 minutes</p> <p>Monthly: 10 minutes</p>

# ADVANTAGES AND DISADVANTAGES OF BUYING, LEASING AND RENTING

	Advantages	Disadvantages
<b>Buying</b>	<ul style="list-style-type: none"><li>• Cheaper than leasing or renting over the long run</li><li>• Ability to change system</li><li>• Provides tax advantages of accelerated depreciation</li><li>• Full control</li></ul>	<ul style="list-style-type: none"><li>• Initial cost is high</li><li>• Risk of obsolescence</li><li>• Risk of being stuck if choice was wrong</li><li>• Full responsibility</li></ul>
<b>Leasing</b>	<ul style="list-style-type: none"><li>• No capital is tied up</li><li>• No financing is required</li><li>• Leases are lower than rental payments</li></ul>	<ul style="list-style-type: none"><li>• Company doesn't own the system when lease expires</li><li>• Usually a heavy penalty for terminating the lease</li><li>• Leases are more expensive than buying</li></ul>
<b>Renting</b>	<ul style="list-style-type: none"><li>• No capital is tied up</li><li>• No financing is required</li><li>• Easy to change systems</li><li>• Maintenance and insurance are usually included</li></ul>	<ul style="list-style-type: none"><li>• Company doesn't own the computer</li><li>• Cost is very high because vendor assumes the risk (most expensive option)</li></ul>

## Advantages and Disadvantages of

(i) creating custom software,

(ii) purchasing COTS (commercial off the shelf software) packages, and

(iii) outsourcing to an ASP (application service provider)

	Advantages	Disadvantages
<b>Creating Custom Software</b>	<ul style="list-style-type: none"><li>• Specific response to specialized business needs</li><li>• Innovation may give firm a competitive advantage</li><li>• In-house staff available to maintain software</li><li>• Pride of ownership</li></ul>	<ul style="list-style-type: none"><li>• May be significantly higher initial cost compared to COTS software or ASP</li><li>• Necessity of hiring or working with a development team</li><li>• Ongoing maintenance</li></ul>
<b>Purchasing COTS Packages</b>	<ul style="list-style-type: none"><li>• Refined in the commercial world</li><li>• Increased reliability</li><li>• Increased functionality</li><li>• Often lower initial cost</li><li>• Already in use by other firms</li><li>• Help and training comes with software</li></ul>	<ul style="list-style-type: none"><li>• Programming focused; not business focused</li><li>• Must live with the existing features</li><li>• Limited customization</li><li>• Uncertain financial future of vendor</li><li>• Less ownership and commitment</li></ul>
<b>Using an ASP</b>	<ul style="list-style-type: none"><li>• Organizations that do not specialize in information systems can focus on what they do best (their strategic mission)</li><li>• There is no need to hire, train, or retain a large IT staff</li><li>• There is no expenditure of employee time on nonessential IT tasks</li></ul>	<ul style="list-style-type: none"><li>• Loss of control of data, systems, IT employees, and schedules</li><li>• Concern over the financial viability and long-run stability of the ASP</li><li>• Security, confidentiality, and privacy concerns</li><li>• Loss of potential strategic corporate advantage regarding innovativeness of applications</li></ul>

# COST BENEFIT ANALYSIS

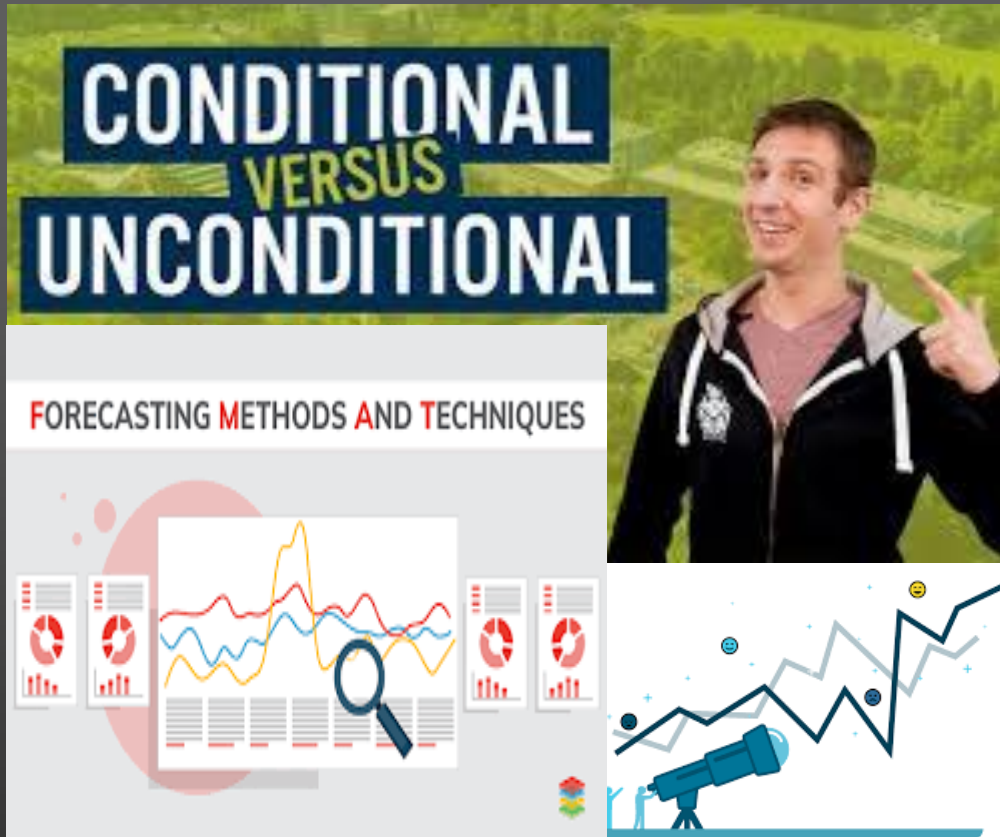


- Costs and benefits of the proposed computer system must always be considered together, because
- they are interrelated and often interdependent.
  
- Although the systems analyst is trying to propose a system that fulfills various information requirements,
- decisions to continue with the proposed system will be based on a cost-benefit analysis,
- not on information requirements.
  
- In many ways, benefits are measured by costs

# A. FORECASTING



- Systems analysts are required to predict certain key variables before the proposal is submitted to the client.
- To some degree, a systems analyst will rely on a what-if analysis, such as, “What if labor costs rise only 5 percent per year for the next three years, rather than 10 percent?”
- The systems analyst has many forecasting models available.
- The main condition for choosing a model is the availability of historical data.
- If they are unavailable, the analyst must turn to one of the judgment methods:
  - estimates from the sales force,
  - surveys to estimate customer demand,
  - Delphi studies (a consensus forecast developed independently by a group of experts through a series of iterations),
  - creating scenarios, or
  - drawing historical analogies.



- If historical data are available, the next differentiation between classes of techniques involves whether the forecast is conditional or unconditional.
- Conditional implies that there is an association among variables in the model or that such a causal relationship exists. Common methods in this group include correlation, regression, leading indicators, econometrics, and input/output models.
- Unconditional forecasting means the analyst isn't required to find or identify any causal relationships.
- Consequently, systems analysts find that these methods are low-cost, easy-to-implement alternatives.
- Included in this group are graphical judgment, moving averages, and analysis of time-series data.



## B. ESTIMATION OF TRENDS



- One way to estimate trends is to use a moving average.
- This method is useful because some seasonal, cyclical, or random patterns may be smoothed, leaving the trend pattern.
- The principle behind moving averages is to calculate the arithmetic mean of data from a fixed number of periods; a three-month moving average is simply the average of the last three months.
- For example, the average sales for January, February, and March is used to predict the sales for April. Then the average sales for February, March, and April are used to predict the sales for May, and so on.
- When the results are graphed, it is easily noticeable that the widely fluctuating data are smoothed.
- Disadvantage:
- Moving averages are more strongly affected by extreme values than by using graphical judgment or estimating using other methods such as least squares.
- The analyst should learn forecasting well, as it often provides information valuable in justifying the entire project.

# C. IDENTIFYING BENEFITS AND COSTS

**TANGIBLE**

Anything that you can feel with your hands!  
Perceptible by the senses especially the sense of touch!



- **TANGIBLE BENEFITS**
- Tangible benefits are advantages measurable in dollars that accrue to the organization through the use of the information system.
- Examples of tangible benefits are
  - an increase in the speed of processing,
  - access to otherwise inaccessible information,
  - access to information on a more timely basis than was possible before,
  - the advantage of the computer's superior calculating power, and
  - decreases in the amount of employee time needed to complete specific tasks.
- Although measurement is not always easy, tangible benefits can actually be measured in terms of dollars, resources, or time saved.



- **INTANGIBLE BENEFITS**

- Some benefits that accrue to the organization from the use of the information system are difficult to measure but are important nonetheless.



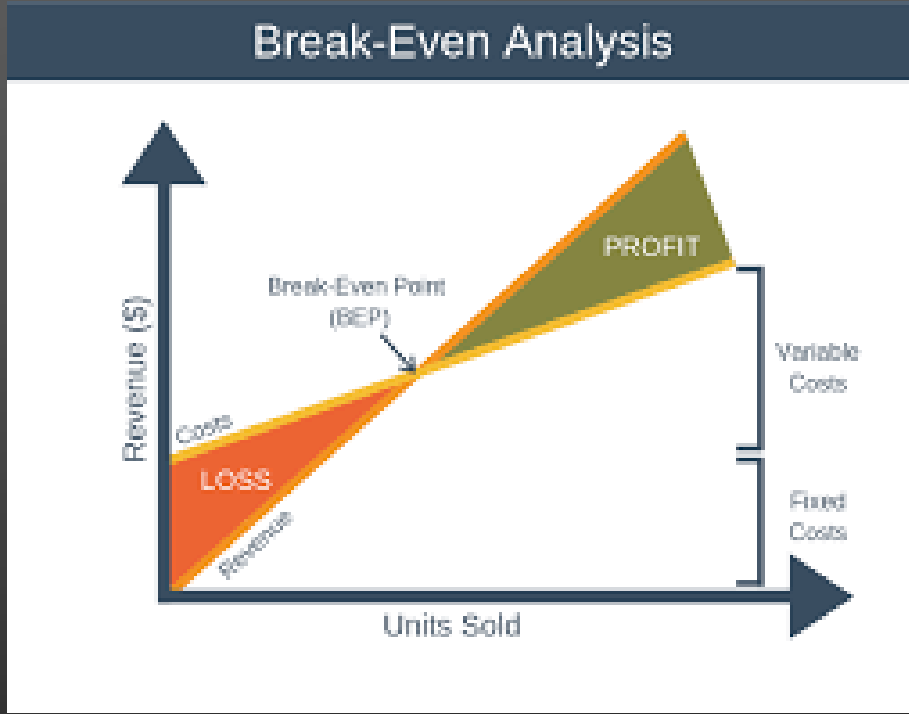
- Intangible benefits include
  - improving the decision-making process,
  - enhancing accuracy,
  - Becoming more competitive in customer service,
  - maintaining a good business image, and
  - Increasing job satisfaction for employees by eliminating tedious tasks.
- 
- intangible benefits are extremely important and can have far-reaching implications for the business as it relates to people both outside and within the organization.
  - Although intangible benefits of an information system are important factors that must be considered when deciding whether to proceed with a system, a system built solely for its intangible benefits will not be successful.



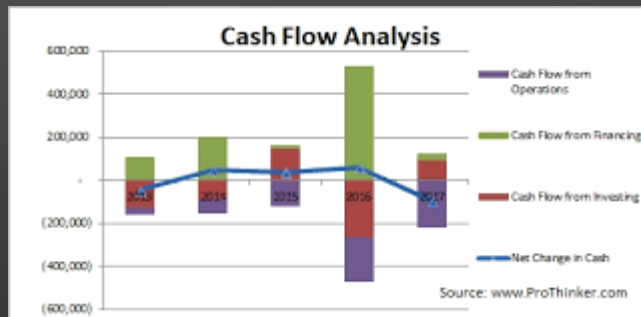
- **TANGIBLE COSTS**
  - The concepts of tangible and intangible costs present a conceptual parallel to the tangible and intangible benefits discussed already.
  - Tangible costs are those that can be accurately projected by the systems analyst and the business's accounting personnel.
  - Included in tangible costs are the cost of equipment such as computers and terminals, the cost of resources, the cost of systems analysts' time, the cost of programmers' time, and other employees' salaries.
  - These costs are usually well established or can be discovered quite easily, and are the costs that will require a cash outlay of the business.
- 
- **INTANGIBLE COSTS**
  - Intangible costs are difficult to estimate and may not be known.
  - They include losing a competitive edge,
  - losing the reputation for being first with an innovation or the leader in a field,
  - declining company image due to increased customer dissatisfaction, and
  - ineffective decision making due to untimely or inaccessible information.

# D. COMPARING COSTS AND BENEFITS

- They include break-even analysis, payback, cash-flow analysis, and present value analysis.
- All these techniques provide straightforward ways of yielding information to decision makers about the worthiness of the proposed system.



- **BREAK-EVEN ANALYSIS.**
- The point at which the total costs of the current system and the proposed system intersect represents the break-even point,
- the point where it becomes profitable for the business to get the new information system.
- Total costs include the costs that recur during operation of the system plus the developmental costs that occur only once (one-time costs of installing a new system), that is, the tangible costs
- One disadvantage of break-even analysis is that benefits are assumed to remain the same, regardless of which system is in place
- Break-even analysis can also determine how long it will take for the benefits of the system to pay back the costs of developing it.



- **CASH-FLOW ANALYSIS.**
- Cash-flow analysis examines the direction, size, and pattern of cash flow that is associated with the proposed information system.
- If you are proposing the replacement of an old information system with a new one and if the new information system will not be generating any additional cash for the business, only cash outlays are associated with the project.
- If that is the case, the new system cannot be justified on the basis of new revenues generated and must be examined closely for other tangible benefits if it is to be pursued further.
- Cash-flow analysis is used to determine when a company will begin to make a profit and when it will be “out of the red,” that is, when revenue has made up for the initial investment
- The proposed system should have increased revenues along with cash outlays.
- Then the size of the cash flow must be analyzed along with the patterns of cash flow associated with the purchase of the new system.

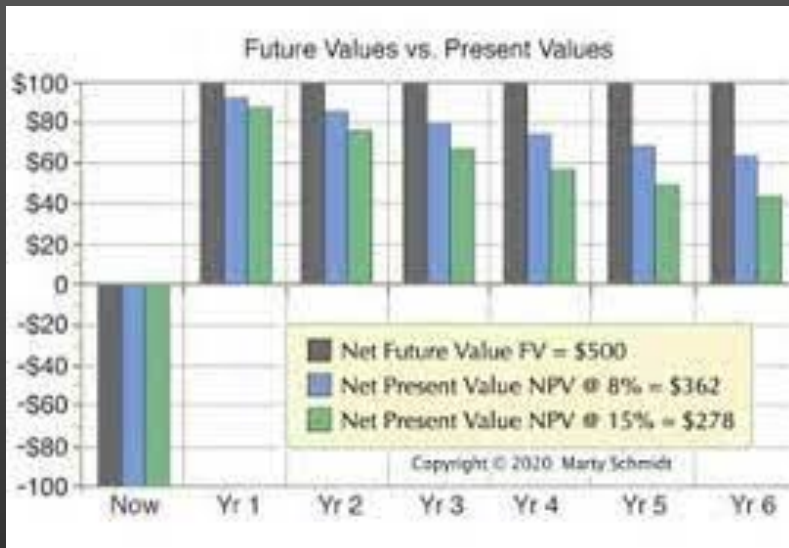
## Net Present Value Formula



$$NPV = \sum \frac{CF_n}{(1+i)^n} - \text{Initial Investment}$$



- **PRESENT VALUE ANALYSIS.**
- Present value analysis helps the systems analyst to present to business decision makers the time value of the investment in the information system as well as the cash flow
- Present value is a way to
- assess all the economic outlays
- revenues of the information system over its economic life,
- to compare costs today with future costs and
- today's benefits with future benefits.



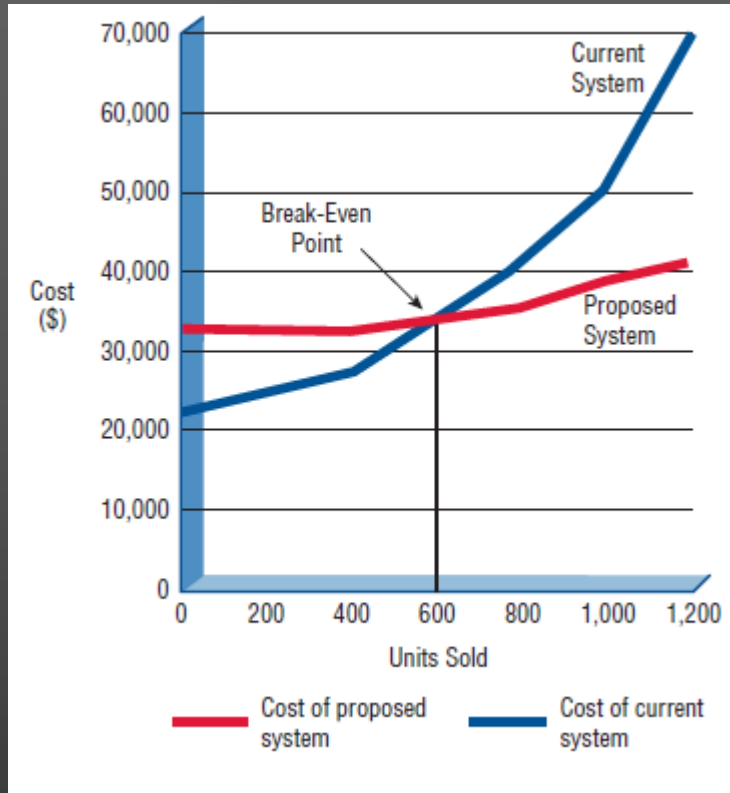


- **GUIDELINES FOR ANALYSIS.**
- **1.** Use break-even analysis if the project needs to be justified in terms of cost, not benefits, or if benefits do not substantially improve with the proposed system.
- **2.** Use payback when the improved tangible benefits form a convincing argument for the proposed system.
- **3.** Use cash-flow analysis when the project is expensive relative to the size of the company or when the business would be significantly affected by a large drain (even if temporary) on funds.
- **4.** Use present value analysis when the payback period is long or when the cost of borrowing money is high.
- Whichever method is chosen, it is important to remember that cost-benefit analysis should be approached systematically, in a way that can be explained and justified to managers, who will eventually decide whether to commit resources to the systems project.

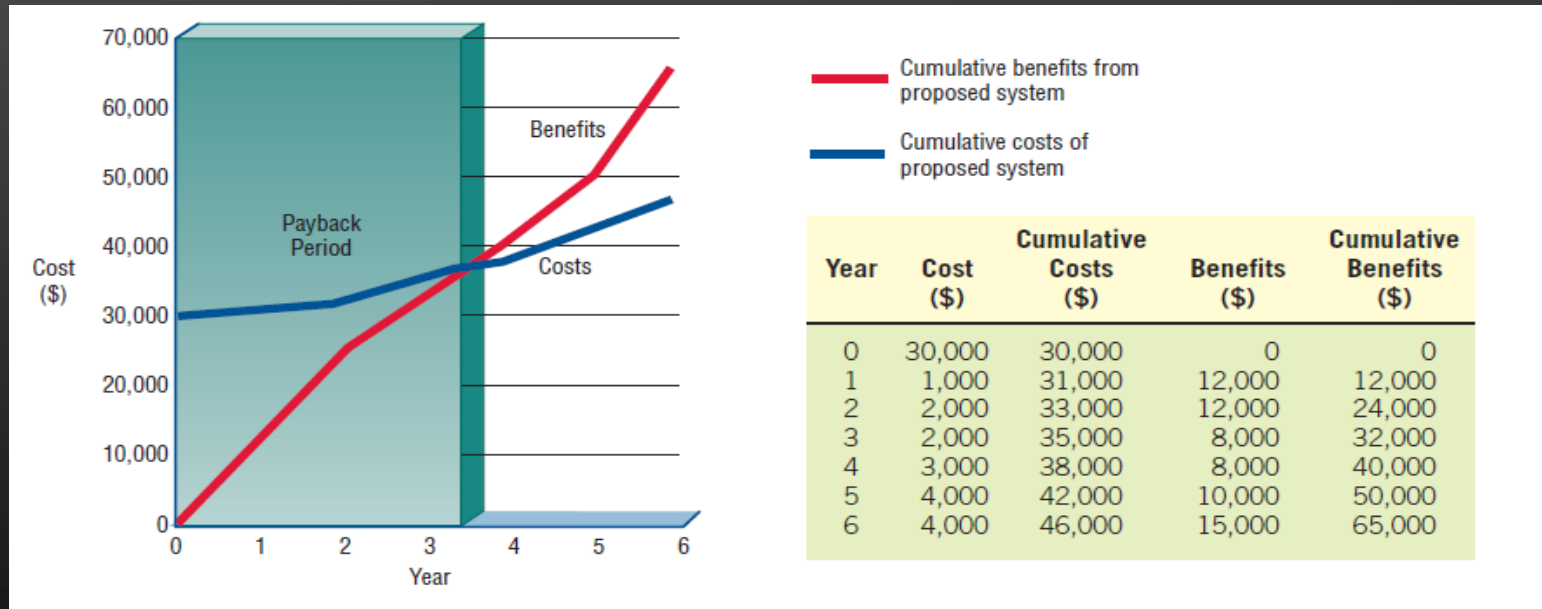


# EXAMPLE

- A small store that maintains inventory using a manual system.
- As volume rises, the costs of the manual system rise at an increasing rate. A new computer system would cost a substantial sum up front, but the incremental costs for higher volume would be rather small.
- The graph shows that the computer system would be cost effective if the business sold about 600 units per week.
- Break-even analysis can also determine how long it will take for the benefits of the system to pay back the costs of developing it, which in this case is a payback period of three and a half years.



Break-even analysis



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

	Quarter 1	Year 1			Year 2
		Quarter 2	Quarter 3	Quarter 4	Quarter 1
<b>Revenue</b>	\$5,000	\$20,000	\$24,960	\$31,270	\$39,020
<b>Costs</b>					
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
<b>Total Costs</b>	26,000	27,400	17,370	18,670	20,090
<b>Cash Flow</b>	-21,000	-7,400	7,590	12,600	18,930
<b>Cumulative Cash Flow</b>	-21,000	-28,400	-20,810	-8,210	10,720

Cash-flow analysis

Cash-flow analysis for a small company that is providing a mailing service to other small companies in the city.

Revenue projections are that only \$5,000 will be generated in the first quarter, but after the second quarter, revenue will grow at a steady rate.

Costs will be large in the first two quarters and then level off.

Cash-flow analysis is used to determine when a company will begin to make a profit (in this case, it is in the third quarter, with a cash flow of \$7,590) and when it will be “out of the red,” that is, when revenue has made up for the initial investment (in the first quarter of the second year, when accumulated cash flow changes from a negative amount to a positive \$10,720).

	Year						
	1	2	3	4	5	6	Total
Costs	\$40,000	42,000	44,100	46,300	48,600	51,000	272,000
Benefits	\$25,000	31,200	39,000	48,700	60,800	76,000	280,700

Without considering present value, the benefits appear to outweigh the costs.

	Year						
	1	2	3	4	5	6	Total
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	27,690	31,168	34,656	38,760	179,484

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.

- System costs total \$272,000 over six years and benefits total \$280,700.
  - Therefore, we might conclude that benefits outweigh the costs.
  - Benefits only started to surpass costs after the fourth year, however, and dollars in the sixth year will not be equivalent to dollars in the first year.
  - For instance, a dollar investment at 7 percent today will be worth \$1.07 at the end of the year and will double in approximately 10 years. The present value, therefore, is the cost or benefit measured in today's dollars and depends on the cost of money. The cost of money is the opportunity cost, or the rate that could be obtained if the money invested in the proposed system were invested in another (relatively safe) project.
  - The present value of \$1.00 at a discount rate of  $i$  is calculated by determining the factor where  $n$  is the number of periods. Then the factor is multiplied by the dollar amount, yielding the present value as shown in Figure.
  - In this example, the cost of money—the discount rate—is assumed to be .12 (12 percent) for the entire planning horizon. Multipliers are calculated for each period:  $n_1, n_2, \dots, n_6$ . Present values of both costs and benefits are then calculated using these multipliers. When that step is done, the total benefits (measured in today's dollars) are
- $$\frac{1}{(1 + i)^n}$$
- where  $n$  is the number of periods
  - In this example, the cost of money—the discount rate—is assumed to be .12 (12 percent) for the entire planning horizon. Multipliers are calculated for each period:  $n_1, n_2, \dots, n_6$ .

