UNIT 5: INVESTMENT DECISIONS

5.0 AIMS AND OBJECTIVES

This unit aims at presenting the meaning, importance, need, types and various methods of project appraisals.

After finishing this unit, you will be able to:

- ☞ understand the meaning of long-term investment
- ☞ explain the need of capital decision
- ☞ list out the methods of capital budgeting
- ☞ identify the major required steps to appraise a project.

5.1 INTRODUCTION

You have learned in unit 2, that one of the important functions of financial management is investment decisions. The success of a business unit depends upon the investment of resource in such a way that bring in benefits or best possible returns from any investment. The investment in general means an expenditure in cash or its equivalent during one or more time periods in anticipation of enjoying a net cash inflows or its equivalent in some future time period or periods.

The investment in any project will bring in desired profits or benefits in future. If the financial resources were in abundance, it would be possible to accept several investment proposals which satisfy the norms of approval or acceptability. Since, we are sure that resources are limited, a choice has to be made among the various investment proposals by evaluating their comparative merit. This would help us to select the relatively superior proposals keeping in view the limited available resources. For this purpose, we have to develop some evaluating techniques for the appraisal of investment proposals.

5.2 IMPORTANCE OF INVESTMENT DECISIONS

The terms in financial management like investment decisions, investment projects, and investment proposals are generally associated with application of long-term resources. What is long-term? There is no hard and fast rule to define it, but by common practice and accordance with the financing policies, practices and regulations of the financial institutions and banks a

period of ten years and above may be treated as long period. The decisions related to long-term investment is also known as capital budgeting techniques. It is important because of the following reasons:

1) The investment decisions are the vehicles of a company to reach the desired destiny of the company. An appropriate decision would yield spectacular results whereas a wrong decision may upset the whole financial plan and endanger the very survival of the firm. Even firm may be forced into bankruptcy.
2) Capital budgeting techniques involve huge amounts of funds and imply permanent commitment. Once you invest in the form of fixed assets it is not easy to reverse the decision unless you incur heavy loss.
3) A capital expenditure decision has its effect over a long period of time span and inevitably affects the company's future cost.
4) Investment decision are among the firm's most difficult decisions. They are the predictors of future events which are difficult to predict. It is a complex problem investment. The cash flow uncertainty is caused by economic, political, social and technological forces.

5.3 TYPES OF INVESTMENT PROPOSALS

The long-term funds are required for the following purposes:

Expansion: A company adds capacity to its existing product lines to expand existing operations. For example, a manufacturing unit producing one hundred thousand units per year. If it intends to double the output by two hundred thousands, this will obviously increase the need for funds for acquiring fixed and current assets.

Diversification: Some times the management of a company may decide to add new product line to the existing product lines. Philips, a famous company for radio and electric bulbs etc. diversified into production of other electrical appliances and television sets.

Replacements: Machines used in production may either wear out or may be rendered obsolete on account of new technology. The productive capacity of the enterprise and its competitive ability may be adversely affected. Extra funds are required for modernization or renovation of the entire plant. The investment obviously is going to be long terms.

Research and Development: There has been an increased realization that the efficiency of production and the total operations can be improved by application of new and more sophisticated techniques of production and management. To acquire the technology huge funds are needed.

The useful way of classifying investments is as under

1. Accept - Reject Decisions
2. Mutually Exclusive Decisions
3. Capital Rationing

I. Accept-Reject Decisions

Under this, if a project is accepted, the firm is going to invest, otherwise it is not going to invest its funds. In general, the project proposals that yield a rate of return greater than the certain required rate of return or cost of capital are accepted and others are rejected. By applying this criteria more than one independent projects are accepted subject to availability of funds. Various appraisal techniques are used to evaluate each project.

Mutually Exclusive Decisions

These are the projects which compete with each other in such a way that the acceptance of one will exclude the acceptance of the other one. The alternatives are mutually exclusive one may be chosen.

II. Capital Rationing

We are aware that the financial resources are limited. But, a large number of investment proposals compete for those limited funds. The firm, therefore ration them. The firm allocates funds to projects in a manner that it maximizes long-run returns. Thus, capital rationing refers to the situation in which the firm has more acceptable investments, requiring a greater amount of finance than is available with the firm. It is concerned with the selection of a group of investment proposals out of making investment proposals acceptable under the accept-reject decision. The projects are ranked as per their merits of acceptance basing on certain predetermined criteria.

5.4 DATA REQUIRED FOR INVESTMENT DECISIONS

Initial Investment: The total amount of cash required to buy various assets like land, buildings, plant, machinery, equipment, etc and there installation expenses have to be estimated. In addition to fixed cost, the cost of maintaining stocks, contingency reserves to cover the cost of supporting the additional receivables. Benefit of credit from suppliers will have the effect of reducing the quantum of additional working capital required.

Subsequent Investment: The cost of maintenance, replacement and updating are to be treated as outflows during the period in which they are expected to be incurred.

Economic Life of the project:

The economic life of a project is to be distinguished from the life of an individual assets. The building may have life of fifty years, plant may have ten years, and some equipments may have five years only. The economic life of the project is determined by the duration of the "earnings flow" generated by the project.

The economic life may end:

a) The cost of replacement becomes uneconomical in relation to the likely benefits.
b) When the viability is adversely affected due to obsolescence.
c) When maintenance costs exceed the disposable value, and
d) When the development of new technology necessitates new investment

Salvage Values:

Some times the plant assets may have value for the enterprise at the end of the life of the project or there may be some anticipated sales value of the plant. Such amount is to be treated as an inflow at the end of the life of the project.

Annual Cash Flows:

The calculation of annual cash flows in investment appraisal plays a key role.

5.5 PROJECT APPRAISAL METHODS

There are two important methods of evaluating the investment proposals

Traditional methods

- Pay back period
- Accounting rate of return

Discounted cash flow method

- Net present value
- Profitability Index method / Benefit cost Ratio
- Internal Rate of Return

Pay Back Period:

This is one of the widely used methods for evaluating the investment proposals. Under this method the focus is on the recovery of original investment at the earliest possible. It determines the number of years to recoup the original cash out flow, disregarding the salvage value and interest. This method do not take into account the cash inflows that are received after the pay back period. There are two methods in use to calculate the pay back period

1) Where annual cash flows are not consistent vary form year to year 2) Where the annual cash flow are uniform

1. Unequal cash flows

$$P = E + \frac{B}{C}$$

where, P stands for pay back period.

E stands for number of years immediately preceding the year of final recovery.

B stands for the balance amount still to be recovered.

C stand for cash flow during the year of final recovery.

Ex: The following is the information related to a company

Project A		Project B	
Year	Cash flow $	Year	Cash flow $
0	-700	0	-700
1	100	1	400
2	200	2	300
3	300	3	200

4	400	4	100
5	500	5	0

Calculate pay back period

Project A		Cumulative	Project B		Cumulative
Year	Cash flow	cash flow	Year	Cash flow	Cash flow
0	-700	-700	0	-700	-700
1	100	-600	1	400	-300
2	200	-400	2	300	0
3	300	-100	3	200	200
4	400	300	4	100	300
5	500	800	5	0	-

$$P = E + \frac{B}{C}$$

$$= 3 + \frac{100}{400}$$

$$= 3.25 \text{ year}$$

$$P = E + \frac{B}{C}$$

$$= 2 + 0$$

$$= 2 \text{ years}$$

Uniform cash flows:

Where the annual cash flows are uniform

$$PB = \frac{Original\ Investment}{Annual\ cash\ flows}$$

Shorter is the payback period better is the product

EX: A project requires an investment of $ 100, 000, it will generate annual cash flow of $25,000 per year. Calculate the pay back period.

$$PB = \frac{Original\ Investment}{Annual\ cash\ flows}$$

$$= \frac{100,000}{25,000}$$

= 4 years

Accounting Rate of Return

This method is based on the financial accounting practices of the company working out the annual profits. Here, instead of taking the annual cash flows, we take the annual profits into account. The net annual profits are calculated after deducting depreciation and taxes. The average of annual profits thus derived is worked out on the basis of the period

$$\text{ARR} = \frac{\textit{Average annual profits after taxes}}{\textit{Average investment over the life of project}} \times 100$$

Average investment = Net working capital + Salvage value +

$\frac{1}{2}$ (Initial cost of plant – salvage value)

Net working capital = current assets – current liabilities

$$\text{Average profits} = \frac{\textit{Total of annual profits}}{\textit{Number of years}}$$

Ex: Initial investments of plant $ 10, 000

Installation costs	$ 1, 000
Salvage value	$ 1, 000
Working capital	$ 1, 000
Life of plant	5 years
Annual profit per year	$ 2, 500

Calculate ARR:

The ARR is compared to the predetermined rate. The project will be accepted if the actual ARR is higher than the desired ARR. Otherwise it will be rejected.

Discounted cash flow techniques:

This concept is based on the time value of money. The flow of income is spread over a few years. The real value of Birr in your hand today is better than value of birr you earn after a year. The future income, therefore, has to be discounted in order to be associated with the current out flow of funds in the investment. Two methods of appraisal of investment project are based on this concept. These are net present value and internal rate of return method.

Net Present Value

Net present value may be defined as the total of present value of the cash proceeds in each year minus the total of present values of cash outflows in the beginning

$$NPV = \sum^{n} \frac{CFt}{(1+K)^{t}} - Co$$

where; NPV = Net present value

CFt = Cash inflows at different periods

Co = Cash outflow in the beginning

K = Cost of capital

The decision rule here is to accept a project if the NPV is positive and reject if it is negative

I) NPV > Zero accept

II) NPV = Zero accept

III) NPV < Zero reject

EX: ABC PLC is considering to invest in a cement project. It has on hand $180, 000. It is expected that the project may work for seven years and likely to generate the following annual cash flows. Calculate the Net present value.

Year	**ACF**
1	30,000
2	50,000
3	60,000
4	65,000
5	40,000
6	30,000
7	16,000

The cost of capital is 8%

Solution:

Year	ACF	PV factor	Present value
1	30, 000	.926	27, 780
2	50, 000	.857	42, 850
3	60, 000	.794	47, 640
4	65, 000	.735	47, 775

5	40, 000	.681	27, 240
6	30, 000	.630	18, 900
7	16, 000	.583	9, 328
			221, 513
- Original investment			180, 000
Net present value			41, 513

I. The above problem the NPV is greater than zero hence, it may be accepted. You have already learned in financial accounting to calculate the time value of money and the usage of present value tables. Hence, you may directly use the present value factors from tables.

Present value of birr 1 = $\frac{1}{(1+r)^n} = \frac{1}{(1+.10)^1}$

The present value of 1 Birr @ 10 cost after one year .909

two year .826

three .751

Profitability Index Method / Benefit Cost Ratio B/C Ratio

Profitability index method is the relationship between the present values of net cash inflows and the present value of cash outflows. It can be worked out either in unitary or in percentage terms. The formula is

$$\text{Profitability Index} = \frac{\text{Present value of cash inflows}}{\text{Present value of cash outflows}}$$

PI > 1 Accept

PI = 1 indifference

PI < 1 reject

Higher the profitability index more is the project preferred.

From the above example we can calculate the profitability index as below

Present value of cash out flows $ 180, 000

Present value of cash inflows $ 221, 513

: - PI = $\frac{221,513}{180,000}$

Internal Rate of Return (IRR)

The internal rate of return is also known as yield on investment, marginal efficiency of capital, marginal productivity of capital, rate of return time adjusted rate of return and so on. Internal rate of return is nothing but the rate of interest which equates the present value of future earnings with the present value of present investment. Therefore, IR depends entirely on the initial outlay and the cash proceeds of the project which is being evaluated for acceptance or rejection. The computation of IRR is difficult one; you have to start equating the two values i.e., present value of future earnings and present value of investment. It is possible through trial and error method.

IRR can be calculated basing on the pay back period where annual cash flows are uniform, in case the annual cash inflows are different for the periods, the fake pay back period is calculate then adopt trial and error procedure.

$$\text{IRR} = r - \frac{PB - DFr}{DFrL - DFrH}$$

where; PB = Pay back period

DFr = Discount Factor for interest

DFrL = Discount Factor for lower interest rate

DFrH = Discount Factor for higher interest rate

r = Either of the two interest rates used

or

$$\text{IRR} = \text{LRD} + \frac{NPVL}{PV} \times R$$

where; IRR = Internal Rate of Return

LRD = Lower Rate of Discount

NPVL = Net present value at lower rate of discount

(i.e., difference between present values of cash)

PV = The difference in present values at lower and higher discount values at lower.

R = The difference between two rates of discount.

Ex: Nissan Plc. has $100, 000 on hand. This amount is invested in a project, where the annual benefits after taxes are as below. It would like to know the rate of return earned by the company at the end of the life of the project.

Year	ACFS
1	$ 40, 000
2	35, 000
3	30, 000
4	25, 000
5	20, 000

Solution

		At Discount Factor 20%		At Discount Factor 10%	
Year	**ACFS**	**PV Factor**	**PV in $**	**PV Factor**	**PV in $**
1	40, 000	.833	33, 300	.909	36, 400
2	35, 000	.694	24, 300	.826	28, 900
3	30, 000	.579	17, 400	.751	22, 500
4	25, 000	.482	12, 100	.683	17, 100
5	20, 000	.402	8, 000	.621	12, 400
			95, 100		117, 300

$$\text{IRR} = \text{LRD} + \frac{NPVL}{PV} \times R$$

$$= 10 + \frac{17,300}{22,200} \times 10$$

$$= 17.8$$

Additionally read your class note