



மனோன்மணியம் சுந்தரனார் பல்கலைக்கழகம்

Manonmaniam Sundaranar University

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Tirunelveli - 627 012, Tamilnadu, India.

DIRECTORATE OF DISTANCE

&

CONTINUING EDUCATION

BUSINESS FINANCE



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BUSINESS FINANCE

UNIT I

Introduction to Business Finance and Time value of money

Business Finance: Meaning, Objectives, Scope – Time Value of money: Meaning, Causes – Compounding–Discounting–Sinking Fund Deposit Factor– Capital Recovery Factor – Multiple Compounding–Effective rate of interest–Doubling period (Rule of 69 and Rule of 72) – Practical problems.

UNIT II

Risk Management

Risk and Uncertainty: Meaning –Sources of Risk– Measures of Risk –Measurement of Return – General pattern of Risk and Return – Criteria for evaluating proposals to minimize Risk (Single Asset and Portfolio)– Methods of Risk Management– Hedging Currency risk

UNIT III

Startup Financing and Leasing

Startup Financing: Meaning, Sources, Modes (Bootstrapping, Angel investors, Venture capital fund) - Leasing: Meaning – Types of Lease Agreements – Advantages and Disadvantages of Leasing– Financial evaluation from the perspective of Lessor and Lessee.

UNIT IV

Cash, Receivable and Inventory Management

Cash Management: Meaning, Objectives and Importance – Cash Cycle – Minimum Operating Cash – Safety level of cash – Optimum cash balance – Receivable Management: Meaning – Credit policy – Controlling receivables: Debt collection period, Ageing schedule, Factoring–Evaluating investment in accounts receivable- Inventory Management: Meaning and Objectives–EOQ with price breaks–ABC Analysis.

UNIT V

Multi National Capital Budgeting

Multi National Capital Budgeting: Meaning, Steps involved, Complexities, Factors to be considered– International sources of finance – Techniques to evaluate multi-national capital expenditure proposals: Discounted Pay Back Period, NPV, Profitability Index, Net Profitability Index and Internal Rate of Return–Capital rationing-Techniques of Risk Analysis in Capital Budgeting.

Books for study:

1. Maheshwari S.N.,(2019),“FinancialManagementPrinciplesandPractices”,15th Edition, Sultan Chand & Sons, New Delhi.
2. Khan M.Y & Jain P.K, (2011), “Financial Management: Text, Problems and Cases”, 8th Edition, McGraw Hill Education, New Delhi.
3. Prasanna Chandra, (2019), “Financial Management, Theory and Practice”, 10th Edition, McGraw Hill Education, New Delhi.
4. Apte P.G, (2020), “International Financial Management” 8th Edition, Tata McGraw Hill, New Delhi.

Books for reference:

1. Pandey I. M., (2021), “Financial Management”, 12th Edition, Pearson India Education Services Pvt. Ltd, Noida.
2. Kulkarni P. V. & Satyaprasad B. G., (2015), “Financial Management”, 14th Edition, Himalaya Publishing House Pvt Ltd, Mumbai.
3. Rustagi R.P.,(2022),“FinancialManagement,Theory,Concept,Problems”, 6th Edition, Taxmann Publications Pvt. Ltd, New Delhi.
4. Arokiamary Geetha Rufus, Ramani N. & Others, (2017), “Financial Management”, 1st Edition, Himalaya Publishing House Pvt Ltd, Mumbai.

Webreferences:

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4. <https://resource.cdn.icai.org/65599bos52876parta-cp16.pdf>

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Unit – I

Introduction to Business Finance and Time value of money

Meaning

Business finance refers to the management of money and other assets in an organisation. And the scope of business finance encompasses everything, ranging from financial planning, risk assessment, and investment decision-making to financial statement analysis, capital structure, and working capital management. Basically, it is the backbone of an organisation that supports all operations, from procurement to marketing and human resources.

7 Objectives of Business Finance

The principal objectives of finance are to raise capital to earn adequate profit through investment, conservation, and efficient utilization of investable capital.

Raising of Capital

Finance's first and foremost objective is to raise the capital needed for the organization concerned.

The financial manager attempts to raise the capital economically so that excess funds do not remain idle or a shortage of funds does not create a bottleneck in running the business.

Investment of Capital

The second objective is to invest the capital raised appropriately and in proper sequence. By investment of funds, we mean financial managers should decide where corporate money may be invested.



Generally, money should be invested where it will do the most good. In a corporate setting, this means being profitable.

Protection of Capital

It is also the objective of finance to protect the capital invested in the business. Uncertainty always prevails in the business world.

If the investment is made unwisely and un-prudently, it may bring disaster to the business unit. Therefore, to fulfill the objective of finance, the risk of loss and protection of capital must be given due consideration.

Minimization of Cost

One objective of finance is to minimize the cost of funds to maximize shareholders' wealth. That involves examining all alternative sources of financing.

A firm may decide to issue bonds instead of stock. Bonds are riskier than stocks; on the other hand, bonds cost less than stocks. Here, the firm accepts the risk of borrowing in exchange for a lower cost of funds.

Maximization of Profit

One of the important objectives of finance is to maximize the firm's profit. The financial manager would take actions expected to make a major contribution to the firm's overall profits.

For each alternative being considered, the financial manager would select the one expected to result in the highest monetary return.



Maximization of Wealth

The other most important objective of the firm is to maximize the wealth of the owners for whom it is being operated. The wealth of corporate owners is measured by the share price of the stock, which in turn is based on the timing of returns, magnitude, and risk.

Maintain Firm Value

One of the important objectives of finance is to maintain the firm's value. It is generally believed that the firm's value is maximized when the cost of capital is minimized.

The optimum capital structure exists the value of the firm is maintained constantly. So, maintain firm value associated with the formation of optimum capital structure.

The scope of business finance in India

In India, business finance is particularly crucial given the rapidly growing economy and increasing global competition. A robust understanding of financial management can help Indian businesses stand out and succeed in a crowded marketplace. However, several government initiatives are aimed at boosting the financial capabilities of MSMEs like Credit Guarantee Trust Fund for Micro & Small Enterprises (CGTMSE), the Pradhan Mantri Mudra Yojana (PMMY) and Startup India scheme. And leveraging such MSME government loan schemes requires an in-depth understanding of business finance.

Time Value of Money (TVM)

The time value of money (TVM) is the concept that a sum of money is worth more now than the same sum will be at a future date due to its earnings



potential in the interim. The time value of money is a core principle of finance. A sum of money in the hand has greater value than the same sum to be paid in the future. The time value of money is also referred to as the present discounted value.

Meaning of Time Value of Money

The time value of money is one of the basic theories of financial management, it states that ‘the value of money you have now is greater than a reliable promise to receive the same amount of money at a future date’.

The time value of money (TVM) is the idea that money available at the present time is worth more than the same amount in the future due to its potential earning capacity. This core principle of finance holds that, provided money can earn interest, any amount of money is worth more the sooner it is received.

Concept of Time Value of Money

Important terms or concepts used in computing the time value of money are-

- (1) Cash-flow
- (2) Cash inflow
- (3) Cash outflow
- (4) Discounted Cash flow
- (5) Even cash flows /Annuity cash flows
- (6) Uneven/mixed streams of cash flows
- (7) Single cash flows



(8) Multiple cash flows

(9) Future value

(10) Present value

(11) Compounding

(12) Discounting

(13) Effective interest rate / Time preference rate

(14) Risks and types of risks

(15) Uncertainty, and

(16) Doubling Period.

The above concepts are briefly explained below:

(1) Cash-Flow:

Cash flow is either a single sum or the series of receipts or payments occurring over a specified period of time. Cash flows are of two types namely, cash inflow and cash outflow and cash flow may be of much variety namely; single cash flow, mixed cash flow streams, even cash flows or uneven cash flows.

(2) Cash Inflow:

Cash inflows refer to the receipts of cash, for the investment made on the asset/project, which comes into the hands of an individual or into the business



organisation account at a point of time/s. Cash inflow may be a single sum or series of sums (even or uneven/mixed) over a period of time.

(3) Cash Outflow:

Cash outflow is just opposite to cash inflow, which is the original investment made on the project or the asset, which results in the payment/s made towards the acquisition of asset or getting the project over a period of time/s.

(4) Discounted Cash Flow- The Mechanics of Time Value:

The present value of a future cash flow (inflows or outflows) is the amount of current cash that is of equivalent value to the decision maker today. The process of determining present value of a future payment (or receipts) or a series of future payments (or receipts) is called discounting. The compound interest rate used for discounting cash flows is called discount rate.

(5) Even Cash Flows /Annuity Cash Flows:

Even cash flows, also known as annuities, are the existence of equal/even/fixed streams of cash flows may be a cash inflow or outflow over a specified period of time, which exists from the beginning of the year.

Annuities are also defined as a series of uniform receipts or payments occurring over a number of years, which results from an initial deposit.'

In simple words, constant periodic sums are called annuities.

Annuity Aspects:



It is essential to discuss some of the aspects related to annuities, which are discussed as below:

1. Annuitant
2. Status
3. Perpetuity
4. Various types of Annuity-
 - i. Annuity Certain
 - ii. Annuity Contingent
 - iii. Immediate or Ordinary annuity
 - iv. Annuity due
 - v. Perpetual annuity
 - vi. Deferred annuity
5. Annuity factor-
 - (i) Present Value Annuity factor, and
 - (ii) Compound value annuity factor.

A brief description each of the above aspects is as follows:

- i. Annuitant is a person or an institution, who receives the annuity.



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- ii. Status refers to the period for which the annuity is payable or receivable.
- ii. Perpetuity is an infinite or indefinite period for which the amount exists.
- iv. a. Annuity Certain refers to an annuity which is payable or receivable for a fixed number of years.
- b. Annuity Contingent refers to the payment/receipt of an annuity till the happening of a certain event/incident.
- c. Immediate annuities are those receipts or payments, which are made at the end of the each period.
- d. A series of cash flows (i.e., receipts or payments) starting at the beginning of each period for a specified number of periods is called an Annuity due. This implies that the first cash flow has occurred today.
- e. Perpetual annuities when, annuities payments are made for ever or for an indefinite or infinite periods.
- f. Deferred annuities are those receipts or payments, which starts after a certain number of years.
- v. (a) Present Value of Annuity factor is the sum of the present value of Re. 1 for the given period of time duration at the given rate of interest;
- (b) Compound value/Future value of annuity factor is the sum of the future value of Re. 1 for the given period of time duration at the given rate of interest. This is the reciprocal of the present value annuity discount factor.



Note – When the interest rate rises, the present value of a lump sum or an annuity declines. The present value factor declines with higher interest rate, other things remaining the same.

vi. Sinking fund is a fund which is created out of fixed payments each period (annuities) to accumulate to a future sum after a specified period. The compound value of an annuity can be used to calculate an annuity to be deposited to a sinking fund for n period at i rate of interest to accumulate to a given sum.

(6) Uneven/Mixed Streams of Cash Flows:

Uneven cash flows, as the concept itself states, is the existence of un-equal or mixed streams of cash inflows emanating from the investment made on the assets or the project.

(7) Single Cash Inflows:

A single cash inflow is a single sum of receipt of cash generated from the project during the given period, for which the present value is ascertained by multiplying the cash inflow by the discount factor.

(8) Multiple Cash Inflows:

Multiple cash inflows (even or mixed cash inflows) are the series of cash flows, may be annuities/mixed streams of cash inflows which are generated from the project over the entire life of the asset.

(9) Future Value/Compound Value [FV/CV]:



The future value concept states as to how much is the value of current cash flow or streams of cash flows at the end of specified time periods at a given discount rate or interest rate. Future value refers to the worth of the current sum or series of cash flows invested or lent at a specified rate of return or rate of interest at the end of specified period.

In simple terms, future value refers to the value of a cash flow or series of cash flows at some specified future time at specified time preference rate for money.

(10) Compounding:

The process of determining the future value of present money is called compounding. In other words, compounding is a process of investing money, reinvesting the interest earned & finding value at the end of specified period is called compounding.

In simple words, calculation of maturity value of an investment from the amount of investment made is called compounding.

Under compounding technique the interest earned on the initial principal become part of principal at the end of compounding period. Since interest goes on earning interest over the life of the asset, this technique of time value of money is also known as ‘compounding’.

The simple formula to calculate Compound Value in different interest time periods is-

(a) If Interest is added at the end of each year or compounded annually-

$$FV \text{ or } CV = PV (1 + i)^n$$



Where, FV or CV = Future Value or Compound Value, PV= Present Value,

$(1 + i)^n$ = Compound Value factor of Re.1 at a given interest rate for a certain number of years.

(b) If Interest is added/computed semi-annually and other compounding periods/multi- compounding-

$$FV_n = PV \left(1 + \frac{i}{m}\right)^{n \times m}$$

Where FV_n = future value or terminal value at the end of 'n' number of years

PV = initial principal/ present value

1 = Re. One

r = nominal interest rate or discount rate before adjusting for inflation

n = number of years

m = number of times compounding is made in a year.

Say for example;

(i) When Compounding is made semi-annually, then $m=2$ (because two half years in one year).

(ii) When Compounding is made quarterly, then $m= 4$ (because, 4 quarter years in one year).

(iii) When Compounding is made monthly, then $m= 12$ (because, 12 months in one year).

(11) Present Value:

The present value is just opposite to the future value. Present value refers to the present worth of a future sum of money or streams of cash flows at a specified interest rate or rate of return. It is also called a discounted value.



In simple terms it refers to the current value of a future cash flow or series of cash flows.

(12) Discounting:

The inverse of the compounding process is discounting technique. The process of determining the present value of future cash flows is called discounting.

Discounting or Present Value technique is more popular than compounding technique, since every individual or an organisation intends to have/hold present sums, rather than getting some amount of money after some time, because of time preference for money.

$$PV = FV_n \left[\frac{1}{(1+i)^n} \right]$$

The simple formula to find Present Value

$$PV = \frac{FV_n}{(1+i)^n}$$

Or

Where; PV = present value
FV_n = future value
I = interest rate
N = No of periods

(13) Effective Interest Rate / Time Preference Rate:

Time preference rate is used to translate the different amounts received at different time periods; to amounts equivalent in value to the firm/individual in the present at common point reference. This time preference rate is normally expressed in ‘percent’ to find out the value of money at present or in future.

(14) Risk: In business, the finance manager is supposed to take number of decisions under different situations. In all such decisions, there is an existence of risk and uncertainty.



Risk is the variability of returns or the chance of financial losses associated with the given asset. Assets that are having higher chances of loss or the higher rate of variability in returns are viewed as risky assets and vice versa. Hence care should be taken to recognize and to measure the extent of risk associated with the assets, before taking the decision to invest on such risky assets.

3. Importance of Time Value of Money

The Consideration of time is important and its adjustment in financial decision making is also equally important and inevitable. Most financial decisions, such as the procurement of funds, purchase of assets, maintenance of liquidity and distribution of profits etc., affect the firm's cash flows/movement of cash in and out of the organization in different time periods.

Cash flows occurring in different time periods are not comparable, but they should be properly measurable. Hence, it is required to adjust the cash flows for their differences in timing and risk. The value of cash flows to a common time point should be calculated.

To maximize the owner's equity, it's extremely vital to consider the timing and risk of cash flows. The choice of the risk adjusted discount rate (interest rate) is important for calculating the present value of cash flows.

For instance, if the time preference rate is 10 percent, it implies that an investor can accept receiving Rs.1000 if he is offered Rs.1100 after one year. Rs.1100 is the future value of Rs.1000 today at 10% interest rate.

Thus, the individual is indifferent between Rs.1000 and Rs.1100 a year from now as he/she considers these two amounts equivalent in value. You can also



say that Rs.1000 today is the present value of Rs.1100 after a year at 10% interest rate.

Time value adjustment is important for both short-term and long-term decisions. If the amounts involved are very large, time value adjustment even for a short period will have significant implications.

However, other things being same, adjustment of time is relatively more important for financial decisions with long range implications than with short range implications. Present value of sums far in the future will be less than the present value of sums in the near future.

The concept of time value of money is of immense use in all financial decisions.

The time value concept is used

1. To compare the investment alternatives to judge the feasibility of proposals.
2. In choosing the best investment proposals to accept or to reject the proposal for investment.
3. In determining the interest rates, thereby solving the problems involving loans, mortgages, leases, savings and annuities.
4. To find the feasible time period to get back the original investment or to earn the expected rate of return.
5. Helps in wage and price fixation.



4. Reasons for Time Preference of Money / Reasons for Time Value of Money

There are three primary reasons for the time value of money- reinvestment opportunities; uncertainty and risk; preference for current consumption.

These reasons are explained below:

1. Reinvestment Opportunities:

The main fundamental reason for Time value of money is reinvestment opportunities.

Funds which are received early can be reinvested in order to earn money on them. The basic premise here is that the money which is received today can be deposited in a bank account so as to earn some return in terms of income.

In India saving bank rate is about 4% while fixed deposit rate is about 7% for one year deposit in public sector banks. Therefore even if the person does not have any other profitable investment opportunity to invest his funds, he can simply put his money in a savings bank account and earn interest income on it.

Let us assume that Mr. X receives Rs.100000 in cash today. He can invest or deposit this Rs.100000 in fixed deposit account and earn 7% interest p.a. Therefore at the end of one year his money of Rs.100000 grows to Rs.107000 without any efforts on the part of Mr. X.

If he deposits Rs.100000 in two years fixed deposit providing interest rate 7% p.a. then at the end of second year his money will grow to Rs.114490 (i.e. Rs.107000+ 7% of Rs.107000). Here we assume that interest is compounded annually i.e. we do not have a simple interest rate but compounded interest rate of 7%.



Thus Time value of money is the compensation for time.

2. Uncertainty and Risk:

Another reason for Time value of money is that funds which are received early resolves uncertainty and risk surmounting future cash flows. All of us know that the future is uncertain and unpredictable. At best we can make best guesses about the future with some probabilities that can be assigned to expected outcomes in the future.

Therefore given a choice between Rs.100 to be received today or Rs.100 to be received in future say one year later, every rational person will opt for Rs.100 today. This is because the future is uncertain. It is better to get money as early as possible rather than keep waiting for it.

The underlying principle is —A bird in hand is better than two in the bush.¶

It must be noted that there is a difference between risk and uncertainty.

In a Risky situation we can assign probabilities to the expected outcomes. Probability is the chance of occurrence of an event or outcome. For example I may get Rs.100 with 90% probability in future. Therefore there is 10% probability of not getting it at all. In a risky situation outcomes are predictable with probabilities.

In case of an uncertain situation it is not possible to assign probabilities to the expected outcomes. In such a situation the outcomes are not predictable.

3. Preference for Current Consumption:



The third fundamental reason for Time value of money is preference for current consumption. Everybody prefers to spend money today on necessities or luxuries rather than in future, unless he is sure that in future he will get more money to spend.

Let us take an example, Your father gives you two options – to get Wagon R today on your 20th birthday OR to get Wagon R on your 21st birthday which is one year later.

Which one would you choose? Obviously you would prefer Wagon R today rather than one year later. So every rational person has a preference for current consumption. Those who save for future, do so to get higher money and hence higher consumption in future.

In the above example of a car if your father says that he can give you a bigger car, say Honda City on your 21st birthday, then you may opt for this option if you think that it is better to wait and get a bigger car next year rather than settling for a small car this year.

Thus we can say that the amount of money which is received early (or today) carries more value than the same amount of money which is received later (or in future). This is Time Value of Money.

5. Valuation Concepts

There are the following two valuation concepts:

- 1) Compound Value Concept (Future Value or Compounding)
- 2) Present Value Concept (Discounting)



1) Compound Value Concept:

The compound value concept is used to find out the Future Value (FV) of present money. A Future Value means that a given quantity of money today is worth more than what will be received at some point of time in future.

It is the same as the concept of compound interest, wherein the interest earned in a preceding year is reinvested at the prevailing rate of interest for the remaining period. Thus, the accumulated amount (principal + interest) at the end of a period becomes the principal amount for calculating the interest for the next period.

$$\text{Future Value (FV)} = \text{Present Value (PV)} + \text{Interest (r)}$$

The compounding technique to find out the FV to present money can be explained with reference to:

- i) The FV of a single present cash flow,
- ii) The FV of a series of equal cash flows and
- iii) The FV of multiple flows.

i) FV of a Single Present Cash Flow: The future value of a single cash flow is defined in term of equation as follows:

$$FV = PV (1 + r)^n$$

Where, FV = Future value

PV = Present value

r = % Rate of interest, and

n = Time gap after which FV is to be ascertained.



Illustration 1:

Mr. A makes a deposit of Rs. 10,000 in a bank which pays 10% interest compounded annually for 5 years. You are required to find out the amount to be received by him after 5 years.

Solution:

$$FV_n = PV (1 + r)^n$$

$$PV_n = \text{Rs.}10,000, r = 10\% \text{ and } n = 5 \text{ years}$$

$$FV_n = 10,000 (1 + 0.10)^5$$

$$FV_n = \text{Rs.}10,000 (1.6105)$$

$$FV_n = \text{Rs.}16,105$$

ii) Future Value of Series of Equal Cash Flows or Annuity of Cash Flows:

Quite often a decision may result in the occurrence of cash flows of the same amount every year for a number of years consecutively, instead of a single cash flow. For example, a deposit of Rs. 1,000 each year is to be made at the end of each of the next 3 years from today.

This may be referred to as an annuity of deposit of Rs. 1,000 for 3 years. An annuity is thus, a finite series of equal cash flows made at regular intervals.

In general terms, the future value of an annuity is given as:

$$FVA_n = A \frac{(1+r)^n - 1}{r}$$

Where, FVA_n = Future value of an annuity which has duration of n years.

A = Constant periodic flow

r = Interest rate per period

n = Duration of the annuity



It is evident from the above that future value of an annuity depends upon three variables, A, r and n. The future value will vary if any of these three variables changes. For computation purposes, tables or calculators can be made use of.

Illustration 2:

Mr. A is required to pay five equal annual payments of Rs. 10,000 each in his deposit account that pays 10% interest per year. Find out the future value of annuity at the end of four years.

Solution:

$$FVA_n = A(1+r)^n - 1/r$$

$$FVA_n = 10,000(1.10)^4 - 1/.10$$

$$FVA_n = 10,000 [4.641] = 46,410$$

iii) Future Value of Multiple Flows:

Illustration 3:

Suppose the investment is Rs. 1,000 now (beginning of year 1), Rs.2,000 at the beginning of year 2 and Rs.3,000 at the beginning of year 3, how much will these flows accumulate at the end of year 3 at a rate of interest of 12 percent per annum?

Solution:

To determine the accumulated sum at the end of year, add the future compounded values of Rs. 1,000, Rs.2, 000 and Rs.3, 000 respectively:



$$\begin{aligned} & \text{FV}(12,3) (\text{Rs.}1,000) + \text{FV}(12,2) (\text{Rs.}2,000) + \text{FV}(12,1) (\text{Rs.}3,000) \\ & = \text{Rs.}1,000 \times \text{FVF}(12,3) + 2,000 \times \text{FVF}(12,2) + 3,000 \times \text{FVF}(12,1) \\ & = \text{Rs.}[(1,000 \times 1.405) + (2,000 \times 1.254) + (3,000 \times 1.120)] = \text{Rs.}7,273 \end{aligned}$$

2) Present Value Concept:

Present values allow us to place all the figures on a current footing so that comparisons may be made in terms of today's rupees. Present value concept is the reverse of compounding technique and is known as the discounting technique.

As there are FVs of sums invested now, calculated as per the compounding techniques, there are also the present values of a cash flow scheduled to occur in future.

The present value is calculated by discounting technique by applying the following equation:

$$PV = FV/(1 + r)^n$$

The discounting technique to find out the PV can be explained in terms of:

i) Present Value of a Future Sum:

The present value of a future sum will be worth less than the future sum because one forgoes the opportunity to invest and thus forgoes the opportunity to earn interest during that period. In order to find out the PV of future money, this opportunity cost of the money is to be deducted from the future money.

The present value of a single cash flow can be computed with the help of following formula:



$$PV = FV_n / (1+r)^n$$

Where, FV_n = Future value n years hence
 r = Rate of interest per annum
 N = No. of years for which discounting is done

Illustration 4:

Find out the present value of Rs.3, 000 received after 10 years hence, if the discount rate is 10%.

Solution:

$$PV = FV_n / (1+r)^n$$

$$r = 10\%, n = 10 \text{ years}$$

$$PV = 3,000 / (1+10)^{10}$$

$$PV = 3,000 / (.386) = \text{Rs. } 1,158$$

Illustration 5:

Mr. A makes a deposit of Rs. 5000 in a bank which pays 10% interest compounded annually. You are required to find out the amount to be received after 5 years.

Solution:

$$PV = FV / (1+r)^n$$

$$FV = PV \times (1+r)^n$$

$$= 5000 \times (1+.10)^5$$

$$= 5000 \times 3.791$$

$$= 18,955$$

ii) PV of a Series of Equal Future Cash Flows or Annuity:

A decision taken today may result in a series of future cash flows of the same amount over a period of number of years.



For example, a service agency offers the following options for a 3-year contract:

- a) Pay only Rs.2, 500 now and no more payment during next 3 years, or
- b) Pay Rs.900 each at the end of first year, second year and third year from now. A client having a rate of interest at 10% p.a. can choose an option on the basis of the present values of both options as follows:

Option I:

The payment of Rs.2, 500 now is already in terms of the present value and therefore does not require any adjustment.

Option II:

The customer has to pay an annuity of Rs.900 for 3 years.

Year	Amount	PVF @ 10%	P.V.
1	900	.909	818
2	900	.826	744
3	900	.751	<u>676</u>
			<u>2238</u>

In order to find out the PV of a series of payments, the PVs of different amounts accruing at different times are to be calculated and then added. For the above example, the total PV is Rs.2, 238. In this case, the client should select option B, as he is paying a lower amount of Rs.2, 238 in real terms as against Rs.2, 500 payable in option A.

The present value of an annuity may be expressed as follows:



$$PVA_n = A \left[\frac{(1+r)^n - 1}{r(1+r)^n} \right]$$

where, PVA_n = Present value of annuity which has duration of n years.

A = Constant periodic flow

R = Discount rate

Illustration 6:

Find out the present value of a 5 years annuity of Rs.50, 000 discounted at 8%.

Solution:

$$r = 8\%$$

$$n = 5 \text{ years}$$

$$PV = \text{Rs.}50,000$$

$$PV = \text{Amount of annuity} \times PV(r, n)$$

$$PVA_n = A \left[\frac{(1+r)^n - 1}{r(1+r)^n} \right]$$

$$= 50,000(1.08)^5 - 1/0.08(1.08)^5$$

$$= \text{Rs.}50,000 [3.993]$$

$$= \text{Rs.}1,99,650$$

6. Techniques Used to Understand the Concept of Time Value of Money

Basically two techniques are used to find the time value of money.

They are:

1. Compounding Technique or Future Value Technique
2. Discounting Technique or Present Value technique

1. Compounding Technique:

Compounding technique is just reverse of the discounting technique, where the present sum of money is converted into future sum of money by multiplying the



present value by the compound value factor for the required rate of interest and the period.

Hence Future Value or Compound Value is the 'product' of the present value of a given sum of money and the factor.

The simple formulas are used to calculate the Compound value of a single sum:

(a) If interest is compounded annually is-

$$FV = PV (1 + i)^n = PV (CVFni)$$

Note- $(1 + i)^n$ is the formula for future value or compound value factor and

CVFni = Compound Value factor for the given number of years at required rate of interest.

(b) If Interest is added semi-annually and other compounding periods-

$$FV = PV \left[1 + \frac{i}{m} \right]^{nm}$$

Where A = Compound Value or Future Value of Present Sum of money

P = Present sum of money given already as a known value.

1 = Re. One

i = Interest rate

n = number of years

m = number of times compounding should be made in a year

2. Discounting Technique or Present Value Technique:



Discounting technique or present value technique is the process of converting the future cash flows into present cash flows by using an interest rate/time preference rate/discount rate.

The simple formula used to calculate the Present Value of a single sum is:

$$PV = FV(\text{PVF or DF}) = FV \left[1 + \frac{i}{m} \right]^{-nm}$$

Or

$$PV = \frac{A}{(1 + i)^n}$$

Where;

P= Present Value, PVF= Present value factor of Re.1, DF= Discount factor of Re.1, A= Future Value or Compound Value, i = interest rate & n= number of years or time period given for 1 to n years and $(1 + i)^n$ = The compound value factor.

So from the above formula, it is very clear that the present value of future cash flows is the product of the 'future sum of money and the discount factor' or 'the quotient of the future sum of money and the compound value factor $(1 + i)^{-n}$ '.

Note – Present value can be computed for all types of cash flows, say single sum/ multiple sums, even / annuity sums and mixed/un-even sums.

Alternatively, PVF/DF, CVF of a rupee and also the annuity discount factor (PADF) and the compound value annuity factor (CVAF) at the given rate of interest for the expected period can be referred through the tables also.



7. Present Value Technique or Discounting Technique

It is a process of computing the present value of cash flow (or a series of cash flows) that is to be received in the future. Since money in hand has the capacity to earn interest, a rupee is worth more today than it would be worth tomorrow.

Discounting is one of the core principles of finance and is the primary factor used in pricing a stream of future receipts. As a method, discounting is used to determine how much these future receipts are worth today.

It is just the opposite of compounding where compound interest rates are used in determining the present value corresponding to a future value. For example, Rs. 1,000 compounded at an annual interest rate of 10% becomes Rs. 1,771.56 in six years.

Conversely, the present value of Rs. 1,771.56 realized after six years of investment is Rs. 1,000 when discounted at an annual rate of 10%. This present value is computed by multiplying the future value by a discount rate. This discount rate is computed as reciprocal of compounding.

Present value calculations determine what the value of a cash flow received in the future would be worth today (that is at time zero). The process of finding a present value is called discounting; the discounted value of a rupee to be received in future gets smaller as it is applied to a distant future.

The interest rate used to discount cash flows is generally called the discount rate. How much would Rs.100 received five years from now be worth today if the current interest rate is 10%?

Let us draw a timeline.

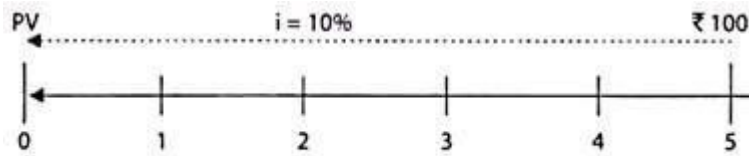


Fig. 2.2: Timeline to show present value and future value.

The arrow represents the flow of money and the numbers under the timeline represent the time period. It may be noted that time period zero is today, corresponding to which the value is called present value.

A generalized procedure for calculating the future value of a single amount compounded annually is as given below:

Formula: $FV_n = PV(1 + r)^n$

In this formula, $(1 + r)^n$ is called the **future value interest factor (FVIF)**.

Where, FV_n = Future value of the initial flow n year hence;

PV = Initial cash flow;

r = Annual rate of interest;

n = Number of years.

Using the above formula, the present value can be found out by discounting as shown below:

$$PV = \frac{FV_n}{(1+r)^n} = FV_n \left(\frac{1}{(1+r)^n} \right)$$
 In this formula, $\left(\frac{1}{(1+r)^n} \right)$ is called the **discounting factor** that is multiplied by the future value to find out the present value.

I. Ascertaining the Present Value (PV):

The discounting technique that facilitates the ascertainment of present value of a future cash flow may be applied in the following specific situations:

(a) Present Value of a Single Future Cash Flow:

The future value of a single cash flow may be ascertained by applying the usual compound interest formula as given below:



$$PV = \frac{FV_n}{(1+r)^n} = FV_n \times \left(\frac{1}{(1+r)^n} \right)$$

Where FV_n = Future cash flow at the end of period;

PV = Present value of a future cash flow;

r = Rate of interest per annum (or period);

n = Number of years (or periods).

$\left(\frac{1}{(1+r)^n} \right)$ is present value of interest factor (PVIF) at r rate for n years.

Let us understand the computation of present value with the help of an example that follows:

Example:

Mr. Aman shall receive Rs.25,000 after 4 years. What is the present value of this future receipt, if the rate of interest is 12% p.a.?

Solution: Given that $FV_4 = 25,000$, $n = 4$ and $r = 0.12$ (or 12%), on applying the following formula for present value, we get

$$PV = FV_n \times \left(\frac{1}{(1+r)^n} \right) = 25000 \left(\frac{1}{(1+0.12)^4} \right) = 25000 \times 0.635518 = 15887.95$$

Therefore, the present value of this future receipt is ₹ 15,888 (Approx.)

On a timeline, this can be depicted as shown below:

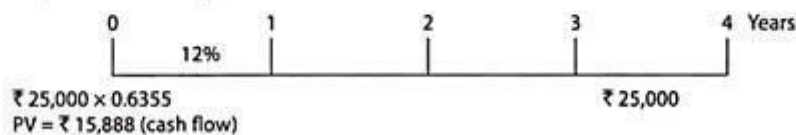


Fig. 2.3: Present value of cash flow occurring at the end of fourth year.

(b) Present Value of Series of Equal Cash Flows (Annuity):

An annuity is a series of equal cash flows that occur at regular intervals for a finite period of time. These are essentially a series of constant cash flows that are received at a specified frequency over the course of a fixed time period. The most common payment frequencies are yearly, semi-annually, quarterly and monthly.



There are two types of annuities – ordinary annuity and annuity due. Ordinary annuities are payments (or receipts) that are required at the end of each period. Issuers of coupon bonds, for example, usually pay interest at the end of every six months until the maturity date. Annuity due are payments (or receipts) that are required in the beginning of each period.

Payment of rent, lease etc., are examples of annuity due. Since the present and future value calculations for ordinary annuities and annuities due are slightly different, we will first discuss the present value calculation for ordinary annuities.

The formula for calculating the present value of a single future cash flow may be extended to compute present value of series of equal cash flow as given below:

$$PV_n = \frac{A}{(1+r)^1} + \frac{A}{(1+r)^2} + \dots + \frac{A}{(1+r)^n} \quad \dots (1)$$

Where, A = Series of future cash flows for n years (or periods);
 PV_n = Present value of equal cash flows (or annuities) for n years;
 r = Annual (or periodic) rate of interest;
 n = Number of years;

Multiplying both sides of Eq. (1) by $(1+r)$, we get

$$PV_n(1+r) = A + \frac{A}{(1+r)^1} + \frac{A}{(1+r)^2} + \dots + \frac{A}{(1+r)^{n-1}} \quad \dots (2)$$

Subtracting Eq.(1) from Eq.(2), we get

$$PV_n \times r = A - \frac{A}{(1+r)^n} = A \left[1 - \frac{1}{(1+r)^n} \right]. \text{ Accordingly,}$$

$$PV_n = A \left[\frac{1 - \frac{1}{(1+r)^n}}{r} \right] = A \times PVIFA_{(r\%,n)}; \therefore PVIFA_{(r\%,n)} = \left[\frac{1 - \frac{1}{(1+r)^n}}{r} \right]$$

In above formula, $PVIFA_{(r\%,n)}$ is called the **present value of interest factor annuity** to imply present value of a cash flow of ₹ 1 for n number of years (or periods) at r rate of interest. This factor is multiplied by the annuity value to find out the present value of annuity.



Capital Recovery Factor

Capital recovery is when funds initially paid at the beginning of an investment are earned back. The capital recovery factor is an effective cost analysis tool, and is used by many start-up businesses and investors looking to determine the success of their investments.

The ratio translates the present value of successive payments over a fixed amount of time. The present value represents the equivalent value at the present of a set of future cash flows, taking into account the time value of money.

The formula for determining the capital recovery factor is:

$$CRF = i(1+i)^n / (1+i)^n - 1$$

In this case, n is equal to the number of annuities received.

This formula is related to the annuity formula, which gives the present value in terms of the annuity, the interest rate, and the number of annuities.

Effective rate of interest:

An effective annual interest rate is the real return on a savings account or any interest-paying investment when the effects of compounding over time are taken into account. It also reflects the real percentage rate owed in interest on a loan, a credit card, or any other debt.

Doubling Period:

Doubling period refers to the time period required to double the value or size of investment, population, inflation etc and is calculated by dividing the log of 2 by



the product of number of compounding per year and the natural log of one plus the rate of periodic return.

Doubling Time Formula

Mathematically, the doubling time formula is represented as,

$$\text{Doubling Time} = \ln 2 / [n * \ln (1 + r/n)]$$

where

- r = rate of annual return
- n = no. of compounding period per year

In the case of **continuous compounding formula**, the calculation of doubling time in terms of years is derived by dividing the natural log of 2 by the rate of annual return (since $(1 + r/n) \sim e^{r/n}$).

$$\text{Doubling time} = \ln 2 / [n * \ln e^{r/n}]$$

- $= \ln 2 / [n * r / n]$
- $= \ln 2 / r$

where r = rate of return

The above formula can be further expanded as,

Doubling time = $0.69 / r = 69 / r\%$ which is known as **rule of 69**.

However, the above formula is also modified as **the rule of 72** because practically continuous compounding is not used, and hence 72 gives a more realistic value of the time period for less frequent compounding intervals. On the other hand, there is also the **rule of 70** in vogue, which is used just for the ease of calculation.



Doubling Time Calculation (Step by Step)

Follow the below steps:

1. Firstly, determine the rate of annual return for the given investment. The annual rate of interest is denoted by r .
2. Next, try to figure out the frequency of compounding per year, which can be 1, 2, 4, etc., corresponding to annual compounding, half-yearly, and quarterly, respectively. The number of compounding periods per year is denoted by n . (The step is not required for continuous compounding)
3. Next, the rate of periodic return is calculated by dividing the rate of annual return by the number of compounding periods per year. Rate of periodic return = r/n
4. Finally, in case of discrete compounding, the formula in terms of years is calculated by dividing the natural log of 2 by the product of no. of compounding period per year and the natural log of one plus the rate of periodic return as Doubling time = $\ln 2 / [n * \ln (1 + r/n)]$
5. On the other hand, in the case of continuous compounding, the formula in terms of years is derived by dividing the natural log of 2 by the rate of annual return as,

$$\text{Doubling time} = \ln 2 / r$$



Example:

Let us take an example where the rate of annual return is 10%. Calculate the doubling time for the following compounding period:

- Daily
- Monthly
- Quarterly
- Half Yearly
- Annual
- Continuous

Given, Rate of annual return, $r = 10\%$

#1 – Daily Compounding

Since daily compounding, therefore $n = 365$

Doubling time = $\ln 2 / [n * \ln (1 + r/n)]$

- = $\ln 2 / [365 * \ln (1 + 10\%/365)]$
- = 6.9324 years

#2 – Monthly Compounding

Since monthly compounding, therefore $n = 12$

Doubling time = $\ln 2 / [n * \ln (1 + r/n)]$

- = $\ln 2 / [12 * \ln (1 + 10\%/12)]$
- = 6.9603 years

#3 – Quarterly Compounding

Since quarterly compounding, therefore $n = 4$



$$\text{Doubling time} = \ln 2 / [n * \ln (1 + r/n)]$$

- $= \ln 2 / [4 * \ln (1 + 10\%/4)]$
- $= 7.0178 \text{ years}$

#4 – Half Yearly Compounding

Since half yearly compounding, therefore $n = 2$

$$\text{Doubling time} = \ln 2 / [n * \ln (1 + r/n)]$$

- $= \ln 2 / [2 * \ln (1 + 10\%/2)]$
- $= 7.1033 \text{ years}$

#5 – Annual Compounding

Since annual compounding, therefore $n = 1$,

$$\text{Doubling time} = \ln 2 / [n * \ln (1 + r/n)]$$

- $= \ln 2 / [1 * \ln (1 + 10\%/1)]$
- $= 7.2725 \text{ years}$

#6 – Continuous Compounding

Since continuous compounding,

$$\text{Doubling time} = \ln 2 / r$$

- $= \ln 2 / 10\%$
- $= 6.9315 \text{ years}$



Unit – II

Risk Management

Risk and uncertainty

Risk and uncertainty are two concepts commonly encountered in various fields, including finance, business, and decision-making. While often used interchangeably, they represent distinct concepts with different implications. Understanding the differences between risk and uncertainty is crucial for effective risk management and decision-making. In this article, we will explore the disparities between risk and uncertainty, highlighting their key differences, advantages, disadvantages, and areas of similarity.

Point	Risk	Uncertainty
1	Relates to known and measurable probabilities	Involves unknown probabilities and unpredictable outcomes
2	Can be quantified and assessed objectively	Difficult to quantify or assess due to lack of information
3	Arises from identifiable events or situations	Arises from ambiguity and lack of information
4	Involves known potential outcomes and their likelihoods	Involves unknown potential outcomes and their probabilities
5	Allows for calculation of expected values and probabilities	Does not allow for precise calculations or predictions
6	Can be managed and mitigated through	Cannot be fully managed or



	risk management strategies	eliminated
7	Provides a basis for decision-making and planning	Requires adaptive and flexible approaches
8	Involves both positive and negative consequences	Can lead to both opportunities and threats
9	Frequently encountered in structured and well-defined environments	Common in dynamic and complex environments
10	Associated with potential losses or gains	Associated with ambiguity and limited information

Risk

Risk is a concept that refers to the potential for loss, harm, or deviation from expected outcomes. It involves the analysis and assessment of potential events or situations, their probabilities, and the impact they may have on objectives or goals. Risk is often quantifiable and can be evaluated using various techniques, such as probability assessments and risk models. It plays a significant role in decision-making, as understanding and managing risks allow individuals and organizations to make informed choices and allocate resources effectively.

Advantages of Risk

- Enables proactive decision-making and planning.
- Allows for the identification and assessment of potential threats.
- Supports resource allocation and prioritization.
- Facilitates effective risk mitigation strategies.
- Provides a basis for measuring and monitoring performance.
- Enhances stakeholder confidence and trust.



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- Supports compliance with regulations and standards.
 - Promotes a culture of risk awareness and accountability.
 - Enables organizations to seize opportunities and innovate.
 - Helps in minimizing potential losses and maximizing returns.

Disadvantages of Risk

- Risk assessments may involve uncertainty and subjective judgments.
- Overemphasis on risk may lead to excessive caution and missed opportunities.
- Complex risk models or methodologies may be time-consuming and resource-intensive.
- Inaccurate or incomplete risk information can lead to flawed decision-making.
- Overreliance on past data may not account for emerging risks or changing circumstances.
- Risk assessments may overlook rare or low-probability events with significant consequences.
- Individuals or organizations may underestimate or misunderstand certain risks.
- Risk management efforts can create a false sense of security.
- Balancing risk mitigation measures with operational efficiency can be challenging.
- Different stakeholders may have conflicting risk perceptions and tolerances.

Uncertainty

Uncertainty refers to a state of not knowing or having limited information about future events or outcomes. It involves ambiguity, unpredictability, and the absence



of clear probabilities or measures of likelihood. Uncertainty can arise from various factors, such as incomplete data, complex environments, or situations with multiple possible outcomes. Unlike risk, uncertainty is not easily quantifiable or manageable through traditional risk management techniques.

Advantages of Uncertainty

- Encourages flexibility, adaptability, and agility in decision-making.
- Fosters creativity and innovation in finding new solutions.
- Promotes learning and exploration of new possibilities.
- Enhances resilience and the ability to navigate unpredictable situations.
- Provides opportunities for growth and personal development.
- Encourages collaboration and diverse perspectives.
- Supports anticipation and preparation for unexpected events.
- Stimulates curiosity and the pursuit of knowledge.
- Motivates individuals or organizations to challenge the status quo.
- Allows for the discovery of untapped opportunities.

Disadvantages of Uncertainty

- Lack of information can lead to indecision or analysis paralysis.
- Uncertainty can create anxiety or discomfort, particularly for risk-averse individuals.
- Difficulties in predicting outcomes may hinder effective planning.
- Limited information may result in suboptimal or irrational decision-making.
- Uncertainty can impede long-term strategic thinking and goal setting.
- Inadequate understanding of uncertainties may lead to significant risks being overlooked.
- Uncertainty can make it challenging to secure investments or funding.



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- Stakeholders may have divergent opinions or risk tolerances regarding uncertainty.
 - Rapidly changing circumstances can make decision-making more complex.
 - Lack of clarity or consensus regarding uncertainty can create conflicts or misunderstandings.

Similarities between Risk and Uncertainty

- Both involve future events or outcomes that are not yet realized.
- Both play a role in decision-making and resource allocation.
- Both can have positive or negative consequences.
- Both require analysis and understanding for effective management.
- Both can be influenced by external factors or forces.
- Both are inherent in dynamic and complex environments.
- Both involve assessing the potential for deviations from expected outcomes.
- Both require consideration of various factors and inputs.
- Both influence the level of confidence or uncertainty in decision-making.
- Both necessitate continuous monitoring and adaptation.

Measures of Return

Analyzing potential investments requires a lot of thought. One of the most important elements influencing your decision is expected return.

Generally, you'll compare different investments based on their final performance -- usually either an interest rate or a percentage gain. By studying various products' literature, brochures, websites, calculators and more, you should start to understand how different measurements of return are calculated and how they're used to help you evaluate your investment/portfolio.



Broadly, the returns measured from an investment are calculated by comparing the cost paid to acquire the asset (outflow) to what is earned from it (inflows) and computing the rate of return. The inflows can be from periodic payouts such as interest from fixed income securities and dividends from equity investments and capital gains or losses from a change in the value of the investment. In mutual funds, investors enjoy returns in the form of dividends and capital gains. While the forms of returns may differ, almost every fund or investment's performance is calculated in the form of standard return measures.

Types of Return Measures

Absolute Return

Absolute returns are the growth or decline in your investment. They are expressed as percentage of value. The fact that we don't take time into account when calculating absolute returns is often misleading. Generally, this method of calculating returns is used for periods less than 1 year. The current market value of the investment is Rs. 1,40,000 and the amount originally invested was Rs.1,00,000. In this case, the absolute return would be 40%. People often use absolute returns to measure the returns on real estate, like how many 'x' times has your property value grown? Since we are not considering time here, often absolute returns can be very misleading over one year and the longer the period, the more misleading it gets.

Annualized Return

Annualized returns measure how much your investment grew in value each year. The total return of the investment is averaged out or spread over a number of years, and one "return" is calculated. One important thing to note about annualized returns is that the effect of compounding is included. If a number doesn't look very attractive at first, over longer periods it can have a big impact on your return.



Investors should keep this power from compounding in mind when looking at annualized returns.

Let us see with an example - what is better? 15% annualised returns for 5 years or 85% absolute returns? Normally, people think that 15% times five is 75%, so 85% is a great deal. However, considering the power of compounding, 15% gives you a much higher effective return of 101.14%. Over time, this difference in returns will grow to astounding numbers.

Total Return

Taking into account all forms of inflows and appreciation, the total return is the actual rate of return earned from an investment. Capital gains and dividends would be included in the total return calculation for mutual funds / stocks. Considering the total returns of an investment is important when there are multiple forms of income/return from the investment to realise its true value.

For example, say you invest at the price/NAV of Rs. 20 and after a year, the price/NAV grew to Rs. 22. Sometime in the year you also received a dividend of Rs. 2 per share /unit. If you sum up, you are standing on a profit or return of Rs.4 and the total return is 20%.

Point to Point Return

As the name suggests, the point-to-point returns measure annualized returns between two points in time. To calculate point-to-point returns of a mutual fund scheme, you necessarily need to have a start date and end date. Often, we see that returns are expressed in terms of fixed periods of say 1 year, 5 years, 10 years and so on. Here the ‘To Date’ is always the present or the date of the report /calculation and the ‘From Date’ is the period before the ‘To Date’. Investors should



understand that the choice of ‘To Date’ makes all the difference to returns, and may or may be truly reflective of the quality/performance of the investment.

Compounded Annual Growth Rate (CAGR)

CAGR is a common mutual fund return used when a fund’s performance, usually seen for longer holding periods. While Annualised returns is generally used to convert less than one-year returns to an annual return, CAGR is used for longer periods to give compounded annual returns. CAGR considers the start and end value of the investment and the period concerned while normalising all highs & lows of the investment during the period. One important point to note is that CAGR does not consider periodic investments or multiple cashflows. Thus, if there are multiple investments in a year at irregular dates, CAGR may not provide a good picture. It works best on a point-to-point basis where we are considering one-time investments.

Extended Internal Rate of Return (XIRR)

If we have multiple cash flows - inflows and outflows, as in the case of SIP, which measure should we use if CAGR is not suitable? XIRR is the answer.

The Internal Rate of Return (IRR) is a very common measure used to calculate the returns from a series of cash-flows. The extended version of IRR, XIRR, is used to calculate returns on investments where multiple cash flows occur at different times. In XIRR, the CAGR of each cash flow is calculated, and then they are combined to give you the overall CAGR.

Regulations for Mutual Funds

When we talk about mutual funds in India, we have clear guidelines on what has to be disclosed w.r.t. scheme returns. Importantly, regulations do not allow anyone to promise any returns unless it is an assured returns scheme. Regulations require the



scheme performance to be compared and shown against the scheme's benchmark. The returns are required to be calculated based on _Total Returns' Index values and when the scheme age is +3 years, point-to-point returns and CAGR as on a particular date, both are required to be disclosed. This can be seen in scheme related documents.

Criteria for evaluating proposals to minimize risk (Single asset and portfolio)

Request for proposal (RFP) evaluation criteria is a set of standards that guide the scoring of vendor proposals. When put into practice, your RFP evaluation criteria standardizes scoring and removes subjectivity from the process. Proposal issuers use criteria to organize the proposal evaluation process and select the right vendor for their procurement projects.

Generally, both internal and external teams receive the RFP evaluation criteria. Specifically, vendors review scoring criteria as a part of the RFP documentation. And, your internal stakeholders who will participate in RFP scoring use it as a reference document.

In addition to improving confidence in vendor selection, having clear evaluation criteria sets expectations, ensures high-quality RFP responses and delivers fairness and transparency to the process. Indeed, scoring guidelines help to guide vendors to focus on the issues and areas of the RFP that are most important to you.

Methods of Risk Management

There are five basic techniques of risk management:

- Avoidance
- Retention



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- Spreading
 - Loss Prevention and Reduction
 - Transfer (through Insurance and Contracts)

Avoidance: Many times it is not possible to completely avoid risk but the possibility should not be overlooked. For example, at the height of a thunderstorm, Physical Plant may not release vehicles for travel until the weather begins to clear, thus avoiding the risk of auto accidents during severe weather. Some buildings on campus have had repeated water problems in some areas. By not allowing storage of records or supplies in those areas, some water damage claims may be avoided.

Retention: At times, based on the likely frequency and severity of the risks presented, retaining the risk or a portion of the risk may be cost-effective even though other methods of handling the risk are available. For example, the University retains the risk of loss to fences, signs, gates and light poles because of the difficulty of enumerating and evaluating all of these types of structures. When losses occur, the cost of repairs is absorbed by the campus maintenance budget, except for those situations involving the negligence of a third party. Although insurance is available, the University retains the risk of loss to most University personal property.

Spreading: It is possible to spread the risk of loss to property and persons. Duplication of records and documents and then storing the duplicate copies in a different location is an example of spreading risk. A small fire in a single room can destroy the entire records of a department's operations. Placing people in a large number of buildings instead of a single facility will help spread the risk of potential loss of life or injury.



Loss Prevention and Reduction: When risk cannot be avoided, the effect of loss can often be minimized in terms of frequency and severity. For example, Risk Management encourages the use of security devices on certain audio visual equipment to reduce the risk of theft. The University requires the purchase of health insurance by students who are studying abroad, so that they might avoid the risk of financial difficulty, should they incur medical expenses in another country.

Transfer: In some cases risk can be transferred to others, usually by contract. When outside organizations use University facilities for public events, they must provide evidence of insurance and name the University as an additional insured under their policy, thereby transferring the risk of the event from the University to the facility user. The purchase of insurance is also referred to as a risk transfer since the policy actually shifts the financial risk of loss, contractually, from the insured entity to the insurance company. Insurance should be the last option and used only after all other techniques have been evaluated.

Contracts: Often vendors and service providers will attempt through a contract to release themselves from all liability for their actions relating to the contract. These are often referred to as "hold harmless or indemnification" clauses. **Due to the complexity of interpreting these provisions, the President has delegated contracting authority for the University solely to staff in Contracts & Procurement.** The Office of University Risk Management reviews contracts and agreements as requested by Contracts & Procurement to identify and assess risks, evaluate insurance standards, and review hold harmless and indemnification provisions. The Chancellor's Office requires that the University obtain in most instances not only a Certificate of Insurance, but also an Endorsement. Collecting these documents is often the most time consuming aspect of the contracting process.



ESSENTIAL TOOLS OF RISK MANAGEMENT

Risk identification and assessment should be part of the planning and development of all department and unit programs or activities. To assess the risks posed by a program or activity, take the following steps:

1. Identify the tasks associated with the program or activity. For example, the tasks associated with conducting a lab experiment might include travelling to an off-site location, preparing the experiment, conducting the experiment, cleaning up the experiment and disposing any waste.
2. Identify the hazards associated with each task. A thorough identification of the tasks involved and the hazards they present is very important. Risks that aren't identified cannot be managed! For example, hazards related to preparing the experiment might include improper set up and lack of appropriate equipment.
3. Evaluate and select risk management techniques. The goal is to conduct the program or activity in such a way as to reduce the likelihood that something will go wrong and/or reduce the severity of any losses if something does go wrong. For example, the hazards related to preparing the experiment might be addressed through training and supervision, creating several different experiment stations so that not all of the students are working at the same station, and bringing extra equipment.
4. Assess the risks associated with the program or activity with the selected risk controls or transfers in place.
5. Determine whether to modify or proceed with the program or activity based on the risk assessment.



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6. Implement the selected risk management techniques and monitor the results. Designating who will implement the selected risk management measures and setting a time table for completion of those tasks is very important
 7. "Frequency" and "severity" are used to measure the risk remaining after appropriate risk management techniques have been implemented.
 - Activities or programs that include tasks that pose a high severity of loss, i.e. major injuries or death, significant property damage, significant operational interruptions, should be avoided if the frequency or likelihood of a loss occurs regularly or often. Activities with a high severity of loss but a moderate or low frequency of loss must at the least be well-supervised and require participants to sign releases of liability.
 - Most of the programs and activities of the University include tasks that pose a moderate severity of loss, i.e. minor injuries, property damage or operational interruptions, and a moderate or low frequency of loss. Nonetheless, these activities should be well-planned and have adequate supervision.
 - Activities or programs that include a negligible severity of loss, i.e. injuries that only require first aid or minor medical treatment and little or no property damage, and little likelihood of loss require very little risk management



Hedging Currency risk

Currency risk is the financial risk that arises from potential changes in the exchange rate of one currency in relation to another. And it's not just those trading in the foreign exchange markets that are affected. Adverse currency movements can often crush the returns of a portfolio with heavy international exposure, or diminish the returns of an otherwise prosperous international business venture. Companies that conduct business across borders are exposed to currency risk when income earned abroad is converted into the money of the domestic country, and when payables are converted from the domestic currency to the foreign currency.

The currency swap market is one way to hedge that risk. Currency swaps not only hedge against risk exposure associated with exchange rate fluctuations, but they also ensure the receipt of foreign monies and achieve better lending rates.

Key considerations before currency hedging

Investors shouldn't make long-term investment decisions based on expectations of future foreign currency movements. Here are three reasons why:

1. It is extremely challenging to predict the timing of currency movements. Predicting when a particular currency may rise or fall is a very difficult task, and is therefore best left to investment professionals. Exchange rate movements tend to vary over time and



can be severe over shorter time periods.

2. The impact of currency movements tends to diminish over time.

While exchange rates fluctuate from year to year, the impact of currency on investment returns tends to decline over time.

3. In a diversified portfolio, currency movements tend to even out.

A well-diversified portfolio has exposure to many different currencies. The interplay between baskets of currencies is sometimes referred to as a natural hedge..



Unit – III

Start-up Financing and Leasing

Meaning

Sources of Financing for small business or startup can be divided into two parts: Equity Financing and Debt Financing. Some common source of financing business is Personal investment, business angels, and assistance of government, commercial bank loans, financial bootstrapping, and buyouts.

1. Personal investment

When borrowing, you invest some of your own money—either in the form of cash or collateral on your assets. This proves to your banker that you have a long-term commitment to your project.

2. Love money

This is money loaned by a spouse, parents, family or friends. A banker considers this as "patient capital", which is money that will be repaid later as your business profits increase.

When borrowing love money, you should be aware that:

- family and friends rarely have much capital
- they may want to have equity in your business—be sure you don't give this away
- a business relationship with family or friends should never be taken lightly



3. Venture capital

The first thing to keep in mind is that this funding source is not necessarily for all entrepreneurs. Right from the start, you should be aware that venture capitalists are looking for technology-driven businesses and companies with high-growth potential in sectors such as information technology, communications, and biotechnology.

Venture capitalists take an equity position in the company to help it carry out a promising but higher risk project. This involves giving up some ownership or equity in your business to an external party. Venture capitalists also expect a healthy return on their investment, often generated when the business starts selling shares to the public. Be sure to look for investors who bring relevant experience and knowledge to your business.

BDC has a venture capital team that supports leading-edge companies strategically positioned in a promising market. Like most other venture capital companies, it gets involved in start-ups with high-growth potential, preferring to focus on major interventions when a company needs a large amount of financing to get established in its market.

4. Angels

Angels are generally wealthy individuals or retired company executives who invest directly in small firms owned by others. They are often leaders in their own field who not only contribute their experience and network of contacts but also their technical and/or management knowledge.



Angels tend to finance the early stages of the business with investments in the order of Rs.25,000 to Rs.100,000. Institutional venture capitalists prefer larger investments, in the order of Rs.1 million.

In return for risking their money, they reserve the right to supervise the company's management practices. In concrete terms, this often involves a seat on the board of directors and an assurance of transparency.

Angels tend to keep a low profile. To meet them, you have to contact specialized associations or search websites on angels. The National Angel Capital Organization, the Canadian International Angel Investors and Angels Québec can put entrepreneurs in touch with angels.

5. Crowd funding

Crowd funding is a form of fundraising where a business asks the public for a contribution, usually in exchange for equity in the company.

It usually entails a private company asking large numbers of people for small contributions. This differs from the more conventional practice of raising money through angel investors or venture capitalists, where a handful of actors inject larger sums into your business.

In return for investing in your business, supporters will receive equity, albeit with less liquidity than what do would get with public stocks. There are also more relaxed rules governing crowdfunding than IPOs.

There are various forms of crowdfunding, including:



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- **Equity crowdfunding**, where, in exchange for their money, investors receive shares in a company or the right to a portion of revenues or profits from a specific product.
 - **Debt crowdfunding**, where investors lend their money to a company at relatively high interest rates, thus mitigating their overall lending risk by spreading a large amount of money in small increments across a large number of loans.
 - **Donation/rewards-based crowdfunding**, where a company sets a fundraising target and asks for donations—in exchange for some kind of token or receipt of the eventual product or service to be developed.

6. Business Incubators

Business incubators (or "accelerators") generally focus on the high-tech sector by providing support for new businesses in various stages of development. However, there are also local economic development incubators, which are focused on areas such as job creation, revitalization and hosting and sharing services.

Commonly, incubators will invite future businesses and other fledgling companies to share their premises, as well as their administrative, logistical, and technical resources. For example, an incubator might share the use of its laboratories so that a new business can develop and test its products more cheaply before beginning production.

Generally, the incubation phase can last up to two years. Once the product is ready, the business usually leaves the incubator's premises to enter its industrial production phase and is on its own.



Businesses that receive this kind of support often operate within state-of-the-art sectors such as biotechnology, information technology, multimedia, or industrial technology. Businesses that were supported by an incubator have a better success rate over five years.

7. Grants and subsidies

It's not always easy to bring innovations to light so government agencies provide aid to Canadian companies. You may have access to this funding to help cover expenses, such as research and development, marketing, salaries, equipment and productivity improvement.

Technically, a grant is a sum of money conditionally given to your business that you don't have to repay. However, you're bound legally to use it under the terms of the grant, or otherwise you may be asked to repay it. As well, once you are granted money from one government source, it is not uncommon to receive further funding from the source if you meet program requirements.

Criteria

Getting grants can be tough. There may be strong competition and the criteria for awards are often stringent. Generally, most grants require you to match the funds you are being rewarded and this amount varies greatly, depending on the granter. For example, a research grant may require you to find only 40% of the total cost.

Generally, you will need to provide:

- a detailed project description, including location
 - an explanation of the benefits of your project
 - a detailed work plan with full costs
-



-
- details of relevant experience and background on key managers
 - completed application forms when appropriate

Most reviewers will assess your proposal based on the following criteria:

- Significance
- Approach
- Innovation
- Assessment of expertise
- Need for the grant

Some of the problem areas where candidates fail to get grants include:

- The research/work is not relevant.
- Ineligible geographic location.
- Applicants fail to communicate how their ideas will be addressed.
- The proposal makes without a strong rationale.
- The research plan is unfocused.
- There is an unrealistic amount of work.
- Funds are not matched.

The Government of Canada's Business Benefits Finder provides sources of financing, including government grants and subsidies.

8. Loans

Loans are the most commonly used source of funding for small and medium sized businesses. Consider the fact that all lenders offer different advantages, whether it's personalized service or customized repayment. It's a good idea to shop around ~~and find the lender that meets your specific needs.~~



In general, start-ups have a harder time accessing loans than do established businesses. Entrepreneurs with a solid business plan and a good credit rating are more likely to be able to access loans.

Lease financing

Lease financing is one of the popular and common methods of assets based finance, which is the alternative to the loan finance. Lease is a contract. A contract under which one party, the leaser (owner) of an asset agrees to grant the use of that asset to another leaser, in exchange for periodic rental payments. Lease is contractual agreement between the owner of the assets and user of the assets for a specific period by a periodical rent.

Elements of Leasing

Leasing is one of the important and popular parts of asset based finance. It consists of the following essential elements. One should understand these elements before they are going to study on leasing.

1. Parties: These are essentially two parties to a contract of lease financing, namely the owner and user of the assets.
2. Leaser: Leaser is the owner of the assets that are being leased. Leasers may be individual partnership, joint stock companies, corporation or financial institutions.
3. Lease: Lease is the receiver of the service of the assets under a lease contract. Lease assets may be firms or companies.
4. Lease broker: Lease broker is an agent in between the leaser (owner) and lessee. He acts as an intermediary in arranging the lease deals. Merchant banking divisions of foreign banks, subsidiaries indian banking and private foreign banks are acting as lease brokers.
5. Lease assets: The lease assets may be plant, machinery, equipments, land, automobile, factory, building etc.



Term of Lease

The term of lease is the period for which the agreement of lease remains for operations. The lease term may be fixed in the agreement or up to the expiry of the assets. Lease Rental The consideration that the lesae pays to the leaser for lease transaction is the rental.

Type of Leasing

Leasing, as a financing concept, is an arrangement between two parties for a specified period. Leasing may be classified into different types according to the nature of the agreement. The following are the major types of leasing as follows:

(A) Lease based on the term of lease

1. Finance Lease

2. Operating Lease

(B) Lease based on the method of lease

1. Sale and lease back

2. Direct lease

(C) Lease based in the parties involved

1. Single investor lease

2. Leveraged lease

(D) Lease based in the area



1. Domestic lease

2. International lease

1. Financing lease

Financing lease is also called as full payout lease. It is one of the long-term leases and cannot be cancelable before the expiry of the agreement. It means a lease for terms that approach the economic life of the asset, the total payments over the term of the lease are greater than the lessor's initial cost of the leased asset. For example: Hiring a factory, or building for a long period. It includes all expenditures related to maintenance.

2. Operating lease

Operating lease is also called as service lease. Operating lease is one of the short-term and cancelable leases. It means a lease for a time shorter than the economic life of the assets, generally the payments over the term of the lease are less than the lessor's initial cost of the leased asset. For example: Hiring a car for a particular travel. It includes all expenses such as driver salary, maintenance, fuels, repairs etc.

3. Sale and lease back

Sale and lease back is a lease under which the lessee sells an asset for cash to a prospective lessor and then leases back the same asset, making fixed periodic payments for its use. It may be in the form of operating leasing or financial leasing. It is one of the convenient methods of leasing which facilitates the financial liquidity of the company.

4. Direct lease



When the lease belongs to the owner of the assets and users of the assets with direct relationship it is called as direct lease. Direct lease may be Dipartite lease (two parties in the lease) or Tripartite lease. (Three parties in the lease)

5. Single investor lease

When the lease belongs to only two parties namely leaser and it is called as single investor lease. It consists of only one investor (owner). Normally all types of leasing such as operating, financially, sale and lease back and direct lease are coming under this categories.

6. Leveraged lease

This type of lease is used to acquire the high level capital cost of assets and equipments. Under this lease, there are three parties involved; the leaser, the lender and the lessee. Under the leverage lease, the leaser acts as equity participant supplying a fraction of the total cost of the assets while the lender supplies the major part.

7. Domestic lease

In the lease transaction, if both the parties belong to the domicile of the same country it is called as domestic leasing.

8. International lease

If the lease transaction and the leasing parties belong to the domicile of different countries, it is called as international leasing.



Advantages of Leasing

Leasing finance is one of the modern sources of finance, which plays a major role in the part of the asset based financing of the company. It has the following important advantages.

1. Financing of fixed asset Lease finance helps to mobilize finance for large investment in land and building, plant and machinery and other fixed equipments, which are used in the business concern.
2. Assets based finance Leasing provides finance facilities to procure assets and equipments for the company. Hence, it plays a important and additional source of finance.
3. Convenient Leasing finance is convenient to the use of fixed assets without purchasing. This type of finance is suitable where the company uses the assets only for a particular period or particular purpose. The company need not spend or invest huge amount for the acquiring of the assets or fixed equipments.
4. Low rate of interest Lease rent is fixed by the lease agreement and it is based on the assets which are used by the business concern. Lease rent may be less when compared to the rate of interest payable to the fixed interest leasing finance like debt or loan finance.
5. Simplicity Lease formalities and arrangement of lease finance facilities are very simple and easy. If the leaser agrees to use the assets or fixed equipments by the lessee, the leasing arrangement is mostly finished.
6. Transaction cost when the company mobilizes finance through debt or equity,



they have to pay some amount as transaction cost. But in case of leasing finance, transaction cost or floating cost is very less when compared to other sources of finance.

7. Reduce risk Leasing finance reduces the financial risk of the lessee. Hence, he need not buy the assets and if there is any price change in the assets, it will not affect the lessee.

8. Better alternative Now a days, most of the commercial banks and financial institutions are providing lease finance to the industrial concern. Some of the them have specialised lease finance company. They are established to provide faster and speedy arrangement of lease finance.

Disadvantages of Leasing

Lease Expenses

The treatment of lease payments is as expenses rather than as equity payments towards an asset.

Limited Financial Benefits

If paying lease payments toward land, the business cannot benefit from any appreciation in the value of the land. The long-term lease agreement also remains a burden on the business as the agreement is locked and the expenses for several years are fixed. In a case when the use of an asset does not serve the requirement after some years, lease payments become a burden.

Reduced Return for Equity Holders

Given that lease expenses reduce the net income without any appreciation in value,



it means limited returns or reduced returns for an equity shareholder. In such a case, there is no achievement of the objective of wealth maximization for shareholders.

Debt

Although a lease doesn't appear on a company's balance sheet, investors still consider long-term leases as debt and adjust their valuation of a business to include leases.

Limited Access to Other Loans

Given that investors treat long-term leases as debt, it might become difficult for a business to tap capital markets and raise further loans or other forms of debt from the market.

Processing and Documentation

Overall, entering into a lease agreement is a complex process and requires thorough documentation and proper examination of an asset being leased.

No Ownership

At the end of the leasing period, the lessee doesn't become the asset owner though quite a good sum of payment is being done over the years towards the asset.

Maintenance of the Asset

The lessee remains responsible for the maintenance and proper operation of the asset being leased.



Limited Tax Benefit

For a new start-up, the tax expense is likely to be minimal. In these circumstances, no added tax advantage derives from leasing expenses.

Illustration 1:

A limited company is interested in acquiring the use of an asset costing Rs. 5,00,000. It has two options:

- (i) To borrow the amount at 18% p.a. repayable in 5 equal installments or
- (ii) To take on lease the asset for a period of 5 years at the year end rentals of Rs. 1,20,000.

The corporate tax is 50% and the depreciation is allowed on w.d.v. at 20%. The asset will have a salvage of Rs. 1,80,000 at the end of the 5th year.

You are required to advise the company about lease or buy decision. Will decision change if the firm is allowed to claim investment allowance at 25%?

Note:

(1) The present value of Re. 1 at 18% discount factor is:

1st year – .847

2nd year – .718

3rd year – .609



4th year – .516

5th year – .437

(2) The present value of an annuity of Re. 1 at 18% p.a. is Rs. 3.127.

Solution:

(i) Calculation of loan instalment								
$\text{Loan Instalment} = \frac{\text{Amount of Loan}}{\text{P.V. Factor of Annuity}}$ $= \frac{5,00,000}{3.127}$ $= ₹ 1,59,898 \text{ appx.}$								
(ii) Schedule of Loan Payment								
Year	Loan Balance at beginning of the year	Loan Instalment	Interest Payment	Principal Payment	Loan Balance at the end of the year			
	(₹)	(₹)	(₹)	(₹)	(₹)			
1.	5,00,000	1,59,898	90,000	69,898	4,30,102			
2.	4,30,102	1,59,898	77,418	82,480	3,47,622			
3.	3,47,622	1,59,898	62,572	97,326	2,50,296			
4.	2,50,296	1,59,898	45,053	1,14,845	1,35,451			
5.	1,35,451	1,59,832*	24,381	1,35,451	Nil			
* The amount of loan instalment in the last year is different from the equal payments because of compensation for rounding error.								
(iii) Calculation of Present Value of After-Tax Cash Outflows under Borrowing/Buying Option								
Year end	Loan Instalment (₹)	Tax Saving on			Net cash Outflow (₹)	P.V. factor at 18%	P.V. of after tax Net cash Outflow (₹)	
		Interest (₹)	Dep. (after-tax) (₹)	Total (₹)				
Col. 1	2			3	4 = 2-3	5	6	
1.	1,59,898	45,000	50,000	95,000	64,898	.847	54,969	
2.	1,59,898	38,709	40,000	78,709	81,189	.718	58,294	
3.	1,59,898	31,286	32,000	63,286	96,612	.609	58,837	
4.	1,59,898	22,527	25,600	48,127	1,11,771	.516	57,674	
5.	1,59,832	12,190	20,480	32,670	1,27,162	.437	55,570	
Total : 2,85,344								
Less : P.V. of salvage at the end of 5th year (1,80,000 × .437)							78,660	<u>2,06,684</u>

(v) Evaluation:



As the present value of after-tax cash outflows under the leasing option is lesser than the present value of after-tax cash outflows of the buying option, it is advisable to take the asset on lease.

(vi) Decision if Investment Allowance is allowed:

In case Investment Allowance is allowed on purchase of asset the total of present value of net cash outflows will decrease by the present value of tax savings on investment allowance as below:

Investment Allowance :	₹
(allowed at the end of 1st year) $5,00,000 \times \frac{25}{100}$	1,25,000
Tax Savings (50%)	62,500
P.V. Factor at the end of year 1	.847
P.V. of Tax Savings on Investment Allowance	52,938
Hence, P.V. of Cash Outflows in Buying Option shall be = ₹ 2,06,684-52,938	1,53,746

In that case, the P.V. of cash outflows under buying option shall be lesser than the P.V. of cash outflows under leasing option and the company should buy the asset.

Financial Evaluation of Leasing: Way # 2.

Lessor's Point of View:

The financial viability of leasing out an asset from the point of view of lessor can be evaluated with the help of the two time adjusted methods of capital budgeting:

(a) Present Value Method



(b) Internal Rate of Return Method.

(a) Present Value Method:

This method involves the following steps:

(i) Determine cash outflows by deducing tax advantage of owning an asset, such as investment allowance, if any.

(ii) Determine cash inflows after-tax as below:

Lease Rental (say)	1,00,000
Less : Depreciation (say)	20,000
Earnings Before Tax (EBT)	80,000
Less : Tax (say 50%)	40,000
Earnings After Tax (EAT)	40,000
Add : Depreciation	20,000
Cash Inflows After Tax (CFAT)	60,000

(ii) Determine the present value of cash outflows and after tax cash inflows by discounting at weighted average cost of capital of the lessor.

(iv) Decide in favour of leasing out an asset if P.V. of cash inflows exceeds the P.V. of cash outflows, i.e., if the NPV is +ve; otherwise in case N.P.V. is -ve, the lessor would lose on leasing out the asset.

The above technique has been explained with the help of the following example.

Illustration 2:

From the information given below, you are required to advise about leasing out of the asset:



Cost of Equipment	₹ 4,00,000	
Average Cost of Capital to the lessor	12%	
Depreciation (Allowable)	20%	on original cost
Expected Life of Asset	5	years
Salvage Value	Nil	
Lease Rent payable at the end of each of 5 years	₹ 1,50,000	
Corporate Tax (applicable to lessor)	50%	
P.V. of an annuity of Re. 1 for 5 years at 12% is	₹ 3.605	

Solution:

(i) Calculation of Cash Outflow			
	Cost of Equipment		(₹) 4,00,000
	Less : Tax Advantage, if any		Nil
	Cash Outflow		4,00,000
(ii) Calculation of After-Tax Cash Inflows			(₹)
	Lease Rental		1,50,000
	Less : Depreciation		80,000
	Earnings Before Tax (EBT)		70,000
	Less : Tax at 50%		35,000
	Earnings After Tax (EAT)		35,000
	Add : Depreciation		80,000
	Cash Inflows After Tax (CFAT)		1,15,000
(iii) Calculation of Present Value (P.V.) of Cash Outflows			
Year	Cash Outflow	P.V. Discount Factor at 12%	P.V. of Cash Outflow
(₹)	(₹)		(₹)
0	4,00,000	1.00	4,00,000
(iv) Calculation of P.V. of Cash Inflows			
Year	Cashflow After Tax (CFAT) ₹	P.V. Annuity Discount Factor at 12%	P.V. of Cash Inflows ₹
1-5	1,15,000	3.605	4,14,575
(iv) Calculation of Net Present Value			₹
	Present value of Cash Inflows		4,14,575
	Less : P.V. of Cash Outflows		4,00,000
	Net Present value of Cash flows		14,575

Since the present value of cash inflows is more than the present value of cash outflows or says N.P.V. is positive, it is desirable to lease out the asset.

(b) Internal Rate of Return Method:



The internal rate of return can be defined as that rate of discount at which the present value of cash- inflows is equal to the present value of cash outflows.

It can be determined with the help of the following mathematical formula:

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

where, C = Initial Outlay at time Zero.

$A_1, A_2, \dots \dots A_n$ = Future net cash flows at different periods.

2,3, = Numbers of years

r = Rate of discount of internal rate of return.

The Internal rate of return can also be determined with the help of present value tables.

The following steps are required to practice the internal rate of return method:

(1) Determine the future net cash flows for the period of the lease. The net cash inflows are estimated future net cash flows for the period of the lease. The net cash inflows are estimated future earnings, from leasing out the asset, before depreciation but after taxes.

(2) Determine the rate of discount at which the present value of cash inflows is equal to the present value of cash outflows. This may be determined as follows:

(a) When the annual net cash flows are equal over the life of the asset:



Firstly, find out Present Value Factor by dividing initial outlay (cost of the investment) by annual cash flow, i.e., Present Value Factor = Initial Outlay/Annual Cash Flow. Then, consult present value annuity tables with the number of year equal to the life of the asset and find out the rate at which the calculated present value factor is equal to the present value given in the table.

Illustration 3:

Initial Outlay	₹ 50,000
Life of the Asset	5 years
Estimated Annual Cash-flow	₹ 12,500
Calculate the Internal Rate of Return.	

Solution:

Present Value Factor	$= \frac{\text{Initial Outlay}}{\text{Annual Cash Flow}}$ $= \frac{50,000}{12,500} = 4.$
Consulting Present Value Annuity Tables for 5 years periods at Present Value Factor of 4. (For Present Value Tables see Appendix A and B given at the end of the book)	
Internal Rate of Return = 8% approx.	
(as seen from the table that at 8% for 5 year period, the present value is 3.9927 which is nearly equal to 4.)	

(b) When the annual cash flows are unequal over the life of the asset:

In case annual cash flows are unequal over the life of the asset, the internal rate of return cannot be determined according to the technique suggested above. In such cases, the internal rate of return is calculated by hit and trial and that is why this method is also known as hit and trial yield method.



We may start with any assumed discount rate and find out the total present value of all the cash flows by consulting present value tables.

So calculated total present value of cash inflows as compared with the present value of cash outflows which is equal to the cost of the initial investment where total investment is to be made in the beginning. The rate, at which the total present value of all cash inflows equals the initial outlay, is the internal rate of return. Several discount rates may have to be tried until the appropriate rate is found. The calculation process may be summed up as follows.

- (i) Prepare the cash flow table using an arbitrary assumed discount rate to discount the net cash flow to the present value.
 - (ii) Find out the Net Present Value by deducting from the present value of total cash flows calculated in (i) above the initial cost of the investment.
 - (iii) If the Net Present Value (NPV) is positive, apply higher rate of discount.
 - (iv) If the higher discount rate still gives a positive net present value, increase the discount rate further until the NPV becomes negative.
 - (v) If the NPV is negative at this higher rate, the internal rate of return must be between these two rates:
- (3) Accept the proposal if the internal rate of return is higher than or equal to the minimum required rate of return, i.e. the cost of capital or cut off rate.
 - (4) In case of alternative proposals select the proposal with the highest rate of return as long as the rates are higher than the cost of capital or cut-off rate.
-



Illustration 4:

Initial Investment – Rs. 60,000 Life of the Asset – 4 years

Estimated Net Annual Cash Flows:

1st Year	15,000
2nd Year	20,000
3rd Year	30,000
4th Year	20,000

Compute the internal rate of return and also advise the lessor about the leasing out decision if his expected minimum rate of return is 15%.

Note: Present Value Factor at various rates of discount.

Year	Annual Cash Flow ₹	Discount rate 10%		12%		14%		15%	
		P.V.F.	P.V. ₹	P.V.F.	P.V. ₹	P.V.F.	P.V. ₹	P.V.F.	P.V. ₹
1	15,000	.909	13,635	.892	13,380	.877	13,155	.869	13,035
2	20,000	.826	16,520	.797	15,940	.769	15,380	.756	15,120
3	30,000	.751	22,530	.711	21,330	.674	20,220	.657	19,710
4	20,000	.683	13,660	.635	12,700	.592	11,840	.571	11,420
			66,345		63,350		60,595		59,285

(1) The present value of cash flows at 14% rate of discount is Rs. 60,595 and at 15% rate of discount it is t 59,285. So the initial cost of investment which is Rs. 60,000 falls in between these two discount rates. At 14% the NPV is + 595 but at 15% the NPV is – 715, we may say that IRR = 14.5% (approx).

(2) As the IRR is less than the minimum required rate of return, the lessor should not lease out the asset.



Illustration 5 :

The following details relate to an investment proposal of XYZ Ltd.

Investment outlay Rs. 100 lakhs

Lease Rentals are payable at Rs. 180 per

Rs.10000 Term of lease 8 years

Cost of capital for the firm is 12%

Find the Present Value of Lease Rentals if

- Lease Rentals are payable at the end of the year
- Lease Rentals are payable at the beginning of the year

Solution :

Lease Rentals paid per annum = Rs. 180 × 10000 = Rs. 18 lakhs

a. If Lease Rentals are payable at the year end :

Present Value of Lease Rentals = Rs. 18 lakhs × PV factors for years

[1-8]

= Rs. 18 lakhs × PVIFA (12%, 8)

= Rs. 18 lakhs × 4.9676

= Rs. 89,41,680

b. If Lease Rentals are payable at the beginning :

Present Value of Lease Rentals = Rs. 18 lakhs × PV factors for years

[0-7]

= Rs. 18 lakhs × [1 + PVIFA (12%, 7)]

= Rs. 18 lakhs × [1 + 4.5638]

= Rs. 100,14,840



Illustration 6 :

Find out Loan payments per annum for the

following : Cost of Equipment : Rs. 50 lakhs

Borrowing rate : 15%

Term of Loan : 5 years

- Principal is payable in equal investment over the period of five years
- Amount of Loan is payable equally over the period of five years

Prepare a table showing principle & interest payments and the total payable over period of five years.

Solution :

If principle is payable in equal installments :

Each installment = Rs. 50 lakhs/5 = Rs. 10 lakhs

Opening Balance	Principle	Interest	Balance
50 Lakhs	10 Lakhs	7.50 Lakhs	40 Lakhs
40 Lakhs	10 Lakhs	6.00 Lakhs	30 Lakhs
30 Lakhs	10 Lakhs	4.50 Lakhs	20 Lakhs
20 Lakhs	10 Lakhs	3.00 Lakhs	10 Lakhs
10 Lakhs	10 Lakhs	1.50 Lakhs	Nil
TOTAL	50 Lakhs	22.50 Lakhs	

Total Payable : Rs. 50 lakhs + Rs. 22.50 Lakhs = Rs. 72.50 Lakhs

a. If loan is payable in equal installments:

Each installment = Rs.50 Lakhs/PVIFA (15%, 5) = Rs.50 Lakhs/3.3522 =
Rs.1491558

Opening Balance	Installment	Interest	Principle	Balance
5000000	1491558	750000	741558	4258442



4258442	1491558	638766	852792	3405650
3405650	1491558	510848	980710	2424940
2424940	1491558	363741	1127817	1297123
1297123	1491558	194568	1297123	Nil
TOTAL	7457790	2457923	5000000	

Total Payable : Rs. 50 lakhs + Rs. 2457923 lakhs = Rs. 7457923 Lakhs

NET ADVANTAGE OF LEASING - NAL Method

If a firm goes for leasing what it gets and what it foregoes :

What it gets		What it spends/foregoes	
Pv of Tax Benefit on Lease Rentals Investment Outlay (Not Spent)	A B	PV of Lease rentals <u>By not going for Debt, it foregoes:</u> PV of Interest Tax Shield PV of Depreciation Tax Shield PV of Salvage Value	C D E F
TOTAL	A+B		C+D+E+F

If $A+B > C+D+E+F$, then go for leasing, else Borrowing.

Note: In NAL method we use of debt (and not cost of capital) to find PV of lease rentals as we are finding the benefit of leasing ‘instead of borrowing’. And the PV of tax-shields are arrived at by using the opportunity cost of capital. And we also use the PV of lease rentals as the amount that will be borrowed.

Illustration 7 :

The following details relate to an investment proposals of HI Ltd.

- Investment outlay Rs.180 lakhs



- Net salvage value after 3 years, Rs. 18 lakhs
- Annual rate of Depreciation

40% HI Ltd. has two alternatives.

Option I: Borrow and buy the equipment @ 17% p.a, Marginal rate of Tax 35%; Cost of capital of HI Ltd. 12%

Option II: Lease on 3 years full payout basis @ Rs. 444/Rs.1000 payable annually in arrear. Which option HI Ltd. should choose any and why?

Solution :

Decision Analysis: (Rs.lakhs)

What it gets

- | | |
|--|----------|
| 1. Investment Outlay : | (180.00) |
| 2. Less : PV of Lease rentals (Working Note 1) | 176.61 |

What it spends/foregoes

- | | |
|---|---------------|
| 3. Add : PV of Tax Shield on Lease Rentals (Working Note 2) | 67.19 |
| 4. Less : PV of tax shields on Depreciation (Working Note 3) | 41.01 |
| 5. Less : PV of Interest shields on Displaced Debt (Working Note 4) | 18.29 |
| 6. Less : PV of Salvage value (Working Note 5) | 2.81 |
| NAL / NPV (L) | (1.53) |

Since NAL is negative lease is not economically viable.

Working Notes :

- PV of lease rentals = Rs. 180 lakhs \times 444/1000 \times PVIFA (17,3)
= Rs. 79.92 \times 2.21
= Rs. 176.61 lakhs
- PV of Tax shield on lease rentals
= Rs. 180 lakhs \times 444/1000 \times 0.35 \times PVIFA (12,3)
= Rs. 27.972 lakhs \times 2.402 = Rs. 67.19 Lakhs



3. PV of Tax shield on depreciation

$$\begin{aligned} &= [72 \times \text{PVIF} (12, 1) + 43.2 \times \text{PVIF} (12,2) + 25.92 \times \text{PVIF} (12,3)] \times 0.35 \\ &= [72 \times 0.893 + 43.2 \times 0.797 + 25.92 \times 0.712] \times 0.35 \\ &= \text{Rs. 41.01 lakhs} \end{aligned}$$

Calculation of Depreciation :

Year 1 $0.4 * 180 = 72$

Year 2 $0.4 * (180 - 72) = 43.2$

Year 3 $0.4 * (180 - 72 - 43.2) = 25.92$

4. PV of interests Tax shield on Displaced Debt: (assuming that instead of lease, total PV of the lease rentals has been borrowed)

Displaced debt (PV of lease rentals) Amortization schedule (Rs. lakhs)

Year	Loan O/s beginning	Interest @ 17%	Capital	Installment amount 176.61 + 2.210
1	176.61	30.03	49.89	79.92
2	126.72	21.54	58.38	79.92
3	68.34	11.61	68.34	79.92
Check Total of Capital			176.61	

$$\text{PV of interest Tax shield on Displaced Debt} = [30.03 \times \text{PVIF} (12,1) + 21.54 \times \text{PVIF} (12,2) + 11.61 \times \text{PVIF} (12,3)] \times 0.35$$

$$= [30.03 \times 0.893 + 21.54 \times 0.797 + 11.61 \times 0.712] \times 0.35$$

$$= \text{Rs. 18.29 lakhs}$$



5. PV of net salvage value = $18 \times PVIF (12,3) = 18 \times 0.712 = \text{Rs. } 12.81$
lakhs.

Note : If cost of capital is not given, use borrowing rate i.e. $17 \times (1 - 0.35) = 11\%$ approx.

Illustration 8 :

Armada Leasing Company is considering a proposal lease out a school bus. The bus can be purchased for Rs. 50,0000 and in turn, be leased out at Rs. 125000 per year for 8 years with payments occurring at the end of each year.

- i. Estimate the IRR for the company assuming tax is ignored.
- ii. What should be the yearly lease payment charged by the company in order to earn 20% annual compounded rate of return before expenses and taxes?
- iii. Calculate the annual lease rent to be charged so as to amount to 20% after tax annual compounded rate of return, based on the following assumptions :
 1. Tax rate is 40%
 2. Straight Line Depreciation
 3. Annual expenses of Rs. 50000, and
 4. Resale value Rs. 100000 after the turn.

Solution :

- i. Finding IRR (without tax effect)

As per above formula we have $L \times (1 - T) \times PVIFA (k \%, n \text{ years}) = PV$
of Outflow

The only difference being here we need to find k, instead of L.

Therefore $1.25 \text{ lacs} \times (1 - 0) \times PVIFA (k\%, 8) = 5 \text{ lacs}$ Solving we get

$PVIFA (k,8) = 4$



By interpolating [See Interpolation method explained in Annexures]

We get IRR = 18.63%

ii. Finding L, given k (without tax effect)

We have $L \times (1 - T) \times PVIFA (k\%, n \text{ years}) = \text{pv of Outflow i.e. 5 lacs}$

$L \times (1 - 0) \times PVIFA (20\%, 8) = 5 \text{ lacs}$

Solving we get $L = \text{Rs. } 130310.13 \text{ p.a}$

iii. Finding L, with tax, depreciation and other data Let 'L' be the Lease

Rental $[(L - \text{expenses} - \text{depreciation}) (1 - T) + \text{Depreciation}] \times PVIFA$

$(20\%, 8) + \text{Salvage value} \times PVIF (20\%, 8) = 5 \text{ lacs}$ By solving the above

equation we get, $[(L - 50000 - 50000) (1 - 0.4) + 50000] \times 3.837 +$

$100000 \times 0.233 = 5 \text{ lacs}$

$L = \text{Rs. } 223729.47$

Illustration 9:

The following are the details regarding the machine to be given on lease by X Ltd.

- i. Cost of machine to the lessor is Rs. 1,00,000 financed 80% through debt and balance through equity. Cost of debt before tax amount to 20% and equity 16%.
- ii. The lessor is in 35% tax bracket. The rate of depreciation of machinery is 20% according to diminishing balance method.
- iii. The scrap value of machines is Rs. 10,000 at the end of 5th year.
- iv. Estimated cost for maintenance and general administration in respect of machine is Rs. 1,000 per annum.
- v. The lessee agrees to pay the following:
 - (a) Annual rent Rs. 36,000 for 5 years. The payment is to be made at the end of each year.



- (b) The security deposit of Rs. 3,000 which is refundable at the end of lease period without interest.
- (c) Management fees (non-refundable) payable at the inception of lease period is Rs. 2,500.

You are required to decide whether the lessor should lease the machine using internal rate of return method.

Solution :

Cost of Capital for Lessor

Source	Amount (Rs.)	After tax	Total cost (Rs.)
Equity	20000	16%	3200
Debt	80000	13%	10400
	100000		13600

$$\begin{aligned} \text{Average cost of capital} &= \text{Rs. } \frac{13,600}{1,00,000} * 100 \\ &= 13.6 \% \end{aligned}$$

Computation of Annual tax liability

	Years				
	1	2	3	4	5
	Rs.	Rs.	Rs.	Rs.	Rs.
Lease revenue	36,000	36,000	36,000	36,000	36,000
Less: Maintenance & Admn. Cost	1,000	1,000	1,000	1,000	1,000
Less: Depreciation	20,000	16,000	12,800	10,240	8,192
Income before tax	15,000	19,000	22,200	24,760	26,808
Less: Income tax @ 35 %	5,250	6,650	7,770	8,666	9,383
Income after tax	9,750	12,350	14,430	16,094	17,425



Computation of Annual Net Cash Inflows

	Years				
	1	2	3	4	5
	Rs.	Rs.	Rs.	Rs.	Rs.
Lease revenue	36,000	36,000	36,000	36,000	36,000
Add : Sale of machinery (Scrap)	-	-	-	-	10,000
Less : Administration cost	1,000	1,000	1,000	1,000	1,000
Less : Refund of deposit	-	-	-	-	3,000
Less : Tax liability	5,250	6,650	7,770	8,666	9,383
	29,750	28,350	27,230	26,334	32,617

Cash outflow at beginning of year 1

	Rs.
Cost of machinery	1,00,000
Less: Management fees	2,500
Security deposit	<u>3,000</u> <u>5,500</u>
	<u>94,500</u>

Computation of Internal Rate of Return

Year	Cash outflow	Cash Inflow	Discount factor	Present value	Discount factor	Present value
	Rs.	Rs	@ 14%	Rs.	@ 18%	Rs.
0	94,500	-	-	-	-	-
1		29,750	0.877	26,091	0.847	25,198
2		28,350	0.769	21,801	0.718	20,355
3		27,230	0.675	18,380	0.609	16,583
4		26,334	0.592	15,590	0.516	13,588
5		32,617	0.519	16,928	0.437	14,254
				98,790		89,978
			N.P.V	4,290		-4,522

$$\text{IRR} = 14 + \frac{4,290}{4,290 + 4,522} \times 4$$



$$\begin{aligned} &= 14 + \frac{4,290}{8,812} \times 4 \\ &= 14 + 1.95 \\ &= 15.95 \end{aligned}$$

The weighted average cost of capital is 13.6 % while I.R.R from leasing out the asset is 15.95%. Hence, it is beneficial for a company to lease out the machinery.

Break Even Lease Rentals (BELR)

Under this method, the lessee is interested in that quantum of lease rental which will match the borrowing option. Thus we find the total present value under the borrowing option and taking that as the benchmark we find the lease rental in the reverse order, keeping in mind the tax effect and other data that may be provided, like rentals paid in advance etc. Under this method the buyer comes to know of the amount he will actually fork out every year under each option. This helps him to plan his cash flows.

Illustration 10 :

Beta Ltd. is considering the acquisition of a personal computer costing Rs. 50,000. The effective life of the computer is expected to be five years. The company plans to acquire the same either by borrowing Rs. 50,000 from the bankers at 15% interest per annum or by lease. The company wishes to know the lease rentals to be paid annually which will match the loan option. The following further information is provided to you :

- a. The principle amount of the loan will be paid in five annual equal installments.
- b. Interest, lease rental, principle repayment is to be paid on last day of each year.
- c. The full cost of the computer will be written off over the effective life of



computer on a straight-line basis and the same will be allowed for tax purposes.

- d. The company's effective tax rate is 40% and the after tax cost of capital is 9%
- e. The computer will be sold for Rs. 1,700 at the end of the 5th year. The commission on such sales is 9% on the sale value and the same will be paid.

You are required to compute the annual lease rentals payable by Beta Ltd. which will result in indifference to the loan option.

Solution :

Computation of present value of total after tax cash flow under loan option:

1. Annual Loan installment = 50000/5	=Rs. 10000				
2. Interested on Loan: Year	1	2	3	4	5
Principle O/s at the Beginning of the year	50000	40000	30000	20000	10000
Interest @15%	7500	6000	4500	3000	1500

3. Annual Depreciation on SLM Basis: Rs. 50000/5 =
Rs. 10000

4. In flow at the end of year 5

Rs.

Sale Value 1700

Less: Commission at 9% 153

Profit on Sale of Computer 1547 (WDV

is Zero) Less: Tax at 40% 619



Net Inflow

928

5. Computation of net outflow under loan option:

Year	1	2	3	4	5	Total
Principle Repayment	10000	1000 0	10000	10000	10000	50000
Interest	7500	6000	4500	3000	1500	22500
TOTAL (A)	17500	1600 0	14500	13000	11500	72500
Less: Tax Saving at 40%						
On Depreciation	4000	4000	4000	4000	4000	20000
On interest	3000	2400	1800	1200	600	9000
TOTAL (B)	7000	6400	5800	5200	4600	29000
Net Outflow(A-B)	10500	9600	8700	7800	6900	43500
PV factors @ 9%		0.92	0.84	0.77	0.71	0.65
Present value of Outflow	9660	8064	6699	5538	4485	34446
Less: PV of inflow at the end of 5th Year =928*0.65						603
PV of Net Outflow						33843

Computation of Annual Lease Rentals:

Steps to calculate Lease Rentals :

Step 1. Let be the lease rental

Step 2. Find L (1-T)

Step 3. Multiply the same with PVIFA (k%, n) where k is the post tax borrowing rate, n is the number of years

Step 4. Equate this to post tax outflow under borrowing option, to find L

Therefore $L \times (1 - 0.4) \times \text{PV factors for Annuity at 9\% for 5 years} = \text{PV of}$



Outflow under loan option i.e $L \times 0.6 \times 3.89 = \text{Rs. } 33843 \rightarrow L = \text{Rs. } 14500$

(Note: This will result in difference to the loan option i.e. both are required) Therefore, Annual Lease Rentals payable by Beta Ltd. should be Rs. 14500

Illustration 11 :

Evergreen Ltd. typically writes 5 year leases with rentals payable annually in arrears. The following information is available about a lease under review.

Equipment cost : Rs. 47 lakh (inclusive of CST

@ 10%) Salvage value : 5% of original cost

After 5 years

Initial Direct cost : Rs. 0.50 lakh (front

ended) Management Fee : Rs 0.75 Lakh

(front ended)

The marginal cost of capital to Evergreen Ltd. is 16% and the marginal rate of tax is 46%. Calculate the break even rental for Evergreen Ltd. assuming a tax relevant depreciation rate of :

(i) 25%

(ii) 40%

(iii) 100%

Solution :

Define L as the annual break rental for Evergreen:

The components of NPV (L) to Evergreen can be computed as

follows: a. Equipment cost = Rs. 47

lakh

b. PV of lease Payments = $L \times L \times PVIFA (16.5) = 3.274L$



c. PV of tax on lease rentals = $0.46 \times L \times PVIFA (16.5)$
 $= 0.46 \times L \times 3.274$
 $= 1.506 L$

d. PV of tax shield

On Depreciation [25%] = $[11.75 \times PVIFA (16.5) + 8.81 \times PVIFA$
(16.2)
 $+ 6.61 \times PVIFA (16.3) + 4.96 \times PVIFA$
(16.4)
 $+ 3.72 \times PVIFA (16.5)] \times 0.46$
 $= [(11.75 \times 0.862) + (8.81 \times 0.743)$
 $+ (6.61 \times 0.641) + (4.96 \times 0.552)$
 $+ (3.72 \times 0.476)] \times 0.46$
 $= 25.42 \times 0.46$
 $= \text{Rs. 11.69 lakh}$

On Depreciation [40%] = $[18.80 \times PVIFA (16.4) + 11.28 \times PVIFA$
(16.2) +
 $+ 6.77 \times PVIFA (16.3) + 4.06 \times PVIFA$
(16.4)
 $+ 2.44 \times PVIFA (16.5)] \times 0.46$
 $= [(18.80 \times 0.862) + (11.28 \times 0.743)$
 $+ (6.77 \times 0.641) + (4.06 \times 0.552)$
 $+ (2.44 \times 0.476)] \times 0.46$
 $= 32.32 \times 0.46$
 $= \text{Rs. 14.87 lakh.}$

On Depreciation [100%] = $47 \times PVIFA (16.1) \times 0.46$



$$= 47 \times 0.862 \times 0.46$$
$$= \text{Rs. } 18.63 \text{ lakh}$$

e. PV of initial direct cost = Rs. 0.5 lakh

f. PV of management fee = Rs. 0.75 lakh

g. Pv of tax shield on initial = $0.5 \times 0.46 \times \text{PVIF}$
(16,1)Direct cost = $0.5 \times 0.46 \times 0.862$
= Rs. 0.198 lakh

h. PV of tax on = $0.75 \times 0.46 \times \text{PVIFA (16,5)}$
Management fee = $0.75 \times 0.46 \times 0.862$
= Rs. 0.297 lakh

i. PV of salvage value = $2.35 \times \text{PVIFA (16,5)}$
= 2.35×0.476
= Rs. 1.12 lakh

Given a tax relevant depreciation rate of 25% p.a, L can be obtained from the equation.

$$- 47 + 3.274L - 1.506 + 11.69 - 0.5 + 0.75 + 0.198 - 0.297 + 1.12 = 0$$

Solving we get $1.768L = 34.04$ i.e. $L = \text{Rs. } 19.25$ lakh

Where the relevant depreciation rate is 40% p.a, L can be obtained from the equation.

$$- 47 + 3.27L - 1.506L + 14.87 - 0.5 + 0.75 + 0.198 - 0.297 + 1.12 = 0$$

Solving we get $1.768L = 30.85$ i.e. $L = \text{Rs. } 17.45$ lakh

Where rate of depreciation is 100% L can be obtained from the equation.

$$- 47 + 3.274L - 1.506L + 18.63 - 0.5 + 0.75 + 0.198 - 0.297 + 1.12 = 0$$

Solving we get $1.768L = 27.10$ i.e. $L = \text{Rs. } 15.33$ lakh.

BUY OR LEASE :



Illustration 12 :

A company wishes to acquire an asset costing Rs. 1,00,000. The company has an offer from a bank to lend @ 18% repayable in 5 years and installments. A leasing company has also submitted a proposal to the Company to acquire the asset on lease at a yearly rentals of Rs. 280 per Rs. 1000 of the assets value for 5 years payable at year end. The rate of depreciation of the asset allowable for tax purposes is 20% on W.D.V with no extra shift allowance. The salvage value of the asset at the end of 5 years period is estimated to be Rs. 1000. Whether the company should accept the proposal of Bank or leasing company, if the effective tax rate of the company is 50%.

Solution :

Borrowing Option

1	2	3	4	5	6	7	8
Year	Principle	Interest @ 18%	Depre- ciation 20% on on WDV	Shield (3+4)× 50%	Cash Flow (2+3)-5	Discount factor = 18(1-0.5)= 9%	Discounted Cash flow @ 9%
1	20000	18000	20000	19000	19000	0.917	17431.19
2	20000	14400	16000	15200	19200	0.842	16160.26
3	20000	10800	12000	11400	19400	0.772	14980.36
4	20000	7200	8000	7600	19600	0.708	13885.13
5	20000	3600	4000	3800	19800	0.650	12868.64
6	- 1000		39000	19500	-20500	0.596	-12223.5
							63102.1

Owing to an inflow of Rs. 1000 (salvage value), The terminal depreciation claim will be Rs. 39000.

Leasing Option



1 Year	2 Lease Rentals	3 Tax shield (2) × 50%	4 Net Cash Flow (2) - 3	5 Discount factor	6 Discounted cash flow @ 9%
1	28000	14000	14000	0.917	12844.04
2	28000	14000	14000	0.842	11783.52
3	28000	14000	14000	0.772	10810.57
4	28000	14000	14000	0.708	9917.953
5	28000	14000	14000	0.650	9099.039
					54455.12

Recommendation: As the NPV of leasing is less, the company should go for leasing

Your company is considering to acquire an additional computer to supplement its time share services to clients. It has two options.

(i) To purchase the computer for Rs. 22 lakhs

To lease the computer for 3 years from a leasing company for Rs. 5 lakhs as annual least rent + 10% of gross time share service revenue. The agreement also requires an additional payment of Rs. 6 lakhs at the end of the third year. Lease rents are payable at year-end and the computer reverts to the lessor after the contract period.

Illustration 13 :

The company estimates that the computer under review will be worth Rs. 10 lakhs at the end of the third year. Forecast revenues are:

Year	I	II	III
Amount (Rs. lakhs)	22.5	25	27.5

Annual operation costs excluding depreciation / lease rent of computer are estimated at Rs. 9 lakhs with an additional Rs. 1 lakh for start up and training



costs at the beginning of the first year. These costs are to be borne by the lessee. Your company will borrow at 16% interest to finance the acquisition of computer. Repayment are to be made according to the following schedule:

Year End	I	II	III
Principle	500	850	850
Interest	352	272	136

The company uses the straight line method of depreciation to depreciate its assets and pays 50% Tax on its income. The management approaches the company secretary for advice. Which alternative would be recommended and why? [May, 2004]

PV factors for years 1,2,3 for 8% are 0.926, 0.857 & 0.794

PV factors for years 1,2,3 for 10% are 0.862, 0.743 & 0.641

Solution :

Working Notes:

Depreciation = $(2200000 - 1000000)/3 = \text{Rs. } 400000 \text{ p.a}$

Applicable discount rate for leasing & buying - after tax cost of debt = $16 \times (1 - 0.5) = 8\%$ Operating and training costs are not considered, as they are incurred under both options. Same logic applied for not taking into account the revenues.

Cost of Leasing :



	Years		
	1	2	3
Lease Rent	500000	500000	500000
10% - Gross Revenue	225000	250000	275000
Lump sum payment	-	-	600000
Total	725000	750000	1375000
Tax shield 50%	362500	375000	687500
Net cash Outflow	362500	375000	687500
PV Factor	0.926	0.857	0.794
Pv of cash Outflow	335675	321375	545875

Total PV of cash out flow = Rs. 1202925.

Cost of Borrowing:

	Years		
	1	2	3
Principle	500000	850000	850000
Interest	352000	272000	136000
Tax shield on Int. (50%) Tax shield on Depr. (50%) Salvage value	176000	136000	68000
Net	0	0	(1000000)
PV Factor	476000	786000	(282000)
Pv of Cash Outflow	0.926	0.857	0.794
	440776	673602	(223908)

Total PV of Cash Outflow: Rs 890470



Suggestion: Since the present value of net cash outflow of borrowing is less, it is suggested to purchase the computer instead of leasing it.

Illustration 14 :

Alfa Ltd. is thinking of installing a computer. Decide whether the computer is to be purchased outright (through 15% borrowing) or to be acquired on lease rental basis. The rate income-tax may be taken at 40%. The other data available are as under :

Purchase of computer :

Purchase price	Rs. 20 lakh
Annual maintenance (to be paid in advance)	Rs. 50000 p.a
Expected economic useful life	6 years
Depreciation (for tax purposes)	SLM
Salvage value	Rs.2 lakhs

Leasing of computer :

Lease charges to be paid in advance	Rs. 4.50 lakhs
Maintenance expenses to be borne by lessor. Payment of loan is made in 6 year-end installments of Rs. 5,28,474 each.	

Solution :

Lease Option :

PV of Cash Outflows under Leasing Alternatives [Mmt. in Rs.]

Year end	Lease Payment	Tax Shield @40%	Cash outflows after taxes	Pvf (9%,n) 5%(1-0.40)	Total PV
0	400000	-	400000	1.000	400000
1 - 5	400000	160000	240000	3.890	933600



6	-	160000	(160000)	0.596	(95360)
				NPV	1238240

Lease payment = [Rs. 4,50,000 (lease rent) - Rs. 50,000 (saving in maintenance expenses)] =Rs. 4,00,000

Purchase Option :

Debt Payment Schedule

[Amit. in Rs.]

Year End	Loan Installment	Loan at the beginning	Payment		Principle O/s at the end
			Interest	Principle	
1	528474	2000000	300000	228474	1771526
2	528474	1771526	265729	262745	1508781
3	528474	1508781	226317	302157	1206624
4	528474	1206624	180994	347460	859144
5	528474	859144	128872	399602	459542
6	528474	459542	68932	459542	-

PV of Cash Outflows under Buying Alternative

[Amit. in Rs.]

YearEnd	Loan	Tax advantage	Net	PVF	PV of
---------	------	---------------	-----	-----	-------



	Installment	@40%		Cash Outflow	(9%,n)	Cash flows
		Interest	Depreciation			
1	528474	120000	120000	288474	0.917	264531
2	528474	106292	120000	302182	0.842	254437
3	528474	90527	120000	317947	0.772	245455
4	528474	72398	120000	336076	0.708	237942
5	528474	51549	120000	356925	0.650	232001
6	528474	27573	120000	380901	0.596	227017
Total Pv of cash Outflows						1461383
Less: PV of Salvage value (Rs. 200000 × 0.596)						119200
NPV of Cash Outflows under buying alternative						1342183

Since Cash Outflow of Leasing is lower than that of buying, leasing option should be advised.

Illustration 15 :

Welsh Ltd. is faced with a decision to purchase or acquire on lease a mini car. The cost of the mini car is Rs. 126965. It has a life of 5 years. The mini car can be obtained on lease by paying equal lease rentals annually. The leasing company desires a return of 10% on the gross value of the asset. Welsh limited can also obtain 100% finance from its regular banking channel. The rate of interest will be 15% p.a and the loan will be paid in five annula installments, inclusive of interest. The effective tax rate of the company is 40%. For the purpose of taxation it is to be assumed that the asset will be written off a period of 5 years



on straight line basis. Advise Welsh Limited about the method of acquiring the car.

What should be the annual lease rental to be charged by the leasing company to match the loan option ?

For your exercise use the following discount factors for five years :

Discount Rate	1	2	3	4	5
10%	0.9	0.8	0.7	0.6	0.6
	1	3	5	8	2
15%	0.8	0.7	0.6	0.5	0.4
	7	6	6	7	9
9%	0.9	0.8	0.7	0.7	0.6
	2	4	7	1	5

Solution :

BUY OPTION :

(a) Annual Loan Repayment : Loan Amount/PVIFA (15%,5) =
Rs.126965/3.86 = Rs. 32892

Interest Computation :

Year	0	1	2	3	4
Opening	12696	94073	7529	5369	28856
Bal.	5		2	4	
Interest 15%	0	14111	1129	8054	4036
			4		
Total	12696	10818	8658	6174	32892



	5	4	6	8	
Repayment	32892	32892	3289	3289	32892
Closing Bal.	94073	75292	5369	2885	0
			2	2	
			4	6	

Debt Option : Cash Outflows

Year	Installment	Interest @ 15%	Depreciation	Tax Shield on Int.	Net cash Outflow	PVF @ 9%	PV of Cash Outflows
0	32892	0	0	0	32892	1.00	32892
1	32892	1411	25393	15802	17090	0.92	15723
2	32892	11294	25393	14675	18217	0.84	15302
3	32892	8054	25393	13379	19513	0.77	15025
4	32892	4036	25393	11772	21120	0.71	14995
5	0	0	25393	10157	(10157)	0.65	(6602)
Total Present Value of Cash Outflows:							87335

LEASE OPTION:

Annual Lease rentals = Cost of assets : [1+PVIFA

(10%,4)][Note Rentals paid in Advance]

= Rs. 126965 : 4.17 = Rs. 30447

Leasing Alternative

Year	Lease Payment	Tax Shield	After Tax Cash at 9%	PV Factors	PV of Outflows
------	---------------	------------	----------------------	------------	----------------



		Outflows		Cash	
0	30447	0	30447	1.00	30447
1 - 4	30447	12179	18268	3.24	59188
5	0	12179	(12179)0.65		(7916)
Total Present Value of Cash Outflows :					81719

Decision : Since PV of Leasing is lower than that of Buying, it is advisable to go for leasing.

(a) Let the Annual Rentals be L

After tax cost of Lease Rentals = $0.60L$

PV of Lease Rentals = $0.60L \times 4.17 = 2.502L$ Equation $2050L = \text{Rs. } 87335$, we get L as Rs. 34906

Illustration 16 :

A company is thinking of installing a machine. It is to decide whether the machine is to be purchased outright (through 14% borrowings) or to be acquired on lease rent basis. The firm is in the 50% tax bracket. The other data available are:

Buying:

Purchase price Rs. 20 lakhs Expected economic useful life 6 years
Depreciation Straight-line method
Salvage Value Rs. 2 lakhs

Lease Option:

Lease charges (to be paid in adv.) Rs. 4 lakhs

Maintenance Expenses To be borne by the lessor

Payment of Loan 6 year and equal installments of Rs. 5,14,271



Should the company buy or lease ?

Solution :

Buying Option:

Lease Option:

If the firm procures the asset on lease basis, then it will have to pay a lease rental of Rs. 4,00,000 in the beginning of each of 6 years. This means that the first lease rental will be payable now and the others will be payable in the beginning of next 5 years. These lease rentals will be tax deductible at the end of each year. So, for the year 0, the net cash outflow is Rs. 4,00,000. The net cash outflow for years 1, 2, 3, 4 & 5 will be Rs. 4,00,000 - Tax Shield of Rs. 2,00,000. So, net outflows will be Rs. 2,00,000 only. However, for year 6, there will not be any outflow but shall be tax shield of Rs. 2,00,000 resulting in net cash inflow.

This may be presented as follows:

Year	Cash Flow (Rs.)	Tax Shield (Rs.)	Net Cash Flow	PV Factor (Rs.)	PV (Rs.)
0		-400000	-		
-400000	1.000		-400000		
1 - 5	-400000	200000	-200000	4.100	-820000
6	200000	+200000	0.666	+133200	-1086800

So, if the firm procures the asset on lease basis, the PV of will be Rs. 10,86,800 which is less than the PV of outflows in buying option. So, the firm should procure the asset on lease basis.

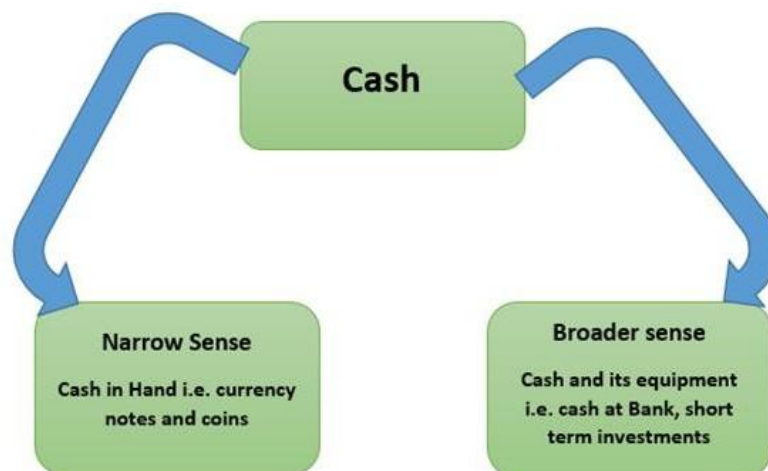


Unit – IV

Cash, Receivable and Inventory Management

Management of Cash

Cash is considered as vital asset and its proper management support company development and financial strength. An effective cash management program designed by companies can help to realise this growth and strength. Cash is vital element of any company needed to acquire supply resources, equipment and other assets used in generating the products and services. Marketable securities also come under near cash, serve as back pool of liquidity which provides quick cash when needed.



Cash management is the stewardship or proper use of an entity's cash resources. It assists to keep an organization functioning by making the best use of cash or liquid resources of the organization. Cash management is associated with management of cash in such a way as to realise the generally accepted objectives



of the firm, maximum productivity with maximum liquidity. It is the management's Capability to identify cash problems before they ascend, to solve them when they arise and having made solution available to delegate someone carry them out.

The notion of cash management is not new and it has attained a greater significance in the modern world of business due to change that took place in business operations and ever increasing difficulties and the cost of borrowing". It is the most liquid current assets, cash is the common denominator to which all current assets can be reduced because the other current assets i.e. receivables and inventory get eventually converted into cash. This emphasizes the importance of cash management. The term cash management denotes to the management of cash resource in such a way that generally accepted business objectives could be accomplished. In this perspective, the objectives of a firm can be combined as bringing about consistency between maximum possible effectiveness and liquidity of a firm. Cash management may be defined as the ability of a management to identify the problems related with cash which may come across in future course of action, finding appropriate solution to curb such problems if they arise, and lastly delegating these solutions to the competent authority for carrying them out. Cash management maintains sufficient quantity of cash in such a way that the quantity denotes the lowest adequate cash figure to meet business obligations. Cash management involves managing cash flows (into and out of the firm), within the firm and the cash balances held by a concern at a point of time.

In financial literature, Cash management denotes to wide area of finance involving the collection, handling, and usage of cash. It involves assessing market liquidity, cash flow, and investments. The notion of cash management is not novel and it has gained more significance in contemporary business world due to change



that took place in the conduct of business and ever increasing difficulties and the cost of borrowing.

Objective of Cash Management

1. To make Payment According to Payment Schedule: Firm needs cash to meet its routine expenses including wages, salary, taxes etc.
2. To minimise Cash Balance: The second objective of cash management is to reduce cash balance. Excessive amount of cash balance helps in quicker payments, but excessive cash may remain unused & reduces profitability of business. Contrarily, when cash available with firm is less, firm is unable to pay its liabilities in time. Therefore optimum level of cash should be maintained (Excel Books India, 2008).

An effective management is considered to be important for the following reasons:

1. Cash management guarantees that the firm has sufficient cash during peak times for purchase and for other purposes.
2. Cash management supports to meet obligatory cash out flows when they fall due.
3. Cash management helps in planning capital expenditure projects.
4. Cash management helps to organize for outside financing at favourable terms and conditions, if necessary.
5. Cash management helps to allow the firm to take advantage of discount, special purchases and business opportunities.
6. Cash management helps to invest surplus cash for short or long-term periods to keep the idle funds fully employed.



General Principles of Cash Management

Harry Gross has recommended certain general principles of cash management.

1. **Determinable Variations of Cash Needs:** A reasonable amount of funds, in the form of cash is required to be kept aside to overcome the period expected as the period of cash shortage. This period may either be short and temporary or last for a longer duration of time. Normal and regular payment of cash leads to small cutbacks in the cash balance at periodic intervals. Making this payment to different workers on different days of a week can balance these reductions. Another practice for balancing the level of cash is to schedule cash disbursements to creditors during the period when accounts receivables collected amounts to a large sum but without putting the helpfulness at stake.
2. **Contingency Cash Requirement:** There may arise certain cases, which fall beyond the forecast of the management. These establish unexpected calamities, which are too difficult to be provided in the normal course of the business. Such contingencies always demand for special cash requirements that was not assessed and provided for in the cash budget. Denials of wholesale product, huge amount of bad debts, strikes, and lockouts are some of these contingencies. Only a prior experience and investigation of other similar companies prove supportive as a customary practice. A useful procedure is to shield the business from such calamities like bad-debt losses, fire by way of insurance coverage.
3. **Availability of External Cash:** This factor also has immense significance in the cash management which refer to the availability of funds from outside sources. These resources help in providing credit facility to the firm, which materialized the firm's objectives of holding minimum cash balance. As such if a



firm succeeds in obtaining sufficient funds from external sources such as banks or private financiers, shareholders, government agencies, the need to maintain cash reserves lessens.

4. **Maximizing Cash Receipts:** Nearly, all financial managers have objective to make the best possible use of cash receipts. Cash receipts if tackled carefully results in minimizing cash requirements of a concern. For this purpose, the comparative cost of granting cash discount to customer and the policy of charging interest expense for borrowing must be appraised continually to determine the ineffectiveness of either of the alternative or both of them during that particular period for maximizing cash receipts.

Some techniques proved helpful in this context are mentioned below:

- i. **Concentration Banking:** In this system, a company launches banking centres for collection of cash in different areas. Thus, the company instructs its customers of neighbouring areas to send their payments to those centres. The collection amount is then deposited with the local bank by these centres as early as possible. Whereby, the collected funds are transferred to the company's central bank accounts operated by the head office.
- ii. **Local Box System:** Under this system, a company rents out the local post offices boxes of different cities and the customers are asked to forward their remittances to it. These remittances are picked by the approved lock bank from these boxes to be transferred to the company's central bank operated by the head office.
- iii. **Reviewing Credit Procedures:** This type of technique assists to determine the impact of slow payers and bad debtors on cash. The accounts of slow paying customers should be revised to determine the volume of cash tied



up. Besides this, evaluation of credit policy must also be conducted for introducing essential modifications. As a matter of fact, too strict a credit policy involves rejections of sales. Thus, restricting the cash inflow. On the other hand, too lenient, a credit policy would increase the number of slow payments and bad debts again reducing the cash inflows.

- iv. **Minimizing Credit Period:** Shortening the terms allowed to the customers would definitely quicken the cash inflow side-by-side reviewing the discount offered would prevent the customers from using the credit for financing their own operations gainfully.
- v. **Others:** There is a need to introduce various procedures for managing large to very large remittances or foreign remittances such as, persona pick up of large sum of cash using airmail, special delivery and similar techniques to accelerate such collections.
- vi. **Minimizing Cash Disbursements:** The intention to minimize cash payments is the ultimate benefit derived from maximizing cash receipts. Cash disbursement can be brought under control by stopping deceitful practices, serving time draft to creditors of large sum, making staggered payments to creditors and for payrolls.
- vii. **Maximizing Cash Utilization:** It is emphasized by financial experts that suitable and optimum utilization leads to maximizing cash receipts and minimizing cash payments. At times, a concern finds itself with funds in excess of its requirement, which lay idle without bringing any return to it. At the same time, the concern finds it imprudent to dispose it, as the concern shall soon need it. In such conditions, company must invest these funds in some interest bearing securities. Gitman suggested some fundamental procedures, which helps in managing cash if employed by the cash management. These



include:

- viii. Pay accounts payables as late as possible without damaging the firm's credit rating, but take advantage of the favourable cash discount, if any.
- ix. Turnover, the inventories as quickly as possible, avoiding stock outs that might result in shutting down the productions line or loss of sales.
- x. Collect accounts receivables as early as possible without losing future loss sales because of high-pressure collections techniques. Cash discounts, if they are economically justifiable, may be used to accomplish this objective.

Function of Cash Management

It is well acknowledged in financial reports and various studies that cash management is concerned with minimizing fruitless cash balances, investing temporarily excess cash usefully and to make the best possible arrangements for meeting planned and unexpected demands on the firm's cash (Hunt, 1966). Cash Management must have objective to reduce the required level of cash but minimize the risk of being unable to discharge claims against the company as they arise. There are five cash management functions:

1. **Cash Planning:** Experts emphasizes the wise planning of funds that can lead to huge success. For any management decision, planning is the primary requirement. According to theorists, "Planning is basically an intellectual process, a mental pre-disposition to do things in an orderly way, to think before acting and to act in the light of facts rather than of a guess." Cash planning is a practise, which comprises of planning for and controlling of cash. It is a management process of predicting the future need of cash, its available resources and various uses for a specified period. Cash planning deals at length with



formulation of necessary cash policies and procedures in order to perform business process constantly. Good cash planning aims at providing cash, not only for regular but also for irregular and abnormal requirements.

2. **Managing Cash Flows:** Second function of cash management is to properly manage cash flows. It means to manage efficiently the flow of cash coming inside the business i.e. cash inflow and cash moving out of the business i.e. cash outflow. These two can be effectively managed when a firm succeeds in increasing the rate of cash inflow together with minimizing the cash outflow. As observed accelerating collections, avoiding excessive inventories, improving control over payments contribute to better management of cash. Whereby, a business can protect cash and thereof would require lesser cash balance for its operations.
3. **Controlling the Cash Flows:** It has been observed that prediction is not an exact knowledge because it is based on certain conventions. Therefore, cash planning will unavoidably be at variance with the results actually obtained. Due to this, control becomes an unavoidable function of cash management. Moreover, cash controlling becomes indispensable as it increases the availability of usable cash from within the enterprise. It is understandable that greater the speed of cash flow cycle, greater would be the number of times a firm can convert its goods and services into cash and so lesser will be the cash requirement to finance the desired volume of business during that period. Additionally, every business is in possession of some concealed cash, which if traced out significantly decreases the cash requirement of the enterprise.
4. **Optimizing the Cash Level:** It is important that a financial manager must focus to maintain sound liquidity position i.e. cash level. All his efforts relating to planning, managing and controlling cash should be diverted towards



maintaining an optimum level of cash. The prime need of maintaining optimum level of cash is to meet all requirements and to settle the obligations well in time. Optimization of cash level may be related to establishing equilibrium between risk and the related profit expected to be earned by the company.

5. **Investing Idle Cash:** Idle cash or surplus cash is described as the extra cash inflows over cash outflows, which do not have any specific operations or any other purpose to solve currently. Usually, a firm is required to hold cash for meeting working needs facing contingencies and to maintain as well as develop friendliness of bankers. In banking area, cash management is a marketing term for some services related to cash flow offered mainly to huge business customers. It may be used to describe all bank accounts (such as checking accounts) provided to businesses of a certain size, but it is more often used to describe specific services such as cash concentration, zero balance accounting, and automated clearing house facilities. Sometimes, private banking customers are given cash management services. Financial instruments involved in cash management include money market funds, treasury bills, and certificates of deposit.

Benefits of Cash Management System

In the period of technology progression, the Cash Management System provides following Benefits to its customers:

1. Funds availability as per need on day zero, day one, day two, day three etc.
i.e. Corporate can plan their cash flows.
2. Bank interest saved as instruments are collected faster.
3. Affordable and competitive rates.



4. Single point enquiry for all queries.
5. Pooling of funds at desired locations.

To summarize, Cash Management denotes to the concentration, collection and disbursement of cash. The major role for managers is to maintain the flow of cash. Cash Management include a series of activities aimed at competently handling the inflow and outflow of cash. This mainly involves diverting cash from where it is to where it is needed. It is established that cash management is the optimization of cash flows, balances and short-term investments.

Management of Receivable

Accounts receivable typically comprise more than 25 percent of a firm's assets. The term receivable is described as debt owed to the firm by the customers resulting from the sale of goods or services in the ordinary course of business. There are the funds blocked due to credit sales. Receivables management denotes to the decision a business makes regarding to the overall credit, collection policies and the evaluation of individual credit applicants. Receivables Management is also known as trade credit management. Robert N. Anthony, explained it as "Accounts receivables are amounts owed to the business enterprise, usually by its customers. Sometimes it is broken down into trade accounts receivables; the former refers to amounts owed by customers, and the latter refers to amounts owed by employees and others".

Receivables are forms of investment in any enterprise manufacturing and selling goods on credit basis, large sums of funds are tied up in trade debtors. When company sells its products, services on credit, and it does not receive cash for it immediately, but would be collected in near future, it is termed as



receivables. However, no receivables are created when a firm conducts cash sales as payments are received immediately. A firm conducts credit sales to shield its sales from the rivals and to entice the potential clientele to buy its products at favourable terms. Generally, the credit sales are made on open account which means that no formal reactions of debt obligations are received from the buyers. This enables business transactions and reduces the paperwork essential in connection with credit sales.

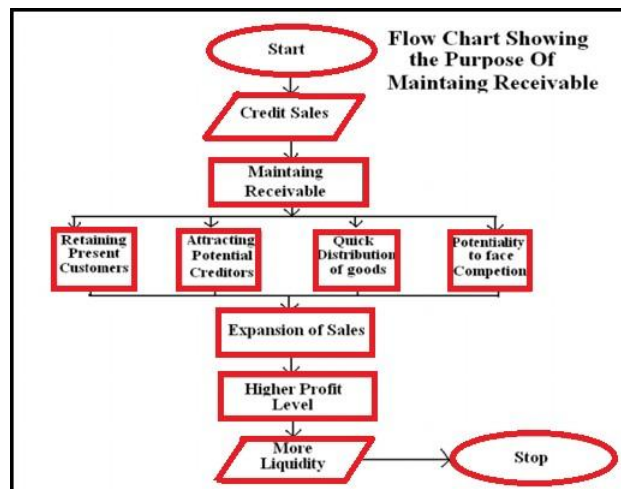
Accounts Receivables Management denotes to make decisions relating to the investment in the current assets as vital part of operating process, the objective being maximization of return on investment in receivables. It can be established that accounts receivables management involves maintenance of receivables of optimal level, the degree of credit sales to be made, and the debtors' collection.

Receivables are useful for clients as it increases their resources. It is preferred particularly by those customers, who find it expensive and burdensome to borrow from other resources. Thus, not only the present customers but also the Potential creditors are attracted to buy the firm's product at terms and conditions favourable to them.

Receivables has vital function in quickening distributions. As a middleman would act fast enough in mobilizing his quota of goods from the productions place for distribution without any disturbance of immediate cash payment. As, he can pay the full amount after affecting his sales. Likewise, the customers would panic for purchasing their needful even if they are not in a position to pay cash immediately. It is for these receivables are regarded as a connection for the movement of goods from production to distributions among the ultimate consumer.



Maintenance of receivable



Objectives of receivables management: The objective of Receivables Management is to promote sales and profits until that point is reached where the return on investment in

further funding receivables is less than the cost of funds raised to finance that

t additional credit i.e. cost of capita.

Management of Accounts Receivables is quite expensive. The following are the main costs related with accounts receivables management:

Cost of Management of Accounts Receivables





Advantages of accounts receivable management:

Accounts Receivables Management has numerous benefits. These include:

1. **Increased Sales:** Offering goods or services on credit enhances sales, by holding old customers and attraction potential customers.
2. **Increased Market Share:** When the firm is able to maintain old customers and attract new customers automatically market share will be bigger to the extent new sales.
3. **Increase in profits:** Increase sales, leads to increase in profits, because it need to produce more products with a given fixed cost and sales of products with a given sales network in both cost per unit comes down and the profit will be better.

Management of Inventory

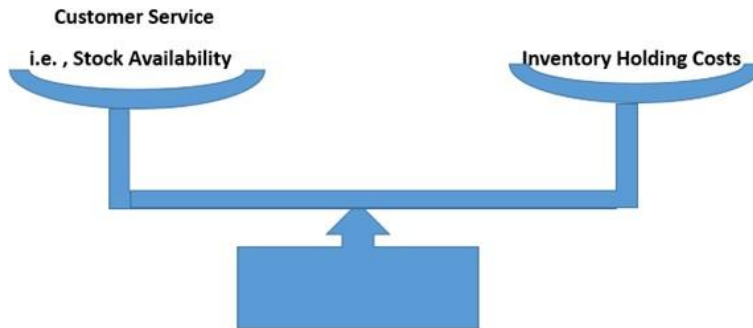
Inventory management is basically related to task of controlling the assets that are produced to be sold in the normal course of the firm's procedures. In supply chain management, major variable is to effectively manage inventory. The significance of inventory management to the company depends on the extent of its inventory investment.

The objectives of inventory management are of twofold:

1. The operational objective is to uphold enough inventory, to meet demand for product by efficiently organizing the firm's production and sales operations.
2. Financial interpretation is to minimize unproductive inventory and reduce inventory, carrying costs.



Effective inventory management is to make good balance between stock availability and the cost of holding inventory.

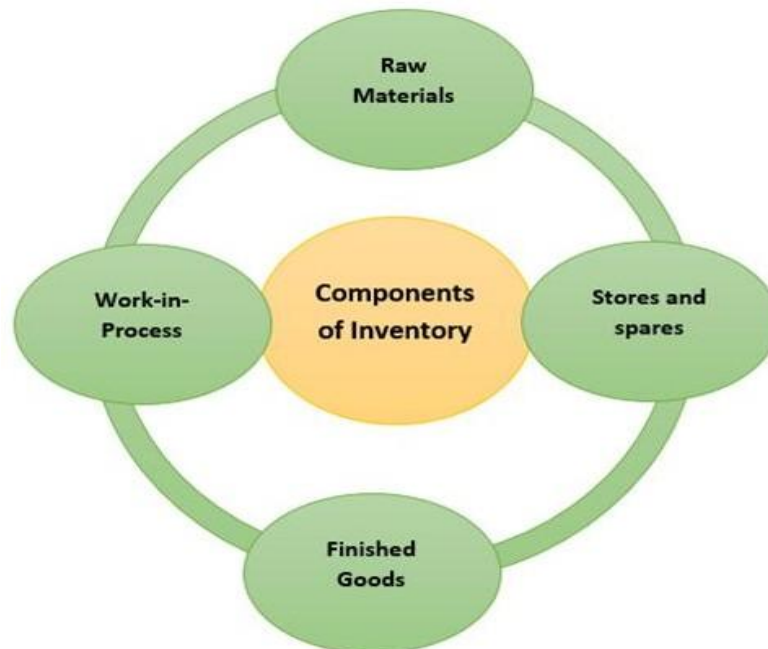


Components of inventory management: Inventories exist in different forms in a manufacturing company. These include:

1. **Raw materials:** Raw materials are those inputs that are transformed into completed goods throughout manufacturing process. Those form a major input for manufacturing a product. In other words, they are very much needed for uninterrupted production.
2. **Work-in-process:** Work-in-process is a stage of stocks between raw materials and finished goods. Work-in-process inventories are semi-finished products. They signify products that need to undergo some other process to become finished goods.
3. **Finished products:** Finished products are those products which are totally manufactured and company can immediately sell to customers. The stock of finished goods provides a buffer between production and market.
4. **Stores and spares:** It comprises of office and plant cleaning materials like soap, brooms, oil, fuel, light, bulbs and are purchased and stored for the purpose of maintenance of machinery.



Component of inventory



Inventory control encompasses managing the inventory that is previously in the warehouse, stockroom or store. This is to know the type of products are "out there", how many each item and where it is kept. It means having accurate, complete and timely inventory transactions record and avoiding differences between accounting and real inventory levels. Two tools commonly used to ensure inventory accuracy and control is ABC analysis and cycle counting.

The process of Inventory management consists of determining, how to order products and how much to order as well as identifying the most effective source of supply for each item in each stocking location. Inventory management contains all activities of planning, forecasting and replenishment. The main purpose of inventory management is minimize differences between customers demand and availability of items. These differences have caused by three factors that include



customers demand fluctuations, supplier's delivery time fluctuations and inventory control accuracy.

Types of Inventory

The aim of carrying inventories is to separate the operations of the firm. It means to make each function of the business independent of each other function so that delays or closures in one area do not affect the production and sale of the final product. Because production cessations result in increased costs, and because delays in delivery can lose customers, the management and control of inventory are important duties of the financial manager. There are many types of inventory. The common categories of inventory include raw materials inventory, work-in-process inventory, and finished-goods inventory.

Raw-Materials Inventory: Raw materials inventory include basic materials purchased from other firms to be used in the firm's production operations. These goods may include steel, lumber, petroleum, or manufactured items such as wire, ball bearings, or tires that the firm does not produce itself. Regardless of the specific form of the raw-materials inventory, all manufacturing firms maintain a raw-materials inventory. The intention is to separate the production function from the purchasing function that is, to make these two functions independent of each other so delays in the delivery of raw materials do not cause production delays. If there is a delay, the firm can satisfy its need for raw materials by liquidating its inventory.

Work-in-Process Inventory: Work-in-process inventory comprises of partly finished goods requiring additional work before they become finished goods. The more difficult



and lengthy the production process, the larger the investment in work-in-process inventory. The main aim of work-in-process inventory is to disengage the various operations in the production process so that machine failures and work stoppages in one operation will not affect other operations.

Finished-Goods Inventory: Finished-goods inventory includes goods on which production has been completed but that are not yet sold. The purpose of a finished-goods inventory is to separate the production and sales functions so that it is not required to produce the goods before a sale can occur and sales can be made directly out of inventory.

Motives of inventory management:

Managing inventories involve lack of funds and inventory holding costs. Maintenance of inventories is luxurious. Still there is motive to retain inventories. There are three general motives:

1. **The transaction motive:** Firm may hold the inventories in order to facilitate the smooth and continuous production and sales operations. It may not be possible for the company to obtain raw material whenever necessary. There may be a time lag between the demand for the material and its supply. Therefore, it is needed to hold the raw material inventory. Similarly, it may not be possible to produce the goods instantly after they are demanded by the customers. Hence, it is needed to hold the finished goods inventory. The need to hold work-in- progress may arise due to production cycle.
2. **The precautionary motive:** Firms also prefer to hold them to protect against the risk of unpredictable changes in demand and supply forces. For example, the



supply of raw material may get delayed due to the factors like strike, transport disruption, short supply, lengthy processes involved in import of the raw materials.

3. **The speculative motive:** Firms may like to buy and stock the inventory in the quantity which is more than needed for production and sales purposes. It is done to get the advantages in terms of quantity discounts connected with bulk purchasing or expected price rise.

Merits of Inventory Management

There are several advantages of managing inventory in proper way.

1. Inventory management guarantees adequate supply of materials and stores to minimize stock outs and shortages and avoid costly interruption in operations.
2. It keeps down investment in inventories, inventory carrying costs, and obsolescence losses to the minimum.
3. It eases purchasing economies throughout the measurement of requirements on the basis of recorded experience.
4. It removes duplication in ordering stock by centralizing the source from which purchase requisition emanate.
5. It allows better utilization of available stock by enabling inter-department transfers within a firm.
6. It offers a check against the loss of materials through carelessness or pilferage.
7. Perpetual inventory values provide a stable and reliable basis for preparing financial statements a better utilization.



Demerits of Holding Inventory

Besides several benefits, there are some drawbacks of holding inventory.

1. **Price decline:** It is a major disadvantage of inventory holding. Price decline is the result of more supply and less demand. It can be said that it may be due to introduction of competitive product. Generally, prices are not controllable in the short term by the individual firm. Controlling inventory is the only way that a firm can counter act with these risks. On the demand side, a decrease in the general market demand when supply remains the same may also cause price to increase. This is also long-lasting management problem, because reduction in demand may be due to change in customer buying habits, tastes and incomes.
2. **Product deterioration:** It is also serious demerits of inventory holding. Holding of finished completed goods for a long period or shortage under inappropriate conditions of light, heat, humidity and pressures lead to product worsening.
3. **Product obsolescence:** If items are hold for long time, it may become outdated. Product may become outmoded due to improved products, changes in customer choices, particularly in high style merchandise, changes in requirements. Then this is a major risk and it may affect in terms of huge revenue loss. It is costly for the firms whose resources are limited and tied up in slow moving inventories.

In final words, the notion of inventory management has been one of the many analytical characteristics of management. It involves optimization of resources available for holding stock of various materials. If there is shortage of inventory, it leads to stock-outs, causing stoppage of production and a very high inventory will result in increased cost due to cost of carrying inventory.



PROCEDURE FOR PREPARING FUNDS FLOW STATEMENT

Fund Flow Statement can be prepared by comparing two balance sheets and other information derived from various accounts as may be needed. While preparing the funds flow statement mainly two statements are prepared.

- Schedule of Changes in Working Capital
- Funds Flow Statement

Schedule of Changes in Working Capital

A statement of changes in working capital is prepared by recording changes in current assets and current liabilities during the accounting period. Working capital during this period is bound to change due to an increase or decrease in the current assets and current liabilities.

The schedule of changes in working capital can be prepared by comparing the balance sheets of two dates. Firstly we have to recognize the current assets and current liabilities of the concern and then compare them between two dates if the current assets of current year are more than the previous year that is recognized as an increase in working capital or vice-versa. On the other hand if current liabilities of current year is more than the previous year it will recognize as decrease in working capital or vice-versa because

$$\text{Working Capital} = \text{Current Assets} - \text{Current Liabilities.}$$

Schedule of Changes in Working Capital				
Particulars	Previous Year	Current Year	Changes in working Capital	
			Increase	Decrease
Current Assets				
Cash in Hand				



Cash at Bank				
Sundry Debtors				
Stock				
Prepaid expenses				
Accrued income				
Total Current Assets				
Current Liabilities				
Bills payable				
Sundry Creditors				
Outstanding expenses				
Bank overdraft				
Short-term advances				
Proposed dividend*				
Provision for Taxation*				
Total Current Liabilities				
Working Capital CA- CL (Increase / Decrease)				

Preparation of Fund Flow Statement

The two ways of presenting fund flow statements are shown below.

- ✓ T-Format of Fund Flow Statement
- ✓ Vertical Format of Fund Flow Statement

T-Format of Fund Flow Statement

Fund Flow Statement for the year ended on

Sources	Rs	Application	Rs
Issue of share Capital (both equity and preference)	XXX	Redemption of Pref. Shares	XXX



Issue of debentures	XXX	Redemption of debentures	XXX
Amount raised through long-term loans	XXX	Repayment of loans	XXX
Sale of fixed assets	XXX	Purchase of fixed assets	XXX
Sale of Investment	XXX	Purchase of loan-term investments	XXX
Non-trading income	XXX	Payment of interim and final dividends in cash	XXX
Fund from operation	XXX	Non-trading expenses	XXX
Decrease in working capital (as per statement of changes in working capital)	XXX	Increase in working capital (as per statement of changes in working capital)	XXX
		Payment of taxes	XXX
		Funds lost in operations	XXX
	XXXX		XXXX



Vertical Format of Fund Flow Statement

Sources	Rs
Issue of share Capital (both equity and preference)	XXX
Issue of debentures	XXX
Amount raised through long-term loans	XXX
Sale of fixed assets	XXX
Sale of Investment	XXX
Non-trading income	XXX
Fund from operation	XXX
Decrease in working capital (as per statement of changes in working capital)	XXX
Total	XXX
Application	
Redemption of Pref. Shares	XXX
Redemption of debentures	XXX
Repayment of loans	XXX
Purchase of fixed assets	XXX
Purchase of loan-term investments	XXX
Payment of interim and final dividends in cash	XXX
Non-trading expenses	XXX
Increase in working capital (as per statement of changes in working capital)	XXX
Payment of taxes	XXX
Funds lost in operations	XXX
Total	XXX

Illustration: 1 Prepare a Statement of change in working capital from the



following Balance Sheet of Sushruth Steel Co

Balance Sheet of Sushruth Steel Co					
Liabilities	2003	2004	Assets	2003	2004
Creditors	15,000	18,000	Cash	11,200	8,500
Bills Payable	10,000	7,500	Debtors	21,300	23,500
Loan on Mortgage	40,000	40,000	Stock	35,000	30,600
Capital	50,000	45,000	Sinking fund investment	16,000	12,000
Sinking fund	16,000	12,000	Land	10,000	10,000
P & L a/c	13,950	16,275	Building	60,000	60,000
Provision for Doubtful debts	1,350	1,425	Furniture & fixture	8,000	7,000
Depreciation fund	15,200	11,400			
	1,61,500	1,51,600		1,61,500	1,51,600

Solution:

Schedule in Changes in Working Capital				
	2003	2004	Changes in Working	
			Increase	Decrease
Current Assets:				
Cash	11,200	8,500	2,700	



Debtors less provision	19,950	22,075		2,125
Stock	35,000	30,600	4,400	
Total	66,150	61,175		

<u>Current Liabilities</u>				
Creditors	15,000	18,000	3,000	
Bills Payable	10,000	7,500		2,500
Total	25,000	25,500	10,100	4,625
Working Capital (CA-CL)	41,150	35,675		
Increase in Working Capital		5,475		5,475
	41,150	41,150	10,100	10,100

Illustration: 2 The preparation of statement of changes in working capital and fundflow statement.

Liabilities	2004	2005	Assets	2004	2005
Share Capital	1,50,000	1,80,000	Land & building	85,000	85,000
P& L a/c	35,000	42,000	P & M	54,000	70,000
Loans	2,000	15,000	Stock	30,500	50,000
Creditors	17,000	23,000	Debtors	25,500	45,000
Bills Payable	3,000	1,000	Bills receivable	5,000	2,000
			Cash	7,000	9,000



	2,07,000	2,61,000		2,07,000	2,61,000
--	-----------------	-----------------	--	-----------------	-----------------

Solution

Schedule in changes in working capital

Particulars	2004 (Rs)	2005 (Rs)	Increase (Rs)	Decrease (Rs)
Current Assets				
Stock	30,500	50,000	19,500	
Debtors	25,500	45,000	19,500	
B/R	5,000	1,000		2,000
Cash	7,000	9,000	2,000	
Total CA	68,000	1,06,000		
Current Liabilities				
Creditors	17,000	23,000		6,000
B/P	3,000	1,000	2,000	
Total CL	20,000	24,000	43,000	8,000
CA – CL	48,000	82,000		
Increase in Working Capital				35,000
Total			43,000	43,000

Fund Flow Statement

Sources	Rs	Application	Rs
Issue of share capital	30,000	Purchase of P & M	16,000
Loan	13,000	Increase in working capital	34,000
Fund from operations	7,000		
	50,000		50,000

Adjusted Profit & Loss A/c

Particulars	Rs	Particulars	Rs
		By Balance b/d	35,000
		By Fund from operations	7,000
To Balance c/d	42,000		



	42,000		42,000
--	---------------	--	---------------

Illustration: 3 From the following balance sheets and additional information given, you are required to calculate funds operations for the year ended 2017.

Liabilities	2016 Rs.	2017 Rs.	Assets	2016 Rs.	2017 Rs.
Share capital	100000	150000	Land & buildings	100000	95000
General reserve	30000	30000	Plant & Machinery	80000	90000
Profit & loss a/c	20000	22000	Stocks	70000	110000
6% Debentures	80000	80000	Debtors	20000	25000
Creditors	65000	58000	Investments	---	10000
Provision for tax	5000	10000	Cash	10000	10000
			Goodwill	20000	10000
	300000	350000		300000	350000

Additional information:

- a. During 2017, dividends of Rs. 15000 were paid.
- b. Depreciation written off plant and machinery amounted to Rs. 6000 and no depreciation has been charged on land and buildings.
- c. Provision for tax made during the year Rs. 5000.



d. Profit on sale of machinery Rs. 2000.

Solution:

Calculation of funds from operations

	Rs.	Rs.
Closing balance of P/L A/c given in the B/S		22000
Add: Non-fund or Non-Operating items already debited to P/L A/c:		
Depreciation	6000	
Dividends	15000	
Provision for tax	5000	
Goodwill	10000	36000
Less: Non-fund or Non-Operating items already credited to P/L A/c:		
Profit on sale of machinery	2000	
Opening balance of P/L A/c (given in B/S)	20000	22000
Funds from operations		36000

ADJUSTED PROFIT AND LOSS ACCOUNT

	Rs.		Rs.
To depreciation	6000	By opening balance	20000
To dividends	15000	By profit on sale of machinery	2000
To provision for tax	5000	By funds from operations (bal.fig.)	36000
To goodwill	10000		
To closing balance	22000		
	58000		58000

Illustration: 4 From the following balance sheets of A & Co Ltd., you are required to



show any increase or decrease in working capital and sources and applications there of:

Liabilities	As at 31.12.16 Rs.	As at 31.12.17 Rs.	Assets	As at 31.12.16 Rs.	As at 31.12.17 Rs.
Equity share capital	240000	360000	Land	166200	339600
Share premium	24000	36000	Machinery	106800	153900
General reserve	18000	27000	Furniture	7200	4500
Profit and Loss Account	58500	62400	Stock	66300	78000
8% Debentures	---	78000	Debtors	109500	117300
Provision for taxation	29400	32700	Bank	14400	12000
Creditors	100500	109200			
	470400	705300		470400	705300

Depreciation written off during the year: on machinery Rs.38,400 ; on furniture Rs.1,200.

Solution:

Schedule in changes in working capital

	2016 Rs.	2017 Rs.	Increase	Decrease
Current Assets:				
Stock	66300	78000	11700	
Bank	109500	117300	7800	
Debtors	14400	12000	---	
	190200	207300		2400
Current Liabilities:				
Creditors	100500	109200		8700
Provision for taxation	29400	32700		3300
	129900	141900		
Working Capital	60300	65400		



Net Increase in W.C.	5100			5100
	65400	65400	19500	19500

STATEMENT OF SOURCES AND APPLICATIONS OF FUNDS

Sources	Rs.	Applications	Rs.
Issue of share capital	120000	Purchase of land & building	173400
Share premium	12000	Purchase of machinery	85500
Issue of debentures	78000	Net increase in W.C.	5100
Sale of furniture	1500		
Funds from operations	52500		
	264000		264000

Working Notes:

Machinery A/c			
	Rs.		Rs.
To balance B/d	106800	By depreciation	38400
To purchase during the year (Bal. Fig.)	85500	By balance c/d	153900
	192300		192300
Land & Buildings A/c			
To balance B/d	166200	By balance c/d	339600
To purchase during the year(Bal. Fig.)	173400		
	339600		339600
Furniture A/c			
To balance B/d	7200	By depreciation	1200
		By cash-sale (bal. fig.)	1500
		By balance c/d	4500
	7200		7200
Adjusted Profit & Loss A/c			
To transfer to Reserves	9000	By balance b/d	58500
To Depreciation on machinery	38400	By funds from operation	52500
To Depreciation on furniture	1200		
To Balance C/d	62400		



	111000		111000
--	---------------	--	---------------

Illustration: 5 SMS Company presents the following information and you are required to calculate funds from operations.

Profit and Loss A/c

	Rs.		Rs.
To Expenses:		By Gross profit	2,00,000
Operation	1,00,000	By Gain on sale of plant	20,000
Depreciation	40,000		
To Loss on Sale of building	10,000		
To Advertisement Suspense A/c	5,000		
To Discount (allowed to customers)	500		
To Discount on Issue of Shares written off	500		
To Goodwill	12,000		
To Net Profit	52,000		
	2,20,000		2,20,000

Solution:

Calculation of Funds from Operations

	Rs.	Rs.
Net profit (as given)		52000
Add: Non-fund or non-operating items which have been debited to P/L A/c:		
Depreciation	40000	
Loss on sale of building	10000	
Advertisement written off	5000	
Discount on issue of shares written off	500	
Good will written off	12000	67500
		119500
Less: Non-fund or Non-operating items which have been credited to P/L A/c: Gain on sale of plant	20000	20000
Funds from operations		99500



CASH FLOW STATEMENT VS FUND FLOW STATEMENT

Cash Flow Statement	Fund Flow Statement
Cash inflow and outflow are only considered	Increase or decrease in the working capital is registered
Cause & changes of cash position	Causes & Changes of working capital position
Considers only most liquid assets pertaining to cash resource: which forters only for very short span of planning	Considers in general i.e current assets, the duration of the liquidity of the current assets are longer in gestation than the liquid assets; which pavas way for long span of planning.
Opening and closing balances of cash resources are considered for the preparation	Increase or decrease of working capital is considered but not the opening and closing balance for preparation.
The flow in the statement means real cash flow	The flow in the statement need not be real cash flow.

Format for Cash Flow Statement

Cash Flow Statement for the year ended

	Rs	RS
--	----	----



Cash flow from operating activities		
Cash receipts from customers		
Cash paid to suppliers and employees		
Cash generated from operations		
Income tax paid		
Cash flow before extraordinary items		
Net cash from operating activities OR Net profit before tax and extraordinary items		
Income tax paid		
Net cash from operating activities		
Cash flow from Investing activities		
Individual items of cash inflows and outflows financial activities		
Net cash from financing activities		
Cash and cash equivalents at the beginning of the period		
Cash and cash equivalents at the end of the period		

Illustration: 6 From the following information, calculate cash flows from operating activities.

	<i>Rs</i>
Total sales for the year	250000
Total purchases for the year	200000
Trade debtors as on 1.7.2007	12000
Trade creditors as on 1.7.2007	14500
Trade debtors as on 30.6.2008	20800
Trade creditors as on 30.6.2008	21600
Total operating expenses for the year	10200
Outstanding expenses as on 1.7.2007	1800



Prepaid expenses as on 1.7.2007	1500
Outstanding expenses as on 30.6.2008	2400
Prepaid expenses as on 30.6.2008	2200
Income tax paid during the year	2000

Solution:

Cash flow from operating activities

Cash receipts from customers (working Note: 1)	241200
Cash paid to supplies and employees (working note: 2)	203200
Cash generated from operations	38000
Income tax paid	2000
Net cash flows from operating activities	36000

Calculate of cash receipts from customers:

1. Calculation of cash receipts from customers :	Rs.
Sales for the year	2,50,000
<i>Add</i> : Trade debtors as on 1.7.2007	12.000
	2,62,000
<i>Less</i> : Trade debtors as on 30.6.2008	20.800
Cash receipts from customers	2.41.200
2. Calculation of cash paid to suppliers and employees :	
Total purchases for the year	2,00,000
<i>Add</i> : Trade creditors as on 1.7.2007	14.500



	2,14,500
<i>Less</i> : Trade creditors as on 30.6.2008	21.600
Cash paid to creditors for purchase of goods (a)	1.92,900
Total operating expenses for the year	10,200
<i>Add</i> : Outstanding expenses as on 1.7.2007	1.800
	12,000
<i>Less</i> : Outstanding expenses as on 30.6.2008	2.400
	9,600
<i>Add</i> : Prepaid expenses as on 30.6.2008	2.200
	11,800
<i>Less</i> : Prepaid expenses as on 1.7.2007	1,500
Cash paid for services and expenses (b)	10,300
Cash paid to suppliers and employees(a + b) or(1,92,900+10,300)	203200

Illustration: 7 Cash Flows From Financing Activities

From the information given below, calculate cash flows from financing activities.

	2016 Rs.	2017 Rs.
Equity share capital	200000	300000
8% debentures	100000	50000
Securities premium	20000	30000
Bank loan (long-term)	---	100000

Additional information: Interest paid on debentures Rs. 8000.

Calculation of cash flows from financing activities

	Rs.	Rs.
--	-----	-----



Issue of share capital	100000	
Redemption of debentures	(50000)	
Proceeds from securities premium	10000	
Raising of Bank Loan	100000	
Interest on Debentures paid	(8000)	
Net Cash Flows From Financing Activities		152000

Illustration: 8 The following details are available from a company.

Liabilities	31-12-06	31-12-07	Assets	31-12-06	31-12-07
	Rs	Rs.		Rs.	Rs.
Share Capital	70,000	74,000	Cash	9,000	7,800
Debentures	12,000	6,000	Debtors	14,900	17,700
Reserve for doubtful debts	700	800	Stock	49,200	42,700
Trade Creditors	10,360	11,840	Land	20,000	30,000
P/L A/c	10,040	10560	Goodwill	10,000	5,000
	103100	103200		103100	103200
In addition, you are given:					

Dividend paid total Rs. 3,500. Land was purchased for Rs. 10,000. Amount provided for a mortisation of goodwill Rs. 5,000. Debentures paid off Rs. 6,000. Prepare Cash Flow Statement.

Cash Flow Statement for ended 31st December, 2007)

CASH FLOWS FROM OPERATING ACTIVITIES	Rs.	Rs.
--------------------------------------	-----	-----



Increase in the balance of P/L A/C	520	
Adjustments for non-cash and non-operating items:		
Reserve for Doubtful Debts	100	
Dividend	3500	
Goodwill written off	5000	
Operating Profit before working capital changes	9120	
Adjustments for changes in current operating assets and liabilities:		
Increase in Trade Creditors	1480	
Increase in Debtors	(2800)	
Decrease in Stock	6500	
Cash generated from operations	14300	
Income tax paid	---	
Net cash from operating activities		14300
Cash Flows from Investing Activities		
Purchase of Land	(10000)	
Net cash used in investing activities		(10000)
Cash Flows from Financing Activities		
Proceeds from the issue of Share	4000	
Capital Redemption of Debentures	(6000)	



Dividend paid	(3500)	
Net cash used in financing activities		(5500)
Net Decrease in cash and cash equivalents		(1200)
Cash and cash equivalents at the beginning of the period		9000
Cash and cash equivalents at the end of the period		7800

Illustration 9:

Mahendra Ltd purchases and sells goods entirely on credit basis. The credit period allow to it by suppliers is 45 days and firms allows 60 days and the average age of account receivable is 70 days. The average age of the firms inventory is 80 days.

Required:

- i) Calculate the firms cash cycle.
- ii) Determine cash turnover assuming 360 days in a year.

Solution:

$$\begin{array}{rcl} \text{i) Average age of inventory} & = & 80 \\ \\ \text{(+) Average age of accounts receivable} & = & 70 \\ & & \text{-----} \\ & & 150 \\ \\ \text{(-) Average age of accounts payable} & = & 60 \\ & & \text{-----} \\ \\ \text{Cash cycle} & = & 90 \text{ days} \\ & & \text{-----} \end{array}$$

(ii) Computation of cash turnover:

$$\text{Cash turnover} = \text{No.of days in a year} / \text{Cash cycle in days}$$



$$= 360 / 90 = 4 \text{ times.}$$

ECONOMIC ORDER QUANTITY WITH PRICE-BREAK

The concept of Economic Order Quantity fails in certain cases where there is a discount offered when purchases are made in large quantities. Certain manufactures offer reduced rate for items when a larger quantity is ordered. It may appear that the inventory holding cost may increase if large quantities of items are ordered. But if the discount offered is so attractive that it even outweighs the holding cost, the probably the order at levels other than the EOQ would be economical. An illustration is given in the following example and the rationale is explained.

Example: A company uses 12000 items per year supplied ordinarily at a price of Rs.3.00 per item. Carrying costs are 16% of the value of the average inventory and the ordering costs are Rs.20 per order. The supplier however offers discounts as per the table below:

Order Size	Price per item
Less than 2000	Rs.3.00
2000 to 3999	Rs.2.90
4000 more	Rs.2.85

Compute the economic order size.

$$EOQ = \sqrt{2 * 12000 * 20 / 3.00 * 0.16} = 1000$$

EOQ at Rs.2.90 per item



$$EOQ = \sqrt{2 * 12000 * 20 / 2.90 * 0.16} = 1017$$

EOQ at Rs.2.85 per item

$$EOQ = \sqrt{2 * 12000 * 20 / 2.85 * 0.16} = 1026$$

The EOQ at Rs. 2.90 per item = 1017. But the price per item is Rs. 2.9 only if the items are ordered in the range of 2000 to 3999. This is therefore an infeasible solution. Similarly the EOQ at Rs. 2.85 per item is 1026. This price is valid only for items ordered in the range 4000 or more. This is also an infeasible solution.

We follow the routine procedure and calculate the cost for various order sizes: 1000, 2000, 4000,

Order Size			
	1000	2000	3000
Item Cost (Rs.)	36000	34800	34200
Order cost (Rs.)	240	120	60
Holding cost (Rs.)	240	464	912

Problem 1

The John Equipment Company estimates its carrying cost at 15% and its ordering cost at Rs.9 per order. The estimated annual requirement is 48,000 units at a price of Rs. 4 per unit.

Required:

- What is the most economical number of units to order?
- How many orders should be placed in a year?



- How often should an order be placed?

Solution

1. What is the most economical number of units to order?

Annual requirement = 48,000 units

Ordering cost = Rs.9 per order

Carrying cost = 15% of per-unit cost

Per unit cost = Rs.4 per unit

$$\begin{aligned} \text{EOQ} &= \sqrt{\frac{2 \times \text{AR} \times \text{OC}}{\text{CC}}} \\ &= \sqrt{\frac{2 \times 48,000 \times 9}{4 \times 15\%}} \\ &= \sqrt{\frac{864,000}{0.6}} \\ &= \sqrt{1,440,000} \\ &= 1,200 \text{ units} \end{aligned}$$

2. How many orders should be placed in a year?

= Annual requirement / EOQ

= 48,000 units / 1,200 units



= 40 orders

3. How often should an order be placed?

Frequency of orders = No. of days in one year / No. of orders

= 360 days / 40 orders

= 9 days

Problem 2

To date, Raymond Bro. has been purchasing an item in lots of 900 units. This equates to a three-month supply. The cost per unit is \$12, the order cost is \$16 per order, and the carrying cost is 25%.

Required: How much can Raymond Bro. save per year by purchasing the item in the most economical quantities?

Solution

Annual Requirement	Order Size	No. of Orders	Order Size	Average Inventory	Carrying Cost	Total Cost
Units	Units	Nos.	Rs.	Units	Rs.	Rs.
3,600	900	4	64	450	1,350	1,414
3,600	196	18	288	98	294	582
Saving						832

The first stage in our working is to compute the annual requirement.

Given that 900 units amounts to a three-month supply, the monthly requirement is 900 units / 3 months = 300 units.



Therefore, the annual requirement is 300 units x 12 months = 3,600 units.

In turn, the EOQ can be computed as follows:

$$\begin{aligned} \text{EOQ} &= \sqrt{\frac{2 \times \text{AR} \times \text{OC}}{\text{CC}}} \\ &= \sqrt{\frac{2 \times 3,600 \times 16}{12 \times 25\%}} \\ &= \sqrt{\frac{115,200}{3}} \\ &= \sqrt{38,400} \\ &= 196 \text{ units approximately} \end{aligned}$$

No. of Orders = 3,600 units / 900 units

= 4 orders

= 3,600 units / 196 units

= 18 orders approx.

Ordering Cost = 4 orders x Rs.16 per order

= Rs.64

Also, in the case of EOQ:



$$= 18 \text{ orders} \times \text{Rs.}16 \text{ per order}$$

$$= \text{Rs.}288$$

$$\text{Average Inventory} = 900 \text{ units} / 2$$

$$= 450 \text{ units}$$

In the case of EOQ:

$$= 196 \text{ units} / 2$$

$$= 98 \text{ units}$$

$$\text{Carrying cost} = \$3 \times 450 \text{ units}$$

$$= \text{Rs.}1,350$$

In the case of EOQ:

$$= \text{Rs.} 3 \times 98 \text{ units}$$

$$= \text{Rs.} 294$$

$$\text{Total cost} = \text{Rs.}64 + \text{Rs.}1, 350$$

$$\text{Rs.}1, 414$$

In the case of EOQ:



$$= \text{Rs.}288 + \text{Rs.}294$$

$$= \text{Rs.}582$$

$$\text{Saving} = \text{Rs.}1,414 - \text{Rs.}582$$

$$= \text{Rs.}832.$$

Problem 3

A manufacturing company places a semi-annual order of 24,000 units at a price of Rs.20 per unit. Its carrying cost is 15% and the order cost is Rs.12 per order.

Required:

- What is the most economical order quantity?
- How many orders need to be placed?

Solution



$$\begin{aligned} \text{EOQ} &= \sqrt{\frac{2 \times \text{AR} \times \text{OC}}{\text{CC}}} \\ &= \sqrt{\frac{2 \times 48,000 \text{ units} \times \$12}{\$20 \times 15\%}} \\ &= \sqrt{\frac{1,152,000}{3}} \\ &= \sqrt{384,000} \\ &= 620 \text{ units approximately} \end{aligned}$$

No. of orders per year = Annual Requirement / EOQ

$$= 48,000 \text{ units} / 620 \text{ units}$$

$$= 77 \text{ orders approximately}$$

To compute the annual requirement:

24,000 units are ordered semiannually, therefore:

$$\text{Annual requirement} = 24,000 \text{ units} \times 2 = 48,000 \text{ units.}$$

Problem 4:

Calculate **Economic Order Quantity** (EOQ) from the following:

Annual consumption 6,000 units

Cost of ordering Rs. 60



Carrying costs Rs. 2

Solution:

$$EOQ = \sqrt{\frac{2 * RU * OC}{UC * CC\%}}$$

$$EOQ = \sqrt{\frac{2 * 6,000 * 60}{2}}$$

EOQ = 600 Units.

Problem 5:

From the following particulars, calculate the Economic Order Quantity (EOQ):

Annual requirements 1,600 units

Cost of materials per units Rs. 40

Cost of placing and receiving one order: Rs. 50

Annual carrying cost for inventory value 10%

Solution:

$$EOQ = \sqrt{\frac{2 * RU * OC}{UC * CC\%}}$$

$$EOQ = \sqrt{\frac{2 * 1,600 * 50}{40 * 10\%}}$$

EOQ = 200 Units

Problem 6:

Calculate EOQ from the following?

Consumption during the year = 600 units

Ordering cost Rs. 12 per order

Carrying cost 20%

Selling Price per unit Rs. 20



Solution:

$$EOQ = \sqrt{\frac{2 * RU * OC}{UC * CC\%}}$$

$$EOQ = \sqrt{\frac{2 * 600 * 12}{1 * 10\%}}$$

Economic Order Quantity = 379 Units

Problem 7:

A manufacturer buys certain equipment from suppliers at Rs. 30 per unit. Total annual needs are 800 units. The following further data are available:

Annual return on investments 10%

Rent, insurance, storing per unit per year Rs. 2

Cost of placing an order Rs. 100

Required: EOQ

Solution:

$$EOQ = \sqrt{\frac{2 * RU * OC}{UC * CC\%}}$$

$$EOQ = \sqrt{\frac{2 * 800 * 100}{2}}$$

EOQ = 200 Units

Problem 8:

From the figures given below, calculate Economic Order Quantity (EOQ) and Total cost at EOQ?

Total consumption of material per year 10,000 kgs

Buying cost per order Rs. 50

Unit cost of material Rs. 2 per kg



Carrying and storage cost 8%

Solution:

$$EOQ = \sqrt{\frac{2 * RU * OC}{UC * CC\%}}$$

$$EOQ = \sqrt{\frac{2 * 10,000 * 50}{2 * 8\%}}$$

EOQ = 2,500 Units

*Total Inventory Cost = [Fixed ordering cost (F) * Number of Order per year N] + [Carrying Cost (C)* EOQ/2]*

Total Inventory Cost = [50 * 10,000/2,500] + [(2*0.08)* 2,500/2]

Total Inventory Cost = 200 + 200

Total Inventory Cost = Rs. 400

ABC ANALYSIS AND HOW IS IT USED IN INVENTORY MANAGEMENT

- ABC Analysis helps make better decisions about which items to stock and how to manage them
 - It can be used to prioritize inventory items for ordering and recording to reduce stock outs and improve customer satisfaction
 - The challenges of ABC Analysis include difficulty in classifying items and obtaining up-to-date data on items
-



ABC Analysis can also be used to prioritize inventory items for reordering. By focusing on the A items, businesses can ensure that they are always stocked and that their stock levels are not too low. This helps to reduce the risk of stock outs and improve customer satisfaction. ABC Analysis is a popular inventory optimization technique used by businesses to prioritize inventory items. It helps businesses identify the items that are most and least valuable and focus on managing those items accordingly.

ABC Analysis

ABC Analysis classifies inventory items into three categories based on their value and importance to the business: A (high-value items), B (medium-value items), and C (low-value items). The A items — typically the most expensive and most important — should be managed with extra care and attention. The B items are also important for the business's success, but not as much as A. The C items are not as important for the business's success.

Advantages of ABC Analysis

- It allows businesses to focus attention on the most important items. By focusing on A items, businesses can ensure that they are properly managed and stocked. This helps to ensure that the business has the items it needs when it needs them.
 - It helps businesses save money. By focusing on the A items, businesses can save money by not wasting resources on managing and stocking unimportant items.
 - ABC analysis provides businesses with greater control over their inventory. By focusing on the A items, businesses can better manage their inventory levels and avoid stock outs.
 - It helps businesses make better decisions. By understanding which items are
-



more important, businesses can make better decisions about which items to stock and how to manage them.

Examples of ABC Analysis in Inventory Management

ABC Analysis can be used in a variety of ways in inventory management. For example, it can be used to prioritize inventory items for ordering. By focusing on the A items, businesses can ensure that they are always stocked and available. This helps to reduce stock outs and improve customer satisfaction.

ABC Analysis can also be used to prioritize inventory items for reordering. By focusing on the A items, businesses can ensure that they are always stocked and that their stock levels are not too low. This helps to reduce the risk of stock outs and improve customer satisfaction.

ABC Analysis can also be used to prioritize inventory items for replenishment.

4 Steps To Implement ABC Analysis

The four steps to successful ABC analysis are:

Gather Data:

The data to be analyzed should include the sales history, inventory levels, and cost of the items. This information will be used to determine which items are the most important.

Calculate the ABC Coefficients:

This is done by dividing the sales of each item by the total sales for the period being analyzed.

Classify the Items:

Items with the highest coefficients will be classified as -A|| items, items with the next highest coefficients will be classified as -B|| items, and items with the lowest coefficients will be classified as -C|| items.



Implement Controls:

The -A|| items should be monitored closely and managed carefully, the -B|| items should be monitored and managed on a regular basis, and the -C|| items should be monitored periodically.

Challenges in Using ABC Analysis

Most common challenges while using ABC Analysis are as follows:

Difficult to Implement:

The process requires detailed data on the items being analyzed, and it can be time-consuming to gather and analyze the data. Additionally, it can be difficult to determine which items should be classified as -A||, -B||, or -C||.



Doesn't Consider Demand Patterns:

This means that items may be classified as –All even if they do not have high demand. This can lead to inefficient inventory management and missed sales opportunities.

Seasonal Demand:

One of the main limitations of ABC Analysis is that it does not take into account seasonal demand. This means that items may be classified as –All even if they only have high demand during certain times of the year. This can lead to inefficient inventory management and missed sales opportunities.

Lead Times:

This means that items may be classified as –All even if they have long lead times. This can lead to inefficient inventory management and missed sales opportunities.

Illustration 1:

ABC Ltd. is a multiproduct company, manufacturing three products A,B, and C. The budgeted costs and production for the year ending 31st March, 2018 are as follows:

	A	B	C
Production quantity (Units)	4,000	3,000	1,600
Resources per Unit:			
- Direct Materials (Kg.)	4	6	3



- Direct Labour (Minutes)	30	45	60
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The budgeted direct labour rate was Rs.10 per hour, and the budgeted material cost was Rs.2 per kg. Production overheads were budgeted at Rs.99,450 and were absorbed to products using the direct labour hour rate. ABC Ltd. followed an Absorption Costing System.

ABC Ltd. is now considering to adopt an Activity Based Costing system. The following additional information is made available for this purpose.

1. Budgeted overheads were analysed into the following:

	Rs.
Material handling	29,100
Storage costs	31,200
Electricity	39,150

2. The Cost drivers identified were as follows:

Material handling	Weight of material handled
Storage Costs	Number of batches of material
Electricity	Number of Machine operations

3. Data on Cost Drivers was as follows:

	A	B	C
For Complete production:			
Batches of material	10	5	15
Per unit of products			
Number of Machine operations	6	3	2



You are requested to:

1. Prepare a statement for management showing the unit costs and total costs of each product using the absorption costing method.
2. Prepare a statement for management showing the product costs of each product using the ABC approach.
3. State what are the reasons for the different product costs under the two approaches?

Solution:

1. Traditional Absorption Costing

	A	B	C	Total
(a) Quantity (Units)	4,000	3,000	1,600	8,600
(b) Direct labour	30	45	60	-
(minutes)				
(c) Direct labour hours (a*b) / 60 minutes	2,000	2,250	1,600	5,850

Overhead rate per direct labour hour:

= Budgeted overheads + Budgeted labour hours

= Rs.99,450 + 5,850 hours

= Rs.17 per direct labour hour

Unit Costs:

	A (Rs.)	B (Rs.)	C (Rs.)
Direct Costs:			
Direct Labour	5.00	7.50	10.00
Direct Material	8.00	12.00	6.00
Production Overhead:			
	(17*30/60)	(17*45/60)	(17*60/60)
Total unit costs	21.50	32.25	33.00
Number of units	4,000	3,000	1,600
Total costs	86,000	96,750	52,850



2. Activity Based Costing

	A	B	C	Total
Quantity (units)	4,000	3,000	1,600	-
Weight per unit (kg.)	4	6	3	-
Total Weight	16,000	18,000	4,800	38,000
Machine operations per unit	6	3	2	-
Total Operations	24,000	9,000	3,200	36,200
Total batches of material	10	5	15	30

Material handling rate per kg. = Rs.29,000 / 38,800 kg. = Rs. 0.75 per kg.

Electricity rate per machine operations = Rs.39,150 / 36,200
= Rs. 1,082 per machine

operationsStorage rate per batch = Rs.31,200 / 30
batches

= Rs.1,040 per batch.

Unit Costs:

	A (Rs.)	B (Rs.)	C (Rs.)
Direct Costs:			
Direct Labour	5.00	7.50	10.00
Direct Material	8.00	12.00	6.00
Production Overheads:			
Material Handling	3.00	4.50	2.25
	(Rs.0.75*4)	(Rs.0.75*6)	(Rs.0.75*3)
Electricity	6.49	3.25	2.16
	(Rs.1.082*6)	(Rs.1.082*3)	(Rs.1.082*2)
Storage	2.60	1.73	9.75
	(Rs.10*Rs.1,040/4000)	(Rs.5*Rs.1,040/4000)	(Rs.15*Rs.1,040/4000)
Total unit costs	25.09	28.98	30.16
Number of units	4,000	3,000	1,600
Total Costs	Rs.1,00,360	Rs.86,940	Rs.48,256



3. Comments: The difference in the total costs under the two systems is due to the difference in the overheads borne by each of the products. The Activity Based Costs appear to be more precise.



Unit-V

Multinational Capital Budgeting

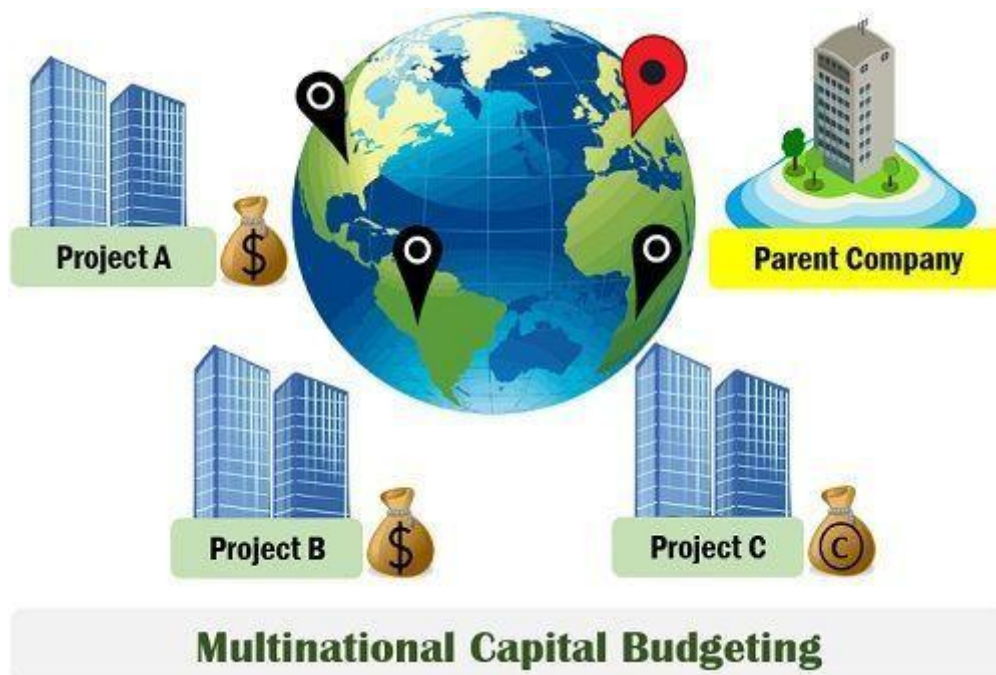
Capital budgeting is a process that businesses use to evaluate potential major projects or investments. Building a new plant or taking a large stake in an outside venture are examples of initiatives that typically require capital budgeting before they are approved or rejected by management.

As part of capital budgeting, a company might assess a prospective project's lifetime cash inflows and outflows to determine whether the potential returns it would generate meet a sufficient target benchmark. The capital budgeting process is also known as investment appraisal.

Definition:

Multinational Capital Budgeting (MCB) is the decision-making process wherein financial managers evaluate long-term projects based on foreign lands worthy of investment.

Multinational companies (MNCs) aspire to invest outside their geographical boundaries. This is because they want to make the best use of their valuable resources.



Thus, Multinational co-operations evaluate international projects using capital budgeting.

The parent companies can invest in capital assets or projects in foreign countries. In addition, they can set up their production units in economic locations.

MNCs are concerned about the potential cash inflow and outflow generated from investments. MCB helps them in finding the *most profitable investment* among various options.

For evaluation, the managers make use of capital budgeting techniques. Also, it includes the estimation of **Annual Cash Flows** and **Salvage Value**.

Post evaluation, the positive cash flow signifies that the project is acceptable. Whereas, a negative cash flow depicts the project's inability to generate enough funds.



MCB process is critical as it involves the financial evaluation of the proposed investment projects. And, the generated net cash flow of parent and subsidiary companies varies.

Objective

The objective behind any investment is to earn maximum return on investments.

- ❖ *MNCs invest in projects in different countries to earn lucrative returns.* In addition, it focuses on maximizing its shareholder's wealth and finding profitable projects.
- ❖ Consequently, it allocates resources like capital and management skills to the subsidiary company.

Working of Capital Budgeting

Ideally, businesses could pursue any and all projects and opportunities that might enhance shareholder value and profit. However, because the amount of capital any business has available for new projects is limited, management often uses capital budgeting techniques to determine which projects will yield the best return over an applicable period.

Although there are a number of capital budgeting methods, three of the most common ones are discounted cash flow, payback analysis, and throughput analysis.



Discounted Cash Flow Analysis

Discounted cash flow (DCF) analysis looks at the initial cash outflow needed to fund a project, the mix of cash inflows in the form of revenue, and other future outflows in the form of maintenance and other costs.

These cash flows, except for the initial outflow, are discounted back to the present date. The resulting number from the DCF analysis is the net present value (NPV). The cash flows are discounted since present value assumes that a particular amount of money today is worth more than the same amount in the future, due to inflation.

In any project decision, there is an opportunity cost, meaning the return that the company would have received had it pursued a different project instead. In other words, the cash inflows or revenue from the project need to be enough to account for the costs, both initial and ongoing, but also to exceed any opportunity costs.

With present value, the future cash flows are discounted by the risk-free rate such as the rate on a U.S. Treasury bond, which is guaranteed by the U.S. government, making it as safe as it gets. The future cash flows are discounted by the risk-free rate (or discount rate) because the project needs to at least earn that amount; otherwise, it wouldn't be worth pursuing.

In addition, a company might borrow money to finance a project and, as a result, must earn at least enough revenue to cover the financing costs, known as the cost of capital. Publicly traded companies might use a combination of debt—such as bonds or a bank credit facility—and equity, by issuing more shares of stock. ~~The cost of capital is usually a weighted average of both equity and debt.~~



The goal is to calculate the hurdle rate or the minimum amount that the project needs to earn from its cash inflows to cover the costs. To proceed with a project, the company will want to have a reasonable expectation that its rate of return will exceed the hurdle rate.

Project managers can use the DCF model to decide which of several competing projects is likely to be more profitable and worth pursuing. Projects with the highest NPV should generally rank over others. However, project managers must also consider any risks involved in pursuing one project versus another.

Payback Analysis

Payback analysis is the simplest form of capital budgeting analysis, but it's also the least accurate. It is still widely used because it's quick and can give managers a "back of the envelope" understanding of the real value of a proposed project.

Payback analysis calculates how long it will take to recoup the costs of an investment. The payback period is identified by dividing the initial investment in the project by the average yearly cash inflow that the project will generate. For example, if it costs Rs.400,000 for the initial cash outlay, and the project generates Rs.100,000 per year in revenue, it will take four years to recoup the investment.

Payback analysis is usually used when companies have only a limited amount of funds (or liquidity) to invest in a project, and therefore need to know how quickly they can get back their investment. The project with the shortest payback period would likely be chosen. However, the payback method has some limitations, one of them being that it ignores the opportunity cost.



Also, payback analysis doesn't typically include any cash flows near the end of the project's life. For example, if a project that's being considered involves buying factory equipment, the cash flows or revenue generated from that equipment would be considered but not the equipment's salvage value at the conclusion of the project. As a result, payback analysis is not considered a true measure of how profitable a project is, but instead provides a rough estimate of how quickly an initial investment can be recouped.

Throughput Analysis

Throughput analysis is the most complicated method of capital budgeting analysis, but it's also the most accurate in helping managers decide which projects to pursue. Under this method, the entire company is considered as a single profit-generating system. Throughput is measured as an amount of material passing through that system.

The analysis assumes that nearly all costs are operating expenses, that a company needs to maximize the throughput of the entire system to pay for expenses, and that the way to maximize profits is to maximize the throughput passing through a bottleneck operation. A bottleneck is the resource in the system that requires the longest time in operations. This means that managers should always place a higher priority on capital budgeting projects that will increase throughput or flow passing through the bottleneck.

Factors affecting Multinational Capital Budgeting



Following are the major factors that affect multinational capital budgeting:

- Exchange Rate Fluctuations
- Inflation
- Financial Arrangement
- Blocked Funds
- Uncertain salvage value
- Present Cash flow
- Host Government Incentives
- Real Options

Importance

It is essential to perform capital budgeting before investing in long-term foreign projects. This is because the capital investment is huge, and the decision is not easily reversible.

There are several risks attached to international projects:

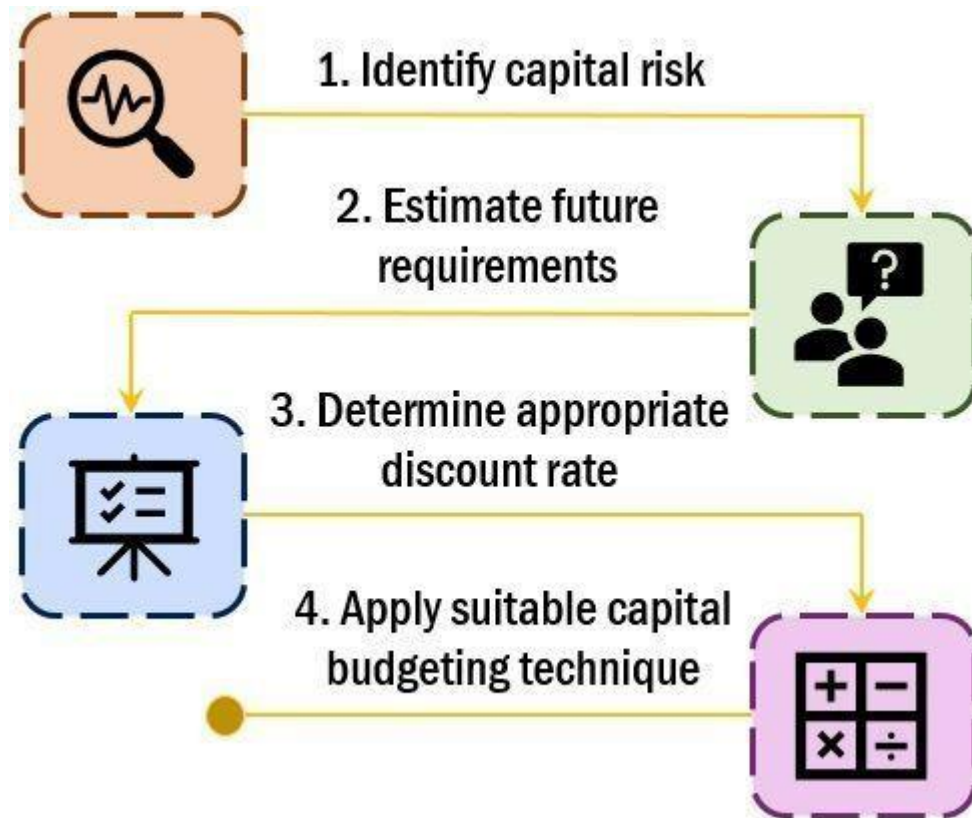
1. Political Risks
2. Economical Risks
3. Financial Risks
4. Market Risks

However, financial managers can adjust these risks with the help of **Sensitivity Analysis**.

Steps



The process of multinational capital budgeting is similar to that of capital budgeting. However, the capital budgeting process for international companies is complex compared to home countries.



The steps involved in the process are as follows:

Step: 1 Identify the capital risk

Find out the amount of initial capital invested in the project.

Step: 2 Estimate the future cash flows

Compute the expected cash flow generated by the project in the future.

Step: 3 Determine the appropriate discount



rate Identify the discounting rate that will help estimate the present value of future cashflows.

Step: 4 Apply suitable capital budgeting techniques & decision criteria Evaluate the projects using appropriate capital budgeting techniques like NPV and IRR. Post-evaluation decide – whether to accept or reject the project. **Inputs for Multinational Capital Budgeting**

The financial manager has to make forecasts about the components given below. These components are the input for the multinational capital budgeting process.



- **Initial Investment:** It is the amount to be invested in the potential project. Besides, the financial manager must consider the additional funds required until sufficient cash inflow is generated.
- **Price and Consumer Demand:** The projections about the product price and expected lifetime of the project are required. For this purpose, managers can analyze the competitive products in the



market. In addition, forecasts about current and future consumer demand are also essential.

- **Cost:** Cost is the most important aspect that needs to be projected. In order to make accurate projections, the future inflation of the host country is considered.
- **Tax Laws:** The tax laws of the parent and host country vary. Therefore, it is vital to acknowledge the prevailing tax policies beforehand.
- **Remitted Funds:** Finance managers also learn and foresee the norms regarding remittance. Moreover, they assess future changes in the norms as it affects the parent company's net cash flows. The norms may change due to economic reasons.
- **Exchange Rates:** The fluctuations in the exchange rate impact multinational projects. But, making forecasts about these rates is quite challenging.
- **Salvage/Liquidation Value:** It is hard to assess the liquidation value of multinational projects during capital budgeting. The lifetime of the projects varies and depends on a variety of factors.
- **Required Rate of Return:** Based on the projected cash flow of the proposed project, estimate the required rate of return.

Techniques of MCB

The decision is based on the acceptance and rejection criteria. The methods consider the discounted cash flow at an appropriate discounted rate. **Net Present Value (NPV)**



It is the variance between the present cash outflows and the present value of expected future cash inflows.

Formula:

$$NPV = \sum_{t=1}^n \frac{A_t}{(1+k)^t} - IO$$

Where,

A_t represents cash inflow k is

Decision Criterion

Accept: When the Net Present Value is greater than zero. It depicts the positive cash flows.

Reject: When the Net Present Value is less than zero. It depicts the negative cashflows.

Example 1: An investor made an investment of Rs.500 in property and gets back Rs.570 the next year. If the rate of return is 10%. Calculate the net present value.

Solution:

Given:

Amount invested = Rs.500



Money received after a

year = Rs.570

Rate of return = 10% = 0.1

Using net present value formula,

Present value, $PV = \frac{\text{cash value at time period}}{(1 + \text{rate of return})^{\text{time period}}}$

$PV =$

$\frac{Rs.570}{(1+0.1)^1}$

$PV = Rs.518.18$

$PV = Rs.518.18$

Net Present Value = $Rs.518.18 - Rs.500.00 = Rs.18.18$

Therefore, for 10% rate of return, investment has NPV = Rs.18.18.

Example 2: Sam bought a house for Rs.750,000 and sells it a year later for Rs.990,000, after deducting any realtor's fees and taxes. Calculate net present value, if the rate of return is 5%.

Solution:

Given:

Investment on buying the house =

Rs.750,000

Money received from sale a

year later = Rs.990,000

Rate of return =

5% = 0.05

Using net present value formula,

Present value, $PV = \frac{\text{cash value at time period}}{(1 + \text{rate of return})^{\text{time period}}}$



PV =

Rs.990,000(1+0.05)¹Rs.990,000(1+0.05

)¹PV = Rs.990,000/1.05

PV = Rs.942,857.143

Net Present Value = Rs.942,857.143 – Rs.750,000 = Rs.192,857.143

Therefore, for 5% rate of return, investment has NPV = Rs.192,857.143

Example 3: If the rate of return is 5%, what would be the net present value of a box of fruits with the price at Rs.20,000 and a year later it costs Rs.45,000.

Solution: Given,

Current price of box =

Rs.20,000 Year later =

Rs.45,000

Rate of return = 5% = 0.05

Using the net present value formula,

Present value, PV = cash value at time period / (1+rate of return)^{time period}
cash value at time period / (1+rate of return)^{time period}

PV =

45000 / (1 +

0.05)¹ PV =



42857.15

Net present value = 42857.15 - 20,000 = 22857.15

Therefore, the net present value is Rs.22857.15

Internal Rate of Return (IRR)

It is the discount rate at which the present value of the expected after-tax cashinflow equals the present value of the after-tax outflows.

It is the discount rate that sets the NPV equal to zero.

Formula:

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

Decision Criterion

Accept: When IRR is greater than the Required Rate of Return.

Reject: When IRR is less than the Required Rate of Return.

Profitability Index (Cost-Benefit Analysis)

It is the ratio between the present value of the future cash flows and the initialoutlay.

Formula:



$$PI = \frac{\sum_{t=1}^n \frac{A_t}{(1+k)^t}}{-IO}$$

Decision Criterion

Accept: When the profitability index is greater than 1.

Reject: When the profitability index is less than 1.

Discounted Payback Period:

Illustration 1:

Example The ABC company is planning to purchase a machine known as machine X. Machine X would cost Rs.25,000 and would have a useful life of 10 years with zero salvage value. The expected annual cash inflow of the machine is Rs.10,000. Compute payback period of machine X and conclude whether or not the machine would be purchased if the maximum desired payback period of ABC company is 3 years.

Solution

Since the annual cash inflow is even in this project, we can simply divide the initial investment by the annual cash inflow to compute the payback period. It is shown below: Payback period = Rs.25,000/Rs.10,000 = 2.5 years

According to payback period analysis, the purchase of machine X



is desirable because its payback period is 2.5 years which is shorter than the maximum payback period of the company.

Illustration 2:

SK Manufacturing Company uses discounted payback period to evaluate investments in capital assets. The company expects the following annual cashflows from an investment of Rs.3,500,000:

<u>Years</u>	<u>Cash flows</u>
0	(3,500,000)
1	900,000
2	900,000
3	900,000
4	900,000
5	900,000
6	900,000
7	900,000
8	900,000

No salvage/residual value is expected. The company's cost of capital is 12%.

Required:

1. Compute discounted payback period of the investment.
2. Is the investment desirable if the required payback period is 4 years or less.

Solution:

(1) Computation of discounted payback period:

Discounted payback method is a variant of simple payback method. It simply incorporates the concept of time value of money into the simple payback method. Under this approach, we first discount all the cash



flows involved and then ask how long it will take for the discounted cash flows to equal the initial investment. See the computations below:

Initial investment: 3,500,000				
Year	Cash inflow	Present value factor (12%)	Present value of cash inflows	Cumulative cash inflow
1	\$ 900,000	*0.893	803,700	803,700
2	900,000	0.797	717,300	1,521,000
3	900,000	0.712	640,800	2,161,800
4	900,000	0.636	572,400	2,734,200
5	900,000	0.567	510,300	3,244,500
6	900,000	0.507	456,300	3,700,800
7	900,000	0.452	406,800	4,107,600
8	900,000	0.404	363,600	4,471,200

Discounted payback period = Years before full recovery +
(Unrecovered cost at start of the year/Cash flow during the year)

$$= 5 + (**Rs.255,500/Rs.456,300)$$

$$= 5 + 0.56$$

$$= 5.56 \text{ years}$$

*Value from –present value of Rs.1 table–.

**Unrecovered cost at start of 6th year = Initial cost – Cumulative cash inflow at the end of 5th year



= Rs.3,500,000 – Rs.3,244,500

= Rs.255,500.

Conclusion:

Because the discounted payback period is longer than 4-year period, this investment is not desirable.

Illustration 3:

Due to increased demand, the management of XYZ Beverage Company is considering to purchase a new equipment to increase the production and revenues. The useful life of the equipment is 10 years and the company's maximum desired payback period is 4 years. The inflow and outflow of cash associated with the new equipment is given below: Initial cost of equipment: Rs.37,500

Annual cash inflows: Sales: Rs.75,000

Annual cash Outflows:

Cost of ingredients: Rs.45,000

Salaries expenses: Rs.13,500

Maintenance expenses: Rs.1,500

Should XYZ Beverage Company purchase the new equipment? Use payback method for your answer.

Solution:

Step 1: In order to compute the payback period of the equipment, we need to work out the net annual cash inflow by deducting the total of cash outflow from the total of cash



inflow associated with the equipment.

Computation of net annual cash inflow:

$$\text{Rs.75,000} - (\text{Rs.45,000} + \text{Rs.13,500} + \text{Rs.1,500}) = \text{Rs.15,000}$$

Step 2:

Now, the amount of investment required to purchase the equipment would be divided by the amount of net annual cash inflow (computed in step 1) to find the payback period of the equipment.

$$= \text{Rs.37,500} / \text{Rs.15,000}$$

$$= 2.5 \text{ years}$$

According to payback method, the equipment should be purchased because the payback period of the equipment is 2.5 years which is shorter than the maximum desired payback period of 4 years.

Illustration 4:

The management of ABC company wants to reduce its labor cost by installing a new machine. Two types of machines are available in the market – machine X and machine Y. Machine X would cost Rs.18,000 where as machine Y would cost Rs.15,000. Both the machines can reduce annual labor cost by Rs.3,000. Which is the best machine to purchase according to payback method?

Solution:

$$\text{Payback period of machine X: } \text{Rs.18,000} / \text{Rs.3,000} = 6 \text{ years}$$

$$\text{Payback period of machine y: } \text{Rs.15,000} / \text{Rs.3,000} = 5 \text{ years}$$

According to payback method, machine Y is more desirable



than machine X because it has a shorter payback period than machine X.

Illustration 5:

Original investment Rs.15,000; annual cash in flow Rs.7,500.

Solution:

$$\begin{aligned} \text{Payback Period} &= \text{Investment} / \text{Annual Cash flow} \\ &= 15000 / 7500 \end{aligned}$$

Payback Period = Rs.2 years.

Illustration 6:

A project cost of Rs.5,00,000 and yield annual a profit of Rs.80,000 after depreciation @ 12 % p.a but before tax 50%. Calculate payback period.

Solution:

Annual Cash Inflow

Particulars	Project
Profit before taxation & after depreciation	80,000
(-) Taxation (80,000 * 50/100)	40,000 -----
Profit after taxation & Depreciation	40,000
(-) Depreciation (5,00,000*12/100)	60,000 -----
Annual Cash flow	1,00,000

$$\text{Payback Period} = 5,00,000 / 1,00,000 = 5 \text{ Years.}$$



Illustration 7:

A Project requires an initial investment Rs.20,000 and the annual inflow 5 years are Rs.8,000, Rs.7,000, Rs.5,000, Rs.6,000 and Rs.4,000 respectively. Calculate the payback period.

Solution:

Year	Cash inflow	Cumulative Cash inflow
1	8,000	8,000
2	7,000	15,000
3	5,000	20,000
4	6,000	26,000
5	4,000	30,000

Initial Amount = Rs.20,000

Payback Period = 3 years.

Illustration 8:

Calculate payback period for a project require a cash outlay Rs.10,000 and generate cash inflows of Rs.2,000, Rs.4,000, Rs.3,000 and Rs.2,000 in the 1st, 2nd, 3rd and 4th year respectively.

Solution:

Year	Cash inflow	Cumulative Cash inflow
1	2,000	2,000
2	4,000	6,000
3	3,000	9,000
4	2,000	11,000

Payback Period = 3 years and 6 months



3 years = 9,000

Initial Amount = Rs.10,000

Remaining 1000 in 4th year = $1000/2000 \times 12 = 6$.

Therefore, Payback period = 3 years and 6 months.

Difficulties in MCB

Some difficulties faced by multinational corporations during capital budgeting areas follows:

1. Administrative Environment:

The taxation and government policies affect the cash flows of both parent and subsidiary companies. Thereby, creating a significant difference between the net cash flows of the parent and subsidiary.

2. Financing Method:

The parent company's decisions regarding the new project financing affect its cash flows. So, the financing decision and cash flows are considered together.

3. Inflation Rates:

Managers must consider the inflation rates of host and parent companies to ascertain the actual rate of return. As the inflations impact the market conditions and competition.

4. Exchange Rates:



Like inflation, exchange rates also affect the future cash flows of the MNC. The exchange rate changes impact the currencies of the parent and host country.

5. Subsidized Loans:

It increases the complexity of capital structure and the calculation of the weighted average cost of capital.

6. Political Risk:

The host country's political environment affects the parent company's cashflows.

Profitability Index

Profitability index (PI), also known as profit investment ratio (PIR) and value investment ratio (VIR), is the ratio of payoff to investment of a proposed project. It is a useful tool for ranking projects because it allows you to quantify the amount of value created per unit of investment.

Profitability index is an investment appraisal technique calculated by dividing the present value of future cash flows of a project by the initial investment required for the project.

Formula:



Profitability Index

= Present Value of Future Cash Flows/ Initial Investment Required

= 1 + Net Present Value / Initial

Investment Required Explanation:

Profitability index is actually a modification of the net present value method. While present value is an absolute measure (i.e. it gives as the total dollar figure for a project), the profitability index is a relative measure (i.e. it gives as the figure as a ratio).

Decision Rule

Rules for selection or rejection of a project:

. If $PI > 1$ then accept the project

. If $PI < 1$ then reject the project

Profitability index is sometimes called benefit-cost ratio too and is useful in capital rationing since it helps in ranking projects based on their per dollar return.

Example 1:

Company C is undertaking a project at a cost of N50 million which is



expected to generate future net cash flows with a present value of N65 million. Calculate the profitability index.

Solution

Profitability Index = PV of Future Net Cash Flows / Initial

Investment Required Profitability Index = N65M / N50M = 1.3

Net Present Value = PV of Net Future Cash Flows – Initial

Investment Required Net Present Value = N65M - N50M = N15M.

The information about NPV and initial investment can be used to calculate profitability index as follows: Profitability Index = 1 + (Net Present Value / Initial Investment Required)

Profitability Index = 1 + N15M/N50M = 1.3

Example 2:

- Investment = N 40,000
- Life of the

Machine = 5 Years CFAT

Year	CFAT
1	18000



2	12000
3	10000
4	9000
5	6000

Calculate Net present value at

10% and PI:Solution:

Year	CFAT	PV@10%	PV
1	18,000	0.909	16362
2	12,000	0.827	9924
3	10,000	0.752	7520
4	9,000	0.683	6147
5	6,000	0.621	3726
	Total Present Value		43679
	(-) Investment		40000
	NPV		3679

$PI = 43679/40000 = 1.091 > 1 \Rightarrow$ Accept the project

Capital Rationing:



Capital rationing is defined as the process of placing a limit on the extent of new projects or investments that a company decides to undertake. This is made possible by placing a much higher cost of capital for the consideration of the investments or by placing a ceiling on a particular proportion of a budget.

A company might intend to implement capital rationing in scenarios where the past revenues generated through investments were not up to the mark.

Meaning:

Rationing is the process of allocating scarce resources on the basis of priority based on certain criterion.

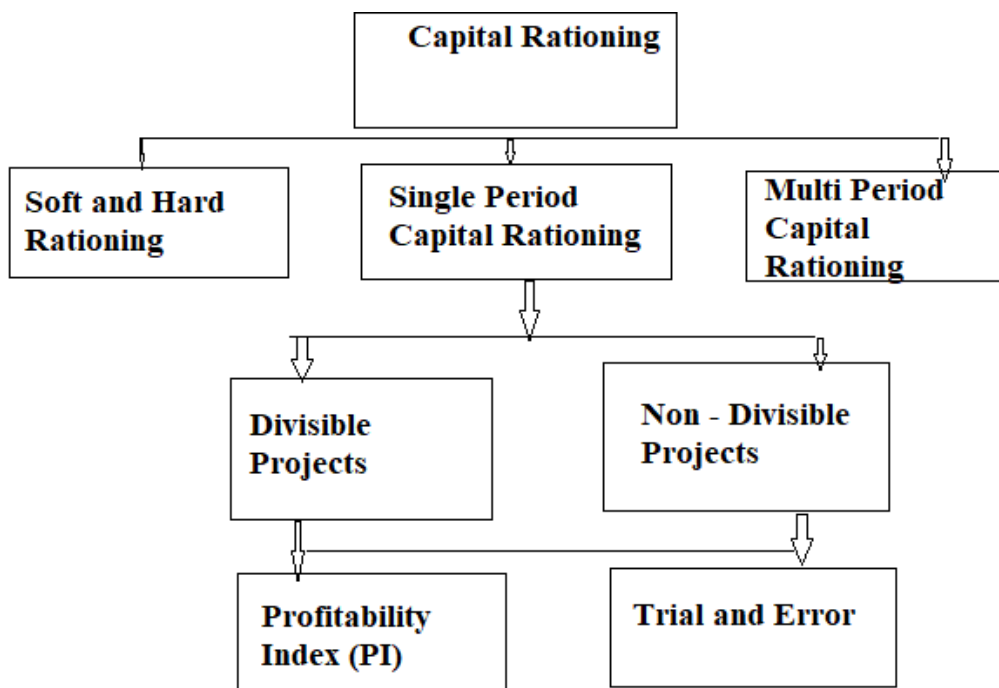
It is a situation when the company cannot undertake all investment projects with positive NPV.

Consider the following situation:

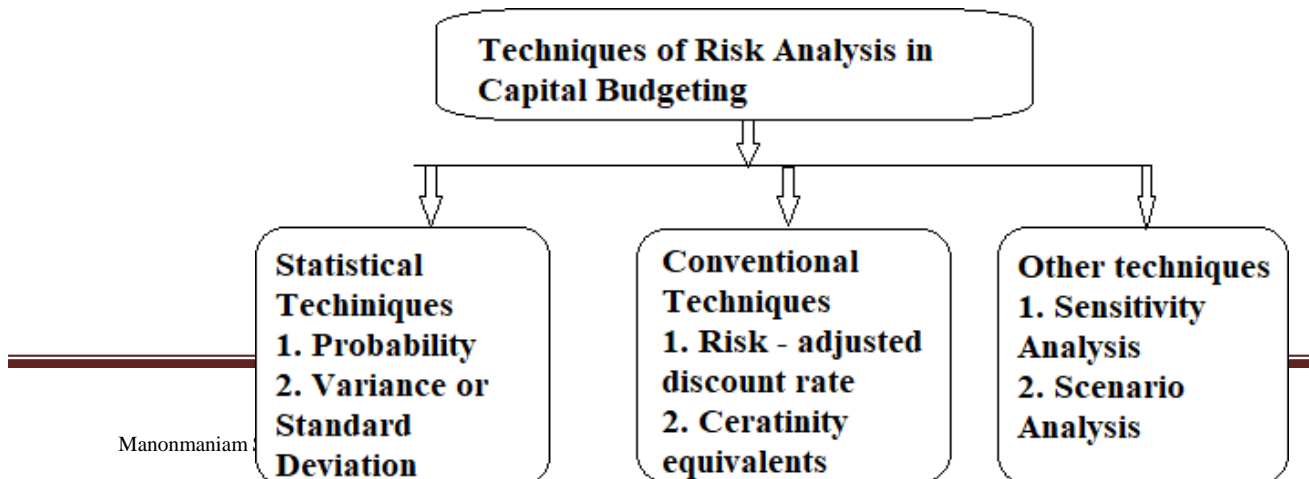
- No problem if the company has sufficient funds
- Suppose, the firm has only Rs.200 lakhs; the firm cannot invest in or undertake all projects which have positive NPV or IRR above the cost of capital.



- In this case the firm has to reject project “B” – a profitable investment project due to lack or insufficiency of capital
- Further, cannot maximize the wealth
- Such a situation warrants capital rationing.



Risk Analysis in Capital Budgeting:





The capital budgeting techniques, we have assumed that the investment proposals do not involve any risk and cash flows of the project are known with certainty. This assumption was taken to simplify the understanding of the capital budgeting techniques. However, in practice, this assumption is not correct. Infact, investment projects are exposed to various degrees of risk. There can be three types of decision making.

- (i) Decision making under Certainty: When cash flows are certain
- (ii) Decision making involving risk: when cash flows involve risk and probability can be assigned.
- (iii) Decision making under Uncertainty: when the cash flows are uncertain and probability cannot be assigned.

Reasons for adjustments of Risk in Capital Budgeting decisions

Main reasons for considering risk capital budgeting decisions are as follows

1. There is an opportunity cost involved while investing in a



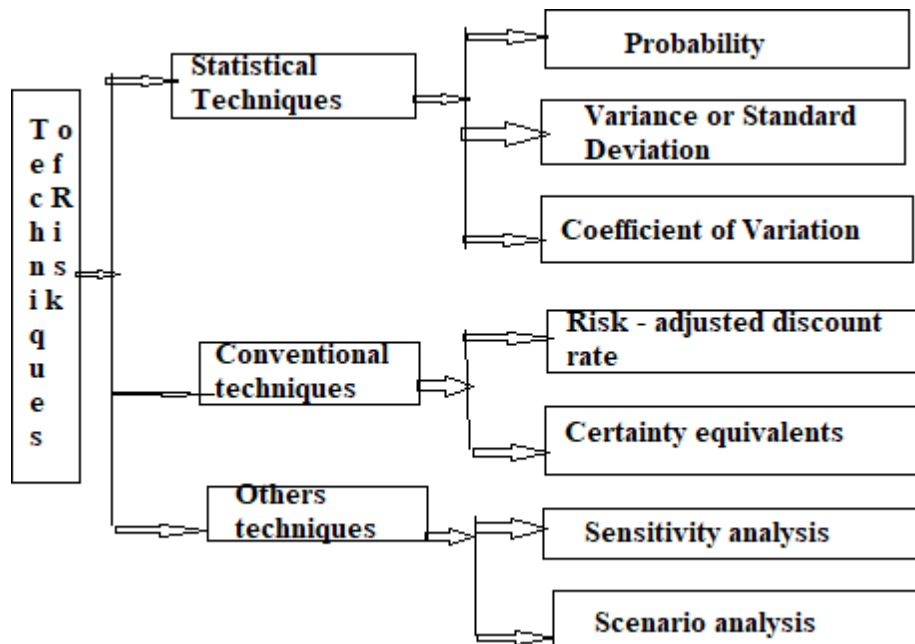
project for the level of risk. Adjustment of risk is necessary to help make the decision as to whether the returns out of the project are proportionate with the risks borne and whether it is worth investing in the project over the other investment options available.

2. Risk adjustment is required to know the real value of the Cash inflows.

Higher risk will lead to higher risk premium and also expectation of higher return.

Techniques of Risk Analysis in Capital Budgeting

Techniques of risk analysis in capital budgeting can be classified as below:



Probability



Meaning: Probability is a measure about the **chances** that an event will occur. When an event is certain to occur, probability will be 1 and when there is no chance of happening an event probability will be 0.

Example:

Assumption	CashFlows	Probability
Best guess	3,00,000	0.3
High guess	2,00,000	0.6
Low guess	1,20,000	0.1

In the above example chances that cash flow will be 3,00,000, 2,00,00 and 1,00,00 are 30%,60% and 10% respectively.

(i) **Expected Net CashFlows**

Expected Cash flows are calculated as the **sum of the likely Cash flows** of the Project multiplied by the probability of cash flows.

Expected Cash flows are calculated as below:

$$E(R)/ENCf = ENCf = \sum^n NCF \times P_i$$



Where, $E(R)/ENCF$ = Expected Cashflows P_i = Probability

of Cashflow

NCF_i = Cash flows

Example:

Assumption(1)	Cash Flows (₹) (2)	Probability (3)	Expected cash flow (2×3) (₹)
Best guess	3,00,000	0.3	$3,00,000 \times 0.3 = 90,000$
High guess	2,00,000	0.6	$2,00,000 \times 0.6 = 1,20,000$
Low guess	1,20,000	0.1	$1,20,000 \times 0.1 = 12,000$
Expected Net cash flow(ENCF)			2,22,000

(i) **Expected Net Present Value**

(ii) **Expected net present value = Sum of present value so**

$$ENPV = \sum_{t=1}^n \frac{ENCF}{(1+k)^t}$$

f expected net cashflows

Where, ENPV is the expected net present value, ENCF, expected net cash flows (including both inflows and outflows) in period t and k is



the discount rate.

(a) **Expected Net Present Value –**

Single period ILLUSTRATION 1

Possible net cash flows of Projects A and B at the end of first year and their probabilities are given as below. Discount rate is 10 per cent. For both the project initial investment is Rs.10,000. From the following information,

CALCULATE the expected net present value for each project. State which project is preferable?

Possible Event	Project A		Project B	
	CashFlow(Rs.)	Probability	CashFlow(Rs.)	Probability
A	8,000	0.10	24,000	0.10
B	10,000	0.20	20,000	0.15
C	12,000	0.40	16,000	0.50
D	14,000	0.20	12,000	0.15
E	16,000	0.10	8,000	0.10

Solution:

Calculation of Expected Value for Project A and Project B

Possible Event	Project A			Project B		
	Net Cash Flow (Rs.)	Probability	Expected Value (Rs.)	Cash Flow (Rs.)	Probability	Expected Value (Rs.)
A	8,000	0.10	800	24,000	0.10	2,400
B	10,000	0.20	2,000	20,000	0.15	3,000



C	12,000	0.40	4,800	16,000	0.50	8,000
D	14,000	0.20	2,800	12,000	0.15	1,800
E	16,000	0.10	1,600	8,000	0.10	800
ENCF			12,000			16,000

The net present value for Project A is $(0.909 \times \text{Rs.}12,000 - \text{Rs.}10,000) = \text{Rs.}908$
 The net present value for Project B is $(0.909 \times \text{Rs.}16,000 - \text{Rs.}10,000) = \text{Rs.}4,544$.

ILLUSTRATION 2

Probabilities for net cash flows for 3 years of project t areas follow:

Year1		Year2		Year3	
Cash Flow (Rs.)	Probability	Cash Flow (Rs.)	Probability	Cash Flow (Rs.)	Probability
2,000	0.1	2,000	0.2	2,000	0.3
4,000	0.2	4,000	0.3	4,000	0.4
6,000	0.3	6,000	0.4	6,000	0.2
8,000	0.4	8,000	0.1	8,000	0.1

CALCULATE the expected net cash flows. Also calculate net present value of the project t using expected cash flows using 10 percent discount rate. Initial Investment is Rs. 10,000.

Solution:

Year1			Year2			Year3		
Cash Flow	Probability	Expected Value	Cash Flow	Probability	Expected Value	Cash Flow	Probability	Expected Value



2,000	0.1	200	2,000	0.2	400	2,000	0.3	600
4,000	0.2	800	4,000	0.3	1200	4,000	0.4	1,600
6,000	0.3	1,800	6,000	0.4	2400	6,000	0.2	1,200
8,000	0.4	3,200	8,000	0.1	800	8,000	0.1	800
ENCF		6,000			4,800			4,200

The present value of the expected value of cash flow at 10 percent discount rate has been determined as follows:

$$\begin{aligned}
 &= \frac{6,000}{(1.1)} + \frac{4,800}{(1.1)^2} + \frac{4,200}{(1.1)^3} \\
 &= (6,000 \times 0.909) + (4,800 \times 0.826) + (4,200 \times 0.751) \\
 &= 12,573
 \end{aligned}$$

Expected Net Present value = Present Value of cash flow – Initial Investment
 = Rs.12,573 – Rs.10,000 = Rs.2,573.