Cost – Benefit Analysis

Evaluating Investment Options

Every software project represents a possible option that could be initiated, cancelled, modified or adopted. To decide whether to take a project or not, it is crucial to evaluate its prospective financial performance. Projects are evaluated as investments since they involve costs and benefits and our final goal is to investigate the ability of this project of maximizing value for the business firm.

Criteria used to evaluate project/investment alternatives or options should have the following characteristics:

1- The criterion should include a method to distinguish between what is accepted and what is rejected.
2- The criterion should be able to solve the problem of choosing among alternatives.
3- The criterion should be applicable in all cases
4- The criterion should give better value for options that generate high and quick profit
5- The criterion should be able to rank options based on their potential performance

Since evaluating investment options is utilized as a decision support approach before projects initiated, it is most likely to find this topic in the "capital budgeting" area in finance literature. Methods that are used to evaluate and compare projects/investment options can be classified into two main categories:

1- Projects that have *equal risks*

This category can be further classified into :

1.1- **Evaluating projects with high degree of certainty:** This sub-category involves no consideration for the time value of money. Under this category , there are two basic evaluation methods :

1.1-1. Pay back period
1.1-2. Accounting Rate of Return

1.2- **Evaluating projects with low degree of certainty:** This sub-category considers the time vale of money. Under this category , there are three of the most popular methods in evaluating investment projects and options

1.2-1. Net Present value
1.2-2. Return on Investment (ROI)

Assessing Economic Feasibility

Cost – Benefit Analysis (Text Book Summary)

1- Determine Benefits

1.1 **Tangible Benefits :** Can be measured easily

Examples

- Cost reduction and avoidance
- Error reduction
- Increased flexibility
- Increased speed of activity
- Improved management planning and control
- Opening new markets and increasing sales opportunities

1.2 **Intangible Benefits :** Cannot be measured easily

Examples

- Increased employee morale
- Competitive necessity
- More timely information
- Promotion of organizational learning and understanding

2- Determine Costs

2.1 **Tangible Costs :** Can easily be measured in dollars

Examples:

- Hardware
- Intangible Costs
- Cannot be easily measured in dollars
- Examples:
- Loss of customer goodwill
- Loss of employee morale

One-Time Costs : Associated with project startup, initiation and development

- System Development
- New hardware and software purchases
- User training
- Site preparation
- Data or system conversion

Recurring Costs : Associated with ongoing use of the system

- Application software maintenance
- Incremental data storage expense
- New software and hardware releases
- Consumable supplies
- Incremental communications

Time value of money (TVM) :The process of comparing present cash outlays to future expected returns

TANGIBLE BENEFITS WORKSHEET
Customer Tracking System Project

	Year 1 through 5
A. Cost reduction or avoidance	$ 4,500
B. Error reduction	2,500
C. Increased flexibility	7,500
D. Increased speed of activity	10,500
E. Improvement in management planning or control	25,000
F. Other _____	0
TOTAL tangible benefits	**$50,000**

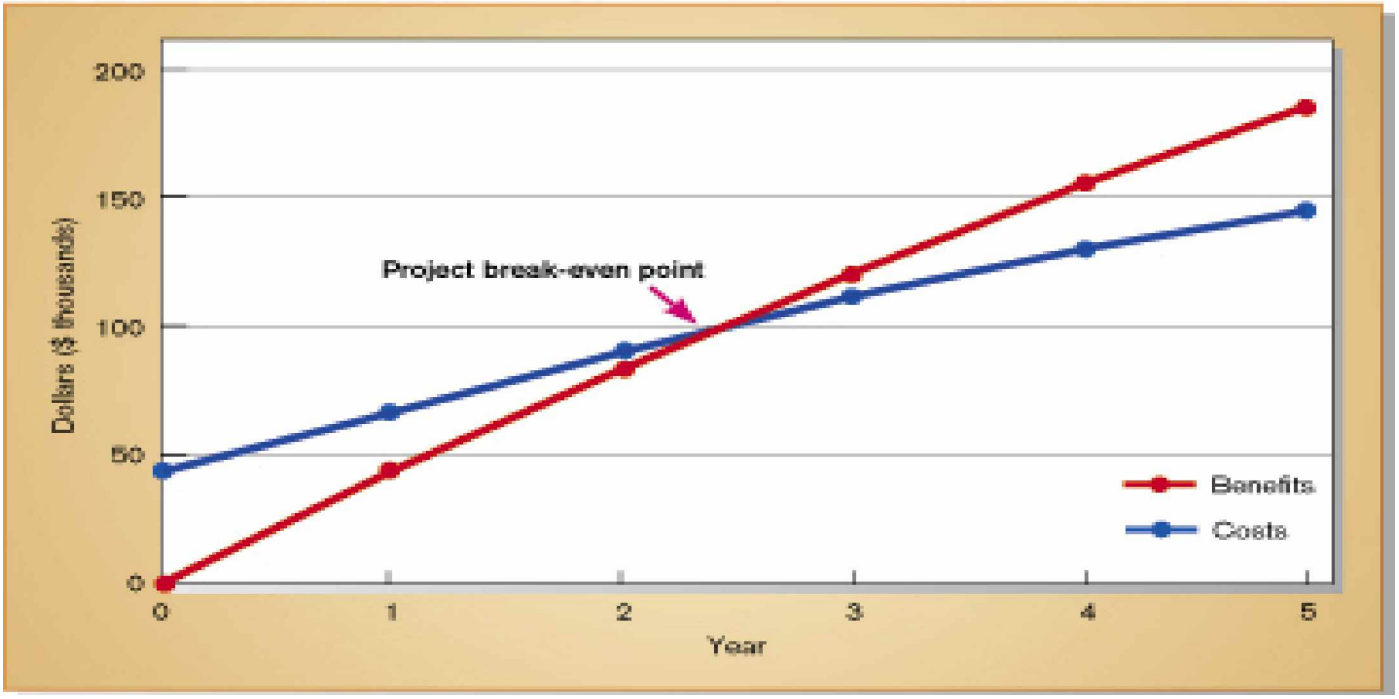
ONE-TIME COSTS WORKSHEET
Customer Tracking System Project

	Year 0
A. Development costs	$20,000
B. New hardware	15,000
C. New (purchased) software, if any	
1. Packaged applications software	5,000
2. Other _____	0
D. User training	2,500
E. Site preparation	0
F. Other _____	0
TOTAL one-time cost	**$42,500**

RECURRING COSTS WORKSHEET
Customer Tracking System Project

	Year 1 through 5
A. Application software maintenance	$25,000
B. Incremental data storage required: 20 MB × $50. (estimated cost/MB = $50)	1,000
C. Incremental communications (lines, messages, . . .)	2,000
D. New software or hardware leases	0
E. Supplies	500
F. Other _____	0
TOTAL recurring costs	**$28,500**

	A	B	C	D	E	F	G	H
1	**Pine Valley Furniture**							
2	**Economic Feasibility Analysis**							
3	**Customer Tracking System Project**							
4								
5					Year of Project			
6		**Year 0**	**Year 1**	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**TOTALS**
7	Net economic benefit	$0	$50,000	$50,000	$50,000	$50,000	$50,000	
8	Discount rate (12%)	**1.0000**	**0.8929**	**0.7972**	**0.7118**	**0.6355**	**0.5674**	
9	PV of benefits	$0	$44,643	$39,860	$35,589	$31,776	$28,371	
10								
11	**NPV of all BENEFITS**	$0	$44,643	$84,503	$120,092	$151,867	$180,239	$180,239
12								
13	**One-time COSTS**	($42,500)						
14								
15	Recurring Costs	$0	($28,500)	($28,500)	($28,500)	($28,500)	($28,500)	
16	Discount rate (12%)	**1.0000**	**0.8929**	**0.7972**	**0.7118**	**0.6355**	**0.5674**	
17	PV of Recurring Costs	$0	($25,446)	($22,720)	($20,286)	($18,112)	($16,172)	
18								
19	**NPV of all COSTS**	($42,500)	($67,946)	($90,666)	($110,952)	($129,064)	($145,236)	($145,236)
20								
21								
22	**Overall NPV**							$35,003
23								
24								
25	**Overall ROI - (Overall NPV / NPV of all COSTS)**							0.24
26								
27								
28	**Break-even Analysis**							
29	Yearly NPV Cash Flow	($42,500)	$19,196	$17,140	$15,303	$13,664	$12,200	
30	Overall NPV Cash Flow	($42,500)	($23,304)	($6,164)	$9,139	$22,803	$35,003	
31								
32	Project break-even occurs between years 2 and 3							
33	Use first year of positive cash flow to calculate break-even fraction - ((15303 - 9139) / 15303) = .403							
34	**Actual break-even occurred at 2.4 years**							
35								
36	Note: All dollar values have been rounded to the nearest dollar							



Determining all costs for implementation

TANGIBLE BENEFITS WORKSHEET Restaurant Operations Information Systems	Year 1 through 4
A. Cost reduction or avoidance	$6,000
B. Increased flexibility	5,000
C. Increased speed of activity	9,000
D. Improvement in management planning	15,000
TOTAL tangible benefits	$35,000

ONE-TIME COSTS WORKSHEET Restaurant Operations Information Systems	Year 0
A. Development costs	$15,000
B. New hardware	9,000
C. New software	4,000
D. User training	2,000
TOTAL one-time cost	$30,000

RECURRING COSTS WORKSHEET Restaurant Operations Information Systems	Year 1 through 4
A. System maintenance costs	$15,000
B. Incremental storage	2,000
C. Incremental communications	2,000
D. Software or Hardware leases	0
E. Supplies	1,000
TOTAL recurring costs	$20,000

Cost-Benefit Analysis

	Year of Project					
	Year 0	**Year 1**	**Year 2**	**Year 3**	**Year 4**	**TOTALS**
Net economic benefit	$0	$35,000	$35,000	$35,000	$35,000	
Discount rate (10%)	**1.0000**	**0.9091**	**0.8264**	**0.7513**	**0.6830**	
PV of benefits	$0	$31,818	$28,926	$26,296	$23,905	
NPV of all BENEFITS	$0	$31,818	$60,744	$87,040	$110,945	$110,945
One-time COSTS	($30,000)					
Recurring Costs	$0	($20,000)	($20,000)	($20,000)	($20,000)	
Discount rate (10%)	**1.0000**	**0.9091**	**0.8264**	**0.7513**	**0.6830**	
PV of Recurring Costs	0	(18,182)	(16,529)	(15,026)	(13,660)	
NPV of all COSTS	($30,000)	($48,182)	($64,711)	($79,737)	($93,397)	($93,397)
Overall NPV						$17,548
Overall ROI - (Overall NPV / NPV of all COSTS)						0.19
Break-even Analysis						
Yearly NPV Cash Flow	($30,000)	$13,636	$12,397	$11,270	$10,245	
Overall NPV Cash Flow	($30,000)	($16,364)	($3,967)	$7,303	$17,548	

Project break-even occurs between years 2 and 3
Use first year of positive cash flow to calculate break-even fraction - ((11270-7303)/11270)= 0.352
Actual break-even occurred at 2.3 years

Note: All dollar values have been rounded to the nearest dollar

Making the Case For ROI Training

Three ROI "bullet points" slapped on a PowerPoint slide won't work to justify even the smallest IT investment. Top managers working with slashed budgets and smaller staffs want detailed cost-benefit analyses before they invest in new IT projects. Yet most IT professionals have never been formally trained on how to calculate return on investment or perform detailed cost studies.

That's beginning to change. Many businesses are kicking up their investments in project management and financial analysis training as a way to teach IT workers how to evaluate investments for ROI.

"CEOs and boards of directors are requiring specific information about financial costs and benefits before they will give the green light for new IT investments," says Lou Marcoccio, president of Marcoccio Associates, a Westboro, Mass.-based consulting firm specializing in cost/benefit analysis.

Project management training enables IT professionals to adopt a methodology that puts rigor behind business planning processes. "Many organizations have identified [project management] training as one of the best investments a company can make to bring the ROI they want," says John Bonnano, chief operating officer at TrainingTrack, a division of Boston University's Corporate Education Center.

UnumProvident Corp. is among them. "We realize training in project management and financial analysis is no longer merely a 'soft' item," says Rick O'Coin, the insurance company's director of IT education. "We can't ask IT departments to measure, evaluate and forecast ROI with no training or experience."

O'Coin says UnumProvident identified a gap in its IT training more than a year ago. "We weren't running projects well and weren't performing ROI or cost-benefit analyses as we should," he says.

Last spring, 30 of the firm's top IT project managers completed training from Boston University, which provided on-site sessions three days a week for nine months at the company's twin headquarters in Portland, Maine, and Chattanooga, Tenn. O'Coin says he's seeing an attitude shift toward ROI evaluation and project management training.

"When dollars were tight, we'd send IT professionals only for technical training, but not for other soft [skills]," he says. "Now we're sending those technology executives for project management training, and [we're] even evaluating what they've learned."

A year ago, says Marcoccio, only seven schools in the U.S. offered ROI-related training as part of their computer science programs. Now more than 1,500 courses are offered in colleges and universities and online. "This is a major money-making opportunity for many schools, as CIOs and IT organizations must learn to provide detailed cost analysis," he says.

Due Diligence, Please

Largely because of Enron Corp.'s financial woes, top managers are aware that they may be held liable if they don't exercise due diligence for potential investments. As a result, companies are performing quarterly financial breakdowns of costs, plus the direct and indirect benefits of any IT investment over a system's life.

Increasingly, executives want to know "what any new system will cost to maintain, what it will cost to train users, what it will cost to upgrade and what it will cost at the end of its useful life cycle to replace the technology," says Marcoccio.

At the same time, the payback period is shrinking. The typical time frame of 12 to 24 months for large IT projects has been pared down to eight months. The upshot is that CIOs must painstakingly analyze all costs to justify IT investments. It has also become nearly impossible to defend larger investments that can't guarantee returns within a year.

Ultimately, most businesses and industry analysts view the trend toward training IT personnel to evaluate and forecast ROI as a big plus in the long run. Some say the faster an organization can clearly visualize the business impact of an IT investment, the sooner it will implement new IT projects.

Source: Computer world, By Barbara DePompa Reimers, June 24, 2002