UNIT-VI
CAPITAL BUDGETING

Meaning & Significance of Capital:

The term capital is used in economics in various senses. In ordinary language and sometimes in economics also capital is used in the sense of money. But when we talk of capital as a factor of production, to confuse capital with money is quite wrong. Of course, money is used to purchase various factors such as raw materials, machinery, labour which help to produce goods, but money itself does not directly help in the production of goods. The money which is available for investment and productive purposes has been called money capital or financial capital by some economists. But money capital is not the real capital. The real capital consists of machinery, tools, tube well, factories; tractors, etc., which directly assist in the production of goods.

The Characteristics or features of capital are:

1. **Man-made Factor:** Capital is not a gift of nature. So, it is not a primary or natural factor, it is made by man in capital goods industry. It is secondary as well as an artificial factor of production.
2. **Productive Factor:** Capital helps in increasing the level of productivity and speed of production.
3. **Elastic Supply:** Supply of capital depends upon capital formation process. Capital formation depends upon savings and investment. By accelerating capital formation, capital supply can be increased. But it is a long term process.
4. **Durable:** Capital is not perishable like labour. It has a long life subject to periodical depreciation.
5. **Easy Mobility:** Movement of capital from one place to another is easily possible.
6. Is a Wealth: Since have all features of wealth viz. utility, scarcity, transferability and externality, capital is a wealth but doesn't necessarily become capital.
7. **Derived Demand:** As a factor production, capital has a derived demand to produce finished goods which have a direct demand.
8. **Round about Production:** Capital goods don't satisfy our wants directly. But resources should be diverted towards production of capital goods first. And thereafter such produced mean can be use to produce consumer goods having direct demand.
9. **Social Cost:** Resources have alternative uses. Either they can be put to production of capital goods or consumer goods. When resources are used for producing capital goods, it means society has sacrificed enjoyment of consumer goods. This is called social cost.

TYPES OF CAPITAL The forms, classification or types of capital are:

1. **Fixed Capital:** It refers to durable capital goods which are used in production again and again till they wear out. Machinery, tools, means of transport, factory building, etc are fixed capital. Fixed capital does not mean fixed in location. Since the money invested in such capital goods is fixed for a long period, it is called fixed capital.
2. **Working Capital:** Working capital or variable capital is referred to the single use produced goods like raw materials. They are used directly and only once in production. They get converted into finished goods. Money spend on them is fully recovered when goods made out of them are sold in the market.

Need and Importance of Working Capital Working capital is the life blood and nerve center of business. Working capital is very essential to maintain smooth running of a business. No business can run successfully without an adequate amount of working capital. The main advantages or importance of working capital are as follows:

1.Strengthen The Solvency Working capital helps to operate the business smoothly without any financial problem for making the payment of short-term liabilities. Purchase of raw materials and payment of salary, wages and overhead can be made without any delay. Adequate working capital helps in maintaining solvency of the business by providing uninterrupted flow of production.

2.Enhance Goodwill Sufficient working capital enables a business concern to make prompt payments and hence helps in creating and maintaining goodwill. Goodwill is enhanced because all current liabilities and operating expenses are paid on time.

3.Easy Obtaining Loan A firm having adequate working capital, high solvency and good credit rating can arrange loans from banks and financial institutions in easy and favorable terms.

4.Regular Supply of Raw Material Quick payment of credit purchase of raw materials ensures the regular supply of raw materials from suppliers. Suppliers are satisfied by the payment on time. It ensures regular supply of raw materials and continuous production. **5.Smooth Business Operations** Working capital is really a life blood of any business organization which maintains the firm in well condition. Any day to day financial requirement can be met without any shortage of fund. All expenses and current liabilities are paid on time.

6.Ability to Face Crisis Adequate working capital enables a firm to face business crisis in emergencies such as depression.

The term working capital is usually used in two different senses namely.

1) Gross Working Capital

2) Net Working Capital

Gross Working Capital It represents total value of current assets. In other words, it is the sum total of net working capital and current liabilities. It is a quantities concept showing the total amount available for financing the current assets. It cannot reveal the true position of the company. For instance, every increase in borrowings will increase the gross working capital but net working capital will remain the same.

Net Working Capital It represents excess of current assets over current liabilities. Current assets include cash, debtors, stock, and bills receivable, Current liabilities include bills payable, accounts payable, expenses payable. It indicates the liquidity position of an enterprise i.e. the soundness or otherwise of the current financial position. The ratio of 2:1 between current assets and current liabilities is considered sound. The concept of net working capital is quantitative concept indicating firm's capacity to meet operating expenses and current liabilities. Net working capital is increased only when there is an increase in current assets without corresponding increase in current liabilities. **Net Working**

Capital = Current assets Current liabilities

3. **Circulating Capital:** It is referred to the money capital used in purchasing raw materials. Usually the term working capital and circulating capital are used synonymously.
4. **Sunk Capital:** Capital goods which have only a specific use in producing a particular commodity are called sunk capital. For e.g. A textile weaving machine can be used only in textile mill. It cannot be used elsewhere. It is Sunk capital.
5. **Floating Capital**: Capital goods which are capable of having some alternative uses are called floating capital. For e.g. electricity, fuel, transport vehicles, etc are the floating capital which can be used anywhere.
6. **Money Capital:** Money capital means the money funds available with the enterprise for purchasing various types of capital goods, raw-material or for construction of factory building, etc. it is also called liquid capital. At the beginning the money capital is required for two purposes one for acquiring fixed assets i.e. fixed capital goods and another for purchasing raw-materials, payment of wages and meeting certain current expenses i.e. working capital.
7. **Real Capital:** On the other hand, real capital is referred to the capital goods other than money such as machinery, buildings, semi-finished goods, raw-materials etc.

8. **Private Capital:** All the physical assets (other than land), as well as investments, which bring income to an individual are called private capital.
9. **Social Capital:** All the assets owned by a community as a whole in the form of non-commercial assets are called social capital. E.g. roads, public parks, hospitals, etc.
10. **National Capital:** Capital owned by the whole nation is called national capital. It comprises private as well as public capital. National Capital is that part of national wealth which is employed in the reproduction of additional wealth.
11. **International Capital:** Assets owned by international organizations like UNO, WTO, World Bank, etc.

SOURCES OF CAPITAL

With your new business plan, financial projections and financing knowledge, you are now ready to secure outside capital for your new venture. The following 10 types of financing sources are ranked according to amount of preparation required and ease of securing the outside capital. Less preparation to secure a loan does not mean it is the best source, nor the least expensive source of capital. Of course, there will be exceptions to these general statements about each financial source.

1**. Trade or supplier credit**

Payment terms offered by your suppliers are a potential source of credit. Study the discounts for early payment and the penalty for late payment to determine the true cost of the credit. While some suppliers will extend credit only to well-established, proven firms, many will extend limited credit to new businesses to encourage another outlet for their merchandise. Planning for use of trade credit is essential. To establish good trade credit, a new business must make timely payments as agreed. Trade credit is effectively used by large businesses to buy products at lower cost than small firms. Do not depend too much on trade credit from one supplier. If repayment problems arise, you may find your major source for supplies cut off when you need it the most

2. **Life insurance policies** A standard feature of most life insurance policies (except term insurance) is the owner's ability to borrow against the cash value of the policy. The money can be used for any business or personal need. It normally takes two years for a policy to accumulate sufficient cash value. You may borrow up to 95 percent of the cash value of the policy for an indefinite period of time. As long as you continue to pay the insurance premiums, the interest can frequently be deferred indefinitely. The policy loan will reduce the dollar value of the policy and, in case of death, the loan is repaid first and then the beneficiaries receive the remainder. Some older life insurance policies guarantee very favorable interest rates.

3. **Friends and relatives** It is best not to borrow from friends and relatives, but many people do. If you must borrow from a friend or relative, do it on a business basis by putting the agreement in writing. Check with a lawyer if you want a binding, legal agreement. You may also get a sample business loan contract form from a bank or lending institution. Use it as a basis for a written agreement that both parties find acceptable. Unrealistic and/or naive investment expectations have ruined many friendships and family relationships.

4. **Customers** When customers pay for work in installments as it is completed or provide some of the materials, they are, in effect, financing the business. For example, a carpenter reduces capital requirements when the customer purchases the building materials for a remodeling project. In addition, it is not uncommon to request a deposit from customers when ordering items, particularly special items.

5. **Leasing companies** Leasing business equipment is another way to reduce capital needs. Everything from office furniture to food processing equipment can be obtained from leasing companies or commercial finance companies.
are easily repossessed in the event of default. In many cases, you have the option to buy the equipment for an agreed upon amount at the end of the lease period.

6. **Commercial finance companies** Commercial finance companies are generally seen as the place to go when you are unable to secure financing from a bank. Commercial finance companies, like banks, are concerned with your ability to

repay the loan; however, they are more willing to rely on the quality of the collateral rather than your track record or profit projections. If you do not have substantial personal assets or collateral, a commercial finance company may not be the best place to secure start-up capital for a business. Commercial finance company capital is usually several percentage points higher than bank financing.

7. **Commercial banks** Commercial banks are by far the most visible lenders and make the greatest number and variety of loans. However, banks are generally conservative lenders. Although they accept collateral for business loans, loan approval rests on your ability to repay the loan as shown by your profit projections, management skills and your personal record. Strive to establish and keep a good working relationship with your banker. It may help to involve the banker in the planning process for your new business. Avoiding the banker until you need money may make a loan harder to get because the banker is unfamiliar with the business and its history.

Capitalization

Capitalization comprises of share capital, debentures, loans, free reserves, etc. Capitalization represents permanent investment in companies excluding long-term loans. Capitalization can be distinguished from capital structure. Capital structure is a broad term and it deals with qualitative aspect of finance. While capitalization is a narrow term and it deals with the quantitative aspect. Capitalization is generally found to be of following types-

- Normal
- Over
- Under

Overcapitalization

Overcapitalization is a situation in which actual profits of a company are not sufficient enough to pay interest on debentures, on loans and pay dividends on shares over a period of time. This situation arises when the company raises more capital than required. A part of capital always remains idle. With a result, the rate of return shows a declining trend. The causes can be-

1. **High promotion cost-** When a company goes for high promotional expenditure, i.e., making contracts, canvassing, underwriting commission, drafting of documents, etc. and the actual returns are not adequate in proportion to high expenses, the company is over-capitalized in such cases.
2. **Purchase of assets at higher prices-** When a company purchases assets at an inflated rate, the result is that the book value of assets is more than the actual returns. This situation gives rise to over-capitalization of company.
3. **A company's floatation n boom period-** At times company has to secure it's solvency and thereby float in boom periods. That is the time when rate of returns are less as compared to capital employed. This results in actual earnings lowering down and earnings per share declining.
4. **Inadequate provision for depreciation-** If the finance manager is unable to provide an adequate rate of depreciation, the result is that inadequate funds are available when the assets have to be replaced or when they become obsolete. New assets have to be purchased at high prices which prove to be expensive.
5. **Liberal dividend policy-** When the directors of a company liberally divide the dividends into the shareholders, the result is inadequate retained profits which are very essential for high earnings of the company. The result is deficiency in company. To fill up the deficiency, fresh capital is raised which proves to be a costlier affair and leaves the company to be over**-** capitalized.
6. **Over-estimation of earnings-** When the promoters of the company overestimate the earnings due to inadequate financial planning, the result is that company goes for borrowings which cannot be easily met and capital is not profitably invested. This results in consequent decrease in earnings per share.

Effects of Overcapitalization

1. **On Shareholders-** The over capitalized companies have following disadvantages to shareholders:

a. Since the profitability decreases, the rate of earning of shareholders also decreases.
b. The market price of shares goes down because of low profitability.
c. The profitability going down has an effect on the shareholders. Their earnings become uncertain.
d. With the decline in goodwill of the company, share prices decline. As a result shares cannot be marketed in capital market.

2. **On Company-**

a. Because of low profitability, reputation of company is lowered.

b. The company’s shares cannot be easily marketed.
c. With the decline of earnings of company, goodwill of the company declines and the result is fresh borrowings are difficult to be made because of loss of credibility.
d. In order to retain the company’s image, the company indulges in malpractices like manipulation of accounts to show high earnings.
e. The company cuts down it’s expenditure on maintainance, replacement of assets, adequate depreciation, etc.

3. **On Public-** An overcapitalized company has got many adverse effects on the public:
a. In order to cover up their earning capacity, the management indulges in tactics like increase in prices or decrease in quality.
b. Return on capital employed is low. This gives an impression to the public that their financial resources are not utilized properly.
c. Low earnings of the company affects the credibility of the company as the company is not able to pay it’s creditors on time.
d. It also has an effect on working conditions and payment of wages and salaries also lessen.

Undercapitalization
An undercapitalized company is one which incurs exceptionally high profits as compared to industry. An undercapitalized company situation arises when the estimated earnings are very low as compared to actual profits. This gives rise to additional funds, additional profits, high goodwill, and high earnings and thus the return on capital shows an increasing trend. The causes can be-
1. **Low promotion costs**
2. **Purchase of assets at deflated rates**
3. **Conservative dividend policy**
4. **Floatation of company in depression stage**
5. **High efficiency of directors**
6. **Adequate provision of depreciation**
7. **Large secret reserves are maintained.**

Efffects of Under Capitalization
1. **On Shareholders**
a. Company’s profitability increases. As a result, rate of earnings go up.
b. Market value of share rises.
c. Financial reputation also increases
d. Shareholders can expect a high dividend.

2. **On company**
a. With greater earnings, reputation becomes strong.
b. Higher rate of earnings attract competition in market.
c. Demand of workers may rise because of high profits.
d. The high profitability situation affects consumer interest as they think that the company is overcharging on products.

3. **On Society**
a. With high earnings, high profitability, high market price of shares, there can be unhealthy speculation in stock market.
b. ‘Restlessness in general public is developed as they link high profits with high prices of product.
c. Secret reserves are maintained by the company which can result in paying lower taxes to government.
d. The general public inculcates high expectations of these companies as these companies can import innovations, high technology and thereby best quality of product.

CAPITAL BUDGETING

Introduction

Capital budgeting decision relates to decision of investment in long-term projects. Capital budgeting is often used interchangeably with capital expenditure or capital investment. Any expenditure that generates a cash flow benefit for more than one year, it is a capital expenditure. For example, the purchase of new equipment, expansion of production capacity, buying another company, research & development, and so on.
All of us, at one time or another has had to deal with either preparing or following a budget. In fact, many households manage their financial affairs through a budget. Businesses do the same thing through what is known as capital budgeting. The process of capital budgeting is vital to any responsible, well managed business. If that business is public and owned by public shareholders, the budgeting process becomes more crucial, since shareholders can hold management accountable for accepting unprofitable projects that can have the effect of destroying shareholder value.

Nature of Capital Budgeting

- Capital expenditure plans involve a huge investment in fixed assets.
- Capital expenditure once approved represents long-term investment that cannot be reserved or withdrawn without sustaining a loss.
- Preparation of capital budget plans involves forecasting of several years of profits in advance in order to judge the profitability of the projects.

It may be asserted that, decision regarding capital investment should be taken very carefully so that the future plans of the company are not affected adversely.

Importance of Capital Budgeting

Capital budgeting is important because it creates accountability and measurability. Any business that seeks to invest its resources in a project, without understanding the risks and returns involved, would be held as irresponsible by its owners or shareholders. Furthermore, if a business has no way of measuring the effectiveness of its investment decisions, chances are that the business will have little chance of surviving in the competitive market place. Businesses (aside from non-profits) exist to earn profits. The capital budgeting process is a measurable way for businesses to determine the long-term economic and financial profitability of any investment project.
Capital budgeting is also vital to a business because it creates a structured step by step process that enables a company to:

1.Develop and formulate long-term strategic goals – the ability to set long-term goals is essential to the growth and prosperity of any business. The ability to appraise/value investment projects via capital budgeting creates a framework for businesses to plan out future long-term direction.
2. Seek out new investment projects – knowing how to evaluate investment projects gives a business the model to seek and evaluate new projects, an important function for all businesses as they seek to compete and profit in their industry.
3. Estimate and forecast future cash flows – future cash flows are what create value for businesses overtime. Capital budgeting enables executives to take a potential project and estimate its future cash flows, which then helps determine if such a project should be accepted.
4. Facilitate the transfer of information – from the time that a project starts off as an idea to the time it is accepted or rejected, numerous decisions have to be made at various levels of authority. The capital budgeting process facilitates the transfer of information to the appropriate decision makers within a company.
5. Monitoring and Control of Expenditures – by definition a budget carefully identifies the necessary expenditures and R&D required for an investment project. Since a good project can turn bad if expenditures aren't carefully controlled or monitored, this step is a crucial benefit of the capital budgeting process.
6. Creation of Decision – when a capital budgeting process is in place, a company is then able to create a set of decision rules that can categorize which projects are acceptable and which projects are unacceptable. The result is a more efficiently run business that is better equipped to quickly ascertain whether or not to proceed further with a project or shut it down early in the process, thereby saving a company both time and money.

Unlike other business decisions that involve a singular aspect of a business, a capital budgeting decision involves two important decisions at once: a financial decision and an investment decision. By taking on a project, the business has agreed to make a financial commitment to a project, and that involves its own set of risks. Projects can run into delays, cost overruns and regulatory restrictions that can all delay or increase the projected cost of the projec. In addition to a financial decision, a company is also making an investment in its future direction and growth that will likely have an influence on future projects that the company considers and evaluates. So to make a capital investment decision only from the perspective of either a financial or investment decisions can pose serious limitations on the success of the project.

Features of Capital Budgeting Capital budgeting refers to that technique using which a company identifies and evaluates the project where the cash flow of the company will be higher and greater than any other project under consideration.

1. Capital budgeting decisions are based on cash flows and not on accounting income concept so for example if company spends Rs.20000 on a project of 4 years then in normal accounting this expense would be accounted as Rs.5000 every year assuming company uses straight line method of depreciation whereas in case of capital budgeting it would be taken into account immediately and shown as Rs.20000 expense.
2. Capital budgeting are affected by externalities, externalities are the effects of acceptance of a project has on other project cash flows. For example if a project has very good cash flow but if due to acceptance of that project cash flows of current projects of the company are reduced than chances are that project will not be undertaken and some other project will be selected.
3. While making capital budgeting decision opportunity cost should be included in project cost so for example if company has project which requires initial outlay of Rs.50000 and if the interest rate of fixed deposit is 8 % then while making any decision company should take into account the loss of 8 % which the company is incurring by not investing in fixed deposit.
4. Time value of money is another important feature which should be taken into account because while making capital budgeting decision company is likely to favour those projects which start generating cash flows quickly because cash flows received earlier are worth more than cash flow received later due to time value of money.
5. Capital budgeting decision are taken by top level management because these decisions are for long period of time usually more than a year and cost of asset or project is very high and hence any mistake done can lead to locking of capital of the company for long period of time and also can result in big losses for the company in the long run.

Objectives of Capital Budgeting The following are the .important objectives of capital budgeting:

(1) To ensure the selection of the possible profitable capital projects.
(2) To ensure the effective control of capital expenditure in order to achieve by forecasting the long-term financial requirements.
(3) To make estimation of capital expenditure during the budget period and to see that the benefits and costs may be measured in terms of cash flow.
(4) Determining the required quantum takes place as per authorization and sanctions.
(5) To facilitate co-ordination of inter-departmental project funds among the competing capital projects.
(6) To ensure maximization of profit by allocating the available investible.

Why Capital budgeting decisions are more important? The long term Investment decision is called capital budgeting? It is more important due to the following reasons
A) Long term growth and affects: As capital budgeting decisions involve investment in long term fixed assets, it affects the long term growth.
b) Large amount of funds involved: As huge amount of fund is blocked for a long period, the decision should be taken rationally.
c) Risk involved: As such a decision affects the returns of the firm as a whole, it involves more risk.
d) Irreversible decisions: These long term decisions taken once cannot be reversed back, without incurring heavy losses. It will lead to waste of fund, if reversed. Thus capital budgeting decisions should be taken after careful study and deep analysis.

The Five Stages in the Capital Budgeting Process

1. **Investment Screening and Selection:** Projects consistent with the corporate strategy are identified. But projects don't simply walk into corporate headquarters. The firm must have some system for seeking or generating investment opportunities. Identifying investment opportunities is not necessarily the task of the financial manager. This task typically lies with the production, marketing, and research and development management of the firm.

2. **The Capital Budget Proposal:** A capital budget is proposed for the projects surviving the screening and selection process. The budget lists the recommended projects and the dollar amount of investment needed for each. This proposal may start as an estimate of expected revenues and costs, but as the project analysis is refined, data from marketing, purchasing, engineering, accounting, and finance functions are collected and put together.

3. **Budgeting Approval and Authorization:** Projects included in the capital budget are authorized, allowing further fact gathering and analysis, and approved, allowing expenditures for the projects. In some firms, the projects are authorized and approved at the same time. In others, a project must first be authorized, requiring more research before it can be formally approved. Formal authorization and approval procedures are typically used on larger expenditures; smaller expenditures are at the discretion of management.

4. **Project Tracking:** After a project is approved, work on it begins. The manager reports periodically on its expenditures, as well as on any revenues associated with it. This is referred to as project tracking, the communication link between the decision makers and the operating management of the firm. For example: tracking can identify cost over-runs; it can also identify that more marketing research is needed to better focus on the target market.

5**. Post-Completion Audit:** Following a period of time, perhaps two or three years after approval, projects are reviewed to see whether they should be continued. This reevaluation is referred to as a post-completion audit. Thorough post completion audits are not usually performed on every project since that would be too time consuming. Rather, they are performed on selected projects, usually the largest projects in a given year's budget for the firm or for each division. Post-completion audits enable the firm's management to see how well the cash flows realized correspond with the cash flows forecasted several years earlier.

Time Value of Money Definition Time Value of Money is a concept that recegnizes the relevant worth of future cash slows arising as a result of financial decisions by considering the opportunity cost of funds.

Concept

Money loses its value over time which makes it more desirable to have it now rather than later. There are several reasons why money loses value over time. Most obviously, there is inflation which reduces the buying power of money. But quite often, the cost of receiving money in the future rather than now will be greater than just the loss in its real value on account of inflation. The opportunity cost of not having the money right now also includes the loss of additional income that you could have earned simply by having received the cash earlier. Moreover, receiving money in the future rather than now may involve some risk and uncertainty regarding its recovery. For these reasons, future cash flows are worth less than the present cash flows.

Time Value of Money concept attempts to incorporate the above considerations into financial decisions by facilitating an objective evaluation of cash flows from different time periods by converting them into present value or future value equivalents. This ensures the comparison of 'like with like'. The present or future values of cash flows are calculated using a discount rate (also known as cost of capital, WACC and required rate of return) that is determined on the basis of several factors such as:

Rate of inflation ●	Higher the rate of inflation, higher the return that investors would require on their investment.
Interest Rates ●	Higher the interest rates on deposits and debt securities, greater the loss of interest income on future cash inflows

	causing investors to demand a higher return on investment.
Risk Premium ●	Greater the risk associated with future cash flows of an investment, higher the rate of return required by investors to compensate for the additional risk.

Leasing is generally more expensive than bank financing and is limited to items that have a long serviceable life, widespread use, and

Capital budgeting – the long – term investment decision – 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.

TECHNIQUES OF CAPITAL BUDGETING The techniques of capital budgeting is classified in to two categories: 1. Traditional Methods 2. Discounted cash flow techniques

Traditional Methods

1. Payback period:

The payback (or payout) period is one of the most popular and widely recognized traditional methods of evaluating investment proposals, it is defined as the number of years required to recover the original cash outlay invested in a project, if the project generates constant annualcash inflows, the payback period can be computed dividing cash outlay by the annual cash inflow.

$$\text{Pay-back period} = \frac{\text{Cash outlay (or) original cost of project}}{\text{Annual cash inflow}}$$

Advantages:

1. A company can have more favourable short-run effects on earnings per share by setting up a shorter payback period.
2. The riskiness of the project can be tackled by having a shorter payback period as it may ensure guarantee against loss.
3. As the emphasis in pay back is on the early recovery of investment, it gives an insight to the liquidity of the project.

Limitations:

1. It fails to take account of the cash inflows earned after the payback period.
2. It is not an appropriate method of measuring the profitability of an investment project, as it does not consider the entire cash inflows yielded by the project.
3. It fails to consider the pattern of cash inflows, i.e., magnitude and timing of cash inflows.
4. Administrative difficulties may be faced in determining the maximum acceptable payback period.

2. Accounting Rate of Return method:

The Accounting rate of return (ARR) method uses accounting information, as revealed by financial statements, to measure the profit abilities of the investment proposals. The accounting rate of return is found out by dividing the average income after taxes by the average investment.

ARR= Average income/Average Investment

$$ARR = \frac{\text{Average net income after taxes}}{\text{Average Investment}} \times 100$$

$$\text{Average net income after taxes} = \frac{\text{Total Income after Taxes}}{\text{No. Of Years}}$$

$$\text{Average investment} = \frac{\text{Total Investment}}{2}$$

Advantages:

1. It is very simple to understand and use.
2. It can be readily calculated using the accounting data.
3. It uses the entire stream of incomes in calculating the accounting rate.

Limitations:

1. It uses accounting, profits, not cash flows in appraising the projects
2. It ignores the time value of money; profits occurring in different periods are valued equally.
3. It does not consider the lengths of projects lives.
4. It does not allow for the fact that the profit can be reinvested.

Modern Approaches

1. Net present value method:

The net present value (NPV) method is a process of calculating the present value of cash flows (inflows and outflows) of an investment proposal, using the cost of capital as the appropriate discounting rate, and finding out the net profit value, by subtracting the present value of cash outflows from the present value of cash inflows. The equation for the net present value, assuming that all cash outflows are made in the initial year (tg), will be:

$$NPV = \left[\frac{A_1}{(1+k)^1} + \frac{A_2}{(1+k)^2} + \frac{A_3}{(1+k)^3} + \ldots\ldots + \frac{A_n}{(1+k)^n}\right] - C$$

$$= \sum \frac{A_1}{(1+k)^t} - C$$

$$= t = 1$$

Where A1, A2…. represent cash inflows, K is the firm’s cost of capital, C is the cost of the investment proposal and n is the expected life of the proposal. It should be noted that the cost of capital, K, is assumed to be known, otherwise the net present, value cannot be known.

Advantages:

1. It recognizes the time value of money
2. It considers all cash flows over the entire life of the project in its calculations.
3. It is consistent with the objective of maximizing the welfare of the owners.

Limitations:

1. It is difficult to use
2. It presupposes that the discount rate which is usually the firm's cost of capital is known. But in practice, to understand cost of capital is quite a difficult concept.
3. It may not give satisfactory answer when the projects being compared involve different amounts of investment.

2. Internal Rate of Return Method:

The internal rate of return (IRR) equates the present value cash inflows with the present value of cash outflows of an investment. It is called internal rate because it depends solely on the outlay and proceeds associated with the project and not any rate determined outside the investment, it can be determined by solving the following equation:

$$C = \frac{A_1}{(1+r)^1} + \frac{A_2}{(1+r)^2} + \frac{A_3}{(1+r)^3} + \dots\dots + \frac{A_n}{(1+r)^n}$$

$$C = \sum_{t=1}^{n} \frac{A_t}{(1+r)^t} \neq C$$

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

$$IRR = L + \frac{P1 - Q}{P1 - P2} \times D$$

L- Lower discount rate

P1 - Present value of cash inflows at lower rate.

P2 - Present value of cash inflows at higher rate.

Q- Actual investment

D- Difference in Discount rates.

Advantages:

1. Like the NPV method, it considers the time value of money.
2. It considers cash flows over the entire life of the project.
3. It satisfies the users in terms of the rate of return on capital.
4. Unlike the NPV method, the calculation of the cost of capital is not a precondition.
5. It is compatible with the firm's maximizing owners' welfare.

Limitations:

1. It involves complicated computation problems.
2. It may not give unique answer in all situations. It may yield negative rate or multiple rates under certain circumstances.
3. It implies that the intermediate cash inflows generated by the project are reinvested at the internal rate unlike at the firm's cost of capital under NPV method. The latter assumption seems to be more appropriate.

3. Profitability Index or Benefit Cost Ratio:

Profitability Index (PI) is a capital budgeting technique to evaluate the investment projects for their viability or profitability. Discounted cash flow technique is used in arriving at the profitability index. It is also known as benefit-cost ratio. Calculation of profitability index is possible with a simple formula with inputs as – discount rate, cash inflows and outflows. PI greater than or equal to 1 is interpreted as good and acceptable criterion. It is the ratio of the present value of future cash benefits, at the required rate of return to the initial cash outflow of the investment. It may be gross or net, net being simply gross minus one. The formula to calculate profitability index (PI) or benefit cost (BC) ratio is as follows. PI = PV cash inflows/Initial cash outlay A,

$$= \frac{\sum_{t=1} \frac{A_t}{(1+k)^t}}{C}$$

Advantages of Profitability Index The advantages of profitability index for a firm are listed below:

- The profitability index tells about an investment increasing or decreasing the firm’s value
- The profitability index takes into consideration all cash flows of the project.
- The profitability index takes the time value of money into consideration.
- The profitability index also considers the risk involved in future cash flows with the help of cost of capital.
- The profitability index is also helpful in ranking and picking projects while rationing of capital.

Disadvantages of Profitability Index

In addition to the aforesaid advantages, there are also certain disadvantages featured by the profitability index. These include:

- An estimate about the cost of capital is required so as to calculate the profitability index of a firm.
- The profitability index of a firm might not, sometimes, provide the correct decision while being used to compare mutually exclusive projects under consideration.