STAR
Research Journal

Available online at www.starresearchjournal.com (Star International Journal)
MANAGEMENT
Star. Management ***1 (2016)***

CORPORATE CAPITAL BUDGETING PRACTICES: REVIEW OF LITERATURE

Dipendra Kumar Chaudhary

Research Scholar, Deptt. Of Commerce and Business Administration, LN Mithila University, Darbhanga, Bihar, India.

Abstract

The term "Capital Budgeting" is used to describe how managers plan significant outlays on projects that have long term implication such as the purchase of new equipment and the introduction of new products. Here the term Capital refers to fixed assets used in production while a budget is a plan that details projected inflows and outflows during some future period. Most companies have many more potential projects than can actually but funded. Hence, managers must carefully select those projects that promise the greatest future return. How well managers make these capital budgeting decisions is a critical factor in the long run profitability of the company. Capital budgeting involves investment – a company must commit fund now in order to receive a return in future. Investments are not limited to stock and bonds. Purchase of inventory or equipment is also an investment.

Keywords: Capital Budgeting, Review of Literature.

Introduction

The term *"Capital Budgeting"* is used to describe how managers plan significant outlays on projects that have long term implication such as the purchase of new equipment and the introduction of new products. Here the term Capital refers to fixed assets used in production while a budget is a plan that details projected inflows and outflows during some future period. Most companies have many more potential projects than can actually but funded. Hence, managers must carefully select those projects that promise the greatest future return. How well managers make these capital budgeting decisions is a critical factor in the long run profitability of the company. Capital budgeting involves investment – a company must commit fund now in order to receive a return in future. Investments are not limited to stock and bonds. Purchase of inventory or equipment is also an investment.[1]

Funds are invested in both short term and long term assets. Capital budgeting is primarily concerned with sizable investments in long term assets. These assets may be tangible items such as property, plant or equipment or intangible ones such as new technology, patents or trademarks. Investments in processes such as research, design, development and testing through which new technology and new products are created may also be viewed as investments in intangible assets.[2] Irrespective of whether the investments are in tangible or intangible assets, a capital investment project can be distinguished from recurrent expenditures by two features. One is that such projects with their benefits or cash flows spreading over many years. Long term investments in tangible or intangible assets have long term consequences. Investments today will determine the firm's strategic position many years hence. These investments also have a considerable impact on the organization's future cash flows and risk associated with those cash flows. Capital budgeting decisions thus have a long range impact on the firm's performance and they are critical to the firm's success or failure. As such, capital budgeting decisions have a major effect on the value of the firm and its shareholder's wealth.

Corporate Capital Budgeting Practices: Review of Literature

A number of researchers in finance and accounting have examined corporate capital budgeting practices. Many of these articles are based on surveys of corporate managers report about the frequency with which various evaluation methods, such as payback, internal rate of return (IRR), net present value (NPV), discounted payback, profitability index (PI), or average return on book value are used. The best known field studies about the practices of corporate finance are **Gitman and Forrester's (1997)** study of Capital Budgeting Techniques used by major U.S. Firms, **Porwal's (1976)** study on Capital Budgeting Techniques and Profitability and Graham and **Harvey's (2001)** study on capital budgeting, cost of capital, and capital structure. It is believed that the findings of this study in the context of India are useful to academicians and practitioners in learning how corporate India operates, developing new theories, and identifying areas where finance theory is not implemented.[3]

What are the capital budgeting tools and techniques being practiced by the industry and how popular are they? Do firms use methods that help to maximize the firm value? The review of empirical surveys and studies help to find answers to these questions.

The changes in capital budgeting procedures over the decades have been well documented in prior studies. The research of Canada and Moller, Fremgen, Gitman and Forrester, Kim and Farragher, Stanley Block all indicate that increasingly sophisticated capital budgeting procedures have been put in practice. However, a generalization that more sophisticated practices take place across all industries is subject to investigation and challenge. This consideration is important because an analyst within a given industry may be intending to follow industry norms but misled by general observation that relate to the studies cited above. Just as there are different valuation procedures or financing norms between industries, there may also be different capital budgeting procedures.

Rosenblatt and Jucker (1979) and Scott and Petty (1984) summarize several of these surveys. They show that from 1955 to 1978 the use of techniques which recognize the time value of money (i.e., IRR, NPV, PI and discounted payback) by sample firms rose from 0.09 to around 0.08. However, many survey authors express surprise that a greater percentage of the respondents did not use techniques which discounted future cash flows. A number of textbooks have similar concerns. **Klammer (1972)**surveyed a sample of 369 firms from the 1969 Composted listing of manufacturing firms that appeared in significant industry groups and made at least $1 million of capital expenditures in each of the five years 1963-1967. Respondents were asked to identify the capital budgeting techniques in use in 1959, 1964, and 1970. The results indicated an increased use of techniques that incorporated the present value **(Klammer, 1984)**.[4]

Fremgen (1973)surveyed a random sample of 250 business firms that were in the 1969 edition of Dun and Bradsheet's Reference Book of Corporate Management. Questionnaire were sent to companies engaged in manufacturing, retailing, mining, transportation, land development, entertainment, public utilities and conglomerates to study the capital budgeting models used, stages of the capital budgeting process, and the methods used to adjust risk. He found that firms considered the Internal Rate of Return model to be the most important model for decision-making. He also found that the majority of firms increased their profitability requirements to adjust risk and considered defining a project and determining the cash flow projections as the most important and most difficult stage of the capital budgeting process.[5]

William et al (1975)examined responses form 109 controllers of 1971 Fortune 500 (by sells dollars) firms concerning the techniques their companies used to evaluate new and existing product lines. They found that Internal Rate of Return was the method preferred for evaluating all projects. Moreover, they found that present value techniques were used more frequently to evaluate new product lines than existing product lines.[6]**Gitman and Forrester (1977)**analyzed the responses from 110 firms who replied to their survey of the 600 companies that Forbes reported as having the greatest stock price growth over the 1971-1979 periods. The survey containing questions related to capital budgeting techniques, the division of responsibility for capital budgeting decisions, the most important and most difficult stages of capital budgeting, the cut-off rate and the methods used to assess risk. They found that the DCF techniques were the most popular methods for evaluating projects, especially the IRR. However, many forms still use the PBP method as a backup or secondary approach. The majority of the companies that responded to the survey indicated that the Finance Department was responsible for analysing capital budgeting projects. Respondents also indicated that project definition and cash flow estimation was the most difficult and most critical stage of the capital budgeting process. The majority of the firms had a cost of capital or cut-off rate between 10 and 15%, and they most often adjusted for risk by increasing the minimum acceptable rate of return on capital projects.[7]

Kim and Farragher (1981) surveyed the 1979 Fortune 100 CFO about their useage of techniques of 1975 and 1979 for evaluating capital budgeting projects. They found that in both years, the majority of the firms relied on a DCF method (either the IRR or the NPV) as the primary method and the payback as the secondary method.[8]**Marc (1986)** In an in-depth study of the capital budgeting projects of 12 large manufacturing firms, he found that although techniques that incorporated discounted cash flow were used to some extent, firms relied Rather heavily on the simplistic payback model, especially for smaller projects. In addition, when discounted cash flow techniques were used, they were often simplified. For example, some firms' simplifying assumptions include the use of the same economic life for all projects even though the actual lives might be different. Further, firms often did not adjust their analysis for risk. Surveys results also indicate that project approval at many firms (in eight out of twelve firms studied) follow different criteria depending on the locus of the decision.[9]

Wong and Leung (1987)surveyed a sample of large corporations in Hong Kong, Malaysia and Singapore in 1985. They found that PBP was the most popular primary technique for evaluating and ranking projects in Malaysia. In Hong Kong, they found PBP and ARR to be equally the most popular. They concluded that, in contrast to US companies where DCF techniques are significantly more popular than non-DCF techniques as primary evaluation measures, companies in Hong Kong, Malaysia and Singapore prefer to use several methods as primary measures in evaluating and ranking proposed investment projects. It is also observed that companies in Hong Kong, Malaysia and Singapore do not undertake much risk analysis, neither attempting to assess risk nor adjust evaluation criteria to reflect risk. The most popular risk assessment techniques were sensitivity analysis and scenario analysis (high-medium-low forecasts).[10]

Stanley (1990) has studied capital budgeting techniques used by small business firms in the 1990s. According to Eugene Brigham, in his book 'Fundamentals of Financial Management' in the chapter "Capital Budgeting in the Small Business Firms", capital budgeting may be more important to the smaller firm than its larger counterparts because of the lack of diversification in a smaller firm. He says that a mistake in one project may not be offset by successes in others. Hits intention of the study is to ascertain where small firms stand today in regard to capital budgeting techniques as opposed to prior decades. He selected 850 small firms out of which he received 232 usable responses to the study. As per his findings, a number of patterns relating to capital budgeting by smaller firms are worthy to note. The firms continue to be dependent on the payback method as the primary method of analysis. This is not necessarily evidence of a lack of sophistication, as much as it is a reflection of the financial pressures put on the small business owner by financial institutions. The question to be answered is not always how profitable the project is, but how quickly a loan can be paid back. Small business owners have increased sophistication as over 27% use discounted cash flow as the primary method of analysis. Stanley opines that their conclusions may, at times, be somewhat misleading due to an inappropriate discount rate. Small firms take risk very seriously which is reflected by a higher required rate of return for risky projects.[11]

Jog and Srivastava (1991) provide direct empirical evidence on the capital budgeting process based upon a survey of large Canadian corporations. They explored many issues viz., the use of capital budgeting techniques, cash flow forecasting methods, risk analysis techniques and methods used to estimate the cost of capital and the cost of equity. His findings are most firms used multiple capital budgeting methods to assess capital investments; DCF methods were employed by more than 75% of our respondents to evaluate projects such as expansion-existing operations, expansion-new operations, foreign operations and leasing. It appears that the propensity to use DCF techniques increases with the complexity of the decision of the DCF methods, IRR was used more frequently than NPV in most cases, of the two rules of thumb, he observed little use of ARR. Payback is used much more freque3ntly in conjunction with DCF methods. According to them, the use of DCF methods has become a norm in Canadian firms and that multiple evaluation criteria are being commonly used. Management's subjective estimates are used as often to generate a cash flow forecast as quantitative methods. Sensitivity analysis is the most popular technique among quantitative methods used in cash flow estimation, possibly reflecting the popularity of pc-based more often on judgment than on any formal models. A significant number of firms use non-standard discount rates, i.e., rates other than the WACC and those using it seem to rely on judgmental or non-standard methods of estimation for their cost of equity, the standard methods being either the CAPM or the dividend growth model. Compared to previous studies, he found the usage rate for DCF methods is higher. However, the use of subjective, judgement and non-standard techniques in the estimation of cash flows, risk analysis and the estimation of the appropriate cost of capital continues to be high.[12]

Bierman (1993) finds that 73 of 74 Fortune 100 firms use discounted cash flow (DCF) analysis, with internal rate of return (IRR) being preferred over net present value (NPV). The payback period method also remains a very popular method in practice, though not as a primary technique. 93 per cent of the respondents use company-wide WACC for discounting free cash flows and 72 per cent use the discount rate applicable to project based on its risk characteristics.[13]**Bierman (1993)**surveyed Fortune 500 industrial companies regarding the capital budgeting methods used by these firms in 1993. He found that every responding firm used some type of DCF method. The payback period was used by 84 per cent of his surveyed companies. However, no company used it as the primary method, and most companies gave the greatest weight to a DCF method. 99 per cent of the Fortune 500 companies used IRR, while 85 per cent used NPV. Thus, most firms actually used both methods. 93 per cent of companies calculated a weighted average cost of capital as part of their capital budgeting process. A few companies apparently used the same WACC for all projects, but 73 per cent adjusted the corporate WACC to account for project risk, and 23 per cent made adjustments to reflect divisional risk.[14]

Drury et al (1993) survey of 300 manufacturing companies with annual sales exceeding £20 million indicates that payback (86%) and IRR (80%) are the most widely used project appraisal methodologies. The most widely used project risk analysis technique is sensitivity analysis. Forty-nine per cent of the respondents do not use statistical analysis for risk analysis and 95 per cent of the respondents never use either CAPM or Monte Carlo simulation due to lack of understanding.[15]**Petry and Sprow's (1993)** study of 151 firms listed in the 1990 Business Week 1,000 firms indicates that about 60 per cent of the firms use the traditional payback period either as a primary or as a secondary method for capital budgeting decision. Ninety per cent of the firms use NPV and IRR either as a primary or as a secondary capital budgeting decision methodology. Most of the financial managers indicated that either they had not heard of the problems of IRR (multiple rates of return, NPV and IRR conflict) or such problems rarely occurred.[16]

Walker et al (1993)focused on small companies. They noted that 21 per cent of small companies used DCF. They also observed that within their sample, the smaller the firm, the smaller the likelihood that DCF would be used. The focal point of their study was why small companies use DCF so much less frequently than large firms. The three most frequently cited reasons, according to the survey, were

(1) small firms' preoccupation with liquidity, which is best indicated by payback, (2) a lack of familiarity with DCF methods, and (3) a belief that small project sizes make DCF not worth the effort.[17]

Richard (1996) has done a longitudinal capital budgeting study based on surveys conducted between 1975 and 1992 compiled by conducting cross-sectional surveys on the same firms at approximately five yearly intervals. According to him, over the 17-year review period, there have been the greatest changes in the areas of risk analysis, NPV analysis and post-completion audits. The usage of DCF techniques have increased with each survey. His other findings are that firm size is still significantly associated with degree of use for DCF methods but not for payback and the use of ARR is unchanged. It is suggested that firm size per se may not be the direct causal factor in determining use of sophisticated methods; size of firm influences the use of computer based capital budgeting packages which, in turn, influence the use of discounting methods, sensitivity analysis, and risk analysis techniques. Once size ceases to be associated with use of computers in capital budgeting. It is envisaged that it will also have far less impact on capital budgeting technique usage rates. He has reported the general increase in so-called sophisticated capital budgeting techniques to a point where the gap between theory and practice is trivial, at least for large firms due to three main factors viz., technical, educational economic. This paper has sought to provide a more reliable and comprehensive analysis of how capital budgeting practices in large UK companies have evolved in recent years and, in so doing, provide a clearer backdrop against which earlier studies can be interpreted and future studies enacted.[18]

Binder and Chaput (1996) in their article 'A Positive analysis of Corporate Capital Budgeting Practices' theoretically and empirically investigates the choice of capital budgeting methods by large US corporations over time. Simple economic analysis indicates that there are costs and benefits to using the various decision rules that are commonly found in the corporate world. This analysis makes predictions about how capital budgeting practices will change over time, which they test by relating the percentage of large firms that use DCF rules to several variables that measure these costs/benefits. Empirically they find that, controlling for differences in the respondents across surveys, the use of DCF methods is positively correlated with both the AAA bond yield (i.e. the cost of ignoring the time value of money) and positively related to measures of how well these methods are understood in the corporate world (e.g., the percentage of MBAs in the population). According to them, increased uncertainty causes firms to use non-DCF rules more heavily. Their findings are consistent with the hypothesis that firms do a cost-benefit calculation when determining which capital budgeting rule(s) to employ. These rules can help reorient academic thinking away from looking at some popular capital budgeting methods as wrong and move it more toward explaining why real world practice has been and is as it is. The hypotheses presented by them suggest new directions for surveys of corporate capital budgeting practices. That is, beyond asking firms to list the methods they use it would be interesting to explore in more detail which methods are used for different types of projects and why. They say that additional surveys of this type may provide valuable new insight into firms' choice of capital budgeting methods.

Cost-benefit analysis suggests that DCF methods will be used more frequently for large projects, where the total cost of using an inaccurate method is large, as opposed to small projects. Similarly, firms may use different methods for short-term projects than for long-term projects. He also suggests examining capital budgeting methods across different countries.[19]

Drury and Tayles (1996) has focused a light on some of unresolved issues on capital budgeting in UK and examined the impact of company size on the use of financial appraisal techniques. They conducted a postal questionnaire survey which can provide an overview of current management accounting practices in UK companies. They mailed their questionnaire to 866 business units and a total 303 usable responses were received (a response rate of 35%). Their survey findings in respect of the 46 largest organizations indicated that 63% always used IRR, 50% always used NPV and 30% always used the payback method. The sample included in this survey included responses from a wide range of organizations of different size. Most of organizations used a combination of appraisal techniques. 86% of those organizations that 'often' or 'always' used the unadjusted payback method combined it with a discounting method. The survey findings also indicate that non discounting methods continue to be used by both smaller and larger organizations. The survey also sought to ascertain the approaches that were used for dealing with project risk. Sensitivity analysis was 'often' or 'always' used by 82% of the larger organizations compared with 30% for the smaller organizations. The survey findings suggest that theoretically sound capital budgeting techniques are more likely to be used by larger organizations rather than by smaller organizations. The impact of company size on the use of investment appraisal techniques has been examined and the survey findings suggest that many firms appear to deal with inflation incorrectly when appraising capital investment. This survey has provided useful attention-directing information by identifying topics that require most in-depth research. They have suggested that in order to understand more fully the role that financial criteria play in the capital investment decision-making process, future studies should widen the scope roles that financial information plays within organizations in the investment decision-making process.[20]

Kester Chong (1996) has studied Capital Budgeting Practices of Listed Firms in Singapore. They took a sample size of 211 companies and the survey resulted in 54 responses. They found that the responding

executives in Singapore considered IRR and payback to be equally important for evaluating and ranking capital investment projects. For assessing risk, Scenario analysis and Sensitivity analysis were perceived to be the two most important techniques while more sophisticated probabilistic technique were seldom used by companies. In selecting the discount rates for project evaluation, about half the executives indicated that their firms based a project's minimum acceptable rate of return on the cost of the specific capital used to finance the project. Multiple risk-adjusted discount rates are used by only 37.8% of respondents and the majority adjusted for risk by classifying projects into subjectively-defined risk categories. None of the respondents used the CAPM to determine project discount rates. In estimating the cost of equity capital, a major component of a firm's WACC, the results were split evenly between the dividend yield and expected growth rate and risk premium methods. Only 17% of the respondents indicated that their firms used the CAPM to estimate the cost of equity capital. The survey results also indicated that most of the firms evaluating project cash flows on an after-tax basis and the majority of firms do not practice capital rationing.[21]**Kester and Chang (1999)** survey 226 CEOs from Australia, Hong Kong, Indonesia, Malaysia, Philippines, and Singapore and find that DCF techniques such as NPV/IRR are the most important techniques for project appraisal except in Hong Kong and Singapore. Sensitivity analysis and scenario analysis are found to be the most important tool for project risk assessment in all the countries. Nearly 72 per cent of the respondents in Australia use CAPM to calculate the cost of equity. The risk premium method (cost of debt plus risk premium) in most popular in Indonesia (53.4%) and Philippines (58.6%). The dividend yield plus growth rate method is the most popular method in Hong Kong (53.8%).[22]

Stanley (2000) has analysed the capital budgeting policies of 146 multinational companies in light of current financial theory. He has examined that some of the actions that MNCs take in the capital budgeting area are the logical extensions of domestic practices into the international area, while others appear to be misguided changes to normal capital budgeting procedures. According to his study, there are a number of misapplications such as applying corporate wide weighted average cost of capital to foreign affiliate cash flows rather than to cash flows actually remitted to the corporations. Also, risk is frequently measured on a local project basis (in a foreign country) rather than considering the portfolio effect on the total corporations. Of the 146 survey respondents in this study, 68.7% believe that international investments increase the risk exposure of the firm and establish policies on that premise. Finally, he has shown that the survey respondents hedge against the uncertainly of the procedures by adding a premium to the weighted average cost of capital as computed by financial analysts to the weighted average cost of capital as computed by financial analysts given the inconsistent procedures that are often utilized in going from domestic to international capital budgeting.[23]

Arnold and Hatzopoulos (2000)has done a study of The Theory- Practice Gap in Capital Budgeting: Evidence from the United Kingdom to consider the extent to which modern investment appraisal techniques are being employed by the most significant UK corporations. It also explores some of the reasons for the continuing high use of traditional, rule-of-thumb techniques, alongside DCF techniques. They selected 300 UK companies taken from the **Times 1000 (1996)** ranked according to capital employed. Out of these companies, their response rate was 32.4%. The results of their research had been compared with **Pike (1982, 1988 and 1996)** and **McIntyre and Coulthurst (1985)**as they have similar characteristics. Surprisingly in contrast to other studies, they observed a reduction in the use of PBP at high level. This survey even presents evidence that the theory-practice gap has been narrowed. Over 90% of SMEs are using either NPV or IRR. 97% of large firms use NPV compared with 84% which employ IRR. Thus NPV has overtaken IRR as the most widely used method. This study revealed that 67% of firms using three or more methods. They observed wide theory-practice gap concerning the use of risk analysis techniques. While textbooks and academics papers advocate the use of probability analysis but in their study it seems managers' revealed hesitancy of using it on behavioural, practical, and theoretical ground. Over three-quarters of the firms surveyed adjust for inflation either by specifying cash flows in constant price terms applying a real rate of return or by expressing cash flows in inflated price terms and discounting at the market rate of return. Capital expenditure ceilings are placed on operating units which lead to the rejection of viable projects in the case of 49% of firms. Thus the central aim of this study is to generate new evidence concerning the capital investment practices of UK firms. [24]

Graham and Harvey (2001) surveyed 392 chief financial officers (CFOs) about their companies' corporate practices. Of these firms, 26% has sales less than $100 million, 32% had sales between $100 million and $1 billion, and 42% exceeded $1 billion. The CFOs were asked to indicate how frequently they use different approaches for estimating the cost of equity: 73.5 per cent use the Capital Asset Pricing Model (CAPM), 34.3 per cent use a multi beta version of the CAPM, and 15.7 per cent use the dividend model. The CFOs also use a variety of risk adjustment techniques, but most still choose to use a single hurdle rate to evaluate all corporate projects.

The CFOs were also asked about the capital budgeting techniques they use. Most use NPV (74.9 per cent) and IRR (75.7 per cent) to evaluate projects, but many (56.7 per cent) also use the payback approach. These results confirm that most firms use more than one approach to evaluate projects.

The survey also found important differences between the practices of small firms (less than $1 million

in sales) and large firms (more than $1 billion in sales). Consistent with earlier studies, Graham and Harvey found that small firms are more likely to rely on the payback approach, while large firms are more likely to rely on the NPV and/or IRR.

The firms with high debt ratios are significantly more likely to use NPV and IRR than firms with low debt rations. They find that CEOs with MBA are more likely than non- MBA CEOs to use NPV technique. Small firms use cost of equity capital based on "what investors tell us they require". CEOs with MBAs use CAPM as against non-MBA CEOs. Nearly 58% of the respondents use the company-wide discount rate to evaluate the projects though the project may have different risk characteristics. Large firms are more likely to use risk-adjusted discount rate than small firms.[25]

Ryan and Ryan (2002)have examined the capital budgeting decision methods used by the Fortune 1000 companies. According to him, management views NPV as the most preferred (96%) capital budgeting tool, which represents alignment between corporate America and academia and even alignment of theory and practice. Firms with larger capital budgets tend to favour NPV and IRR. PBP is used at least half of the time by 74.5% of the respondents. Fourth in popularity was the discounted payback model used at least half of the time by 56.7% of the companies. Finally at least half time usage was reported for the three models as follows. PI ranks fifth at 43.9%, followed by ARR at 33.3% and finally, MIRR at 21.9%. In case of Advanced Capital Budgeting methods, the sensitivity analysis was the most popular tool followed by scenario analysis. Inflation adjusted cash flows were used by 46.6% respondents on a regular basis. EVA was used by over half of respondents while MVA was used by approximately one third. Incremental IRRs were used by 47.3% of the respondents, while simulation models were used by 37.2%. PERT/CPM charting and Decision trees were each used by about 31% of the firms while the more complex mathematical models such as liner programming and option models receive less corporate acceptance. As per Ryans, it appears that the views of academics and senior financial managers of Fortune 1000 companies on basic capital budgeting techniques are in stronger agreement. Discounted capital budgeting methods are generally preferred over non-discounted techniques which may reflect the increased financial sophistication and availability of inexpensive computer technology. The vast majority of respondents agree that WACC is the best starting point to determine the appropriate discount rate.[26]

Akalu (2002) has made an attempt to evaluate the capacity of standard investment appraisal methods indicating the existence of gap between theory and practice of capital budgeting. He observed that when the amount of spending is large and the life of a project is longer, companies tend to use more quantitative and advanced appraisal methods. Most of the companies (65.8%) use multiple models of appraisal out of 217 respondents for reducing the chance of discrepancy between actual and estimated revenue and cost of a project. The survey reveals the existence of correlation between number of times that a project is monitored and its value discrepancy. More than 30% of respondents surveyed reports that the NPV method creates larger discrepancy among the standard appraisal methods. The survey result shows the growing trend in the use of value management technique. Further, it revealed the absence of uniformity in the use of valuation methods throughout the project life span. More than half of the samples perform project appraisal and subsequent project evaluation by two different sets of models which create confusion in the interpretation of the progress result of a project and make companies to keep running value-destroying projects.[27]

Stanley (2003) has studied the use of capital budgeting procedures between industries. Three hundred two Fortune 1000 companies responded to a survey organized by Stanley along industry lines viz., Energy, Manufacturing, Finance, Utilities, Technology, Retail, Healthcare, and Transportation. This study emphasized that just as industry patterns affect financing decisions (debt vs. equity), they also affect capital budgeting decisions. In this study, the author developed the breakdown of industries after a careful analysis of performance metrics, size variation, operational procedures and management strategy. In this study of eight major industrial classifications covering 302 Fortune 1000 companies, Five key areas related to capital budgeting were covered. In each case, a statistical test was employed to determine whether there was a difference in methodology between industries. Overall, this study shows that, just as industry characteristics often affect the financing patterns of firms (debt vs. equity); they also affect the asset deployment decision. This study brings the left-hand side of the balance sheet up to the level of the right-hand side in terms of industry analysis.[28]

Ioannis (2004) had done a survey of capital budgeting practices of the firms in Cyprus. He found that only 30.19% of the sample firms use capital budgeting techniques for all their investment decisions, while 50.94% of the firms use evaluation methods for only some types of investment above a certain cost level. Unfortunately, 18.99% of the companies do not use any evaluation method for their investment projects. The survey shows that 54.43% of projects evaluation is done by a simplified evaluation technique and that 36.71% of the companies use the PBP technique. Among the methods that take into account the time value of money, the NPV method is the one most companies prefer (11.39%). Total statistical risk analysis is being adopted by 31.67% of the firms. The survey with respect to the cost of capital, an important element in the use of the capital budgeting techniques, shows that is determined basically according to the cost of borrowing (30.95%), while 3.57% of the companies believe that determining the cost of capital does not affect their profits. He has

concluded that SMEs in Cyprus do not follow scientific evaluation techniques for their investment projects probably due to lack of familiarity with such methods. These findings indicate the need for training and educating the management of the firms in the capital budgeting area of financial management.[29]

Vaihekoski and Liljeblom (2004) conducted a survey of 144 companies listed on the Helsinki Stock Exchange to examine the practice of the use of investment evaluation methods and required rate of return in Finnish. The results show that the Finnish companies still lag behind US and Swedish companies in their use of the NPV, and the IRR method, even though it has become more commonly used during the last ten years. The PBP method and IRR are the two most popular methods used to evaluate investment projects. CAPM is used in surprisingly few companies, and 27% of the companies have not even defined their required rate of return on equity. The CAPM or multibeta model is used only in some 40% of the companies as the primary or secondary method in setting the cost of equity capital. The median required rate of return for the capital is between 12-14%. But more than 20% of the companies have a requirement above 20%.[30]

Hogaboam and Shook (2004) examined the capital investment practices of publicly owned forest products firms in the United States that trade stock on the NYSE and NASDAQ in 2001 by replicating research reported by Cubbage and Redmond in 1985.They obtained 19 valid responses (24% response rate) out of 79 firms selected to represent the forest products industry operating in the US. His research revealed that the majority of firms (52.6%) perform formal analysis for projects that are greater than $10,000. DCF techniques are the most preferred capital budgeting decision criteria used in the forest products industry. IRR was ranked highest by the majority of firms (52.9%) while 9 firms ranked either first or second in evaluation criteria importance. In case of mutually exclusive projects IRR (46.7%) was considered as their primary choice in capital rationing. Some larger companies indicated frequent use of more sophisticated evaluation methods, such as Economic Value Analysis. The employee safety was the most important qualitative factor influencing the investment decision of the firm followed by environmental responsibility. The probability of not achieving a target return is the main reason an investment is considered to be risky by more than three-quarters of the 17 respondents; second was uncertain market potential followed by entering an inexperienced area. The subjective approaches were selected for evaluating risky investments by the respondents.[31]

Hermes et al. (2006) compared the use of capital budgeting techniques of Dutch and Chinese firms, using data obtained from a survey among 250 Dutch and 300 Chinese companies. They have analysed the use of capital budgeting techniques by companies in both countries from a comparative perspective to see whether economic development matters. The empirical analysis provides evidence that Dutch CFOs on an average use more sophisticated capital budgeting techniques than Chinese CFOs do. Their findings suggest that the difference between Dutch and Chinese firms is smaller than might have been expected based upon the differences in the level of economic development between both counties, at least with respect to the use of methods of estimating the cost of capital and the use of CAPM as the method of estimating the cost of equity. The NPV method is more preferred by Chinese firms while IRR method is more popular among Dutch firms.[32]

Truong and Peat (2006) surveyed Australian firms which revealed that real options techniques have gained a toehold in Australian capital budgeting but are not yet part of the mainstream. Projects are usually be evaluated using NPV, but the company is likely to also use other techniques such as the PBP. The project cash flow projections are made from three to ten years into the future. The project cash flow will be discounted at the WACC as computed by the company, and most companies will use the same discount rate across divisions. The discount rate will also be assumed constant for the life of the project. The WACC will be based on target weights for debt and equity. The CAPM will be used in estimating the cost of capital, with the T-bond used as a proxy for the risk free rate, the beta estimate will be obtained from public sources, and the market risk premium will be in the range of 6% to 8%. Asset pricing models other than the CAPM will not be used in estimating the cost of capital.[33]

However, consistent with recent overseas studies, **Graham and Harvey (2001)** and **Bruner et al. (1998)**the CAPM is the most popular method used in estimating the cost of capital in Australia. **Kester et al. (1999)** found that 73% of companies surveyed in six Asia Pacific countries, used CAPM. Compared to two previous surveys of US companies, **Gitman and Mercurio (1982)** and **Gitman and Vandenberg (2000)**, increasing popularity of the CAPM model is apparent.

Lord and Boyd (2004) surveyed half of the New Zealand Local authorities to find out how they undertook capital budgeting. This study was later extended to all New Zealand local authorities. Results of the two surveys show that 75% of local authorities use cost-benefit analysis and NPV in financially evaluating capital investments. However, compared to studies of the private sector, there is a greater focus on qualitative aspects of decision-making. Post-audits were also highly used, but with a focus on quantitative information.[34]

Cooper (2001) has done a study to assess the current level of capital budgeting sophistication in Corporate America. A survey questionnaire was sent to the CFOs of the Fortune 500 companies. They received response from 113 companies having a response rate of 23%. As per the results of their study, the most commonly used primary capital budgeting evaluation technique is the IRR (57%). The second most popular technique is the PBP (20%). The most popular backup technique is the PBP (23%), which is slightly more

popular than the IRR and the NPV (21%). Many firms use a team approach to evaluate capital projects. The largest number of their respondents believes that project definition and cash flow estimation is the most important and difficult stage of the capital budgeting process. Majority of the firms used cut off rate between 10% and 15%. The most popular method of handling risk in the capital budgeting process identified by 33% of the respondents was to increase the required rate of return of cost of capital.[35]

Chandra (1975) 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 expenditure. The findings of the study reveal 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 investments. Several other criteria such as profit per rupee invested, cost saving per unit of product, 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, safety margin in cost figures, flexible investment yardsticks, acceptable overall certainty index and judgement on three point estimates of rate of return.[36]

Porwal (1976) 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. Important key stages in the capital expenditure process are- (i) initiation, (ii) evaluation, (iii) approval and (iv) control. Though 44% of the respondents ranked first preference for DCF techniques, however, most companies were using combination of traditional and 'theoretically correct' economic evaluation techniques of capital expenditure proposals. IRR is favoured for new product lines whereas ARR is most favoured in case of existing product lines but PBP continues to be the next favoured technique. Competitive position is the main non-financial factor that is given due consideration for the capital budgeting decision. High profitability companies prefer 'cost of funds used to finance the expenditure' more than the WACC for determining the cut-off point. Capital rationing is not much is a problem in Indian industries. So far as risk in the capital budgeting is concerned, uncertainty in the availability of inputs, inability to predict key factors and uncertainty in government policy are reasons of project risk. Most companies in India are using one or more methods for incorporating risk. The shorter payback period and higher cut-off rate are the popular techniques used by companies in India. Priorities and higher rate of return are the two main criteria for minimizing disappointment and perceived conflict among the departments of a firm. For controlling capital expenditures, about two-thirds of the companies under study have reported that they adopt post-audit.[37]

Pandey (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 techniques for analysing risk in investment decisions.[38]

Sahu (1989) has 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 it's 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. Short term financing is generally used for financing fixed investment only during growth periods and that too for short periods. It was observed that PBP and ARR were the methods generally preferred by firms followed by discounting methods NPV and IRR.[39]

Dhankar (1995) examined methods of

evaluating investments and uncertainty in Indian companies. He selected a sample of 75 firms. His findings revealed that 33% of firms used non-discounted methods like PBP and ARR whereas 16% of companies were using modern DCF techniques. Moreover, almost 50% of the companies incorporated risk by 'Adjusting the Discount Rate' and 'Capital Asset Pricing Model'.[40]

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. The favourite capital budgeting methods of earlier years, ARR (about 19%) and PBP (about 38%) have been used as primary methods.[41]

PrabhakaraBabu& Sharma (1996)had done an empirical study on capital budgeting practices in Indian Industry. The authors have conducted a survey of 73 companies in and around Delhi and Chandigarh. They used personal interview method. It has been found by them that 90% of companies have been using capital budgeting methods. Around 73% of the companies have been using DCF methods. The popular investment appraisal methods are the 'IRR' and the 'PBP', used either individually or jointly. Around 70% executives felt that it is possible to estimate accurately the cash flows associated with each capital investment separately. They have observed that capital investment proposals are prepared by the concerned departments and the final decision is vested with other personnel/committee. The popular discount rate used by the firms is 'the term lending rate of financial institutions' closely followed by 'cost of capital'. The most often used method to resolve the uncertainty in the future returns seems to be 'inflating or deflating the future cash flows' –and it is followed by the use of 'sensitivity analysis'. Most of the executives (around 75%) appreciate the suitability of the DCF technique in our country.[42]

Jain and Kumar (1998) has done a comparative study of capital budgeting practices in Indian context and observed that 25% of sample companies invested for expansion and diversification and firms were making regular investments for replacement and maintenance. The selected sample companies preference for evaluating capital budgeting projects were PBP, due to its simplicity, easy understanding, less cost and less time, followed by NPV and IRR. Companies preferred WACC followed by 'Arbitrary rate' and 'Marginal cost of additional funds' as cut off rate for discounting the projects. For adjusting risk, the 'sensitivity analysis' was preferred followed by 'Higher cut off rate' and 'Shorter Pay Back Preiod'.[43]

Anand (2002)surveyed 81 CFOs of India to find out their corporate finance practices vis-à-vis capital budgeting decisions, cost of capital, capital structure, and dividend policy decisions. It analysed the responses by the firm characteristics like firm size, profitability, leverage, P/E ratio, CFO's education, and the sector. The analysis reveals that practitioners do use the basic corporate finance tools that the professional institutes and business schools have taught for years to a great extent. It is also observed that the corporate finance practices vary with firm size. As per his findings, the firms use DCF techniques more than before. They use multiple criteria in their project choice decisions. 85% of the respondents consider IRR as a very important/important project choice. About 65% of the respondents always or almost always use NPV. The PBP method is also popular. Large firms are significantly more likely to use NPV than small firms. Small firms are more likely to use PBP method than large firms. High growth firms are more likely to use IRR than the low growth firms. The sensitivity analysis and scenario analysis are most widely used techniques for assessing the project risk.[44]

Gupta et al. (2007) has made an attempt to explore which capital budgeting techniques is used by industries in Punjab, and the influence of factors such as size of capital budget, age and nature of the company, and education and experience of the CEO in capital budgeting decisions. They conducted a primary survey of 32 companies in Punjab. Almost one-third of the companies had capital budget exceeding ₹ 100mn. Majority of the sample companies still use non-discounted cash flow techniques like PBP and ARR. Only a few companies use DCF, and among them very negligible number use NPV technique to evaluate a new project. The most preferred discount rate is WACC. The most popular risk incorporating technique is 'Shorter PBP. Many companies feel that CEO education and experience play an important role in selecting the capital budgeting technique. Further, the study did not find any significant relationship between the size of capital budget and capital budgeting methods adopted. Similarly, though at some instances it appears that young companies prefer DCF techniques than the older ones, the same is not true in case of NPV method. Thus, age of the company also does not influence the selection of the capital budgeting technique. Similarly no significant

relationship could be established between the nature of industry and investment evaluation techniques.[45]

Conclusion

A large number of empirical studies have been undertaken to examine the methods of capital budgeting used by industries in India and abroad. Discounted as well as non-discounted cash flow techniques are used. Payback Period (PBP), Accounting Rate of Return (ARR), Net Present Value (NPV), Internal Rate of Return (IRR) and Profitability Index (PI) are the major capital budgeting tools used by corporate financial managers. Out of them PBP and ARR are the non-discounted cash flow tools. The NPV method is better than the IRR and PI methods. However, the IRR and PI methods are familiar to many corporate executives, they are widely entrenched in Industry, and they do have some unique virtues, most companies have many more potential protects that can actually be funded. Hence, managers must carefully select those projects that promise the greatest future return out of present cash outflow i.e. initial investment.

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