# A Study on Capital Budgeting

# A. Meghana Satya

Rishi UBR Women's College

#### Abstract

Capital budgeting then consists in planning the deployment of available capital for maximizing the longterm profitability (return on investment) of a firm. It refers to the process by which a firm determines where it should apply its comparatively limited financial resources. Capital budgeting may be defined as the decision-making process by which a firm evaluates the purchase of major fixed assets, including buildings, machinery and equipment. It deals exclusively with major investment proposals which are essentially longterm projects and is concerned with the allocation of the firm's scarce financial resources among the available market opportunities. The capital projects would be evaluated using Internal rate of Return, Net Present Value, Profitability Index method and average rate of Returns. Sample of projects are undertaken for the study and the decision of acceptance or rejection is shown.

Keywords: Capital budgeting, IRR, PBP, NPV

#### Introduction

The term capital budgeting contains two words, capital, the relatively scarce, non- human resource of production enterprise, and budgeting thus indicating a detailed, quantified planning which guides future activities of an enterprise towards the achievement of its profit goals. 'Capital' relates to total funds employed in an enterprise. The capital fund is increased by an inward flow of cash and decreased by an outward flow of cash and as such it is important for an enterprise to plan and arrange cash flows properly. The power of the financial planning package lies in enabling borrowings to be arranged sufficiently in advance to reduce the danger of a liquidity crisis also to provide substantiating documents for loan negotiations.

Capital budgeting is the process a business undertakes to evaluate potential major projects or investments. Construction of a new plant or a big investment in an outside venture are examples of projects that would require capital budgeting before they are approved or rejected.

The company will have a long-term perspective plan of not less than five years, spelling out their production and allied resources for the on-going projects and for the possible new lines.

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

Capital budgeting involves choosing projects that add value to a company. The capital budgeting process can involve almost anything including acquiring land or purchasing fixed assets like a new truck or machinery.

Corporations are typically required, or at least recommended, to undertake those projects that will increase profitability and thus enhance shareholders' wealth.

However, the rate of return deemed acceptable or unacceptable is influenced by other factors specific to the company as well as the project.

# Following are the Categories of Projects that can be Examined using Capital Budgeting Process:

- The decision to buy new machinery,
- Expansion of business in other geographical areas,
- Replacement of an obsolete equipment,
- New product or market development, etc.

# Need of the Study

Capital budgeting is important because it creates the accountability and the measurability. Capital budgeting deals with high volume production keeping in view the quality of products produced. Through the analysis of capital budgeting we can know the demand so that production and sales can be taken up without delay.

# Scope of the Study

The study was conducted to analyse capital budgeting of HSIL company. The analysis is done to suggest the possible solutions. The techniques used were Internal Rate of Return (IRR), Net Present Value (NPV), Return on Investment (ROI), Profitability Index (PI), Pay-Back Period (PBP).

# **Objectives of the Study**

- To determine the proposal and investment.
- To evaluate the investment proposal of HSIL Limited by using capital budgeting techniques.
- To measure the profitability of the project by considering all cash flows.
- To analyse the strength and weakness of existing process of capital budgeting.

# Literature Review Prasanna Chandra (1975)

They conducted a survey of twenty firms to examine the importance assigned to economic analysis of capital expenditures, methods used and its rationale for analysing capital expenditures and ways to improve economic analysis of capital expenditures. The finding of the study reveals that the nature of economic analysis of capital expenditures varies from project to project but in most of the firms surveyed the analysis is done in sketchy terms. The most commonly used method for evaluating investments of small size is the PBP and for large size investments the ARR is used as the principal criterion and the PBP is used as a supplementary criterion. DCF techniques are gaining importance particularly in the evaluation of large investment required to replace a worker are used for evaluating investments. Most of the firms do not have fixed standards for acceptance/rejection of projects. The most common methods used for incorporating the risk factor into the capital expenditure analysis are Cooper, Morgan, Redman and Smith (Capital Budgeting Models: Theory Vs. Practice; Business Forum, 2001, Vol. 26, Nos. 1, 2, pp. 15-19).

# **Porwal L.S. (1976)**

They had done an empirical study of the organizational, quantitative, qualitative, and behavioural and control aspects of capital budgeting in large manufacturing public limited companies in the private sector in India. He had selected 118 companies out of which 52 companies (44%) provided usable responses. The majority of the companies studied give more importance to earning more profits or achieving a higher accounting rate of return on investment in assets. The final authority to make a capital expenditure decision rests with the Board of Directors (BOD) in case of four-fifths of the companies.

# Pandey I.M. (1989)

In a study of the capital budgeting practices of fourteen medium to large size companies in India, it was found that all companies, except one, used payback. With payback and/or other techniques about two-thirds of companies used IRR and about two-fifths NPV. IRR was found to be the second most popular method. The reasons for the popularity of payback in order of significance were stated to be its simplicity to use and understand its emphasis on the early recovery of investment and focus on risk.

It was found that one-third of companies always insisted on the computation of payback for all projects, one-third for majority of projects and remaining for some of the projects. For about two- thirds of companies' standard payback ranged between 3 and 5 years. According to his survey, reasons for the secondary role of DCF techniques in India included difficulty in understanding and using these techniques, lack of qualified professionals and unwillingness of top management to use DCF techniques. For capital rationing it is found that most companies do not reject projects on account of capital shortage. They face the problem of shortage of funds due to the management's desire to limit capital expenditure to internally generated funds or the reluctance to raise capital from outside. But generally companies do not reject profitable projects under capital rationing; they postpone them till funds become available. The most commonly used methods of risk analysis in practice are sensitivity analysis and conservative forecasts. Except a few companies most companies do not use the statistical and other sophisticated.

# Sahu P.K. (1989)

They have done a study on Capital budgeting in corporate sector in the state of Orissa. He made an attempt to study the trends in fixed investment and its financing between 1960-61 to 1973-74. He took a sample of 15 companies. It was observed that routine investments were financed through internal sources of funds while investments for the growth purpose are financed through the external sources of funds. U. Rao Cherukuri's (1996) survey of 74 Indian companies revealed that 51% use IRR as project appraisal criterion. Firms typically use (92% or more) multiple evaluation methods. ARR and PBP are widely used as supplementary decision criteria. WACC is the discount rate used by 35% of the sample firms. The most widely used discount rate is 15%, and over 50% use an after-tax rate. About three-fifths of the respondents explicitly consider risk in capital project analysis and mostly use sensitivity analysis for purposes of risk assessment. The most popular method used by respondents to adjust for risk is shortening the PBP followed by increasing the required rate of return. 35% of the respondents included leasing in the capital budgeting process. A few Indian firms in his survey also used none of the methods listed on questionnaire. They were using profitability and cash flow analysis for assessing capital expenditure. Apart from the formal budgeting techniques due Weightage is given to qualitative aspects like quality improvement expected from the capital expenditure, capital expenditure for enhanced safely and capital expenditure to meet statutory requirements and for benefit to the company's personnel from health considerations and social benefits like housing.

# **Richard Pike (1996)**

This paper reports the findings of a longitudinal study of capital budgeting practices within 100 large UK companies between 1975 and 1992. Such an approach enables a more meaningful comparison of changes in investment practices over time and helps to clarify the confusing picture built up from comparison of prior surveys with different research designs and often low response rates.

#### Richard M. Burns, Joe Walker (1 September 1997)

In response to a call for more research on the "why" of capital budgeting practices, a survey was sent to the Fortune 500 firms to (1) look at the detailed reasons they used particular capital budgeting techniques, (2) to determine if and why they had changed their emphasis on any of those techniques in the last five or ten years, and (3) to explore the importance of strategic considerations in capital budgeting. Detailed reasons and their rankings are given for the choices of payback, discounted payback, accounting rate of return, internal rate of return, modified internal rate of return, profitability index, net present value, and other miscellaneous techniques.

#### Colin Drury, Mike Tayles (24 May 2006)

Probably more surveys have been undertaken on the use of capital budgeting techniques than on any other accounting and finance topic. Despite the many surveys a number of issues remain unresolved. The surveys have consisted of a sample of either very large or very small companies and observations relating to the impact of company size have been derived from comparing the responses from different surveys undertaken at different points in time. The aim of this paper is to provide additional empirical evidence relating to some of the unresolved issues and to examine the impact of company size on the use of financial appraisal techniques. In particular, the paper concentrates on the treatment of inflation, the appraisal of advanced manufacturing technologies and examines whether the empirical evidence supports the claim that many companies use excessive discount rates.

#### **Stanley Block (6 April 2007)**

In recent times, small business firms have created 80 percent of the new jobs in the United States. Thus, their methodology for capital investment decisions is very important, though it continues to be somewhat different from that used by larger business firms. A questionnaire survey with 232 small business respondents indicates that the payback method is still the preferred approach by 42.7 percent of the firms. Unlike many larger firms, their time horizon is often the period over which a financial institution will extend them funding. In any event, the "average" minimal payback period in the survey averaged 2.81 years, a time period far shorter than the useful life of the asset and one that would indicate a required return far higher than most firms anticipate. Somewhat encouraging was the increased use of discounted cash flow methods (27.6 percent), which is a higher rate of utilization than that indicated in other surveys of smaller firms over the last few decades.

# Dorla A. Evans and Shawn M. Forbes (29 October 2007)

Surveys of businesses' capital budgeting practices reveal that the IRR is much preferred over the NPV as an investment decision making tool even though business scholars prescribe the NPV as theoretically optimal. Here practitioners' preference for the IRR is explained through ergonomics: the IRR is treated as a display method. As such it is more compatible with decision makers' expectations and therefore, is more cognitively efficient. Because the IRR is expressed as an interest rate, it more closely resembles an analogue display, in which the IRR is simply compared to the required return. In contrast, the NPV is stated in dollars,

resembling more a very precise digital display. Academicians should reorient their efforts from promoting the NPV to teaching methods to ameliorate the pitfalls of the IRR.

#### Pablo de Andres, Gabriel de Fuente, Pablo San Martin (January-March 2015)

This paper seeks to shed further light on the capital budgeting techniques used by Spanish companies. Our paper posits that the gap between theory and practice might be related to the nature of sources of value and to the efficiency of mechanisms aligning managerial and shareholder incentives, rather than to resource restrictions or model misinterpretation. We analyze data from a survey conducted in 2011, the final sample comprising 140 non-financial Spanish firms. Our findings show a behaviour pattern similar to that reported in prior research for firms in other countries. Particularly noteworthy is that payback appears to be the most widely used tool, while real options are used relatively little.

Our results confirm that size and industry are related to the frequency of use of certain capital budgeting techniques. Further, we find that the relevance of growth opportunities and flexibility is an important factor explaining the use of real options.

# Methodology of the Study

#### **Data Sources**

The data is collected from HSIL Limited with the help of primary and secondary data sources.

#### **Primary Data**

Primary data has been collected through informal sources which constitute discussions with the concerned company guide linked with the topic of study.

#### **Secondary Data**

Secondary data has been collected from the annual report of M/s HSIL Limited and audited income statement relating to the concern years.

# **Tools and Techniques**

NPV = Present Value of Cash Inflow – Present Value of Cash Outflow PI = Present Value of Cash Inflow  $\div$  Present Value of Cash Outflow IRR = Lr + ((P1 – Q)  $\div$  (P1 – P2)) × Dr

Where,

Lr = lower rate P1 = Present value at lower discount rate P2 = Present value at higher discount rate Q = Cost of Project Dr = Difference in rate

 $PBP = Base Year + ((COP - BYCIF) \div (CYCIF - BYCIF))$ 

Where,

COP = Cost of Project BYCIF = Base Year Cash Inflow

CYCIF = Current Year Cash Inflow

 $ARR = (Average PAT \div Average Investment) \times 100$ 

# Data Analysis

#### Project 1

Initial Investment Rs. 250 Crores, Tax 15% and the depreciation of the company was provided in the Balance Sheet.

Year	Cash Flows
1	2500
2	2500
3	2500
4	2500
5	2500

Table 6.1: Project 1 - Cash Flows (In Lakhs)

#### Table 6.2: Calculation of Payback Period (In Lakhs)

Years	PBDT	Less Dep.	PBT	Less Tax 15%	РАТ
1	2500	400	24600	3690	20910
2	2500	750	24250	3637.5	20612.5
3	2500	100	24900	3735	21165
4	2500	150	24850	3727.5	21122.5
5	2500	2150	22850	3427.5	19422.5

РАТ	Add Dep.	CFAT	CCFAT
20910	400	21310	21310
20612.5	750	21362.5	42672.5
21165	100	21265	63937.5
21122.5	150	21272.5	85210
19422.5	2150	21572.5	106782.5

 $PBP = Base Year + (COP - BYCIF) \div (CYCIF - BYCIF)$ 

Where,

COP = Cost of Project

BYCIF = Base Year Cash Inflow

CYCIF = Current Year Cash Inflow

https://doi.org/10.5281/zenodo.7479276

Conference on "Green Technology - Sustainable Initiatives, Practices and Developments in Science and Management" at Rishi UBR Women's College  $PBP = 2 + (25000 - 21310) \div (42672.5 - 21310)$ = 2 + 0.1727 = 2.17 years = 2 years, 1 month and 7 days

**Inference:** From the point of Payback period, the project is accepted, because to get the initial investment of 250 Crores, it is taking a time of 2 years, 1 months and 7 days.

Years	Profit before Tax	Less Tax 15%	Profit after Tax
1	24600	3690	20910
2	24250	3637.5	20612.5
3	24900	3735	21165
4	24850	3727.5	21122.5
5	22850	3427.5	19422.5
		Total	103232.5

 Table 6.3: Calculation of Average Rate of Return (In Lakhs)

Average PAT = Total of Profit After Tax  $\div$  Number of Years = 103232.5  $\div$  5

= 20646.5

Average Investment = Total Investment  $\div 2$ = 250000  $\div 2$ = 125000

Average Rate of Return = (Average PAT  $\div$  Average Investment)  $\times$  100 = (20646.5  $\div$  125000)  $\times$  100 = 16.5172

**Inference:** From the point of Average Rate of Return, the project is accepted, as it is greater than expected returns.

Years	РАТ	Add Dep.	CFAT	NPV @ 15%	PVCF
1	20910	400	21310	0.870	18539.7
2	20612.5	750	21362.5	0.756	16150.05
3	21165	100	21265	0.658	13992.37
4	21122.5	150	21272.5	0.572	12167.87
5	19422.5	2150	21572.5	0.497	10721.53

https://doi.org/10.5281/zenodo.7479276

Conference on "Green Technology - Sustainable Initiatives, Practices and Developments in Science and Management" at Rishi UBR Women's College

				Total	71571.52
--	--	--	--	-------	----------

NPV = Present Value of Cash Inflow – Present Value of Cash Outflow = 71571.5225 – 25000 = 46571.5225

Inference: As NPV is positive, the project is accepted.

Profitability Index = Present Value of Cash Inflow ÷ Present Value of Cash Outflow = 46571.5225 ÷ 25000 = 1.862 times

Inference: As the profitability index is greater than 1, the project is accepted.

Years	РАТ	Add Dep.	CFAT	PVFLR 10%	CFPVLR
1	20910	400	21310	0.909	19370.79
2	20612.5	750	42672.5	0.826	35247.48
3	21165	100	63937.5	0.751	48017.06
4	21122.5	150	85210	0.683	58198.43
5	19422.5	215	106782.5	0.621	6631.93
				Total	275159.16

Table 6.5: Calculation of Internal Rate of Return (In Lakhs)

Years	CFAT	PVFHR 11%	CFPVHR
1	21310	0.901	19200.31
2	42672.5	0.812	34650.07
3	63937.5	0.731	46738.31
4	85210	0.659	56153.39
5	106782.5	0.593	63322.02
		Total	220064.10

Internal Rate of Return = Lr + (  $(P1 - Q) \div (P1 - P2)$  ) × Dr

Where,

Lr = Lower rate

P1 = Present value at lower discount rate

P2 = Present value at higher discount rate

Q = Cost of project

Dr = Difference in rate

 $IRR = 10 + ((275159.1625 - 25000) \div (275159.1625 - 220064.105)) \times (11\% - 10\%)$ = 10 + (250159.1625 ÷ 55095.0575) × 1% = 10 + 4.5405 × 1% = 14.5405%

Inference: Therefore, IRR lies at 14.5405%. IRR is greater than investment.

#### **Project 2**

Initial investment 300 Crores, Tax 15%

Years	Cash Flows (In Lakhs)
1	3000
2	3000
3	3000
4	3000
5	3000

#### Table 6.6: Project 2 - Cash Flows (In Lakhs)

Table 6.7: Calculation of Payback Period (In Lakhs)

Years	PBDT	Less Dep.	PBT	Less Tax @15%	PAT
1	3000	400	2600	390	2210
2	3000	750	2250	337.5	1912.5
3	3000	100	2900	435	2465
4	3000	150	2850	427.5	2422.5
5	3000	2150	850	127.5	722.5

РАТ	Add Dep.	CFAT	CCFAT
2210	400	2610	2610
1912.5	750	2662.5	5272.5
2465	100	2565	7837.5
2422.5	150	2572.5	10410
722.5	2150	2872.5	13282.5
	Total	13282.5	

 $PBP = Base Year + ((COP - BYCIF) \div (CYCIF - BYCIF))$ 

Where,

COP = Cost of Project BYCIF = Base Year Cash Inflow CYCIF = Current Year Cash Inflow

 $PBP = 2 + ((3000 - 2610) \div (5272.5 - 2610))$ = 2 + 0.1464 = 2.14 = 2 years, 1 month and 4 days

**Inference:** From the point of Payback period, the project is accepted, because to get the initial investment of 300 Crores, it is taking a time of 2 years, 1 month and 4 days.

Sr. No.	CF	Tax	CFAT
1	2600	390	2210
2	2250	337.5	1912.5
3	2900	435	2465
4	2850	427.5	2422.5
5	850	127.5	722.5
			9732.5

Table 6.8: Calculation of Average Rate of Return (In Lakhs)

Average  $PAT = Total of Profit After Tax \div Number of Years$ 

 $= 9732.5 \div 5$ = 1946.5

Average Investment = Total Investment  $\div 2$ = 3000  $\div 2$ = 1500

Average Rate of Return = (Average PAT  $\div$  Average Investment)  $\times$  100 = (1946.5  $\div$  1500)  $\times$  100 = 29.766%

Inference: The ARR is greater than the required rate of return (29.76% > 16.5172%) so it is accepted.

Years	РАТ	Add. Dep.	CFAT	PV @12%	PVCFAT
1	2210	400	2610	0.893	2270.7
2	1912.5	750	2662.5	0.797	2012.85
3	2465	100	2565	0.712	1687.77
4	2422.5	150	2572.5	0.636	1471.47
5	722.5	2150	2872.5	0.567	1427.63
				Total	8870.42

 Table 6.9: Calculation of Net Present Value and Profitability Index (In Lakhs)

Net Present value is positive and profitability index is 2.598 times. So the project is accepted.

				Total:	10038.87	
5	722.5	2150	2872.5	0.621	1783.82	0.593
4	2422.5	150	2572.5	0.683	1757.017	0,659
3	2465	100	2565	0.751	1926.31	0.731
2	1912.5	750	2662.5	0.826	2199.22	0.812
1	2210	400	2610	0.909	2372.49	0.901

Table 6.10: Calculation of Internal Rate of Return (In Lakhs)

Internal Rate of Return =  $Lr + ((P1 - Q) \div P1 - P2)) \times Dr$ 

Where,

Lr = Lower rate

P1 = Present value at lower discount rate

P2 = Present value at higher discount rate

Q = Cost of project

Dr = Difference in rate

 $IRR = 10 + ((10038.87 - 3000) \div (10038.87 - 9787.245)) \times (11\% - 10\%)$ 

 $= 10 + 27.9736 \times 1\%$ 

= 37.9736%

Inferences: Therefore, IRR is 37.9736%. IRR is greater than investment.

# Limitations of the Study

- 1. Lack of time, the scheduled period of 45 days is not sufficient to make the study independently regarding capital budgeting in HSIL Limited.
- 2. Non-availability of confidential matter.

https://doi.org/10.5281/zenodo.7479276

- 3. The study is conducted in short period, which was not detailed in all aspects.
- 4. All the techniques are not used in HSIL Limited. Therefore it was possible to explain only few methods of capital budgeting.

#### Conclusion

In the light of inferences drawn from the analysis the company has to concentrate on Pay Back Period and NPV for acceptance of the project. The discounting methods are most preferable as the rate of returns is depending on the present values. All the techniques which were used for the project resulted positive. Finally it is concluded that firm can generate huge profits by investing in more projects diversifying its operations.

# References

#### **Text Books**

- 1. I.M. Pandey, 2003, Financial Management, 9th edition, Vikas Publishing House Pvt Ltd, New Delhi.
- 2. Prasanna Chandra, 1993, Fundamentals of Financial Management, 3<sup>rd</sup> edition, Tata McGraw-Hill Company Limited, New Delhi.

#### Websites

- 3. Richard Pike (January 1996) "A Longitudinal Survey On Capital Budgeting Practices". https://onlinelibrary.wiley.com/doi/10.1111/j.1468-5957.1996.tb00403.x
- 4. Pablo de Andres, Gabriel de Fuente, Pablo San Martin (January–March 2015) "Capital Budgeting Practices In Spain". <u>https://www.sciencedirect.com/science/article/pii/S2340943614000656</u>
- 5. Stanley Block (06 Apr 2007) "Capital Budgeting Techniques Used By Small Business Firms In The 1990s". https://www.tandfonline.com/doi/abs/10.1080/00137919708903184
- Richard M. Burns, Joe Walker (1 September 1997) "Capital Budgeting Techniques Among The Fortune 500: A Rationale Approach". <u>https://www.emerald.com/insight/content/doi/10.1108/eb018643/full/html</u>
- Colin Drury, Mike Tayles (24 May 2006) "UK Capital Budgeting Practices: Some Additional Survey Evidence". https://www.tandfonline.com/doi/abs/10.1080/13518479600000015
- Dorla A. Evans, Shawn M. Forbes (29 Oct 2007) "Decision Making And Display Methods: The Case Of Prescription And Practice In Capital Budgeting". <u>https://www.tandfonline.com/doi/abs/10.1080/00137919308903114</u>
- 9. https://www.encyclopedia.com/economics/economics-magazines/industry-profiles-plastics-products-0
- 10. https://www.ibef.org/industry/manufacturing-sector-india
- 11. https://www.edupristine.com/blog/capital-budgeting
- 12. <u>https://www.investopedia.com/terms/c/capitalbudgeting.asp</u>