



CAPITAL: TYPES AND SOURCES

Learning Objectives

After completing this chapter, you should be able to understand

- concept of capital
- significance of capital
- types of capital
- sources of capital and their implications to the business
- factors affecting the requirements of capital
- estimation of working capital requirements
- institutional network in the Indian context for raising capital

INTRODUCTION

Capital forms the base for the business. Capital, in general, does not mean only money. It may refer to money's worth also. Capital has different forms. Creativity, innovation or new ideas can be considered as one form of capital. Some people have ideas but they may not have money. There are some others who have money only. The ideal combination for business is to have both. Today, there are different sources of raising finance for many types of business provided we have the margin or the base money. In this chapter, we restrict our discussion to money form of capital.

It is the capital that keeps any business going on. There are a number of instances where the business is closed for want of capital. In most of these cases, the probable reasons could be mismanagement of capital or lack of information about the different sources of capital or factors to be considered to estimate the capital requirements. This chapter deals with the concept of capital, its significance, the sources of raising the different types of capital and how to estimate the requirements of working capital.

CAPITAL

Capital is defined as wealth, which is created over a period of time through abstinence to spend. There are different forms of capital: property, cash or titles to wealth. It is the aggregate of funds used in the short-run and long-run. An economist views capital as the value of total assets available with the business. An

accountant sees the capital as the difference between the assets and liabilities. In this chapter, we consider capital as the total amount of finances required by the business to conduct its business operations both in the short-run and long-run.

SIGNIFICANCE OF CAPITAL

Capital plays a very significant role in the modern production system. It is very difficult to imagine the process of production without capital. Capital accumulation and technological advancement are closely related to each other. Capital creates and enhances the level of employment opportunities. It has a strategic role in enhancing productivity. Capital is necessary not only for micro-enterprises but also to the governments. Capital is a scarce resource and every country has to utilise the same judiciously.

NEED FOR CAPITAL

The business needs for capital are varied. They are:

- 1. To promote a business** Capital is required at the promotion stage. A large variety of expenses have to be incurred on project reports, feasibility studies and reports, preparation and filing of various documents, and for meeting various other expenses in connection with the raising of capital from the public.
- 2. To conduct business operations smoothly** Business firms also need capital for the purpose of conducting their business operations such as research and development, advertising, sales promotion, distribution and operating expenses.
- 3. To expand and diversify** The firm requires a lot of capital for expansion and diversification purposes. This includes development expense such as purchase of sophisticated machinery and equipment and also payment towards sophisticated technology.
- 4. To meet contingencies** A firm needs funds to meet contingencies such as a sudden fall in sales, major litigation (legal cases), natural calamities like fire, and so on.
- 5. To pay taxes** The firm has to meet its statutory commitments such as income tax and sales tax, excise duty and so on.
- 6. To pay dividends and interests** The business has to make payment towards dividends and its interests to shareholders and financial institutions respectively.
- 7. To replace the assets** The business needs to replace its assets like plant and machinery after a certain period of use. For this purpose the firm needs funds to make suitable replacement of assets in place of old and worn-out assets.
- 8. To support welfare programmes** The company may also have to take up social welfare programmes such as literacy drive, and health camps. It may have to donate to charitable trusts, educational institutions or public service organisations.
- 9. To wind up** At the time of winding up, the company may need funds to meet the liquidation expenses.

TYPES OF CAPITAL

Capital can broadly be divided into two types: fixed capital and working capital.

Fixed Capital

Fixed capital is that portion of capital which is invested in acquiring long-term assets such as land and buildings, plant and machinery, furniture and fixtures, and so on. Fixed capital forms the skeleton of the business. It provides the basic assets as per the business needs. These assets are not meant for resale. They are intended to generate revenues.

The following are the features of fixed assets:

1. *Permanent in nature* Fixed capital is more or less permanent in nature. It is generally not withdrawn as long as the business carries on its business.
2. *Profit generation* Fixed assets are the sources of profits but they can never generate profits by themselves. They use stocks, cash and debtors to generate profits.
3. *Low liquidity* The fixed assets cannot be converted into cash quickly. Liquidity refers to conversion of assets into cash.
4. *Amount of fixed capital* The amount of fixed capital of a company depends on a number of factors such as size of the company, nature of business, method of production and so on. A manufacturing company such as steel factory may require relatively large finance when compared to a service organisation such as a software company.
5. *Utilised for promotion and expansion* The fixed capital is mostly needed at the time of promoting the company to purchase the fixed assets or at the time of expansion/modernisation. In other words, the need for fixed capital arises less frequently.

Types of Fixed Assets

Fixed assets can be divided into three types:

- 1. Tangible Fixed Assets** These are physical items which can be seen and touched. Most of the common fixed assets are land, buildings, machinery, motor vehicles, furniture and so on.
- 2. Intangible Fixed Assets** These do not have physical form. They cannot be seen or touched. But these are very valuable to business. Examples are goodwill, brand names, trademarks, patents, copy rights and so on.
- 3. Financial Fixed Assets** These are investments in shares, foreign currency deposits, government bonds, shares held by the business in other companies and so on.

Working Capital

Working capital is the flesh and blood of the business. It is that portion of capital that makes a company work. It is not just possible to carry on the business with only fixed assets; working capital is a must. Working capital is also called *circulating capital*. It is used to meet regular or recurring needs of the business. The regular needs refer to the purchase of materials, payment of wages and salaries, expenses like rent, advertising, power and so on. In short, working capital is the amounts needed to cover the cost of operating the business.

Working capital takes the form of cash, near cash and other assets in the process of moving towards the cash form in a short period. These other assets are stocks of raw materials, supplies needed for manufacture, stocks of finished goods ready for sale, semi-processed items or components, debtors and other short-term investments if any.

Features of Working Capital

1. *Short life span* Working capital changes in its form: from cash to stock; stock to debtors; debtors to cash. The cash balances may be kept idle for a week or so, debtors have a life span of a few months, raw materials are held for a short-time until they go into production; finished goods are held for a short-time until they are sold.
2. *Smooth flow of operations* Adequate amount of working capital enables the business to conduct its operations smoothly. It is, therefore, called the 'flesh and blood' of the business.
3. *Liquidity* The assets represented by the working capital can be converted into cash within a short period of time unlike fixed assets.
4. *Amount of working capital* The amount of working capital of a business depends on many factors such as size and nature of the business, production and marketing policies, business cycles and so on. These are discussed in detail in the following section.
5. *Utilised for payment of current expenses* The working capital is used to pay for current expenses such as suppliers of raw materials, payment of wages and salaries, rent and other expenses and so on.

Components of Working Capital

From the accounting point of view, working capital is the difference between current assets and current liabilities. (Working capital = Current Assets – Current Liabilities)

Current Assets *Cash* is required to pay salaries, office expenses and to pay creditors for purchases

Stock of raw materials in adequate quantities to ensure uninterrupted production

Stock of finished goods in sufficient quantities to meet the demand from customers

Debtors, that is, people to whom we sell goods on credit basis for increased sales

Prepaid expenses, that is, the expenses paid in advance such as insurance, rent, salaries and so on

Bills receivables these are the bills of exchange received for the money lent or to be received for a short period.

Current Liabilities

Creditors, that is, the people from whom we purchase on credit basis.

Accruals, that is, those expenses in respect of which, the liability has arisen. In other words, the expenses have fallen due and hence to be incurred, such as interest, salaries, taxes and so on.

Bills payables these are the bills of exchange against which money is to be paid within a short period.

METHODS AND SOURCES OF FINANCE

Method of finance is the type of finance used—such as a loan or a mortgage. The source of finance would be where the money was obtained from—a loan may be obtained from a bank while the mortgage may be obtained from a credit society. From a financial statement, we can read in what form the capital is tied up (fixed assets or current assets) and how these are financed (from own capital or borrowed funds). It is necessary to notice the difference between methods and sources of finance to identify which type of asset can be bought from what source of funds. For example, fixed asset can be bought only from long-term source of funds. If you buy a long-term asset utilising funds from short-term sources, the asset has to be sold off to repay the short-term loan, in the event of pressure to repay the loan.

METHODS OF FINANCE

The following are the common methods of finance:

- Long-term finance
- Medium-term finance
- Short-term finance

Now we will discuss each of these methods identifying the sources under each method:

Sources of Finance

The following are the different sources under various methods of finance.

I. LONG-TERM FINANCE

Long-term finance refers to that finance available for a long period say three years and above. The long-term methods outlined below are used to purchase fixed assets such as land and buildings, plant and so on.

Own Capital

Irrespective of the form of organisation such as soletrader, partnership or a company, the owners of the business have to invest their own finances to start with. Money invested by the owners, partners or promoters is permanent and will stay with the business throughout the life of the business.

Share Capital

Normally in the case of a company, the capital is raised by issue of shares. The capital so raised is called share capital. The liability of the shareholder is limited to the extent of his contribution to the share capital of the company. The shareholder is entitled to dividend in case the company makes profits and the directors announce dividend formally in the general body meetings. The share capital can be of two types: *Preference share capital* and *equity share capital*. The salient features of preference share capital and ordinary share capital are discussed below:

Preference Share Capital Capital raised through issue of preference shares is called preference share capital.

Preference share A preference shareholder enjoys two rights over equity shareholders: (a) right to receive fixed rate of dividend and (b) right to return of capital. After settling the claims of outsiders, preference shareholders are the first to get their dividend and then the balance will go to the equity shareholders. However, the preference shareholders do not have any voting rights in the annual general body meetings of the company. This deprives them of the right to participate in the management of the affairs of the company.

Types of preference shares Preference shares are of five types. They are:

1. *Cumulative preference share* A cumulative preference shareholder gets his right to the arrears of dividend cumulated over a period of time. If the company is not in a position to pay dividends during a particular year due to paucity of profits, it has to pay the same to the cumulative preference shareholders when it makes profits. In other words, the holders of cumulative preference shares enjoy the right to receive, when profits permit, the dividend missed in the years when the profits were nil or inadequate.
2. *Non-cumulative preference shares* The holders of these shares do not enjoy any right over the arrears of dividend. Hence the unpaid dividend in arrears cannot be claimed in future.
3. *Participating preference shares* The holder of these shares enjoys the dividend two times. They get their normal fixed rate of dividend as per their entitlement. They participate again along with the equity shareholders in the distribution of profits.
4. *Redeemable preference shares* These shares are repaid at the end of a given period. The period of repayment is stipulated on each share.
5. *Non-redeemable preference shares* These shares continue as long as the company continues. They are repaid only at the end of the lifetime of the company.

Equity Share Capital Capital raised through issue of equity share is called equity share capital.

An equity share is also called ordinary share. An equity shareholder does not enjoy any priorities such as those enjoyed by a preference shareholder. But an equity shareholder is entitled to voting rights as many as the number of shares he holds. The profits after paying all the claims belong to the equity shareholders. In

case of loss, they are the first to suffer the losses. Equity shareholders are the real *risk bearers* of the company. But at the same time, they are entitled for the whole surplus of the profits after payment of dividends to preference shareholders. Therefore, the rate of dividend on equity shares is not fixed.

Retained Profits

The retained profits are the profits remaining after all the claims. They form a very significant source of finance. Retained profits form good source of working capital. Particularly in times of growth and expansion, retained profits can be advantageously utilised.

Long-term Loans

There are specialised financial institutions offering long-term loans, provided the business proposal is feasible. The promoters should be able to offer assets of the business as security to avail of this source.

Debentures

Debentures are the loans taken by the company. It is a certificate or letter issued by the company under its common seal acknowledging the receipt of loan. A debenture holder is the creditor of the company. A debenture holder is entitled to a fixed rate of interest on the debenture amount. Payment of interest on debenture is the first charge against profits. Apart from the loans from financial institutions, a company may raise loans through debentures. This is an additional source of long-term finance. The payment of interest and principal amounts on these debentures is subject to the terms and conditions of issue of debentures.

The debentures are of different types based on the terms and conditions. There is no standard list. The success of the finance manager lies in designing an instrument suitable to the needs of the investors and which will pull in as much funds as possible. The following are the common types of debentures:

II. MEDIUM-TERM FINANCE

Medium-term finance refers to such sources of finance where the repayment is normally over one year and less than three years. This is normally utilised to buy or lease motor-vehicles, computer equipment, or machinery whose life is less than three years. The sources of medium-term finance are as given below:

Bank Loans

Bank loans are extended at a fixed rate of interest. Repayment of the loan and interest are scheduled at the beginning and are usually directly debited to the current account of the borrower. These are secured loans.

Hire-purchase

It is a facility to buy a fixed asset while paying the price over a long period of time. In other words, the possession of the asset can be taken by making a down payment of a part of the price and the balance will be repaid with a fixed rate of interest in agreed number of instalments. The buyer becomes the owner of the asset only on payment of the last instalment. The seller is the owner of the asset till the last instalment is paid. In case there is any default in payment, the seller can reserve the right of collecting back the asset. Today, most of the consumer durables such as cars, refrigerators, TVs and so on, are sold on hire-purchase basis. It provides an opportunity to keep using the asset much before the full price is paid.

Leasing or Renting

Where there is a need for fixed assets, the asset need not be purchased. It can be taken on lease or rent for specified number of years. The company who owns the asset is called *lessor* and the company which takes the asset on lease is called *lessee*. The agreement between the lessor and lessee is called a *lease agreement*. On the expiry of the lease agreement, the owner takes the asset back into his custody. Under lease agreement, ownership to the asset never passes. Only possession of the asset passes from lessor to the lessee. Lease is not a loan. But when the business wants a certain asset for a short/medium period, lease can significantly reduce the financial requirements of the business to buy the asset.

Venture Capital

This form of finance is available only for limited companies. Venture capital is normally provided in such projects where there is relatively a higher degree of risk. For such projects, finance through the conven-

tional sources may not be available. Many banks offer such finance through their merchant banking divisions, or specialist banks which offer advice and financial assistance. The financial assistance may take the form of loans and venture capital. In the case of viable or feasible projects, the merchant banks may participate in the equity also. In return, they expect one or two (depending up on the volume of funds pumped in) director positions on the board to exercise the control on the company matters. The funds, so provided by the venture capital, can be used for acquiring another company or launching a new product or financing expansion and growth.

III. SHORT-TERM FINANCE

Short-term finance is that finance which is available for a period of less than one year. The following are the sources of short-term finance:

Commercial Paper (CP)

It is a new money market instrument introduced in India in recent times. CPs are issued usually in large denominations by the leading, nationally reputed, highly rated and credit worthy, large manufacturing and finance companies in the public and private sector. The proceeds of the issue of commercial paper are used to finance current transactions and seasonal and interim needs for funds. Reliance Industries is one of the early companies which issued Commercial Paper.

Bank Overdraft

This is a special arrangement with the banker where the customer can draw more than what he has in his savings/current account subject to a maximum limit. Interest is charged on a day-to-day basis on the actual amount overdrawn. This source is utilised to meet the temporary shortage of funds.

Trade Credit

This is a short-term credit facility extended by the creditors to the debtors. Normally, it is common for the traders to buy the materials and other supplies from the suppliers on credit basis. After selling the stocks, the traders pay the cash and buy fresh stocks again on credit. Sometimes, the suppliers may insist on the buyer to sign a bill (bill of exchange). This bill is called bills payable.

Debt Factoring or Credit Factoring

Debt Factoring is the arrangement with factor where the trader agrees to sell its accounts receivable or debtors at discount to the specialised dealers called factors. In the case of Credit Factoring, the trader agrees to sell his accounts payables (at premium).

Example

For example: X sells Y goods worth Rs 5,000. Y cannot pay cash immediately. He agrees to pay after two months. X wants cash immediately. Here X enters into a debt factoring agreement with Z who agrees to pay Rs 4,500 immediately to Y and agrees to collect Rs 5,000 after two months from Y. In this example, Z is called the *factor*. In the same example, if Y enters into an agreement with the factor, the factor pays Rs 5,000 to X and collects Rs 5,500 from Y after two months. This is called *credit factoring*.

Where the business finds its financial resources tied up in the form of debtors who are not paying on time, factoring is a good relief.

A factoring company buys these debts and provides certain additional services, for example;

- It will lend up to 70–80 per cent of outstanding debts
- It will deal with all the paper work of collecting the debts
- It will insure against non-payment of debts.

Factoring frees money due to the business and the same can be utilised for growth and expansion.

Advance from Customers

It is customary to collect full or part of the order amount from the customers in advance. Such advances are useful to meet the working capital needs.



CAPITAL BUDGETING

Learning Objectives

After completing this chapter, you should be able to understand

- the concept and significance of capital budgeting
- kinds of capital budgeting decisions
- estimation of cash inflows and cash outflows
- evaluation of investment proposals under
 - (a) payback method
 - (b) accounting rate of return method
 - (c) internal rate of return method
 - (d) net present value method
 - (e) profitability Index
- limitations of capital budgeting process.

INTRODUCTION

Every organisation, irrespective of its nature (profit-making or otherwise) or size (big or small), in the course of its functioning, usually acquires, upgrades, replaces the assets such as land and buildings, plant and machinery and so on. For each of these, there exist two or more alternatives, which need to be carefully evaluated on the basis of their costs and revenues. To improve the quality of our decisions, an understanding of the principles and practices of capital budgeting is essential.

NATURE OF CAPITAL BUDGETING

Charles T Horngren defines capital budgeting as 'the long-term planning to make and finance proposed capital outlays.' The capital budgeting decisions involve long-term planning for selection and also financing the investment proposals. Capital budgeting is the process of evaluating the relative worth of long-term investment proposals on the basis of their respective profitability.

Capital budgets are different from operating budgets from time frame point of view. Operating budgets (such as sales budget, purchase budget or overheads budget) show the firm's planned operations or resource allocation for a given period in future, normally one year. On the other hand, capital budgets are made for long-term period say three years or beyond.

Long-term investment proposals involve larger cash outlays. This requires a careful analysis of cash outflows and inflows associated with each of these proposals. While evaluating capital budgeting proposals, the following steps are considered:

- Generating investment proposals
- Estimating cash flows for the proposals
- Evaluating cash flows
- Selection of projects based on an acceptance criterion
- Monitoring and re-evaluating, on a continuous basis, the investment projects, once they are accepted.

SIGNIFICANCE OF CAPITAL BUDGETING

Capital budgeting decisions assume special significance for the following reasons:

1. **Substantial capital outlays** Capital budgeting decisions involve substantial capital outlays.
2. **Long-term implications** Capital budgeting proposals are of longer duration and hence have long-term implications. For instance, the cash flows for next 5 to 15 years have to be forecast.
3. **Strategic in nature** Capital budgeting decision can affect the future of the company significantly as it constitutes the strategic determinant for the success of a company. A right investment decision is the secret of the success of many business enterprises.
4. **Irreversible** Once the funds are committed to a particular project, we cannot take back the decision. If the decision is to be reversed, we may have to lose a significant portion of the funds already committed. It may involve loss of time and efforts. In other words, the capital budgeting decisions are irreversible or may not be easily reversible.

- Projects that reduce costs
- Projects that increase revenues

Of these two, the capital budgeting decisions that reduce costs are relatively easier to be handled as full information about their present costs and revenues is available. What is to be decided here is: how to reduce the costs further before a capital budgeting proposal is selected.

Regarding the projects which increase the revenues, it may be difficult to select one from the given alternatives. It is so because the available data about the future cash flows has its own limitations, such as uncertainty in future, inaccurate estimate of life of the asset and so on.

CAPITAL BUDGETING DECISIONS

The following are examples of certain investment or capital budgeting decisions:

- Construction of a new building, or renovation of existing old buildings
- Interior decoration of a given building
- Purchase of technology from a foreign country
- Building a production facility
- Buying a new delivery truck
- Sponsoring a local football or cricket team for one or more number of years
- Building a bridge
- Buying an airline
- Making a new product
- Starting a new business
- Expansion decisions of existing plant and equipment
- Replacement decisions for replacing worn out or damaged equipment as well as replacing obsolete equipment
- Decision to expand into new products or markets such as R& D
- Advertising for the product or service or undertaking market survey
- Safety and/or environmental protection investment decisions necessary to comply with government directives
- Labour agreements and so on.

Kinds of Capital Budgeting Decisions

The above examples can be classified as under:

- Replacements (to replace worn out or obsolete fixed assets/equipment)
- Expansion (to add capacity to existing product lines)
- Diversification (to reduce the risk of failure by operating in more than one market)
- Research and development (where technology is rapidly changing, large sums need to be spent on research and development for investing on new and innovative products or services)
- Others (which include miscellaneous proposals like acquiring a control device or fire-fighting equipment or expenditure to comply with certain health standards and so on.)

In each of these cases, an efficient system is to be evolved to identify which of the given projects is viable or profitable.

METHODS OF CAPITAL BUDGETING

Capital budgeting decisions are made under different criteria. How are these criteria determined. These criteria differ in concepts. Some use thumb rules and some use logic and scientific approach. So, based on these criteria, the methods of capital budgeting can be classified as

- (a) Traditional methods
 - (i) Payback period
 - (ii) Accounting rate of return method
- (b) Discounted cash flow methods.
 - (i) Internal rate of return (IRR) method
 - (ii) Net present value (NPV) method.

Let us discuss these methods in detail.

Payback Method

Under payback method, the decision to accept or reject a proposal is based on its payback period. *Payback period* refers to the period within which the original cost of the project is recovered. It is calculated by dividing the cost of the project by the annual cash inflows.

$$\text{Payback period} = \frac{\text{Cost of the project}}{\text{Annual cash inflows}}$$

The shorter the length of the payback period, the better is the project in terms of paying back the original investment. Particularly where the future is uncertain, the companies favour this method. The earlier the original investment is recovered, the better it is, in terms of safety and liquidity. Where the cashflows are uniform throughout, they are said to even. Consider this example.

Where the cash inflows are even

Example 3

The cost of a project is Rs 50,000 the annual cash inflows for the next 4 years are Rs 25,000. What is the payback period for the project?

$$\begin{aligned}\text{Payback period} &= \frac{\text{Cost of the project}}{\text{Annual cash inflows}} \\ &= \frac{50,000}{25,000} \\ &= 2 \text{ years.}\end{aligned}$$

If another project has 3 years, for example, it is better to choose the above project because it has *less* payback period.

Where the cashflows are uneven

Where the cash flows are not uniform, they are said to be uneven. In such a case take the cumulative cash inflows and see how much time it takes to get back the original investment. Consider the following example.

Example 4

The cost of a project is Rs 50,000 which has an expected life of 5 years. The cash inflows for next 5 years are Rs 24,000; Rs 26,000; Rs 20,000; Rs 17,000 and Rs 16,000 respectively. Determine the payback period.

Table 12.1 Cash Inflows and Cumulative Cash Inflows for the Project

<i>Year</i>	<i>Cash inflows (Rs)</i>	<i>Cumulative cash inflows (Rs)</i>
1	24,000	24,000
2	26,000	50,000
3	20,000	70,000
4	17,000	87,000
5	16,000	1,03,000

Table 12.1 shows that the original investment can be recovered by the end of the second year and hence the project has 2 years of payback period.

So the payback period is 2 years.

Where the cash inflows are same, but timing is different

At times, the cash inflows may be different each year, but the total cash inflows over the life of the project may be the same. Sometimes, the payback period may be similar. In such a case, observe the timing of the cash inflows. Choose the project which has higher cash inflows in the initial years. Check the following example.

Example 5

Two projects, costing Rs 20,000 each, have the following cash inflows. Both have the same payback period. Which one do you choose and why?

Table 12.2 Same total cash inflows with a difference in size and timing

(Figure in Rupees)

<i>Year</i>	<i>Project A</i>	<i>Project B</i>
I	8,000	12,000
II	12,000	8,000
III	10,000	12,000
IV	9,000	7,000
V	7,000	7,000
Total	46,000	46,000

Solution

Table 12.2 shows equal cash inflows and also the equal payback of two years. But the timing of cash inflows is different. Project B yields Rs 12,000 as against Rs 8,000 by A. This has more value for next four years. Besides this, earlier cash inflows are likely to prove more accurate estimates than later cash flows.

Advantages

1. *Easy to calculate and understand* Calculation of payback period does not involve any complicated formulae. It is easy to calculate and understand.
2. *Liquidity is emphasised* It emphasises on the earlier cash flows which are more likely to be accurate than later cash flow. In other words, a short payback period also reduces the risk. (The more the risk, it is more likely that a part or whole of the investment will be lost).
3. *Reliable technique in volatile business conditions* It is a reliable technique for project appraisal, particularly in the areas of volatile business conditions such as change in technology, changing fashions or customer's tastes/preferences.

Disadvantages

1. *Post-payback earnings ignored* This method ignores the earnings after the payback period. It ignores the total life of the project and the total profitability of the investment.
2. *Timing of cash flows ignored* This method does not consider the timing of cash flows. All the cash flows are given equal weightage.
3. *Liquidity is over-emphasised* The liquidity of the proposal is over-emphasised by choosing only cash inflows. Other factors such as cost of proposal or cost of capital are ignored.

Despite the above limitations, the pay back method continues to be very popular and widely put to use particularly where there is a high degree of uncertainty.

Accounting Rate of Return (ARR) Method

Accounting rate of return refers to the ratio of annual profits after taxes to the average investment. The average investment is equal to half of the original investment. Accounting rate of return is also called average rate of return.

$$\text{ARR} = \frac{\text{Average annual profits after taxes}}{\text{Average investment}}$$

Where average investment is half of the capital outlay (that is, Capital outlay divided by 2). Average capital employed is calculated to the usual accounting convention that the original investment gets exhausted steadily to zero over the life of the project.

It is assumed that the asset is depreciated as per straight line method. Usually it is expressed in terms of percentage. The *higher the ARR is, the better is the profitability* and hence the projects with higher accounting rate of return are short-listed for implementation.

The above formula can be changed as per the needs of the appraisal. Average profits can be considered before or after depreciation, interest or taxes. At times, ARR is determined considering the original cost of the project as the denominator.

Example 6 Accounting rate of return

A firm is considering two projects each with an initial investment of Rs 20,000 and a life of 4 years. The following is the list of estimated cash inflows after taxes:

Table 12.3 Estimated Cash Inflows Proposals for I, II & III

Year	Proposal I	Proposal II	Proposal III
1	12,500	11,750	13,500
2	12,500	12,250	12,500
3	12,500	12,500	12,250
4	12,500	13,500	11,750
Total	50,000	50,000	50,000

Determine accounting rate of return on (a) average capital (b) original capital employed.

(a) ARR on average capital

$$\text{ARR} = \frac{\text{Average annual profits after taxes}}{\text{Average investment}}$$

<i>Proposal I</i>	<i>Proposal II</i>	<i>Proposal III</i>
$= \frac{12,500}{10,000}$	$= \frac{12,500}{10,000}$	$= \frac{12,500}{10,000}$
$= 125\%$	$= 125\%$	$= 125\%$

(b) On original investment

$$\text{ARR} = \frac{\text{Average annual profits after taxes}}{\text{Original investment}}$$

<i>Proposal I</i>	<i>Proposal II</i>	<i>Proposal III</i>
$= \frac{12,500}{20,000}$	$= \frac{12,500}{20,000}$	$= \frac{12,500}{20,000}$
$= 62.5\%$	$= 62.5\%$	$= 62.5\%$

From the Table 12.3, it is clear that the ARR gives equal priority to all the proposals though the timing of the cash inflows is different.

If There is Working Capital and Scrap, How is ARR Computed?

Where there is scrap resulting from the sale of the old asset and there is working capital, these two are added to the average investment. These are shown in the following formula:

$$\text{Average investment} = (\text{Cost} - \text{Scrap})/2 + \text{Scrap of old asset} + \text{Working capital}$$

Example 7 Computation of ARR

Find out the average rate of return from the following data relating to CNC Machines 1 and 2.

Cost	Rs 300,000 each
Estimated life	3 years each
Estimated scrap	60,000 each
Income tax rate	50%
Additional working capital required	2,50,000 for each machine

The estimated cash inflows after taxes for each machine are as given below:

Year	CNC Machine 1 Rs	CNC Machine 2 Rs
1	1,50,000	2,00,000
2	3,00,000	3,00,000
3	1,50,000	2,50,000
4	—	1,50,000
Total	<u>6,00,000</u>	<u>9,00,000</u>

Solution

The average cash inflows after taxes for CNC Machine 1 = Rs 2,00,000 that is, $(6,00,000/3)$

The average cash inflows after taxes for CNC Machine 2 = Rs 2,25,000 that is, $(9,00,000/4)$

$$\begin{aligned}\text{Average Capital} &= \frac{(\text{Cost} - \text{Scrap})}{2} + \text{working capital} + \text{Scrap} \\ &= \frac{(3,00,000 - 60,000)}{2} + 2,50,000 + 60,000 \\ &= 1,20,000 + 250,000 + 60,000 \\ &= \text{Rs } 4,30,000\end{aligned}$$

$$\begin{aligned}\text{ARR for Machine 1} &= \frac{\text{Average annual profits after taxes}}{\text{Average investment}} \\ &= \frac{2,00,000}{4,30,000} = 46.5\%\end{aligned}$$

$$\text{ARR for Machine 2} = \frac{2,25,000}{4,30,000} = 52.32\%$$

Based on the accounting rate of return, the machine 2 is profitable.

Advantages

1. It is easy to understand and calculate.
2. It can be compared with the cut off point of return and hence the decision to accept or reject is made easier.
3. It considers all the cash inflows during the life of the project, not like payback method.
4. It is a reliable measure because it considers net earnings that is, earnings after depreciation, interest and taxes.

Disadvantages

1. The concept of time value of money is ignored.
2. Unless we have a cut-off point of return, accounting rate of return cannot be meaningful and effective.
3. The average concept is not reliable, particularly in times of high or wild fluctuations in the returns.
4. The average concept dilutes the profitability of the project. In other words, a project with greater aggregate returns is given lower ranking. For instance, take a project with a life of 3 years has an average annual cash inflows of Rs 20,000 (i.e. total cash inflows of Rs 60,000). If the same project has a life of one more year with a cash inflow of Rs 10,000, the average profitability gets reduced to Rs 17,500 ($70,000/4$) and consequently the project ranked lower.

5. The method of computation of ARR is not standardised. There are many variations in the formula used. Cash inflows before or after depreciation, interest and taxes are used as per the needs of the analysis.

DISCOUNTED CASH FLOW METHODS

Discounted cash flow methods are the improved methods over the traditional techniques. These consider the time value of money. They consider the whole earnings of the proposal and the cost of the project. Because of these reasons, these methods are also called modern methods of investment appraisal. Discounted cash flow methods can be (a) Internal Rate of Return (IRR) method (b) Net Present Value (NPV) method. Under both of these methods, the decision to choose or reject is based on their discounted cash flows.

What are Discounted Cash Flows?

Discounted cash flows are the future cash inflows reduced to their present value based on a *discounting factor*. The process of reducing the future cash inflows to their present value based on a discounting factor or cut-off return is called *discounting*. Discounting is the obverse* of compounding. To understand this, let us see the following example.

Example 8 Time Value of Money

Suppose your friend asks you to lend him Rs 1,000 today and offers to repay the same after one day or one year, do you lend him? What terms do you put forth?

Solution:

Naturally, you would like to have the money as quickly as possible. You may not ask any interest, if the money is repaid after one day. But if the money were to be repaid, after say one year, you would like to make it clear how much interest is to be paid along with the principal amount of Rs 1000. In case the friend does not agree, you may not lend him at all.

The above example shows that money earns interest at a given rate which is otherwise called *time value*. In other words, if you invest the same money in any bank, you will get interest, at a given rate, accrued on this Rs 1000. You don't want to be deprived of this interest. Yes, why should you? (If the friend is very close, that is different, you may not ask any interest at all.)

Using the above example, if it is invested with a bank or a building society at an interest rate of 10 percent per annum, it will increase as follows:

	Rs
Original investment	1,000
Interest at 10% on Rs1000 for the first year	<u>100</u>
Value at the end of first year	1,100
Interest at 10% on Rs 1100 for the second year	<u>110</u>
Value at the end of 2nd year	1,210

* The basic formula for compounding is $S = P(1 + r)^n$ where s is the sum arising in future; r is the rate of interest and n is the number of years. The same is taken as inverse in discounting as shown below Present Value: $PV = \frac{S}{(1 + r)^n}$

In other words, a principal of Rs 1000 will multiply to Rs 1210 at the end of second year @ 10 percent per annum. The growth of Rs 210 is because of time value of money. The higher the rate of interest, the higher is the growth.

The same can be looked at from a different point of view. We are going to receive Rs 1,210 at the end of 2 years. What is its present value if it is growing at 10 percent per annum?

The answer is Rs 1000. The future value of Rs 1000 at the end of two years at a rate of return of 10 percent per annum is Rs 1210.

The present value of Rs 1210 received at the end of two years from now discounted at 10 percent per annum is Rs 1000.

PV Factor Present value factor is also called discounting factor. Present value factors are used to discount the future cash flows (both inflows and outflows) to their present value. The present value of Re 1 over a period of time for different discounting factors is given in Table 12.4. The present value of Re 1 received annually for N years (cumulative values) is given in column 3 of Table 12.5. To increase the present value of future cash inflows, reduce the PV factor and vice versa. In other words, if you increase the PV factor, the present value of future cash inflows gets reduced and vice versa.

The following table of factors outlines the present value for one year and also the cumulative value of present value of Re 1 received for N years for 10 percent interest:

Using your calculator, check that the table of factors above is correct. Multiply 1 with (100/110) for the first year, multiply the result by (100/110) for the second year and so on. This represents the present value of Re 1 invested at a given rate K. The cumulative value of present value of Re 1 received for N years so obtained can be verified from Table 12.5.

The present value is calculated as given below:

Here, we assume that all cash outflows are made in the initial year. K is the discount factor also called 'cost of capital'. Cash flows (CFs) in the year 1, 2 and 3 to n years are divided by the discount factor for K percentage in period 't' is:

$$\begin{aligned} & \frac{1}{(1+K)^t} \\ \text{PV} &= \left[\frac{CF_1}{(1+K)} + \frac{CF_2}{(1+K)^2} + \frac{CF_3}{(1+K)^3} + \dots + \frac{CF_n}{(1+K)^n} \right] \\ C &= \frac{CF_1}{(1+r)} + \frac{CF_2}{(1+r)^2} + \frac{CF_3}{(1+r)^3} + \dots + \frac{S_n + W_n}{(1+r)^n} \end{aligned}$$

or

$$= \sum_{t=1}^n \frac{CF_t}{(1+r)^t} + \frac{S_n + W_n}{(1+r)^n}$$

or

$$\sum_{t=1}^n \frac{CF_t}{(1+r)^t} + \frac{S_n + W_n}{(1+r)^n} - C = 0$$

Net Present Value Method

Net present value refers to the *excess* of present value of future cash inflows over and above the cost of original investment.

$$NPV = (PV_{CFAT}) \text{ minus } (PV_c)$$

Where PV_{CFAT} refers to the present value of future cash inflows after taxes

PV_c refers to present value of original investment or capital

The concept of NPV is a logical extension to the concept of present value. Here the decision is based on the size of net present value. The projects with higher NPVs are selected. If the NPV is negative, that means the project is not profitable. In other words, the NPV should always be positive and should be maximum. The present value factor tables are used here to determine the present value of the future cash inflows.

How is NPV Calculated?

The following are the stages in the determination of NPV

1. From the PV factor table, identify the PV factors of Re 1 for the given discount rate (PV)
2. Multiply the cash flows (both outflows and inflows) with the corresponding PV factor to find the products $DCF = (PV) \times (CFAT)$
3. Find the sum of the products
4. If the sum is positive, that means, the project is profitable. In case of projects with different NPVs, choose the project with the highest NPV because, the higher the NPV, the higher is the profitability.

Interpretation

$NPV > 1$ which means that the project earns more than the discount rate

$NPV = 1$ which means that the project earns the same as the discount rate

$NPV < 1$ which means that the project earns less than the discount rate

Example 12 NPV determination in case of even cash inflows

Given that a project costing Rs 40,000 has annual cash inflows of Rs 20,000 after taxes for a period of 6 years. How much is the net present value if the firm expects 15 percent per annum?

$$\text{Net present Value} = (\text{PV}_{\text{CFAT}}) \text{ minus } (\text{PV}_c)$$

PV (annuity) factor @ 15 percent for six years = 3.784

$$\text{PV}_{\text{CFAT}} = 20,000 \times 3.784$$

$$= \text{Rs } 75,680$$

$$NPV = 75,680 - 40,000$$

$$= \text{Rs } 35,680$$

Example 13 NPV determination in case of uneven cash inflows

A firm has many projects. It wants to earn at least 6 percent per annum on this project with the following cash flows. Do you recommend?

Year end	0	1	2	3	4	5	6
Cash inflow			30,000	40,000	40,000	40,000	50,000
Cash outflow	1,00,000	20,000					

Solution

Year	Cash inflow	6% PV factor	Present value of the future cash flows
0	(1,00,000)	1.000	(1,00,000)
1	(20,000)	0.943	(18,860)
2	30,000	0.890	26,700
3	40,000	0.839	33,560
4	40,000	0.792	31,680
5	40,000	0.747	29,880
6	50,000	0.705	35,250
Total Present value			1,57,070
Less: Present value of original investment			1,18,860
Net present value (NPV)			38,210

Since NPV is positive, the project can be recommended.

Example 14 NPV determination in projects with outflows during the project

From the following details relating to the two projects A and B, suggest which one is to be accepted under NPV method.