UNIT 5 CAPITAL BUDGETING DECISIONS

Objectives

The objectives of this unit are:

- to explain nature and utility of Capital Budgeting,
- to provide an understanding of the process of evaluation of Investment proposals,
- to discuss various tools of ranking of Investment proposals.

Structure

5.1 NATURE OF CAPITAL BUDGETING

Capital budgeting is a managerial technique of planning capital expenditures whose benefits are expected to extend beyond one year, such as expenditure on acquisition of new buildings, improvement of existing buildings, replacement of plant and machinery, acquisition of new facilities, new machines, etc. Permanent addition to working capital, R&D expenditure are also regarded as capital expenditures.

Capital budgeting technique involves matching of expected net cash inflows from the project with anticipated cost of the project these two components of capital budgeting technique are determinant of investment outlay.

5.2 UTILITY OF CAPITAL BUDGETING

Capital budgeting is the most potent technique employed in assessing financial viability of projects and for that matter, allocating prudently the funds among the projects by providing useful guidelines in identifying useful projects and ranking them in terms of economic desirability to choose the most promising one. Thus, it helps a firm in strenghthening its financial health and so also its competitive position.

Capital budgeting also acts as a planning and control device. As a planning tool, it helps the managements to determine long-term capital requirements and timings of such requirements. It also serves as a control device when it is employed to control expenditures.

However, capital budgeting as a technique of decision-making suffers from the problems involved in predicting future cash benefits, cost of capital. Further, it fails to take cognizance of total consequences of the decision.

5.3 INVESTMENT PROPOSALS AND ADMINISTRATIVE ASPECTS

Capital budgeting process involves several steps. The first step in the capital budgeting process is to assemble a list of proposed new investments, together with the data necessary to appraise them. Although practices vary from firm to firm, proposals dealing with asset acquisitions are frequently grouped according to the following four categories:

1. Replacements of existing/old projects.
2. Expansion: additional capacity in existing product lines.
3. Growth: new product lines.
4. Other (for example, pollution control equipment)

Other important aspects of capital budgeting involve administrative matters. Approvals are typically required at higher levels within the organization as we move away from replacement decisions and as the sums involved increase. One of the most important functions of the board of directors is to approve the major outlays in a capital budgeting program as well as the total capital budget for each planning period. Such decisions are crucial for the future well-being of the firm.

The planning horizon for capital budgeting programs varies with the nature of the industry. When sales can be forecast with a high degree of reliability for 10 to 20 years, the planning period is likely to be correspondingly long; electric utilities are an example of such an industry. Also, when the product-technology developments in the industry require an 8-to-10-year cycle to develop a new major product, as in certain segments of the aerospace industry, a correspondingly long planning period is necessary.

After a capital budget has been adopted, funding must be scheduled. Characteristically, the finance department is responsible for scheduling and acquiring funds to meet scheduled requirements. The finance department is also primarily responsible for cooperating with the operating divisions to compile systematic records on the uses of funds and the installation of equipment purchased. Effective capital budgeting programs require such information as the basis for periodic review and evaluation of capital expenditure decisions - the feedback and control phase of capital budgeting, often called the post-audit review.

The foregoing represents a brief overview of the administrative aspects of capital budgeting; the analytical problems involved are considered in the following paragraphs.

5.4 CHOOSING AMONG ALTERNATIVE PROPOSALS

In most firms, there are more proposals for projects than the firm is able or willing to finance. Some proposals are good, others are poor, and methods must be developed for distinguishing between the good and the poor. Essentially, the end product is a ranking of the proposals and a cutoff point for determining how far down the ranked list to go.

In part, proposals are eliminated because some are mutually exclusive. Mutually exclusive proposals are alternative methods of doing the same job. If one piece of equipment is chosen, other will not be required. Thus, if there is a need to improve the materials handling system in a chemical plant, the job may be done either by conveyer belts or by forklift trucks. The selection of one method makes it unnecessary to use the others: They are mutually exclusive items.

Independent projects are those that are being considered for different kinds of tasks that need to be accomplished. For example, in addition to the materials handling system, the chemical firm may need equipment to package the end product. The work would require a packaging machine, and the purchase of equipment for this purpose would be independent of the equipment purchased for materials handling. The firm may undertake any or all independent projects.

Finally, projects may be contingent. For example, there may be only one way to build a football stadium but two ways of housing it (in a metal structure or a geodesic dome). Because the stadium and its housing are contingent, the analysis requires that we consider them together. Hence, we would want to compare the stadium within a metal structure with the alternative of the stadium within a geodesic dome.

To distinguish among the many proposals that compete for the allocation of the firm's capital funds, a ranking procedure must be developed. This procedure requires calculating the estimated cash flows from the use of equipment and then translating them into a measure of their effect on shareholders' wealth. First, we turn our attention to the problem of estimating cash flows for capital budgeting purposes.

5.5 ESTIMATING CASH FLOWS FOR CAPITAL BUDGETING

Cash flows for capital budgeting purposes are defined as the after-tax cash flows for an all-equity financed firm. Algebraically, this definition is equivalent to earnings before interest and taxes, EBIT, less the taxes the firm would pay if it had no debt, T(EBIT), plus noncash depreciation charges, W dep.

W Cash flow = W EBIT - T (W EBIT) + W depreciation

Note that this definition of cash flows is unaffected by the firm's financing decision, for example the amount of debt which it uses. Consequently, the investment decision and the financing decision are kept separate when we use this definition of cash flows for capital budgeting purposes.

We focus on how the firm's cash flows will be changed. Table 5.1 provides an example of a pro-forma income statement which can be used to illustrate a cash flow calculation.

To arrive at the change in after-tax cash flows created by the project, we start with increased revenues, WR, then subtract out all items which are expensable for tax purposes (WVC + WFCC + Wdep). The result is taxable income, assuming the firm has no debt. Next, we subtract the change in taxes and add back the change in depreciation because depreciation is not a cash outflow. The appropriate algebraic expression is:

WCash flow = (WR - WVC - WFCC - Wdep) - T(WR - WVC - WFCC - Wdep) + Wdep.

Table 5.1 Pro-forma Income Statement

Description	Symbol	Amount
Change in sales revenue	W R	Rs.145,000
Change in variable operating cost	W VC	-90,000
Change in fixed cash costs	WFCC	-10,000
Change in depreciation	Wdep	-15,000
Change in earings before interest and taxes	WEBIT	30,000
Change in interest expense	WrD	-5,000
Change in earings before tax	WEBT	25,000
Change in taxes (@T=40%)	Wtax	-10,000
Change in net income	W NI	15,000

This equation can be simplified as follows:

WCash flow = (1–T) (WR – WVC – WFCC – WDep) + WDep

Note that the term in brackets is the same as the change in earings before interest and taxes, WEBIT; hence, the equation becomes:

WCash flow = (1-T) WEBIT + Wdep.

Substituting in the numbers from Table 5.1, we have:

WCash flow = (1 - .4)(Rs.145,000 - Rs.90,000 - Rs.10,000 - Rs.15,000) + Rs.15,000
= .6 (Rs.30,000) + Rs.15,000
= Rs.33,000

The procedure described above starts with revenues at the top of the income statement and then works down to obtain the definition of cash flows for capital budgeting purposes. Alternately, one can start at the bottom of the income statement, with changes in net income (WNI) and build upward to arrive at the same definition. Sometimes this approach is easier to use. The algebraic expression for the change in cash flows is

WCash flow-WNI+Wdep+(1 - T)WrD

Activity 1

a) Identify expenditures that are considered in Capital Budgeting technique.

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b) List out steps involved in evaluating investment proposals.

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c) Explain why net cash flows after tax is considered for decision making.

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d) Explain how depreciation is treated while considering investment proposals.

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5.6 EVALUATING INVESTMENT PROPOSALS

The point of capital budgeting - indeed, the point of all financial analysis - is to make decisions that will maximize the value of the firm. The capital budgeting process is designed to answer two questions: (1) Which of several mutually exclusive investments should be selected? (2) How many projects, in total, should be accepted?

Among the many methods used for evaluating investment proposals, five are discussed here.

1. **Payback method (or payback period):** Number of years required to return the original investment.
2. **Return on assets (ROA) or return on investment (ROI):** An average rate of return on assets employed.
3. **Net present value (NPV) method:** Present value of expected future cash flows discounted at the appropriate cost of capital, minus the cost of the investment.
4. **Internal rate of return (IRR) method:** Interest rate which equates the present value of future cash flows to the investment outlay.
5. **Profitability Index (PI):** It shows the relative profitability of any project, or the present value of benefits per rupee of costs.

General Principles

When comparing various capital budgeting criteria, it is useful to establish some guidelines. What are the properties of an ideal criterion? The optimal decision rule should have four characteristics:

1. It will select from a group of mutually exclusive projects the one which maximizes shareholders' wealth.
2. It will appropriately consider all cash flows.
3. It will discount the cash flows at the appropriate market-determined opportunity cost of capital.
4. It will allow managers to consider each project independently from all others. This has come to be known as the value additivity principle.

The value additivity principle implies that if we know the value of separate projects accepted by management, then simply adding their values, V, will give us the value of the firm. If there are N projects, then the value of the firm will be:

$$V = \sum_{j=1}^{N} v_j, \; j = 1,...N$$

This is a particularly important point because it means that projects can be considered on their own merit without the necessity of looking at them in an infinite variety of combinations with other projects.

Table 5.2 gives the cash flows for four mutually exclusive projects. They all have the same life, five years, and they all require the same investment outlay, Rs.1,500. Once accepted, no project can be abandoned without incurring the outflows indicated. For example, Project A has negative cash flows during its fourth and fifth years. Once the project is accepted these expected cash outflows must be incurred. An example of a project of this type is a nuclear power plant. Decommissioning costs at the end of the economic life of the facility can be as large as the initial construction costs and they must be taken into account.

Table 5.2: Cash Flows of Four Mutually Exclusive Projects

	Cash Flows (Rs.)				
Year	**A**	**B**	**C**	**D**	**PVIF@10%**
0	-1,500	-1,500	-1,500	-1,500	1.000
1	150	0	150	300	.909
2	1,350	0	300	450	.826
3	150	450	450	750	.751
4	-150	1,050	600	750	.683
5	-600	1,950	1,875	900	.621

The last column of Table 5.2 shows the appropriate discount factor for the present value of cash flows, assuming that the appropriate opportunity cost of capital is 10 percent. Since all four projects are assumed to have the same risk, they can be discounted at the same interest rate.

Now we turn our attention to the actual implementation of the five above-mentioned capital budgeting techniques (1) the payback method, (2) the return on assets, (3) the net present value,(4) the internal rate of return, (5) Profitability Index. We shall see that only one technique - the net present value method - satisfies all four of the desirable properties for capital budgeting criteria.

5.6.1 Payback Method

The payback period is the number of years required to recover the initial capital outlay on a project. The payback periods for the four projects in Table 5.2 are given below.

Project A, 2-year payback

Project B, 4-year payback

Project C, 4-year payback

Project D, 3-year payback.

If management were adhering strictly to the payback method, then Project A would be chosen as the best among the four mutually exclusive alternatives. Even a casual look at the numbers indicates that this would be a bad decision. The difficulty with the payback method is that it does not consider all cash flows and it fails to discount them. Failure to consider all cash flows results in ignoring the large negative cash flows which occur in the last two years of Project A. Failure to discount them means that management would be indifferent between the following two cash flow patterns:

Cash Flows

Year	G	G*
0	-1,000	-1,000
1	100	900
2	900	100

because they have the same payback period. Yet no one with a positive opportunity cost of funds would choose Project G because Project G* returns cash much faster.

The payback method also violates the value additivity principle. Consider the following example. Projects 1 and 2 are mutually exlusive but Project 3 is independent. Hence, it is possible to undertake Projects 1 and 3 in combination, 2 and 3 in combination, or any of the projects in isolation.

The only arguments in favour of using the payback method is that it is easy to use, but with the advent of pocket calculators and computers, we feel that other more correct capital budgeting techniques are just as easy to use.

5.6.2 Return on Assets (ROA)

The return on assets (ROA) which is also sometimes called the return on investment (ROI)is an average rate of return technique. It is computed by averaging the expected cash flows over the life of a project and then dividing the average annual cash flow by the initial investment outlay. For example, the ROA for Project B in Table 5.2 is computed from the following definition:

$$\text{ROA} = \left(\sum_{t=0}^{n} \text{cash flow/n} \right) \div \text{Io}$$

where

I_o = Initial cash outlay = Rs.1,500

n = Life of the project = 5 years.

Substituting in the correct numbers from Table 5.2, we have

$$\text{ROA} = \left\{ \frac{\text{Rs.}-1,500 + \text{Rs. } 0 + \text{Rs. } 0 + \text{Rs. } 450 + \text{Rs.}1,050 + \text{Rs.}1,950}{5} \right\} \div$$

$$= \frac{\text{Rs.}1,950}{5} \div \text{Rs.}1,500$$

$$= \frac{\text{Rs. } 390}{\text{Rs.}1,500} = 26\%$$

The ROA's for the four projects are

Project A, - 8%
Project B, 26%
Project C, 25%
Project D, 22%

The ROA criterion chooses Project B as best. The major problem with ROA is that it does not take the time value of money into account. We would have obtained exactly the same ROA for Project B, even if the order of cash flows had been reversed with Rs.1,950 received now, Rs.1,050 at the end of Year 1, Rs.450 at the end of Year 2 and -Rs.1,500 at the end Year 5. But no one

with a positive opportunity cost of capital would be indifferent between the alternatives. The opposite ordering of cash flows would always be preferred.

5.6.3 Present value method

Another method based on discounted cash flow approach employed to evaluate financial viability of investment projects is the present value method, which involves discounting of streams of future cash earnings to present value at required rate of return to the firm (cost of capital). For ranking projects under this method, net present value is computed. Project with highest positive net present value is accorded the highest priority.

The equation for calculating the net present value of a project is :

$$= \sum_{t=1}^{n} \frac{CF_t}{(1+K)^t} - Io$$

Here CF_1,CF_2, and so forth represent the net cash flows; k is the firm's cost of capital;I_0 is the initial cost of the project; and n is the project's expected life.

The net present value of Project C in Table 5.2 is calculated below by multiplying each cash flow by the appropriate discount factor (PVIF), assuming that the cost of capital, k, is 10 per cent.

Year	Cash Flow	X	PVIF	=	PV
0	-1,500		1.000		-1,500.00
1	150		.909		136.35
2	300		.826		247.80
3	450		.751		337.95
4	600		.683		409.80
5	1,875		.621		1,164.38
					NPV = 796.28

The net present value of all four projects in Table 5.2 are:

Project A NPV = Rs. –610.95.

Project B NPV = Rs. 766.05.

Project C NPV = Rs. 796.28.

Project D NPV = Rs. 778.80

If these projects were independent instead of mutually exclusive, we would reject A and accept B,C, and D. Why? Since they are mutually exclusive, we select the project with the greatest NPV, Project C. The NPV of the project is exactly the same as the increase in shareholders' wealth. This fact makes it the correct decision rule for capital budgeting purposes. The NPV rule also meets the other three general principles required for an optimal capital budgeting criterion. It takes all cash flows into account. All cash flows are discounted at the appropriate market-determined opportunity cost of capital in order to determine their present values. Also, the NPV rule obeys the value additivity principle.

The net present value of a project is exactly the same as the increase in shareholders' wealth. To see why, start by assuming a project has zero net present value. In this case, the project returns enough cash flow to do three things:

1. To pay off all interest payments to creditors who have lent money to finance the project.
2. To pay all expected returns (dividends and capital gains) to shareholders who have put up equity for the project, and
3. To pay off the original principal, I_0, which was invested in the project.

Thus, a zero net present value project is one which earns a fair return to compensate both debt holders and equity holders, each according to the returns which they expect for the risk they take. A positive NPV project earns more than the required rate of return, and equity holders receive all excess cash flows because debt holders have a fixed claim on the firm. Consequently, equity holders' wealth increases by exactly the NPV of the project. It is this direct link between shareholders' wealth and the NPV definition which makes the net present value criterion so important in decision making.

5.6.4 Internal Rate of Return Method

The internal rate of return (IRR) is defined as the interest rate that equates the present value of the expected future cash flows, or receipts, to the initial cost outlay. The equation for calculating the internal rate of return is :

$$\frac{Cf_1}{(1+IRR)^1}+\frac{Cf_2}{(1+IRR)^2}+...+\frac{Cf_n}{(1+IRR)^n}-Io=0$$

$$\sum_{t=1}^{n}\frac{CF_t}{(1+IRR)^t}-Io=0$$

Here we know the value of I_o and also the values of CF_1,CF_2,.....CF_n, but we do not know the value of IRR. Thus, we have an equation with one unknown, and we can solve for the value of IRR. Some value of IRR will cause the sum of the discounted receipts to equal the initial cost of the project, making the equation equal to zero, and that value of IRR is defined as the internal rate of return.

The internal rate of return may be found by trial and error. First, compute the present value of the cash flows from an investment, using an arbitrarily selected interest rate - for example, 10 percent. Then compare the present value so obtained with the investment's cost. If the present value is higher than the cost figure, try a higher interest rate and go through the procedure again. Conversely, if the present value is lower than the cost, lower the interest rate and repeat the process. Continue until the present value of the flows from the investment is approximately equal to its cost. The interest rate that brings about this equality is defined as the internal rate of return.

Table 5.3 shows computation for the IRR for Project D in Table 5,2 and Figure 5.1 graphs the relationship between the discount rate and the NPV of the project.

Table 5.3: IRR for Project D

Year	Cash Flow	Pv@10%		PV@20%		PV@25%		PV@25.4%	
0	-1,500	1.000	-1,500.00	1.000	-1,500.00	1.000	-1.500.00	1.000	-1,500.00
1	300	.909	272.70	.833	249.90	.800	240.00	.797	239.10
2	450	.826	371.70	.694	312.30	.640	288.00	.636	286.20
3	750	.751	563.25	.579	434.25	.512	384.00	.507	380.25
4	750	.683	512.25	.482	361.50	.410	307.50	.404	303.00
5	900	.621	558.90	.402	361.80	.328	295.20	.322	289.80
	1650		**778.80**		**219.75**		**14.70**		**-1.65**

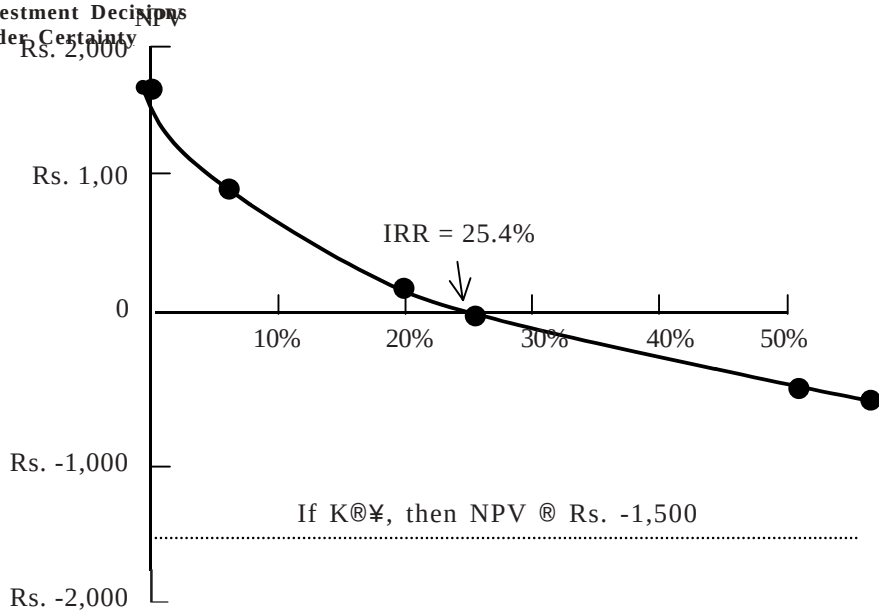

Figure 5.1: NPV of Project D at Different Discount Rates

In Figure 5.1 the NPV of Project D's cash flows decreases as the discount rate is increased. If the discount rate is zero, there is no time value of money and the NPV of a project is simply the sum of its cash flows. For Project D, the NPV equals Rs.1,650 when the discount rate is zero. At the opposite extreme, if the discount rate is infinite, then the future cash flows are valueless and the NPV of Project D is its current cash flow, –Rs.1,500. Somewhere between these two extremes is a discount rate which makes the NPV equal to zero. In Figure 5.1, we see that the IRR for Project D is 25.4 per cent. The IRR's for each of the four projects in Table 1 are given below.

Project A IRR = - 200%

Project B IRR = 20.9%

Project C IRR = 22.8%

Project D IRR = 25.4%

If we use the IRR criterion and the projects are independent, we accept any project which has an IRR greater than the opportunity cost of capital, which is 10 percent. Therefore, we would accept Projects B, C, and D. However, since these projects are mutually exclusive, the IRR rule leads us to accept Project D as best.

Profitability Index (PI)

Another method that is used to evaluate projects is the profitability index (PI), or the benefit/cost ratio, as it is sometimes called:

Present value methods had the merit of simplicity in as much as it helps the management in choosing the most profitable proposal. Further, while evaluating and ranking projects it focuses on one of the primary objectives of a firm, i.e., increasing value of the firm.

However, main drawback of this approach is that it does not take into consideration size of investment outlay and net cash benefits together while ranking projects. This may at times lead to faulty decisions.

Profitability Index (PI) method has come to be employed to overcome the above drawback and to ensure rational investment decision by establishing relationship between the present values of the net cash inflows and net investment outlay.

The equation to compute 'PI' of a project is :

$$PI = \frac{\text{PV benefits}}{\text{PV Costs}} = \frac{\sum_{t=0}^{n} \frac{CIF_t}{(I+K)^t}}{\sum_{t=0}^{n} \frac{COF_t}{(I+K)^t}}$$

Here CIF_t represents the expected cash inflows, or benefits, and COF_t represents the expected cash outflows, or costs. The PI shows the relative profitability of any project, or the present value of benefits per rupee costs. The PI for Project C, based on a 10 percent cost of capital is:

Similarly:

Project A PI = 0.59
Project B PI = 1.51
Project D PI = 1.52

A project is acceptable if its PI is greater than 1.0, and the higher the PI, the higher the project ranking. Mathematically, the NPV, the IRR, and the PI methods must always reach the same accept/reject decisions for independent projects: If a project's NPV is positive, its IRR must exceed k and its PI must be greater than 1.0. However, NPV, IRR, and PI can give different rankings for pairs of projects. This can lead to conflicts between the three methods when mutually exclusive projects are being compared.

Activity 2

a) Contact Finance Managers of five PSUs and five Indian Companies to find out the existing capital budgeting evaluation methods used by them.

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b) Approach Finance Managers of three MNCs to ascertain what methods are used to evaluate the projects.

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c) Explain why.

i) Future Net Cash flows are discounted

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ii) Expected Investment outlay is not discounted

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5.7 CAPITAL BUDGETING METHODS IN PRACTICE

The above discussion leads us to conclude that IRR, NPV and PI methods will result in the same decision, except in certain cases involving mutually exclusive projects or non-normal cash flows. The question that arises which capital budgeting techniques do firm actually use in practice. Lawrence Gitman and John Forester conducted a survey to help answer this question.

Gitman and Forester received 103 usable responses from a survey sent to 268 major companies known to make large capital expenditures. They found that the responsibility for capital budgeting analysis generally rests with the finance department. The respondents also stated that defining projects and estimating their cash flows were the most difficult and the most critical steps in the capital budgeting process.

Table – 5.4 summarizes the capital budgeting methods used by the respondent firms. The results indicate a strong preference for discounted cash flow (DCF) capital budgeting techniques, that is, NPV, IRR, and PI, with the dominant method being IRR. However, the heavy use of ROA and payback as primary ranking techniques indicates that not all U.S. firms were technologically up to part in an economic sense.

Table 5.4: Capital Budgeting Methods Used

	Primary		Secondary	
Method	**Number**	**Percent**	**Number**	**Percent**
IRR	60	53.6%	13	14.0%
ROA	28	25.0	13	14.0
NPV	11	9.8	24	25.8
Payback period	10	8.9	41	44.0
PI	3	2.7	2	2.2
Total	**112**	**100.0%**	**93**	**100.0%**

It may also be noted that almost all the respondents used at least two methods in their analysis, and as evidenced by the 112 primary methods from 103 respondents, some firms use more than one primary method. Although the questionnaire did not bring this point out, we suspect that many of the analysts of firms which use the IRR as the primary method recognize its drawbacks, yet use it anyway because it is easy to explain to non-financial executives but use NPV as a check on IRR when evaluating mutually exclusive or non-normal projects. It is also doubtful the payback method can be used as a liquidity and/ or risk indicator, hence to help choose among competing projects whose NPVs and/or IRRs are close together. One interesting, and encouraging note is that when compared with earlier surveys, Gitman and Forester found that the discounted cash flow methods are gaining in usage.

As regards the use of assessment methods employed by Indian corporates, study of 100 medium and large scale companies conducted in 1994, reveals that Indian Companies have started using discounting techniques more than non-discounting approaches. Although some companies are still using payback period approach, it is the net present value technique which is used quite widely, particularly by companies which have high sales volume and large-paid-up capital. Small and new companies are still relying on traditional approach like pay-back period.

5.8 SUMMARY

For any economy/company there are many avenues of investments, but one can't go and invest in all of these avenues. This gives rise to problem of selection of a particular project out of the many available. Here capital budgeting techniques play an important role in deciding which project to select & which to reject. Capital budgeting technique involves matching of expected net cash inflows from the project with anticipated cost of the project. Capital budgeting techniques are broadly classified in two categories. Discounted and non discounted the major difference between these two is that in former the future cash flows are discounted at appropriate discount rate (usually cost of capital) to get net present value of future cash flows.

5.9 SELF ASSESSMENT QUESTIONS

1) Are there conditions under which a firm might be better off if it chose a machine with a rapid payback rather than one with the largest rate of return?

2) Company X uses the payback method in evaluating investment proposals and is considering new equipment whose additional net after-tax earnings will be Rs.150 a year. The equipment costs Rs.500, and its expected life is ten years (straight-line depreciation). The company uses a three-year payback as its criterion. Should the equipment be purchased under the above assumptions?

3) What are the most critical problems that arise in calculating a rate of return for a prospective investment?

4) What other factors in addition to rate of return analysis should be considered in determining capital expenditures?

5) A firm has an opportunity to invest in a machine at a cost of Rs.6,56,670. The net cash flows after taxes from the machine would be Rs.2,10,000 per year and would continue for five years. The applicable cost of capital for this project is 12 percent.

   a) Calculate the net present value for the investment.

   b) What is the internal rate of return for the investment?

   c) Should the investment be made?

5.10 FURTHER READINGS

Besant C. Raj A, "*Public Enterprises Investment Decisions in India: A Managerial Analysis*.", Macmillan Company of India Ltd., New Delhi, 1977.

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