SECTION-II

Project Evaluation & Estimation

Cost Benefit Analysis:

Cost Benefit analysis is thing that everyone must do so as to think of a powerful or an efficient system. But while thinking out on cost and benefit analysis, we also need to find out factors that really affect benefits and costs of system. In developing cost estimates for a system, we need to consider some of cost elements. Some elements among them are hardware, personnel, facility, operating and supply cost. The following are the cost factors :

1. Hardware cost –

Hardware cost includes actual purchase and peripherals (external devices) that are connected to computer. For example, printer, disk drive etc. Actually, finding actual cost of hardware is generally more difficult especially, when system is shared by various users so as to compared to a system which dedicated stand alone . In some case, best way is to treat it as operating cost.

2. Personnel costs -

Personnel costs includes EDP staff salaries and benefits as well as pay for those who are involved in process of development of system. Cost occurred during development of system which are one time costs and are also called development cost. Once system is installed, cost of operating and maintaining system becomes recurring cost that one has to pay very frequently based on requirement.

3. Facility cost –

Facility cost is amount of money that is spent in preparation of a site that is physical where application or computer will be in operation. This includes wiring, flooring, lighting and air conditioning. These costs are treated as one- time costs and are included into overall cost estimate of candidate system.

4. Operating costs –

These includes all costs associated with day-to-day(everyday) operation of system and amount depends on number of shifts, nature of applications. There are various ways of covering operating costs. One approach is to treat operating costs as an overhead. Another approach is to charge money from each authorized user for amount of processing they require from system. Amount charged is based on computer time or time they spend on system, staff time ad volume of output produced.

5. Supply costs -

Supply cost are variable costs that increase with increased use of paper, disks and like. They should be estimated and included in overall cost of system.

A system is also expected to provide health benefits. First task is to identify each benefit and then assign some value to it for purpose of cost/ benefit analysis. Benefits may be tangible and intangible, direct or indirect.

Two major benefits are improving performance and minimizing cost of processing of system. The performance category emphasizes improvement in accuracy of or access to information and easier access to system by authorized users. Minimizing costs through an efficient system – error control or reduction of staff- is a benefit that should be measured

and included in cost/benefit analysis.

The determination of costs and benefit entails following steps :

- 1. Identify the costs and benefits pertaining to given project.
- 2. Categorize the various costs and benefits for analysis.
- 3. Select a method of evaluation.
- 4. Interpret the results of the analysis.
- 5. Take action.

Cash Flow Forecasting:

Cash flow is the movement of the money in and out of an organisation. It involves the expenditure and income of an organisation.

Cash Flow Forecasting:

In simple words, it is the estimation of the cash flow over a period of time. It is important to do cash flow forecasting in order to ensure that the project has sufficient funds to survive. It gives an estimation that when income and expenditure will take place during the software project's life cycle. It must be done time to time especially for start-ups and small enterprises. However, if the cash flow of the business is more stable then forecasting cash flow weekly or monthly is enough.



Cash flow is of two types:

• Positive Cash Flow:

If an organisation expects to receive income more than it spends then it is said to have a positive cash flow and the company will never go low on funds for the software project's completion.

• Negative Cash Flow:

If an organisation expects to receive income less than it spends then it is said to have a negative cash flow and the company will go low on funds for the software project's completion in future.

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Importance of Cash Flow Forecasting:

- It allows the management to plan the expenditures based upon the income in future.
- It helps the organization to analyse its expenditures and incomes.
- Makes sure that the company can afford to pay the employees and suppliers.
- Helps in financial planning.

Cost Benefit Evaluation Techniques:

We would consider proceeding with a project only where the benefits outweigh the costs. However, in order to choose among projects, we need to take into account the timing of the costs and benefits as well as the benefits relative to the size of the investment.

In the following sections we will take a brief look at some common methods for comparing projects on the basis of their cash flow forecasts.

Net profit

The net profit of a project is the difference between the total costs and the total income over the life of the project. Project 2 in Table 3.2 shows the greatest net profit but this is at the expense of a large investment. Indeed, if we had £lm to invest, we might undertake all of the other three projects and obtain an even greater net profit. Note also, that all projects contain an element of risk and we might not be prepared to risk £1 m. We shall look at the effects of risk and investment later in this chapter.

Moreover, the simple net profit takes no account of the timing of the cash flows. Projects 1 and 3 each have a net profit of £50,000 and therefore, according to this selection criterion, would be equally preferable. The bulk of the income occurs late in the life of project 1, whereas project 3 returns a steady income throughout its life. Having to wait for a return has the disadvantage that the investment must be funded for longer. Add to that the fact that, other things being equal, estimates in the more distant future are less reliable that short-term estimates and we can see that the two projects are not equally preferable.

Payback period

The payback period is the time taken to break even or pay back the initial investment. Normally, the project with the shortest payback period will be chosen on the basis that an organization will wish to minimize the time that a project is 'in debt'.

The advantage of the payback period is that it is simple to calculate and is not particularly sensitive to small forecasting errors. Its disadvantage as a selection technique is that it ignores the overall profitability of the project - in fact, it totally ignores any income (or expenditure) once the project has broken even. Thus the fact that projects 2 and 4 are, overall, more profitable than project 3 is ignored.

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Return on investment

The return on investment (ROI), also known as the accounting rate of return (ARR), provides a way of comparing the net profitability to the investment required. There are some variations on the formula used to calculate the return on investment but a straightforward common version is

The main difficulty with NPV for deciding between projects is selecting an appropriate discount rate. Some organizations have a standard rate but, where this is not the case, then the discount rate should be chosen to reflect available interest rates (borrowing costs where the project must be funded from loans) plus some premium to reflect the fact that software projects are inherently more risky than lending money to a bank. The exact discount rate is normally less important than ensuring that the same discount rate is used for all projects being compared. However, it is important to check that the ranking of projects is not sensitive to small changes in the discount rate - have a look at the following exercise.

Internal rate of return

One disadvantage of NPV as a measure of profitability is that, although it may be used to compare projects, it might not be directly comparable with earnings from other investments or the costs of borrowing capital. Such costs are usually quoted

The IRR may be estimated by plotting a series of guesses:

For a particular project, a discount rate of 8% gives a positive NPV of £7,898; a discount rate of 12% gives a negative NPV of -£5,829. The IRR is therefore somewhere between these two values. Plotting the two values on a chart and joining the points with a straight line suggests that the IRR is about 10.25%. The true IRR (calculated with a <u>spreadsheet</u>) is 10.167%. as a percentage interest rate. The internal rate of <u>return (IRR)</u> attempts to provide a profitability measure as a percentage return that is directly comparable with interest rates. Thus, a project that showed an estimated IRR of 10% would be worthwhile if the capital could be borrowed for less than 10% or if the capital could not be invested elsewhere for a return greater than 10%.

The IRR is calculated as that percentage discount rate that would produce an NPV of zero. It is most easily calculated using a spreadsheet or other computer program that provides functions for calculating the IRR. <u>Microsoft Excel</u> and Lotus, for example, both provide IRR functions which, provided with an initial guess or seed value (which may be zero), will search for and return an IRR.

Manually, it must be calculated by trial-and-error or estimated using the technique illustrated in Figure 3.3. This technique consists of guessing two values