Chapter 4

Capital Budgeting
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CAPITAL BUDGETING

4.0 CAPITAL BUDGETING:

Capital budgeting is the part of the budget process that focuses on the resource plans for building new facilities, renovating existing facilities, buying major pieces of equipment, or improving the campus infrastructure. A capital budget typically has a long-term horizon a minimum of five years because the expenditures are for investments in assets that are expected to benefit more than one year. However, a capital budget also will have a short term, or operating year, component that identifies the annual resources needed to fund the new building or renovation project.

4.0-1 DEFINITION:

Charles T. Horngreen has defined capital budgeting as, “Capital budgeting is long term planning for making and financing proposed capital outlays.”

According to G.C. Philippatos “Capital budgeting is concerned with the allocation of the firm’s scarce financial resources among the available market opportunities. The consideration of investment opportunities involves the comparison of the expected future steams of earnings from a
project with the immediate and subsequent streams of earning from a project, with the immediate and subsequent streams of expenditures for it.”

4.1 IMPORTANCE OF CAPITAL BUDGETING:

Importance of capital budgeting arises mainly due to the following:

a) **Large Investments:** Capital budgeting decisions, generally, involve large investment of funds. But the funds available with the firm are always limited and the demand for funds far exceeds the recourses. Hence, it is very important for a firm to plan and control its capital expenditure.

b) **Long-term Commitment of Funds:** Capital expenditure involves not only large amount of funds but also funds for long-term or more or less on permanent basis. The long-term commitment of funds increases the funds increases the financial risk involved in the investment decision. Greater the risk involved, greater is the need for careful planning of capital expenditure, i.e. Capital budgeting.

c) **Irreversible Nature:** The capital expenditure decisions are of irreversible nature. Once the decision for acquiring a permanent asset is taken, it becomes very difficult to dispose of these assets without incurring heavy losses.
d) **Long – term Effect on Profitability:** Capital budgeting decisions have a long-term and significant effect on the profitability of a concern. Not only the present earnings of the firm are affected by the investments in capital assets but also the future growth and profitability of the firm depends upon the investment decision taken today. An unwise decision may prove disastrous and fatal to the very existence of the concern. Capital budgeting is of utmost importance to avoid over investment or avoid over investment or under investment in fixed assets.

e) **Difficulties of Investment Decisions:** The long term investment decisions are difficult to be taken because (i) decision extends to a series of years beyond the current accounting period, (ii) uncertainties of future and (iii) higher degree of risk.

f) **National Importance:** Investment decision though taken by individual concern is of national importance because it determines employment, economic activities and economic activities and economic growth.

Thus, we may say that without using capital budgeting techniques a firm may involve itself in a losing project. Proper timing of purchase, replacement, expansion and alternation of assets is essential.
4.2 METHODS OF CAPITAL BUDGETING:

4.2-1 PAY – BACK PERIOD METHOD:

The ‘Pay back’ represents the period in which the total investment in permanent assets pays back itself. This method is based on the principle that every capital expenditure pays itself back within a certain period out of the additional earnings generated from the capital assets. Under this method, various investments are ranked according to the length of their pay back period in such a manner that the investment with a shorter pay back period is preferred to the which has longer pay back period.

In this method this formula is applied:

\[
\text{Pay-back period} = \frac{\text{Cash Outlay of the project or Original Cost of Assets}}{\text{Annual Cash inflows}}
\]

4.2-1-I Advantages of Pay-back Period Method:

a) The main advantage of this method is that it is simple to understand and easy to calculate.

b) It saves in cost, it requires lesser time and labour as compared to other methods of capital budgeting.

c) In this method, as a project with a shorter pay-back period is preferred to the one having a longer pay-back period, it reduces the loss through obsolescence and is more suited to the developing countries, like
India, which are in the process of development and have quick obsolescence.

d) Due to its short term approach, this method is particularly suited to a firm which has shortage of cash or whose liquidity position is not particularly good.

4.2-1-II Disadvantages of Pay-back Period Method:

a) It does not take into account the cash inflows earned after the pay back period and hence the true profitability of the projects cannot be correctly assessed.

b) This method ignores the time value of money and does not consider the magnitude and timing of cash in flow.

c) It does not take into consideration the cost of capital which is a very important factor in making sound investment decisions.

d) It may be difficult to determine the minimum acceptable pay-back period, it is usually, a subjective decision.

e) It treats each asset individually in isolation with other assets which is not feasible in real practice.

f) Pay-back period method does not measure the true profitability of the project as the period considered under this method is limited to a short period only and not the full life of the asset.
4.2-2 AVERAGE RATE OF RETURN METHOD:

Under this method average profit after tax and depreciation is calculated and then it is divided by the total capital outlay or total investment in the project. In other words, it establishes the relationship between average annual profits to total investments.

In this method this formula is applied:

Average Rate of Return

\[
\frac{\text{Total profits (after dep. & taxes)}}{\text{Net investment in the project x No. of years of profits}} \times 100
\]

or

\[
\frac{\text{Average Annual Profits}}{\text{Net Investment in the Project}} \times 100
\]

4.2-2-I Advantages of Average Rate of Return Method:

a) It is very simple to understand and easy to operate.

b) It uses the entire earnings of a project in calculating rate of return and not only the earnings upto pay-back period and hence gives a better view of profitability as compared to pay-back period method.

c) As this method is based upon accounting concept of profits, it can be readily calculated from the financial data.
4.2-2-II Disadvantages of Average Rate of Return Method:

a) This method also like pay-back period method ignores the time value of money as the profits earned at different points of time are given equal weight by averaging the profits. It ignores the fact that a rupee earned today is of more value than a rupee earned an year after, or so.

b) It does not take into consideration the cash flows which are more important than the accounting profits.

c) This method cannot be applied to a situation where investment in a project is to be made in parts.

4.2-3 NET PRESENT VALUE METHOD:

The net present value method is a modern method of evaluating investment proposals. This method takes into consideration the time value of money and attempts to calculate the return on investments by introducing the factor of time element. It recognizes the fact that a rupee earned today is worth more than the same rupee earned tomorrow. The net present values of all inflows and outflows of cash occurring during the entire life of the project is determined separately for each year by discounting these flows by the firm’s cost of capital or a pre-determined rate. In this method this formula is applied:

\[ NPV = \frac{A_1}{(1 + r)} + \frac{A_2}{(1 + r)^2} + \frac{A_3}{(1 + r)^3} + \ldots + \frac{A_n}{(1 + r)^n} \]
Where
\[
PV = \frac{1}{(1 + r)^n}
\]

- \(PV\) = Present value
- \(r\) = Rate of Interest/discount rate
- \(n\) = Number of years

\(A_1, A_2, A_3, \ldots, A_n\) = Future net cash flows (profit after tax but before depreciation)

4.2-3-I Advantages of the Net Present Value Method:

a) It recognizes the time value of money and is suitable to be applied in a situation with uniform cash outflows and uneven cash inflows or cash flows at different periods of time.

b) It takes into account the earnings over the entire life of the project and the true profitability of the investment proposal can be evaluated.

c) It takes into consideration the objective of maximum profitability.

4.2-3-II Disadvantages of the Net Present Value Method:

a) As compared to the traditional methods, the net present value method is more difficult to understand and operate.

b) It may not give good results while comparing projects with unequal lives as the project having higher net present value but realized in a longer life span may not be as desirable as a project having something lesser net present value achieved in a much shorter span of life of the asset.

c) In the same way as above, it may not give good results while comparing projects with unequal investment of funds.
d) It is not easy to determine an appropriate discount rate.

4.2-4 Internal Rate Of Return Method:

The internal rate of return method is a modern technique of capital budgeting that takes into account the time value of money. In the net present value method the net present value is determined by discounting the future cash flows of a project at a predetermined or specified rate called the cut-off rate. But under the internal rate of return method, the cash flows of a project are discounted at a suitable rate by hit and trial method, which equates the net present value so calculated to the amount of the investment.

Under this method, since the discount rate is determined internally, this method is called as the 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.

In this method this formula is applied:

\[ C = \frac{A_1}{(1 + r)} + \frac{A_2}{(1 + r)^2} + \frac{A_3}{(1 + r)^3} + \cdots + \frac{A_n}{(1 + r)^n} \]

where,

- \( C \) = Initial Outlay at time Zero
- \( A_1, A_2, A_3, \ldots, A_n \) = Future net cash flows at different periods.
- \( 2, 3, \ldots, n \) = Number of year
- \( r \) = Rate of discount of internal rate of return.
4.2-4-I Advantages of Internal Rate of Return Method:

a) It takes into account the time value of money and can be usefully applied in situations with even as well as uneven cash flow at different periods of time.

b) It considers the profitability of the project for its entire economic life and hence enables evaluation of true profitability.

c) The determination of cost of capital is not a pre-requisite for the use of this method and hence it is better than net present value method where the cost of capital cannot be determined easily.

d) It provides for uniform ranking of various proposals due to the percentage rate of return.

e) This method is also compatible with the objective of maximum profitability and is considered to be a more reliable technique of capital budgeting.

4.2-4-II Disadvantages of Internal Rate of Return Method:

a) It is difficult to understand and is the most difficult method of evaluation of investment proposals.

b) This method is based upon the assumption that the earnings are reinvested at the internal rate of return for the remaining life of the project, which is not a justified assumption particularly when the average rate of return earned by the firm is not close to the internal rate of return.
4.3 COMPARISON BETWEEN NPV AND IRR (NPV Vs. IRR):

The Net Present Value Method and the Internal Rate of Return Method are similar in the sense that both are modern techniques of capital budgeting and both take into account the time value of money. In fact, both these methods are discounted cash flow techniques. However, there are certain basic differences between these two methods of capital budgeting:

(i) In the net present value method, the present value is determined by discounting the future cash flows of a project at a predetermined or specified rate called the cut off rate based on cost of capital. But under the internal rate of return method, the cash flows are discounted at a suitable rate by hit and trial method, which equates the present value so calculated to the amount of the investment. Under IRR method, discount rate is not predetermined or known, as is the case in NPV method.

(ii) The NPV method recognizes the importance of market rate of interest or cost of capital. It arrives at the amount to be invested in a given project so that its anticipated earnings would recover the amount invested in the project at market rate. Contrary to this, the IRR method does not consider the market rate of interest and seeks to determine the maximum rate of interest at which funds invested in any project could be repaid with the earnings generated by the project.

(iii) The basic presumption of NPV method is that intermediate cash inflows are reinvested at the cut off rate, whereas, in the case of
IRR method, intermediate cash flows are presumed to be reinvested at the internal rate of return.

The results shown by NPV method are similar to that of IRR method under certain situations, whereas, the two give contradictory results under some other circumstances. However, it must be remembered that NPV method using a predetermined cut-off rate is more reliable than the IRR method for ranking two or more capital investment proposals.

4.4 FACTORS INFLUENCING CAPITAL EXPENDITURE DECISIONS:

(1) Urgency:
Sometimes an investment is to be made due to an urgency for the survival of the firm or to avoid heavy losses. In such circumstances, the proper evaluation of the proposal cannot be made through profitability tests. The examples of such urgency are: breakdown of some plant and machinery, fire, accident etc.

(2) Degree of certainty:
Profitability is directly related to risk, higher the profits, greater is the risk or uncertainty. Sometimes, a project with some lower profitability may be selected due to constant flow 91' income as compared to another project with an irregular and uncertain flow of income.
(3) Intangible factors:
Sometimes a capital expenditure has to be made due to certain emotional and intangible factors such as safety and welfare of workers, prestigious project, social welfare, goodwill of the firm, etc.

(4) Legal factors:
An investment which is required by the provisions of law is solely influenced by this factor and although the project may not be profitable yet lie investment has to be made.

(5) Availability of funds:
As the capital expenditure; generally, requires large funds, the availability of funds is an important factor that influences the capital budgeting decisions. A project, however profitable, may not be taken want of funds and a project with a lesser profitability may be sometimes preferred due to lesser pay-back period for want of liquidity.

(6) Future Earnings:
A project may not be profitable as compared to another today, but it may promise better future earnings. In such cases it may be preferred to increase earnings.

(7) Obsolescence:
There are certain projects which have greater risk of obsolescence than other. In case of projects with high rate of obsolescence, the project with a lesser pay-back period may be preferred than the one that may have higher profitability but longer pay-back period.
(8) Research and Development Projects:
It is necessary for the long-term survival of the business to invest in research and development projects though it may not look to be profitable investment.

(9) Cost Considerations:
Cost of the capital project, cost of production, opportunity cost of capital, etc. are other considerations involved in the capital budgeting decisions.
4.5 ANALYSIS OF CAPITAL BUDGETING

Q. Do you use the concept of capital budgeting for analysis of long term investment proposals?

<table>
<thead>
<tr>
<th>Percentage of Companies</th>
<th>Opinion</th>
</tr>
</thead>
<tbody>
<tr>
<td>48</td>
<td>Yes</td>
</tr>
<tr>
<td>52</td>
<td>No</td>
</tr>
</tbody>
</table>

Opinion is divided on the use of Capital Budgeting for evaluating projects. 48% respondents use and 52% respondents don’t use Capital Budgeting.
Q. Which type of method / methods of capital budgeting is / are used in your company?

<table>
<thead>
<tr>
<th>Methods</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pay back</td>
<td>8</td>
</tr>
<tr>
<td>ARR</td>
<td>18</td>
</tr>
<tr>
<td>NPV</td>
<td>40</td>
</tr>
<tr>
<td>IRR</td>
<td>6</td>
</tr>
<tr>
<td>PI</td>
<td>28</td>
</tr>
</tbody>
</table>

Most of the respondents (40%) who use Capital Budgeting use NPV method and 28% respondents use PI method. This shows that respondents use non-discounting methods the most.
Q. When these methods are used?

<table>
<thead>
<tr>
<th>Period</th>
<th>Opinion in (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Short term project</td>
<td>6</td>
</tr>
<tr>
<td>Long term project</td>
<td>28</td>
</tr>
<tr>
<td>For Both</td>
<td>14</td>
</tr>
<tr>
<td>None (Don’t Use)</td>
<td>52</td>
</tr>
</tbody>
</table>

**Use of Capital Budgeting By Companies**

[Bar chart showing the percentage of companies using capital budgeting for short term, long term, for both, and none (don’t use).]
Q. Is there any use of operating leverage or financial leverage in your company to enhance profitability?

<table>
<thead>
<tr>
<th>Leverage</th>
<th>Opinion in (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>60</td>
</tr>
<tr>
<td>No</td>
<td>40</td>
</tr>
</tbody>
</table>

60% respondents believe that leverage is useful for companies to increase profitability. It shows that the respondents want to take advantage of cheaper debt funds.