CAPITAL BUDGETING TECHNIQUES

Introduction:

Financial decision making is viewed as an integral part of the overall management of a business concern. The financial manager has to make the financial decision within the framework of overall corporate objectives and policies. The decisions in financial management has been divided in to three categories. They are 1. Investment Decisions 2. Financing Decision 3. Dividend Decision. The investment decision relates to the selection of assets in which funds will be invested by a firm. The assets that can be acquired with these funds are broadly divided into a) Long term assets b) Short term assets The decision regarding short term assets is designated as Working Capital management and the decisions related to long term assets known as Capital Budgeting.

Capital budgeting is the long -term investment decision. It is probably the most crucial financial decision of a firm. It relates to the selection of an assent or investment proposal or course of action that benefits are likely to be available in future over the lifetime of the project. Capital budgeting is the process of making investment decision in long-term assets or courses of action. Capital expenditure incurred today is expected to bring its benefits over a period of time. These expenditures are related to the acquisition & improvement of fixes assets.

Types of Capital Budgeting Decisions

Independent projects (Accept-Reject criterion): Independent projects are the projects which do not compete with one another. Based on the profitability of the projects and the availability of funds, a company undertakes any number of projects. In such a case, projects will be taken up to a level where marginal cost of funds equal to marginal rate of return of the project.

Mutually exclusive projects: In case of mutually exclusive projects, acceptance of one project results into rejection of another project. For example if there are two projects X and Y, either X or Y or Y should be accepted by the company

Capital rationing decisions: A firm may have several profitable investment proposals but only limited funds to invest. In such a case, these various investment proposals compete for limited funds, and thus, the firm has to ration them. The firm selects the combination of proposals that will yield the greatest profitability by ranking them in descending order of their profitability.

Methods of Capital Budgeting

The capital budgeting appraisal methods or techniques for evaluation of investment proposals will help the company to decide the desirability of an investment proposal, depending upon their relative income generating capacity and rank them in order of their desirability. These methods provide the company a set of norms on the basis of which either it has to accept or reject the investment proposal. Therefore, a sound appraisal method should enable the company to measure the real worth of the investment proposal.

The various commonly used Capital Budgeting Methods are:

Traditional Methods (Non Discounting Methods)

1. Pay Back Period Method (PBP)

2. Average Rate of Return or Accounting Rate of Return (ARR)

Modern Methods (Discounting Methods or Time – Adjusted Methods)

1. Net Present Value Method (NPV)

2. Internal Rate of Return (IRR)

3. Profitability Index (PI)

Traditional Methods: These methods are based on the principles to determine the desirability of an investment project on the basis of its useful life and expected returns. These methods depend upon the accounting information available from the books of accounts of the company. These will not take into account the concept of “time value of money” which is a significant factor to determine the desirability of a project in terms of present value

Computation of Cashflows:

Most of the popular capital budgeting techniques are based on Cash Flows After Tax.

Determination of Cash Inflows (CFAT):

Cash Sales Revenue	xxxx
Less: Cash Operating Cost Cash Flows Before Depreciation and Taxes(CFBT)	(xxxx)
Less: Depreciation Profit Before Taxes Less: Taxes Profit After Taxes	(xxxx)
Add: Depreciation	xxxx
Cash Flow After Taxes (CFAT)	xxxx

Pay Back Period:

It is the most popular and widely recognised traditional method of evaluating the investment proposals. It can be defiend as 'the number of years required to recover the original capital invested in a porject'.

"The Pay Back Period is the number of years it takes for the firm to recover its original investment by net returns before depreciation, but after taxes" ----Weston and Brigham

To calculate the Pay Back Period two approaches are there:

1. When cash flows are equal

Pay Back Period = Cash Outlay of the Project ÷ Annual Cash Inflows

2. When cash flows are not equal

Pay Back Period = Base Number of Years + (Unrecovered Amount ÷ Next Year's Net Cash Flow)

The pay-back period can be used as an accept or reject criterion as well as a method of ranking the projects. The pay-back period is the number of years to recover the investment made in a project.

Merits:

1. Easy to calculate- It is one of the easiest methods of evaluating methods of evaluating the investment projects. It is simple to understand and easy to compute.

2. Knowledge- The knowledge of pay-back period is useful in decision making the shorter the period better the project.

3. Easily availability of information- It can be computed on the basis of accounting informatioln what is available from the books.

4. It dose not involve any cost for computation of the payback period.

5. It is one of the widely used methods in small scale industry sector.

6. It can be computed on the basis of accounting information available from the books.

Demerits:

1. Failure in taking cash flows after payback peiod- This methods is not taking into account the cashflows received by the companyafter the pay back period

2. Not consider the time value of money- It does not take into account the time value of money

3. Non consideration of interest factor- It does not take into account the interest factor involved in the capital outlay

4. Failure in taking magnitude and timing of cash inflows- It fails to considered the pattern of cash inflows i.e, the magnitude and timing of cash inflows

Example1: A project requires an initial investment of Rs. 1,00,000 with an useful life of 5 years. The projected cash inflows after tax(CFAT) are as follows

YEAR	1	2	3	4
CFAT (Rs.)	40,000	40,000	40,000	40,000

Calculate Pay Back Period

Solution: Since, cash flows are equal

Pay Back Period = Cash Outlay of the Project ÷ Annual Cash Inflows

= 1,00,000 ÷ 40,000 = 2.5 Years

Example2: A machine costs Rs. 4,00,000 and is expected to generate the following cash infloes during its life time. Compute the pay-back period

YEAR	1	2	3	4	5	6	7	8	9	10
CFAT	60,000	80,000	40,000	1,00,000	1,10,000	80,000	60,000	1,50,000	1,40,000	1,80,000

Solution:

YEAR	CFAT (Rs.)	Cumulative CFAT (RS.)
1	60,000	60,000
2	80,000	1,40,000
3	40,000	1,80,000
4	1,00,000	2,80,000
5	1,10,000	3,90,000
6	80,000	4,70,000
7	60,000	5,30,000
8	1,50,000	6,80,000
9	1,40,000	8,20,000
10	1,80,000	10,00,000

Since, cash flows are not equal

Pay Back Period = Base Number of Years + (Unrecovered Amount ÷ Next Year's Net Cash Flow)

= 5 + [(4,00,000-3,90,000) ÷ 80,000] = 5 + 0.125 = 5.125 Years

Accounting Rate of Return (ARR):

This technique uses the accounting information revealed by the financial statements to measure the profitability of an investment proposal. It can be determined by dividing the average income adter taxes by the average investment.

"Accounting rate of return can be calculated as the ratio of average net income to the initial investment" ----Soloman On the basis of this method the company select all those projects whose ARR is higher than the minimum rate established by the company. It can reject the projects with an ARR lower than the expected rate of return.

ARR = Average Net Annual profits ÷ Net Average Investment in the Project

Where, Average Annual profits = Total Profits from the Project ÷ Life of the Project in Years

And, Net Average Investment in the Project =[(Initial Investment – Scrap Value)/2]+ Working Capital + Scrap

Merits:

- It is very simple to understand and calculate
- It can be readily computed with the help of the available accounting data
- It uses the entire stream of earning to calculate the ARR

Demerits:

- It is not based on cash flows generated by a project.
- This method does not consider the objective of wealth maximization
- It ignores the length of the projects useful life.
- It does not take into account the fact that the profits can be re-invested.

***Example3*:** A machine costs Rs. 10,00,000 has a 5 years life and no scrap. It is depreciated on straight line basis. The expected net earnings after depreciation and taxes are as follows

YEAR	1	2	3	4	5
Annual Profits (Rs.)	1,00,000	1,50,000	2,00,000	1,80,000	1,70,000

Calculate ARR.

Solution:

ARR = Average Net Annual profits ÷ Net Average Investment in the Project

Average Annual profits = Total Profits from the Project ÷ Life of the Project in Years

=(1,00,000 +1,50,000 + 2,00,000 + 1,80,000 + 1,70,000) / 5

= 8,00,000/5

= 1,60,000

And, Net Average Investment in the Project =[(Initial Investment – Scrap Value)/2]+ Working Capital + Scrap

= (10,00,000 – 0)/ 2

=5,00,000

ARR = 1,60,000 ÷ 5,00,000 = 0.32 = 32%

Example 4: Determine the Average Rate of Return from the following data of two machines A and B

Particulars	M-A	M-B
Original Cost of Machine	**60,000**	**60,000**
Net Working Capital	**5,000**	**6,000**
Scrap Value	**3,000**	**3,000**
Annual Income after taxes:		
YEAR 1	4,000	12,000
YEAR 2	6,000	9,000
YEAR 3	8,000	8,000
YEAR 4	9,000	6,000
YEAR 5	12,000	4,000

Solution:

ARR = Average Net Annual profits ÷ Net Average Investment in the Project

Average Annual profits = Total Profits from the Project ÷ Life of the Project in Years

Machine A:

Average Annual profits = 39,000/5

= 7,800

Machine B:

Average Annual profits = 39,000/5

= 7,800

Net Average Investment in the Project =[(Initial Investment – Scrap Value)/2]+ Working Capital + Scrap

Machine A:

[(60,000 – 3,000)/2]+5,000+3,000

=36,500

Machine B:

[(60,000 – 3,000)/2]+6,000+3,000

=37,500

Machine A:

ARR = 7,800 / 36,500

= 21.37%

Machine B:

ARR = 7,800 / 37,500

= 20.8%

Interpretation: Machine A is preferable, because its ARR is higher than Machine B