CHAPTER 3
REVIEW OF LITERATURE

During the past fifty years, the popularity of each of the capital budgeting techniques has shifted rather dramatically. In the 1950’s and 1960’s, the Payback period method dominated capital budgeting. Majority of the studies during this time rated discounted cash flow models as least popular. This is mainly because of the lack of financial knowledge and sophistication as well as the limited use of computer technology in those times. This trend changed in 1970’s and 1980’s when Internal Rate of Return (IRR) and Net Present Value (NPV) techniques slowly gained popularity, and by 1990’s these were used for decision making by virtually all major corporations. Whereas, firms used NPV and IRR as the primary techniques, Payback period method continues to be used as an important supplementary criterion (Bierman, 1992). The logic behind the continued popularity of Payback period method is its emphasis on liquidity or early recovery of cash flows (Sangster, 1993, Drury, Braund and Tayles, 1993, Jog and Srivastva, 1995 and Dhankar, 1995).

But beginning from late 1990’s, there was a big spurt in the use of DCF methods (IRR and NPV) primarily by the larger firms (Arnold and Hatzopoulos, 2000, Graham and Harvey, 2001, Ryan and Ryan, 2002, Anand, 2002, Truong, Peat and Partington, 2007). The Payback period, however, continued to be used as an important supplementary tool of analysis by larger firms, and as a primary technique by the smaller ones (Block, 1997, Holmen, 2005, Pradeep, 2008).

In this chapter, an attempt has been made to present a review of the studies conducted in the area of capital budgeting.

Mao (1970) interviewed 8 medium and large companies from electronics, aerospace, petroleum, household equipment and office equipment industries. The study reveals that maximization of the market value of share as advocated by theory was explicitly or was the prime goal of the interviewed companies. The goal of maximizing share value is translated into operating targets of growth and stability in earnings stream. Further, it pointed out that while modern finance theory recommends the usage of IRR or NPV criterion of investment appraisal, research confirms the prevalence of Payback period and the accounting profit criterion in practice. It was observed that out of 8 companies, 2 made use of IRR (these were growth companies with closely held stock financing growth from internal funds and having relatively
small investments); 4 used IRR together with accounting profit and Payback (these were widely held companies with higher dependence on external sources of financing, and having risky businesses) and 2 used accounting profit, Payback and an “exposure index” (companies having risky investments, due to strong industry competition and few but large investments). Further, Payback criterion was preferred primarily as a risk measure; accounting profit was preferred in widely held companies dependent on external financing; and IRR was preferred in closely held firms which depended on internal financing having small or less critical investments. However, in contrast to the theory, risk adjusted discount rate is preferred over the certainty equivalent approach or probability analysis as a method of incorporating risk. Executives also indicated that their concept of risk is better described by the semi variance than by ordinary variance. In another study by Istvan (1961), he reported an inclination for Accounting Rate of Return and only 10 percent of the firms surveyed by him reported the use of some form of discounting techniques for their investment decisions.

Baker and Beardsley (1972) studied 134 multinational firms (having consolidated sales of at least $ 500 million and having substantial investments in one or more countries outside US), to determine the capital budgeting techniques used by these U.S MNCs in competing international capital investment projects. A total of 62 usable responses were obtained which revealed that less usage is made of DCF techniques like NPV and IRR as compared to the traditional techniques. About 65 percent firms made substantial use of Payback followed by 55 percent ARR, 47 percent IRR and 44 percent NPV. It was observed that majority of low margin multi product firms such as food & tobacco, chemical, plastics & drugs, lumber, paper, wood relied more on Payback period (used by more than 85 percent) while majority of mining, petroleum (72 percent) and electrical (86 percent) preferred DCF techniques. Nearly 55 percent companies indicated the appropriateness of ARR for analyzing foreign investment opportunities. The study concluded that majority of firms seem willing to use a variety of capital budgeting techniques and a trend is developing towards greater use of more sophisticated discounted cash flow techniques. However, Payback is still preferred by financial managers of MNCs because of its simple computations.

Klammer (1972) conducted a survey of 369 manufacturing firms included in 1969 Compustat listing of manufacturing firms and got usable responses from 184 firms (49.9 percent response rate). The study reported a change in preference from
non-discounted to general Discounted Cash Flow (DCF) models with nearly 57 percent of respondents preferring to use DCF methods like NPV and IRR as primary methods of investment evaluation in 1970 as compared to 19 percent in 1959, and Payback by only 12 percent of respondent firms (in 1970) as primary method, as compared to 34 percent in 1959. The non-discounted methods were found to be used mostly as a secondary method of evaluation. Only 25 percent firms were using discounting standards exclusively, although 67 percent made use of some discounting method. Nearly 39 percent of the companies used some specific formal method for incorporating risk with majority of them preferring raising required rate of return for the same. The survey clearly revealed the increasing usage of DCF techniques and declining popularity of Payback.

Fremgen (1973) observed that 14 percent of the firms used the Payback period as a primary measure. Nearly 76 percent of the firms interviewed used discounting methods in evaluating their projects, and risk was considered by 67 percent of the firms in the analysis of capital investment proposals. However, less than 8 percent of the firms used quantitative methods like Sensitivity analysis or Monte-Carlo Simulation for risk incorporation. The most popular method for dealing with risk appeared to be placing more stringent requirements on the customary financial criteria for investments. Further, 97 percent of the firms said that they did approve capital investments that were not economically justified, but such approval was based upon other (non-economic) reasons. Examples of such reasons included safety, social concern for employees and community, necessity of maintaining existing programs, and pollution control.

Petty, Scott and Bird (1975) found that 12 percent of the firms used Payback period as a primary measure, 40 percent as a secondary measure, and about 35 percent as tertiary measure. This is probably because this method is easy to understand and compute and also because it indicates, to some extent, the risk of a project. Nearly 40 percent of the firms defined risk as the probability of not achieving a target return (semi variance) followed by 30 percent defining it as variations in returns (variance). Nearly 61 percent of the firms used the Payback period extensively in their attempt to determine whether the "risk" of a given project is within an acceptable level. The risk-adjusted discount rate method was consistently relied on by 37 percent of the firms. The diversification of corporate investments is recommended in the literature as a way to reduce risk, but 57 percent of the firms stated that no such objective is given
recognition. They further reported that minimum return standards for project evaluation proposals were based upon: (1) Management determined target rate of return (40 percent of the surveyed firms), (2) the Weighted cost of funds (30 percent of the firms), (3) Cost of a specific source of funds (17 percent of the firms), and (4) Historical figures (13 percent of the firms). Further, 77 percent of the firms replied that although quantitative influences are dominant, qualitative factors do influence the investment decision. The most important among these factors, ranked first by 37 percent of the firms, was the legal factor followed by image (17 percent) and environmental responsibility (14 percent) of the firms.

Petry (1975) conducted a study on the use of capital budgeting techniques adopted by 284 large United States Corporations representing 20 industries. The study observed an increasing sophistication in capital budgeting with a shift towards use of Discounted Cash Flow techniques especially the IRR (preferred by 61 percent companies) as compared to NPV (preferred by 33 percent companies). However, Payback period was found to be still very popular with 58 percent companies. Almost 74 percent of the companies studied used more than one capital budgeting technique for evaluating investments. No consistent pattern of use for a particular measure was observed, when the firms were analyzed by size (sales or revenues). But capital-intensive units preferred time-weighted measures (IRR and NPV methods) while the less capital-intensive industries preferred Payback Period method. Similarly, the number of techniques employed was related to size of the firm, with the large firms using a greater number of techniques than the smaller firms. In six industries, on the average, firms used more than 2.5 methods. These industries were either capital intensive or exhibited rapid product obsolescence.

Brigham (1975) conducted a survey of 33 large sophisticated firms in U.S having assets in millions and found that 94 percent firms used DCF methodology i.e. any of the three methods NPV, IRR or Profitability index. Majority of these firms preferred NPV in particular. These firms did not use multiple hurdle rates, and a vast majority of 62 percent firms who used DCF techniques adopted a hurdle rate based on Weighted Average Cost of Capital (WACC). About 39 percent of the respondents revised hurdle rates less than once a year and they did not have a system for its review.

Chandra (1975) in a study of 20 large non-government corporations in India noted that DCF techniques though not commonly used, are gaining importance
particularly in the evaluation of large investments. The study analyzed the impact of different variables like size, industry category, financial performance, capital intensity etc. on the usage of investment evaluation techniques. According to the study, most of the investments undertaken by companies in India are either of replacement type or of expansion of existing production capacity. Further, out of the 20 companies surveyed, only 4 adopted a well defined policy for acceptability of investment proposals by calculating specific measures of investment worth. The survey revealed that, for evaluating small size investments, Payback period method was used mostly by the companies while for evaluating large size investments, the company’s preferred Average Rate of Return as principal criterion, and Payback as a supplementary criterion. Profit per rupee invested, cost saving per unit of product, and investment required to replace a worker were among several other criteria to evaluate investments.

Porwal (1976) studied organizational, quantitative, behavioral and control aspects of capital budgeting in large manufacturing public limited companies. A total of 118 non finance non-government manufacturing public limited companies (above Rs. 10 crore) were selected from the fact sheet prepared by the Department of Company Affairs, Government of India. The companies covered represented three industries i.e basic industries, capital and consumer goods industries, and intermediate goods industries. Mailed questionnaire and personal interview methods were used for data collection resulting in 52 usable responses. The collected data was analyzed profitability-wise, size-wise and rank-wise. The study reveals that IRR method was preferred by 36 percent of the companies especially for new product lines, while ARR by 43 percent of the companies, preferred for existing product lines. It further stated that Payback period is the next favored technique for both the lines, used by 46 percent of the companies due to shortage of liquid funds and by 21 percent because of its easy calculation. Existence of sellers market, too much government control and highly inflationary economy were reasons responsible for non usage of DCF techniques. The most preferred rate of discount was the Arbitrarily decided cut off point but Weighted Average Cost Of Capital was gradually becoming popular. Uncertainty in availability of inputs, probability of not achieving target return and uncertain market potential are considered as risk factors. For incorporation of risk, Shorter payback period and Higher cut off rate were mostly preferred by companies. Employee relations and competitive position were the qualitative considerations in
evaluating investment proposals. The study observed a growing awareness towards the desirability of using discounting techniques in India particularly in case of new product lines.

Gitman and Forrester (1977) studied 103 firms selected from 268 major U.S. firms mentioned in a list of 600 companies which experienced greatest stock price growth over 1971-76 and also appeared in the list of 500 companies having made greatest dollar capital expenditures during 1969 as reported in Forbes. The study observed that majority of the companies had annual capital budget of over $100 million, and for formal analysis of a proposed project a minimum outlay of $10,000 or more was required. As per the study the most difficult (65 percent) as well as the most critical stage (53 percent) of capital budgeting process was project definition and cash flow estimation followed by financial analysis and project selection. A strong preference was found for sophisticated discounted capital budgeting techniques as the primary tools of analysis particularly the IRR (preferred by 53.6 percent of firms). Payback period was considered to be the most popular for secondary analysis (preferred by 44 percent firms). NPV was preferred as a supplementary technique by nearly 26 percent respondents but by only 9.8 percent as primary. Further, 71 percent of the respondents gave an explicit consideration to risk and the most popular technique was increasing the minimum rate of return or cost of capital (43 percent firms) followed by Certainty Equivalent Approach (27 percent firms).

Schall, Sundem and Geijsbeck (1978) analyzed capital budgeting techniques adopted by large US firms. Questionnaires were mailed to major financial officer of 407 firms and 189 responses were received which later increased to 204 by telephone follow up. The study concluded that 86 percent firms used multiple techniques of capital budgeting and 17 percent used all the four i.e Payback, ARR, IRR and NPV. Payback period technique was the most preferred (used by 74 percent of the firms), followed by IRR (65 percent firms), ARR (58 percent firms) and NPV (56 percent firms). WACC was the most common discount rate used by 46 percent of the firms. The most common method of predicting cash flows was by first estimating net income and then adjusting it against non cash items like depreciation. Further, 78 percent firms reported making adjustment for risk, and a clear majority of them (90 percent) adjusted risk by raising the required rate of return (ROR) while very few of these (10 percent) used shortening payback period. It revealed a trend towards the use of sophisticated capital budgeting techniques with 86 percent of firms using DCF
methods. This level of sophistication was found positively related to the size of the firms’ capital budget and negatively to firms’ beta value.

Oblak and Helm (1980) surveyed 226 Fortune “500” firms (operating in 12 or more foreign companies as reported in directory of Corporate Affiliations) and received response from 58 of them. It was found that IRR method was most preferred as the primary evaluation method while Payback period was the most popular secondary criterion. DCF techniques were used by 76 percent firms as the primary method while 94 percent used at least one of the DCF techniques. About 54 percent MNCs used WACC either exclusively or in combination with another discount rate as a cut off rate. As per the study, 72 percent firms considered risk in capital projects and borrowing funds locally was most frequently used to incorporate risk in foreign projects, followed by adjusting the rate of return and adjusting the Payback period. The study concluded that higher percentage of MNCs used DCF methods and adjusted for risk in foreign project evaluations.

Stanley and Block (1984) studied 339 multinational firms (taken from 1000 largest U.S industrial corporations for 1981 as reported in Fortune Magazine) and received responses from 121 of them. The study reported the increased use of sophisticated capital budgeting techniques with IRR as the primary technique of project evaluation preferred by 65.3 percent firms and NPV by only 16.5 percent firms. Payback period was used as a primary technique by only 5 percent firms and as a secondary tool by 37.6 percent firms. It was found that the firms using more sophisticated techniques were more likely to do risk analysis in capital budgeting with 62 percent firms making risk adjustment. Risk adjusted cash flows and Risk adjusted discount rates were both equally popular risk techniques. WACC was the most preferred method for calculating cost of capital used by nearly 88 percent firms. Nearly 49 percent of the respondents used the parent company's cost of capital, 32 percent used the project cost of capital, and some used both. The cost of capital was adjusted for expected changes in foreign exchange rates by 34 percent of firms in order to adjust their foreign currency debt. The study reveals a positive relationship between size of firm and capital budgeting techniques with larger firms tending to use more advanced techniques like IRR and less likely to employ ARR and Payback as a primary evaluation criteria.

Bansal (1985) studied capital expenditure practices of large sized manufacturing companies in public and private sector. A pre-tested questionnaire was
mailed to 297 companies listed in the Fact Sheets prepared by Department of Company Affairs, Government of India resulting in 243 usable responses. The study revealed that multiple objectives were considered while taking capital expenditure decisions, and conventional objectives like return on investment, aggregate profits were still preferred. The company’s planned five years in advance before making the capital expenditure, and top management decided the final acceptance or rejection of the proposals. It was found that ARR was the most preferred method for evaluating existing and new lines investment proposals while Payback was preferred as a secondary method of evaluation. The cut off rate used in DCF techniques was “Arbitrary Cut off Point decided by the management”, and “Cost of funds used to finance projects”. For risk adjustment, majority of the companies used traditional methods of Shorter Payback Period and Higher Cut off Rates. Legal requirements, competitive position, employer-employee relations and community relations were important qualitative consideration in capital expenditure decisions. Over 50 percent companies were doing post completion audit of capital expenditure proposals. Such techniques as PERT, CPM and linear programming were used in capital expenditure planning and control.

Ross (1986) made an in-depth study of capital budgeting for discretionary projects by twelve firms in the processing industries. The study reported a widespread use of DCF methods, especially IRR by 5 firms, usage of a combination of DCF and Payback by another 5 and only Payback by only 2 firms. Simultaneously, many firms also continued to use simple payback or related methods. For smaller projects, most of the firms either simplified their DCF analysis and/or relied primarily on simple Payback while in case of larger projects DCF measures like IRR were preferred. Eight of the twelve firms studied used different hurdle rates (discount rates) depending on the size of the projects i.e. higher hurdle rates for small projects and hurdle rate near cost of capital for large projects. Only four of the twelve firms studied imposed uniform hurdle rates regardless of the locus of decision-making (or size of project).

Mills (1988) in his study titled “Measuring the Use of Capital Budgeting Techniques with the Postal Questionnaire :A UK Perspective” sent questionnaires to 200 companies (corporate headquarters and divisional offices) selected from the London Times 1,000 listing of the largest UK companies according to the market capitalization and turnover definitions used by Pike [1982]. The effective response rate for corporate and divisional offices was 60 percent and 63 percent respectively.
Both in case of corporate headquarters and divisional offices Payback was most preferred followed by 78 corporate and 77 divisional respondents respectively. Further IRR was highly preferred by 68 corporate and 57 divisional respondents respectively. Next to these two was NPV, preferred by 51 corporate and 42 divisional respondents respectively. However, those companies that employed formal methods to analyze risk composed a relatively small proportion of the total (21 percent of corporate respondents and 23 percent of divisional respondents). Further, the methods adopted lacked the sophistication frequently described in the literature on incorporating risk. By far, the most popular method adopted was Sensitivity Analysis upon key variables. This method was reported as being popular because it is simple to understand and use, and its use was facilitated in these companies by the availability of computer spreadsheet and financial modeling packages. The results obtained from both corporate and divisional respondents supported an association between the incidence of discounted cash flow techniques and the company size. The analysis further indicated that large and medium-sized companies tended to adopt a package of sophisticated practices, that is, discounted cash flow techniques, project evaluation procedures, and formal methods to analyze risk. However, while statistical testing revealed no significant association between the use of different appraisal techniques and the industry within which the companies operate, it was observed that more sophisticated practices were tended to be used in oil and continuous process industries and financial services sector.

The study concluded that corporate headquarters and divisions of very large UK companies had not adopted the more sophisticated discounted cash flow techniques to the exclusion of the simpler techniques available. Both corporate and divisional managers report considerable emphasis upon traditional, simple techniques like the payback period. Similarly corporate respondents involved in the process of setting hurdle rates (particularly of large companies) although indicated that a move towards more sophistication in their calculation, the judgment exerted was still found to be the most important.

Pruitt and Gitman (1987) provided a deeper understanding of capital budgeting forecast biases and cash flow estimation. They found that 80 percent of high-ranking financial officers perceived both a pronounced upward bias in the revenue forecasts and a less-pronounced downward bias in the cost forecasts which compounded the profitability forecast error. Over two-thirds of the officers felt that
these biases arose due to intentional overstatement or lack of experience. Among those who did not attribute bias to these two main reasons, 1) psychological explanations (e.g., myopic euphoria, mass psychology, group polarization, and salesmen optimism), or 2) erroneous information emanating from upper level management and provided to forecasting personnel, were found as the main reasons. The officers said they have handled such biases by adjusting the cash flow estimates downward on an informal basis, although specifically, how this adjustment was made was not addressed.

Pohlman, Santiago and Markel (1988) provided the first in-depth look at the cash flow estimation practices by surveying the Fortune 500 companies. Among other important findings, they found that about 67 percent of the survey respondents employed a person to specifically supervise their cash flow estimation. Firms with more leverage and higher capital intensities were even more likely to have such a specialized person. About 85 percent of the respondent companies used systematic, company-wide, standard procedures in estimating cash flows (which were used even more in higher risk firms). Nearly 78 percent had standard forms and worksheets for their cash flow forecasts, and 65 percent had a standard model. In addition to considering production, marketing, financial, and economic factors such as inflation, firms combined judgement with their quantitative forecasts. One of the noteworthy points of their research was the emphasis on the importance of information systems and their role in forecast accuracy.

Mukherjee (1988) found that all the companies required computation of the IRR and payback period for quantifiable projects, especially, when the size of the project exceeds a threshold. Although many firms suggested that the NPV information is to be provided as a part of the supporting data, it was IRR which seemed to enjoy the prominence by virtue of its place on the top summary sheet. References to other techniques (e.g., Profitability Index, Average Rate of Return) were seldom. Some manuals provided hurdle rate for computing NPVs or for comparing with IRRs.

It was observed that when a single hurdle rate was given, it ranged from 10 percent to 25 percent. However, whether this rate was the firm's cost of capital or it was derived in an ad hoc manner is not clear from these manuals. Each project's DCF/ROI was compared to the company's Weighted Cost of Capital for determining the financial attractiveness of that project. It was also observed that very few firms made special efforts to define risk. Several firms made specific reference to
Sensitivity analysis in assessing risk and the objective was to determine those variables to which the returns on the act are most sensitive such as volume, selling price, capital cost, manufacturing unit cost, product mix etc. Adjusting the required rate of return based on a project's risk classification seemed to be the favourite method (in fact, the only method) of risk incorporation for the firms that reported their risk adjustment procedure in the manuals. References to capital rationing were almost non-existent in the manuals and thus the procedure to be followed under such conditions is not reported.

It was further suggested that the recommended alternative might affect a firm's operation via, for example, employee safety, improved work flow, and better quality. These items were a critical part of the approval decision and in some instances, eroded even the financial return. Almost all the firms provided cash flows projection schedule and clearly defined what the cash flow is and what should be included in or excluded from it. According to them, outflows should include outflows from operation, investments in fixed assets, working capital and opportunity costs and inflows should include incremental cash flows from operation and tax ramifications including tax shield by depreciation and ITC. Only a handful of firms incorporated the expected effects of inflation in project cost estimation because the resulting analysis would involve comparing dollars of different purchasing power.

Blazouske, Carlin and Kim (1988) studied the capital budgeting practices of large industrial Canadian companies in 1985 and compared these with the same in 1980 on the basis of responses of 208 CFOs of the companies. It was observed that IRR was most preferred primary investment evaluation technique in both 1980 and 1985. It was applied by 40 percent companies in 1985 while its usage was 38 percent in 1980. IRR was further followed by NPV (25 percent), Payback (19 percent) and ARR (9 percent) in 1985. However, in 1980 it was followed by Payback (25 percent), NPV (22 percent) and ARR (11 percent). Further, 64 percent companies in 1980 made adjustment of risk subjectively which decreased to 55 percent in 1985. Further, 47 percent of the respondent companies in 1980s were found using management science techniques like decision theory, computer Simulation, programme evaluation and review technique, critical path method, regression analysis etc. which increased to 61 percent in 1985.

Pandey (1989) examined capital budgeting practices of companies in India and compared them with those of U.S.A. and the U.K. He studied 14 Indian companies
using Intensive Interview cum Questionnaire method and observed that with the exception of one company, all companies used Payback period method. Further, 9 companies used IRR, about 6 used NPV and nearly one third of the companies were found using ARR. The study concluded that in India and in UK, firms used Payback period as primary method and NPV and IRR as secondary methods of capital budgeting, while it was reverse in case of USA. In computing discount rate, nine companies preferred minimum acceptable rate of return and four preferred the WACC. Selling price, product demand, technological changes and government policies were four prime risk factors in investment proposals. Further, only eleven respondent firms considered risk in evaluating investment proposals and Sensitivity analysis and conservative forecasts were most widely preferred methods for incorporating risk. There is a lack of familiarity with the discounted cash flow methodology amongst the executives. The cost of equity is taken as 25 percent based on value judgment. It was also revealed by the study that Indian firms generally do not reject profitable investment projects for paucity of funds.

Sahu (1989) made an attempt to study the trends in fixed investment and its financing. He selected 44 non-financial, non-government and manufacturing public limited companies registered and working in Orissa. Due to non-availability of complete data, only 15 out of 44 such companies were selected for study. These companies were classified on the basis industry category, size and age. He made use of fund flow analysis, trend analysis and correlation analysis. The study found that routine investments were financed through internal sources of funds while growth investment generally utilized the external sources of funds. Fixed investment of routine nature was made continuously and on regular basis for maintenance and replacement while growth and expansion investments were made in lumpsum and discontinuously. It was observed that Payback period, Accounting Rate of Return, Net Present Value and Internal Rate of Return methods were preferred for evaluating capital investments.

Klammer, Koch and Wilner (1991) identified five hundred large industrial companies included on the Compustat tapes. This sample included those firms that had responded to the 1980 Klammer and Walker survey, with all firms with capital expenditures in 1987 of $100 million or more, and a random sample of firms with reported capital expenditures in 1987 between $20 and $100 million. Mergers reduced the final sampled to 484 firms. The questionnaires were sent to the CFO’s of the
selected companies resulting in 100 usable responses (20 percent response rate) which later increased to 118 firms after second mailing. Twenty-nine firms responded to both the 1980 Klammer and Walker survey and the 1988 survey. These firms were analyzed separately. First, the 1988 responses across all three time periods (1975, 1980 and 1988) were compared for these 29 firms for the project types of replacement, expansion of existing operations, expansion into new operations, foreign operations, abandonment, general and administrative, social, and high technology. Later, for purposes of analysis, responses were grouped into four categories and analyzed in the following order: discounting, simple rate of return, Payback, and urgency.

Where there were changes in the project evaluation methods used, the theoretically preferable evaluation methods were consistently adopted. For example, discounting was used in 1988 when payback had been used in 1984. In a review of the entire project evaluation techniques responses, it was identified that there were only three instances in which individual firms adopted, what might be considered "less sophisticated" evaluation techniques. In each of these cases, the companies specified that they now evaluated that particular project using "urgency" as the primary evaluation tool. The use of theoretically preferred project evaluation techniques continued to grow. The patterns of technique usage and the trend towards use of more discounting methods, shown by this new study are very similar to those of previous surveys.

It was observed that for replacement decisions, expansion of existing operations, expansion into new operations, abandonment decisions, and foreign operations there occurred statistically significant differences in the usage of the various techniques between 1975 and 1988 revealing an increasing trend towards more use of discounting techniques.

Nearly 70 percent of the firms indicated that they looked at risk by using some formal technique. While there are many techniques that might be used to analyze and incorporate risk into capital budgeting analysis, two techniques of Sensitivity analysis and increasing the required rate of return are shown to be predominant. However, it was observed that there has been little growth in the use of mathematically elegant techniques or management science techniques. Chi-square tests were run to determine if there were significant increases in the use of ‘at least one’ of the formal risk analysis techniques. A combined three time periods comparison (1975, 1980 and 1988) was found significant at 5 percent level of significance. Further, the results of
the discriminant analysis suggest that size and performance measures relate to the extent of use of risk analysis but do not determine which risk analysis measures are used.

Ken and Cherukuri (1991) conducted a study on current practices in capital budgeting, cost of capital and risk adjustment adopted by large U.S. corporations. Questionnaires were sent to CFOs of 389 non financial corporations selected from the “Ranking the Forbes, 500 April 1986 Forbes issue”, and 101 usable responses were obtained. It was found that IRR was the most preferred primary technique used by 66 percent companies while 33 percent used NPV, Accounting Rate of Return (ARR) and Payback were least preferred with 7 percent and 5 percent of companies using them respectively. The most widely accepted discount rate was Weighted Average Cost of Capital preferred by 78 percent respondents. For measuring risk, Sensitivity analysis was the most preferred technique used by 80 percent of the respondents, followed by increasing the required rate of return and shortening the payback period. Most of the corporations used multiple evaluation techniques because of availability of computers.

Sangster (1993) conducted a study of 94 out of 491 companies (taken from 1987 volume of Jordan’s ‘Scotland Top 500 companies) to examine the investment appraisal techniques used by Scotland’s largest companies (on basis of turnover). Payback period was found the most popular method for investment appraisal used by 78 percent companies followed by IRR (58 percent), NPV (48 percent), and finally ARR (31 percent). However, the DCF techniques were found almost as widely used as Payback period, and in companies using more than one of the four methods, DCF techniques were more popular than Payback. The prime reason for this is the organizational change fuelled by the growth of Information Technology (i.e. computer and computer packages). Similarly, IRR was found more popular than NPV despite theoretical superiority of the latter. Over 40 percent of the companies surveyed used three or four methods. The study found no association between size of company and usage of DCF techniques. Further, usage of ARR method declined as it was used by only 9 percent of those companies using a single method. It was preferred more as an additional rather than a principal criterion for evaluating investments.

Bierman (1993) conducted a survey of capital budgeting techniques of the largest 100 firms in the Fortune 500 Industrial Firm listing, and received 74 usable responses. All of the respondent firms used time discounting in some form, and 99
percent of the firms (all except one) used IRR or NPV as either the primary or secondary method. ROI is still used extensively by 50 percent of the firms. Of the seven firms that used ROI as a primary method, six used one or more other methods. Payback is extensively used (84 percent of the firms). Several of the responses indicated that a Discounted payback was used. No firm used only the Payback as a primary method. Seventy-three of the firms (99 percent) used IRR compared with 63 of the firms (85 percent) using NPV. Given that IRR can be improperly used (two illustrations of potentially improper use are mutually exclusive investments and multiple rates of return), the sole use of IRR without using NPV is of some concern. However, the fact that 85 percent of the firms used NPV, is a dramatic improvement. Of the 74 firms responding, only ten firms used two methods or less. Sixty four firms used three or more methods. The data indicated that firms tend to use several methods and do not place excessive faith in any one measure. It was also observed that 68 of the 74 firms (93 percent) used Weighted WACC. Secondly, 53 of the 74 firms (72 percent) used the rate applicable to the project based on the risk or the nature of the project. On the other hand, only 26 of the firms (35 percent) used the rate based on the division's risk. The use of the Cost of debt was frequently associated with the buy versus lease decision, and if it is used in other investment decision situations, a risk adjustment to the cash flows would have to be made to consider risk effectively.

Firms are taking the time value of money into consideration, but the corporations make decisions using capital budgeting calculations supplemented by any relevant qualitative and strategic considerations. These capital budgeting decisions are affected by the performance compensation system and these considerations are likely to be more important than marginal improvements in the calculations.

Drury, Braund and Tayles (1993) in a survey of 300 manufacturing companies (with annual sales exceeding £ 20 million) found that Payback (86 percent) and IRR (80 percent) were the most widely used project appraisal techniques. Almost 49 percent of the respondents did not use statistical analysis for risk analysis, and Sensitivity analysis was the most widely used project risk analysis technique. It was also found that 95 percent of the respondents never used either CAPM or Monte Carlo Simulation due to lack of understanding.

Petry and Sprow (1993) in a study of 151 firms (listed in the 1990 Business Week 1,000 firms) observed that about 60 percent firms used the traditional Payback
period and 90 percent firms used NPV and IRR either as a primary or as a secondary tool for capital budgeting. Most of the financial managers pointed out that either they had not heard of the problems of IRR (like multiple rates of return and NPV and IRR conflict) or such problems rarely occurred. They found that 75 percent of the companies used different required rates of return to account for risk differences, when making capital budgeting decisions. Only 25 percent of the respondents used single discount rate for all the projects and most of the respondents indicated that they used cost of funds of their firm as a cut-off rate. In case of riskier projects, they raised the cut-off rate. Some firms used a reduced minimum payback period to evaluate projects with above average risk.

Purohit, Lall and Panda (1994) carried out a study on the fixed assets management in the joint stock companies of eastern India by selecting 100 non-financial public limited companies (from 5664 companies of stock exchange official directory of Bombay stock exchange). The companies were divided into three groups on the basis of age, size and industry. The study concluded that routine investments were financed with internal sources and external sources were used for financing growth investments. Though all four methods of Payback, ARR, IRR and NPV were prevalent with the companies, but Payback Period and Accounting Rate of Return were used more due to their simplicity.

Dhanker (1995) studied the capital budgeting methods used by various industries, and the methods used by them for incorporating risk and uncertainty in projects. For this purpose data was collected from 75 large-scale manufacturing companies in private sector (having paid up capital of over Rs. 1 crore). The companies were classified on the basis of age, sales and paid up capital. The study revealed that 16 percent companies were using Discounted cash flow methods (i.e. NPV, IRR and PI) while 33 percent applied traditional methods (i.e. PB and ARR). Moreover, nearly 51 percent of the respondents were found using a combination of DCF and traditional methods. It was further found that companies incorporate risk either by adjusting the discount rate (51 percent) or shortening the payback period (45 percent). The study further advocated that relatively well established companies with high sales and high paid up capital use more appropriate investment techniques and discounting methods than small newly established companies.
Babu and Sharma (1995) studied 73 companies (12 public and 61 private) in and around Delhi and Chandigarh covering the period Aug-October 1992 and examined the capital budgeting practices prevalent in the Indian industry. It was observed that nearly 92 percent companies were using capital budgeting methods while 73 percent used DCF techniques. Most popular techniques were IRR and Payback period preferred by 25 percent and 19.6 percent companies respectively whereas use of NPV was not as popular (3.4 percent). Inflating or deflating future cash flows is preferred to resolve uncertainty in future cash returns by nearly 36 percent companies followed by Sensitivity analysis (27 percent) and adjustment of discount rate (12 percent). Most popular rate of discount used by the companies was Cost of capital, closely followed by Bank rate and Term lending rate of financial institution. Nearly 75 percent of the executives appreciated the suitability of capital budgeting techniques in India. In majority of the companies, top management or the Board of Directors was the final authority for approving investments.

Shimin (1995) in a study of 115 CFOs of 599 publically held manufacturing firms (drawn from April 1990, Disclosure CD-Rom database provided by disclosure Inc, Maryland) compared four project evaluation techniques (NPV, IRR, Payback and ARR) over three types of investment (expansion in new projects, expansion in existing project and equipment replacement), and examined the impact of eight firm characteristics on the use of capital budgeting techniques. The study observes that DCF techniques are preferred over the Payback period and the use of DCF is more in both types of expansion projects than equipment replacement, though one would expect a decreasing use of DCF techniques in expansion projects due to uncertainty of cash flows. Non-financial techniques are found to play a considerable role in project evaluation. Further, an association between investment types and non-financial techniques was also observed. It was found that non-financial techniques are more heavily used in evaluating projects of expansion into new products than in any other types of projects.

Gilbert and Reichert (1995) in his study of companies included in 1990 Fortune Magazine directory observed that there has been a tendency for firms to shift towards greater use of discounted cash flow techniques such as NPV and IRR. The firms generally did not rely on a single capital budgeting technique for evaluating projects and based their decisions on information generated by more than one technique.
Jog and Srivastava (1995) studied capital expenditure decision making process, capital budgeting techniques, cost of capital and dividend policies of large Canadian firms. He received 133 usable responses (a response rate of 22.9 percent) from 582 large Canadian companies and found that Payback period method was the most preferred method of project appraisal in companies of Canada and United Kingdom. Further, the study noted a decreasing preference for Accounting Rate of Return in these companies. The study also revealed that NPV always trailed IRR in managements’ preference because managers of various companies supported the idea that percentage return is more easily understood and comparable than an absolute dollar value increase in shareholder wealth.

Porterba and Summers (1995) surveyed the chief executive officers of the Fortune 1000 companies to provide a deeper understanding of how hurdle rates were measured and used. They found that Hurdle rates were higher than what the standard analysis would suggest. Most firms had more than one hurdle rate, which varied with the project the firm considered. Some managers made a distinction between the cost of capital and hurdle rates as a way of adjusting for biased estimates of project’s profitability.

Pike (1996) conducted a longitudinal study on capital budgeting practices in UK companies at approximately five years’ intervals between 1975 - 1992 on a sampled of 208 companies (drawn from largest 300 UK quoted companies as measured by market capitalization). He got usable response of 72 percent in 1980, 78.1 percent in 1986, and 71 percent in 1992. An increase in usage of DCF techniques and increased tendency to employ a combination of appraisal methods rather than rely on a single technique was observed with each survey supporting results of Sangster (1993). In 1975, majority of the firms adopted primarily one or two methods (typically Payback, and Accounting Rate of Return); and by 1992 a combination of all four methods (Payback, Accounting Rate of Return, IRR and NPV) was most common (36 percent), a threefold increase since 1980. There took place a major change in percentage of firms formally analyzing risk with a shift from 26 percent in 1975 to 92 percent in 1992. While raising the required rate of return was the most popular risk technique in 1975, Sensitivity analysis was the most prevalent technique in the eighties and the nineties. The comparison of broadly the same respondents over a 17-year review period suggests that firm size is still significantly associated with degree of use of DCF methods, but not for Payback; and the use of Average
Accounting Rate of Return is unchanged. It is suggested that firm size per se may not be the direct causal factor in determining use of sophisticated methods; but the 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.

Cherukuri (1996) surveyed 74 out of 300 top (according to assets) non-government companies in India and compared their capital budgeting practices with those in Hong Kong, Malaysia and Singapore as reported by Ann, Farragher and Leung (1987). The study revealed that IRR was the most preferred project evaluation technique applied by 51 percent companies while 30 percent selected NPV as most preferred. As regards the non-DCF methods were concerned, Payback and Accounting Rate of Return were used by nearly 38 percent and 19 percent of the companies respectively. Overall, nearly 67 percent companies gave first preference to DCF techniques. The use of computer programmes for applying the different methods resulted in increased usage of multiple project evaluation methods. In contrast with the Indian experience, Payback and ARR were most preferred project evaluation techniques in South East Asia. Majority of the companies used WACC (35 percent) followed by Cost of Debt (21 percent) as discount rate in project appraisal. For adjustment of risk, 90 percent firms used shortening the payback period, adjusting the rate of return, and adjusting cash flows. Nearly 59 percent conducted Sensitivity analysis for risk assessment. Monte Carlo Simulation, certainty equivalents or utility theory were, however, not so popular risk techniques. In contrast to this, the three South East Asian countries neither assessed, nor analyzed or adjusted the evaluation methods to reflect any perceived risk to much extent. Except, Sensitivity analysis and adjustment of the cash flows, neither of the risk techniques had high degree of usage. The study further concluded that India is rapidly changing from a seller’s market to a buyer’s market and competition is intensifying. So the trend of adopting theoretically superior methods for project evaluation is expected to continue at an accelerating pace.

Bhattacharya (1997) in a study of capital budgeting practices of 11 Indian companies (3 large public undertakings, 7 private and one state financial institutions) found that IRR was the most popular method used by 10 companies followed by NPV (8) and Payback period (5). Sensitivity analysis was the most popular method for adjusting the cash flows for incorporation of risk. Out of 11 companies, 2 PSUs that
followed Administered Price Mechanism were taking “Guaranteed Return” as cut off point while rest of the 9 companies used “Cost of debt” As per the survey; the use of discounted cash flow methods is a big achievement for Indian corporate sector. The study further suggested “Adjusted Present Value” as a superior alternative to Weighted Average Cost of Capital and recommended use of advanced techniques like Option pricing, Simulation and decision tree for appraising investments in times of intense competition.

Chadwell-Hatfield, Goitein, Horvath, and Webster (1997) supported the results of previous studies (Sangster (1993), Pike (1996)) that firms use more than one criterion in project choice. More than 70 per cent of the firms surveyed considered a high IRR an important criterion in deciding which project to accept. While 84 percent firms used NPV as one of the methods in appraising the projects, only 50 percent stated that a high NPV is important for determining acceptability of the projects. In addition to either high IRR or NPV, nearly 67 percent of the firms used Shorter payback period to adjust for risk in investment evaluation. The discount rate used in the project evaluation was found to be based on the project risk.

Block (1997) studied the capital budgeting practices followed by small business firms in 1990s by drawing a random sample of 850 firms (having sales less than $ 5 million and fewer than 1000 employees) from Dun and Bradstreet’s 1995 Million Dollar Directory resulting in 232 usable responses. The study found that small firms still continued to be dependent on Payback method as the primary method of analysis (42.7 percent), followed by ARR (22.4 percent). The reason for this is its simplicity, emphasis on liquidity, and the increasing financial pressures faced by these firms from financial institutions. However, small firms increased their sophistication over time with nearly 27 percent using DCF as the primary method of analysis (16.4 percent used IRR and 11.2 percent used NPV). The concept of WACC was still not accepted as an appropriate discount rate with the majority using cost of funding the specific project as cut off rate. Others relied on Arbitrarily determined cut off point or Historical rate of return. The main reason for non preference for WACC is that the smaller firms had difficulty in estimating cost of equity capital. It was also observed that majority of the small businesses (nearly 75 percent) took risk seriously. For adjusting risk, higher required returns (46.3 percent) either in form of Increasing the cut-off rate or Shortening the minimum payback period was preferred, followed by Conservative estimates of future cash flows (48 percent). Lastly, small business
owners appear to be most sensitive to Investment Tax Credit (ITC) as a preferred incentive for capital investment.

Bruner, Eades, Harris and Higgins (1998) used a telephone survey to target twenty seven highly regarded corporations and ten leading financial advisers. They studied seven best selling textbooks, and found that DCF was the dominant investment-evaluation technique. WACC was the dominant discount rate, and to work out WACC nearly 60 percent of the respondents used market value weights and only 15 percent used book value weights. Further, 37 percent of the firms surveyed revised the WACC of the firm annually, while 41 percent computed it more frequently (i.e., semi-annually, quarterly, monthly, or for each investment). CAPM was the dominant equity model with more than 80 percent of the firms using it to estimate the cost of equity. However, there is no agreement as to how the variables of CAPM – risk free rate, average market risk premium and the firm’s equity beta – are computed.

Jain and Kumar (1998) compared the capital budgeting practices of 96 non financial non government manufacturing public companies listed on Bombay Stock Exchange in India with 5 South-East Asian companies (from Japan, Malaysia and Singapore) during the time period 1985-95. Based on a response of 20 companies (15 from India and 5 from South East Asia) Maximization of Return on investment in Total Assets and growth in EPS were found to be the two most preferred goals by Indian Companies with a planning horizon of five years. In India, 90 percent companies were found to use traditional capital budgeting methods, while 80 percent a combination of traditional and DCF methods. The most preferred method was Payback period method employed by 80 percent of the companies, followed by NPV (47 percent) and IRR (40 percent) methods. Similar pattern was observed in South East-Asian companies. For calculating hurdle rate, Weighted Average Cost of Capital (WACC) was preferred by nearly 67 percent companies followed by the arbitrary rate decided by management and the marginal cost of additional funds. Sensitivity analysis was mostly preferred for incorporating risk (93 percent), followed by higher cut off rate (33 percent) and Shorter payback period (27 percent). But in South East Asia the most popular technique was Shorter payback period adopted by nearly 60 percent of the companies followed by Sensitivity analysis and higher cut off rate 20 percent each.

Kester and Chang (1999) surveyed CEOs of 226 companies in six countries in the Asia-Pacific region -Australia, Hong Kong, Indonesia, Malaysia, Philippines, and
Singapore which were listed on the Australian Stock Exchange, Stock Exchange of Hong Kong, Jakarta Stock Exchange, Kuala Lumpur Stock Exchange, Philippine Stock Exchange, and Stock Exchange of Singapore respectively. The study covered different aspects of capital budgeting practices by these companies like, risk analysis, discount rates, cost of equity capital, and capital rationing. As per the study the median project sizes requiring a formal quantitative analysis ranged from US $1.9 lac in the Philippines to US $12.93 lac in Hong Kong. Several executives in each country indicated that their companies require a quantitative analysis on all proposed investments, regardless of size. Executives in all of the surveyed countries, except Hong Kong and Singapore, ranked DCF techniques (NPV or IRR) as the most important techniques for evaluating projects. In case of Singapore, IRR and Payback were rated as equally most important techniques. In Hong Kong, payback was ranked as the most important technique. Accounting Rate of Return ranked fourth in each of the countries surveyed. Scenario analysis (optimistic/most likely/pessimistic forecasts) and Sensitivity analysis were perceived to be the two most important techniques for assessing risk in all the countries surveyed. The two other more sophisticated techniques such as decision tree analysis and probabilistic (Monte Carlo) Simulation received significantly lower ratings, indicating that these techniques are seldom used in practice. Further more than half of the respondents in Hong Kong as well as in Malaysia and Singapore indicated that their companies based the discount rate on the cost of the specific capital used to finance the project under consideration. Almost half the respondents in Australia indicated that their companies use a single discount rate based on the company's overall Weighted Average Cost of Capital (WACC) to evaluate all proposed capital investments. Less than half the respondents in Australia and Singapore and less than a third in Hong Kong, Indonesia, and Malaysia indicated that their companies used multiple risk-adjusted discount rates and about half the respondents in the Philippines used multiple rates.

A few companies used the Capital Asset Pricing Model (CAPM) to determine project discount rates. This was mainly because in this model it is difficult and tedious to estimate the project betas. Among the three methods used to estimate the company's cost of equity capital namely CAPM, the Dividend Yield plus Expected Growth Rate method and the Risk Premium Method (Cost of Debt plus Risk Premium), CAPM was clearly the most popular method in Australia, with 72.7 percent of the respondents using it. However, this was not the case in Malaysia and
Singapore, where the respondents remained divided between the Dividend Yield plus Growth Rate and the Risk Premium methods. The most popular method in Indonesia (53.4 percent) and the Philippines (58.6 percent) was the Risk Premium method, while it was Dividend Yield plus Growth Rate method in Hong Kong (53.8 percent).

Although the majority of respondents in all six countries indicated that cash flows are evaluated after taxes, a surprising number of respondents in Hong Kong (41.4 percent), the Philippines (40 percent), and Singapore (42.3 percent) indicated that cash flows (or earnings) were evaluated before taxes. In contrast, only 6.7 percent of respondents in Indonesia, 26.8 percent in Australia, and 28.6 percent in Malaysia evaluated cash flows (or earnings) before taxes.

Parashar (1999) surveyed 32 Indian medium and large private sector companies and found that IRR (68 percent) and Payback period (68 percent) methods followed by NPV (42 percent) were the most commonly used capital budgeting techniques. The WACC was the most commonly used hurdle rate (81 percent) in the project choice while the use of risk adjusted cost of capital was uncommon (as 13 percent of the respondents used it). Further, 43 percent used book value weights, 30 percent market value weights, and 23 percent target capital structure weights to find out Weighted Average Cost of Capital. The use of CAPM to estimate cost of equity of firm was quite rare as just 18.5 percent of the respondents preferred it. On the contrary, 52 percent of the respondents used dividend discount model to estimate cost of equity.

Brealey and Myers (2000) observed that a few large corporations used Payback period or Accounting Rate of Return as their primary method of project choice. Most of them used Discounted Cash Flow methods and for many DCF meant IRR and not NPV. It appeared that IRR was found to be easier to explain to non-financial managers, but to use it properly was a difficult task for these managers. This is so because preference given to high IRR projects may not necessarily add much to the value of the firm because highest IRR may be found in short-lived projects requiring little up-front investment.

PricewaterhouseCoopers (2000) surveyed 34 representatives from across leading Indian companies, lenders, and equity analysts/investors found that CAPM was the most widely used method (90 percent of the respondents use it) for computing cost of equity of a company. Further, 67 percent of the corporate and 75 percent of the equity analysts put cost of equity at 20 percent for Indian companies. The WACC of
Indian companies was generally in the range of 15-20 percent as against 8-12 percent in case of the US companies. This cost differential was identified as a handicap for Indian companies in achieving global competitiveness.

Gitman and Vandenbarg (2000) updated an earlier cost of capital survey (Gitman and Mercurio, 1982) by surveying 111 major U.S Fortune 1000 firms, and found that 93 percent of firms used the CAPM to find cost of equity while 70 percent of respondents used required return of investors. The average cost of capital of firms was about 11.5 percent. Firms used target weights vs. book weights and used after-tax debt costs. About 77 percent of the firms specifically differentiated project risk and found that project size, relationship of project returns with firm’s other projects and payback period were the main factors in assessing project risk. Mostly, firms adjusted their discount rate for risk rather than cash flows. A very small percentage (40 percent) of respondents was faced with capital rationing problem. Only 47 percent firms had formal procedures for evaluating existing projects whereas nearly 33 percent followed ad hoc follow up procedures.

Arnlod and Hatzopoulos (2000) surveyed 300 U.K companies taken from Times 1000 (1996) to study the gap in theory and practice of capital budgeting techniques, and obtained 96 usable responses. In support to the theory, emphasizing the superiority of DCF techniques of NPV and IRR over traditional methods, the practice also revealed increasing adoption of DCF techniques like IRR and NPV with 68 percent companies always or mostly using IRR, and 63 percent NPV. This is due to technological advancements and computer facility which make calculations of DCF techniques much easy. However, it was observed that the traditional theoretically inferior methods still retain a remarkably tenacious hold on practice especially the Payback period method being used by nearly 46 percent companies, mostly or always. However, there was a wide theory-practice gap in use of risk analysis techniques wherein the theory advocates the use of probability analysis but in actual practice the most popular risk analysis techniques were found to be Sensitivity and scenario analysis used by 85 percent firms followed by raising the required rate of return. Further, in line with the academic literature, in practice too WACC was the most preferred discount rate used by 54 percent firms. For calculating WACC, nearly 70 percent preferred the CAPM model. The survey results indicated that UK corporations increasingly adopted prescribed text book financial analysis. Only a small minority did not use discounted cash flows, or follow formal risk analysis.
Bedi (2000) in a study of 72 companies (taken from statistical profile of 500 private corporate giants published in January 1995 issue of CMIE) observed that IRR was the most popular method of capital budgeting, followed Payback period and NPV method. As per the study, the DCF techniques were preferred mainly because they took into consideration the time value of money. WACC was found to be the most widely used discount or cut off rate followed by Cost of debt and Arbitrary rate of interest. To incorporate risk, Sensitivity analysis was found to be most popular followed by Conservative estimate of future cash flows and Shorter payback period.

Graham and Harvey (2002) surveyed 4,440 Fortune 500 companies to study their capital budgeting, cost of capital and capital structure practices and received usable responses of 392 CFOs (9 percent response rate). It was observed that IRR and NPV were most popular capital budgeting techniques being used always or almost always by 75.7 percent and 74.9 percent of the respondents respectively. However, usage of Payback period method still persisted (with 56 percent always or almost always using it), and small firms used it almost as frequently as they used NPV and IRR. Though theoretically considered inferior, this method still persisted because of its simplicity, lack of familiarity of top management with more sophisticated techniques, suitability for capital constrained firms and firms having highly uncertain investments. The survey revealed that firm size, leverage, dividend policy, ownership and CEO education significantly affect the practice of corporate finance.

It was observed that large, highly leveraged public companies paying dividends and with MBA CFO’s are more likely to use NPV and IRR whereas smaller firms with low debt ratios having older CEO’s, without MBAs, are more likely to use Payback method. Large firms are more likely to use risk-adjusted discount rate than are the small firms. Similarly, highly levered firms are more likely to use Sensitivity and Simulation analysis to assess the probability of distress risk. The respondents recognized market risk, but they also identified other risk factors such as interest rate, size, inflation, and foreign exchange rate risk. Another prevalent method was earnings multiple approach (used by 38 percent), and the less used were Accounting Rate of Return (20 percent), Profitability Index (12 percent), Adjusted Present Value (11 percent) and Value at Risk Analysis (14 percent). Surprisingly, Real Options Valuation technique was used by more than one-fourth of the companies though it is fairly new and quite complicated.
Further, 58.8 percent of the respondents used company-wide discount rate to evaluate the projects though the project may have different risk characteristics. Thus, more than half of the firms did not adjust WACC (average firm risk) to reflect specific project risk, especially when evaluating international projects. The study further found that CAPM is widely used (73.5 percent) to find out cost of equity capital of the firm and only a few firms used Dividend Discount Model (rating of 0.91). While small firms calculated cost of equity by what the investors tell they require, large companies are more likely to use CAPM for the same. Similarly CEOs with MBA are more likely to use the CAPM than the non-MBA CEOs. Also the firms with high foreign sales and public firms are more likely to use CAPM. Similarly, CEOs with MBAs use CAPM than are non-MBA CEOs.

Ryan and Ryan (2002) surveyed 205 CFOs of Fortune 1000 companies and found that $100-$499.9 million was size of annual capital budget of majority (38 percent) of the respondent companies. Nearly 99.5 percent of the companies supported use of formal capital budgeting analysis with most of them (nearly 32 percent) preferring it at 5 lakh level. NPV was the most preferred capital budgeting technique (used always and often by 85.1 percent companies) followed closely by IRR (76.7 percent companies). Payback period method was still highly prevalent and being used by 74.5 percent of the respondents, followed by Discounted Payback by 56.7 percent companies, PI by 43.9 percent, ARR by 33.3 percent, and MIRR by 21.9 percent at least half of the time. It was found that MIRR (also Terminal IRR) was the least popular among all the techniques, despite its strong theoretical support and inclusion in popular financial spreadsheet packages. The most popular specialized method to incorporate risk was Sensitivity analysis used by 65.1 percent companies followed by scenario analysis and inflation adjusted cash flows used by 41.6 percent and 31.4 percent of the companies respectively. However, the study advocated a growing acceptance of MIRR in the future, especially by firms with larger capital budgets. Additionally, it was observed that firms with larger capital budgets tended to prefer NPV and IRR while Payback and Profitability Index was preferred by firms with smaller capital budgets. There was a greater acceptance and use of EVA, Incremental IRR, Simulation, MVA, PERT/CPM and decision tree models. However, complex mathematical models, linear programming, option pricing models and real options received less corporate acceptance due to their high level of complexity.
A vast majority of the respondents considered WACC as the most appropriate discount rate chosen by nearly 83.2 percent respondents while merely 7.4 percent chose Cost of debt, 1.5 percent Cost of retained earnings, and 1 percent Cost of new equity. The study concluded that views of academics and senior financial managers of Fortune 1000 companies on basic capital budgeting techniques are in strong agreement than ever before. Availability of inexpensive computer technology has resulted in increased financial sophistication with DCF techniques being preferred over non-DCF, and among the DCF techniques, NPV most frequently used, followed closely by IRR.

Anand (2002) surveyed 81 CFOs from 474 private and 51 public sector top firms of corporate India based on market capitalization and observed that firms mostly used DCF methodology for capital budgeting with IRR (85 percent) being most popular and NPV (65 percent) the next popular technique, followed by Payback period method. Majority of the firms used multiple criteria in their project choice decisions. For incorporation of risk, Sensitivity analysis (90.1 percent) and scenario analysis (61.6 percent) were most widely preferred. Further, 67 percent of the respondents said that they used a single discount rate based on company’s overall WACC. Nearly 22 percent used multiple risk adjusted discount rates depending on the risk characteristics of the projects. Further, CAPM was found to be the most popular method of estimating cost of equity capital (54.32 percent), followed by Gordon’s Dividend Discount Model (52.1 percent) and Earnings Yield (32.4 percent). Very few firms (7 percent) used the Multi-Factor model to estimate the cost of equity. Nearly 65 percent of the respondents who used CAPM considered return on 10-year Government of India (GOI) Treasury Bonds as risk-free rate. Similarly, about 52 percent of the respondents who used CAPM took Industry Average Beta as a measure of systematic risk. The BSE Sensex emerged as the widely used proxy for market portfolio followed by NSE Nifty.

It was also observed that large firms relied heavily on NPV techniques, while small firms were more likely to use Payback criterion. Similarly, the large firms were more likely to use sophisticated risk techniques, such as scenario analysis, risk-adjusted discount rate, decision tree, and Monte Carlo Simulation, than the small firms. High growth firms were more likely to use IRR than low growth firms, and public sector firms more likely to use Profitability Index than private sector. However, there was no difference in techniques used on basis of Economic Value Added (EVA)
and Non-Economic Value Added (Non-EVA) firms, high WACC and low WACC firms, highly leverage and low debt firms. The public sector firms having CFOs with CA qualifications were more likely to use Sensitivity Analysis technique than private sector firms or those having Non-CA CFOs. The large firms gave significantly more importance to CAPM while the Dividend Discount model was more popular amongst the small firms. Similarly, the highly profitable firms (based on ROCE and EVA) gave significantly low importance to Dividend Yield and Earnings Yield while estimating cost of equity capital than the low profitable firms.

Brounen, Jong, and Koedij (2004) took a cross-section of 6,500 companies from the UK, Netherlands, France, and Germany and received a total of 313 responses, (68 in the UK, 52 in the Netherlands, 132 in Germany, and 61 in France). The results showed that European firms are remarkably keen on applying the Payback criterion, instead of discounting their cash flows by using the Internal Rate of Return (IRR) or the Net Present Value (NPV). In the UK, Netherlands, Germany, and France, 69.2 percent, 64.7 percent, 50 percent, and 50.9 percent, of the CFOs respectively used the Payback Period as their favorite tool. In Europe, following the Payback Period Criterion were the NPV and IRR methods respectively. In the UK, Netherlands, Germany, and France, 53.1 percent, 56 percent, 42.2 percent, and 44.1 percent of all CFOs used the IRR method, while 47 percent, 70 percent 47.6 percent, and 35.1 percent of all CFOs in these countries relied on the NPV method.

When taking firm characteristics into account, it was observed that the use of the Payback criterion is more popular among smaller firms (except for the UK) and among firms with management that falls in the highest age cluster. Large firms and firms managed by a CEO with an MBA (except in UK) used NPV significantly more often. Further CAPM was found to be the most popular method of estimating the cost of equity capital in Europe. In UK, Netherlands, Germany, and France, CAPM was followed by nearly 47.1 percent, 55.6 percent, 34 percent and 45.2 percent of the CFOs respectively. In Netherlands and France, "whatever our investors tell us they require" was the second most popular after the CAPM. In Germany, this method was the most popular method and outperformed the CAPM. Further, CAPM was consistently more popular among large firms and among firms with relatively high proportions of foreign sales. Similarly, large public firms were more inclined to apply more sophisticated techniques when setting their cost of capital, but small firms relied on rules of thumb. However, this difference is not due to a lack of familiarity with the
theoretical concept, since there appears to be no relation between the age and education of the CEO and the use of theoretical tools like the CAPM. However, CEOs with long tenures used CAPM more frequently. Similar to their US colleagues, European CFOs determined their cost of capital using the Capital Asset Pricing Model (CAPM), rather than applying Arithmetic-Average Historic Returns or the Dividend Discount Model. Overall, it was observed that firm size was positively related to the use of the Discounted Cash Flow Method and the application of CAPM. Smaller firms and firms less oriented towards maximizing shareholder value were more likely to evaluate their investment opportunities by using the Payback period criterion and setting their cost of capital at whatever level their investors tell them.

It was found that majority of the firms did not take specific risk factors like interest rate risk, foreign-exchange risk, business-cycle risk, unexpected inflation, commodity-price risk, term-structure risk, and distress risk into account when evaluating individual investment projects. Interest-rate and currency risk were the only two risk factors considered and in most of these cases, firms acknowledged these risks by adjusting either the discount rates or the cash flows. Only a small minority of firms consider momentum. The only exception is France, where 27.8 percent of our respondents said that they adjust their discount rate based on recent stock price performance. Overall, there was a strong tendency to omit most of the specific risk factors.

It was found that, except for the French, other European CFOs, like their US counterparts, prefer to use a plain company-wide discount rate rather than more sophisticated risk-matched rates. For the second most popular discount rate, the risk-matched project rate, we see that the European firms are less keen to apply this rate as compared to the US firms. Again, it was found that large firms were more likely to choose the risk-matched rates. Similar to the US, the remaining three alternatives (the use of a discount rate for the overseas market, a divisional discount rate, or different rate for each component cash flow that has a different risk characteristic) were almost never used in each European sample. Large firms were more likely to apply these theoretically more sound risk-matched rates. Except for the Netherlands, it was found that the CEOs’ education tends to increase the likelihood of using risk-matched project rates. The results further showed that highly educated CEOs were more likely to use more complicated alternatives of discounting new projects. Further, older
CEOs were more likely to use the simple company-wide discount rate, and that younger CEOs were more likely to use the more complicated project specific rates.

Holmen (2005) in a survey of 145 Swedish firms explored the capital budgeting techniques for Foreign Direct Investments (FDIs) and found Pay Back Method to be the most preferred capital budgeting technique (used by 79 percent of the sampled units). It was also observed that larger firms are more likely to use NPV or IRR method than smaller ones. Further, the methods used for making adjustments for political risks are increasing the discount rate, Shortening the payback period or requiring higher earnings multiples.

Hermes, Smid and Yao (2005) compared the use of capital budgeting techniques by Dutch and Chinese firms from a survey of 42 Dutch and 45 Chinese firms. The study focused on whether there was the so-called “country effect”, i.e. whether capital budgeting practices differed significantly between Dutch and Chinese firms, and whether these differences could be explained by differences in levels of economic development. It was observed that Dutch CFOs used the NPV method significantly more often than their Chinese colleagues do. Further, Chinese CFOs used the ARR method significantly more than Dutch CFOs do and CFOs of Chinese companies make cost of equity estimations less often as compared to Dutch CFOs. These results may be explained by the fact that there was still a gap with respect to the level of economic, financial, human and technological development between the two countries. It was further found that the use of the IRR method did not seem to differ significantly between Dutch and Chinese firms. The same was true for the estimation of the cost of capital and the use of CAPM as a method of estimating the cost of equity. Therefore, the study restrained from drawing too strong conclusions with respect to the importance of the “country effect” as an explanation for differences in capital budgeting practices between the Netherlands and China.

Danielson and Scott (2006) analyzed the capital budgeting practices of small firms. The US Small Business Administration estimated that small businesses (which they define as firms with fewer than 500 employees) produced 50 percent of private GDP in the U.S., and employed 60 percent of the private sector labor force. The study observed that the most important type of investment was replacement for 46 percent of the sampled firms, and firms in service industry were more likely than the average sampled firm to select this response than those in construction and manufacturing industry. Further, projects to extend existing product lines and investments in new
product lines were shown as the primary investment activity by 21 percent and 23 percent of the sampled firms respectively. The study further suggested that many small firms faced real (or self-imposed) capital constraints and approximately 45 percent of the sampled firms reported that they would delay a promising investment until it could be financed with internally generated funds (wait for cash). Firms that were most likely to wait for cash included the youngest firms, the smallest firms, and those whose owner did not have a college degree. Further, many small firms did not (or chose not to) separate investment and financing decisions, contrary to capital budgeting theory. In particular, older owners were more conservative in their strategies than younger ones. Older owners focused more on replacement activity and were more likely to report that they will wait for cash. It was also observed that nearly 31 percent of the sampled firms had a written business plan. Over 30 percent of the sampled firms did not estimate future cash flows when making investment decisions and 26 percent of the firms did not consider the tax implications of investment decisions. Thus, many small firms did not have a formal planning system that guided their capital budgeting decisions. Firms with the highest growth rates (over 20 percent) were more likely to use each of these planning tools, particularly written business plans and consideration of tax effects. Similarly, firms that extended existing product lines or invested in new lines of business engaged in more planning activities than the average sampled firm. The smallest firms with three or fewer employees were less likely to make cash flow projections, while firms with ten or more employees were more likely to make these estimates. Similarly, firms whose business owner had professional college degree were more likely to make cash flow projections or use a written business plan than the ones with less qualified owners.

As regards the primary tools used by firms to assess a project's financial viability, among the Payback period, Accounting Rate of Return, Discounted Cash Flow Analysis, ‘gut feel’, or a combination of these, it was found that the most common response was the least sophisticated ‘gut feel’ selected by 26 percent of the sampled firms. The use of ‘gut feel’ was strongly related to the business owner's educational background. Owners without a college degree resorted to it most frequently and owners with advanced degrees least. The use of ‘gut feel’ was also inversely related to a firm's use of planning tools. Firms with written business plans and firms that made cash flow projections were significantly less likely to rely on ‘gut feel’. While the use of ‘gut feel’ was concentrated in the least sophisticated of small
firms, it was also widely used by firms that made primarily replacement investments. ‘Gut feel’ was also used extensively by firms in the service industry. Although some service firms made substantial capital expenditures, the investments of many service firms were limited to business vehicles or office equipment.

Payback period was the second most common response, selected by 19 percent of the sampled firms. Firms using the payback period were significantly more likely than other firms to estimate future cash flows (because cash flow estimates are required for this calculation). Finally, use of the payback period appeared to increase with the formal education of the business owner. The Accounting Rate of Return was the next most frequent a rational project evaluation tool for small firms facing choice, identified by 14 percent of the firms as their primary tool. The Accounting Rate of Return is thus especially important if a firm must provide banks with periodic financial statements or is required to comply with loan covenants based on financial statement ratios. The discounted cash flow analysis was the primary investment evaluation method for only 12 percent of the firms. Not surprisingly, owners with advanced/professional degrees were more likely to use this method.

Firms with written business plans and those that consider the tax implications of investments were also significantly more likely to use discounted cash flow techniques. Similarly, firms extending existing product lines were also significantly more likely to use discounted cash flow analysis. It was observed that discounted cash flow analysis was found most useful when evaluating projects with cash flow profiles similar to current operations (such as projects extending existing product lines) because it is easier to obtain reliable cash flow estimates in this case.

Irala (2006) conducted a study on the financial management practices in Indian corporations covering the areas of capital budgeting practices, cost of capital, capital structure and dividend policies. While data was collected from 100 companies, there were only 60 companies in case of which the information was adequate to be included in the analysis. These companies were grouped into 11 industry categories, including 26.7 percent of public sector and 73.3 percent of private sector companies. It was observed that only 22 percent companies preferred NPV as the capital budgeting technique. While IRR stood at 27 percent, surprisingly Payback Period (PBP) was preferred by 44 percent companies. The mean PBP was around 4.42 years and the mean ARR was 15.53 percent. About 76.7 percent used WACC as discount rate and 51.7 percent used the same discount rate for all projects. While book value
weights were preferred for calculating Cost of debt, market value weights were preferred for calculating cost of equity capital. CAPM was the most popular among models of estimation of cost of equity capital. However, Earnings Yield was also widely used model despite the popularity of CAPM.

Rao and Dubey (2007) conducted a study based on the perceptions of the 90 executives (who had experience of more than 2 years in capital budgeting practices) taken from 14 companies (selected from the agro-based, chemical & pharmaceutical and textile sector). This study gave a sector-wise solution with the help of a model for the budgeting practices. The results indicated that the perception of the executives of agro-based and chemical and pharmaceutical sector is similar regarding capital budgeting techniques, whereas the executives from the companies of textile sector have a high degree of dissimilarities with the agro-based and chemical and pharmaceutical sector. This shows that the nature of textile sector is entirely different from the other two sectors regarding capital budgeting practices. It was further observed that NPV method is the most dominating capital budgeting technique, according to the executives of all the sectors. It was found that mostly the executives prefer NPV and IRR methods of capital budgeting from the companies of agro based pharmaceutical and chemical sector whereas the executives of textile sector prefer NPV method for evaluating the capital budgeting. The results also indicated that experience-wise perception of the executives is entirely different within the sector. Similarly, the study showed that the perception of the executives who had experience 2-10 years of all three sectors were not similar. The results also showed that executives who had 2-10 years experience were not able to decide the right capital budgeting technique and they had confusion about it. One of the reasons for this may be inadequate experience. It was also indicated that executives who had more than 10 years of experience had almost similar perception. Hence, it shows that as experience increases, the perfection of understanding the capital budgeting increases.

Truong, Peat and Partington (2008) surveyed capital budgeting practices of 356 companies of 488 Australian listed companies (included in the All Ordinaries Index of August 2004) and received a response of 87 companies (24.4 percent). It was observed that NPV, IRR and Payback were the most frequently used project evaluation techniques. NPV and Payback were the two most popular methods with over 90 percent of the companies reporting that they used these techniques. NPV was ranked the most important by 57 percent of the companies. However, compared to it,
IRR had lost ground and was ranked below the Payback techniques. This suggests that companies are not abandoning rules of thumb, but that they are using them in conjunction with DCF techniques.

Despite the well-known limitations of the Payback technique, it is still widely used by the surveyed firms. This was mainly because Payback was easy to estimate and understand and more popular with smaller firms. Further, most of the companies did not rely on a single capital budgeting technique but employed a number of techniques in their evaluation process. About a third of respondents (32 percent) reported the use of real options techniques. It was also found that real option techniques have gained a toehold in capital budgeting but are not yet part of the mainstream. It was also found that there is no significant difference in the use of techniques among sectors or due to the difference in the firm size.

A substantial majority of respondent companies (88 percent) used cost of capital in their investment evaluation techniques. The company’s cost of capital estimates were subject to regular review, more often than not on an annual or shorter cycle. The majority of respondents said that they estimated the cost of capital themselves, but a substantial minority used both their own estimates and estimates from external sources. The most frequently cited external sources of estimates were financial institutions and analysts. The CAPM was the most popular method used in estimating the cost of capital, with 72 percent of respondent companies using the model. The second most popular method (47 percent) was the Cost of debt plus some premium for equity. Only one respondent was found using a Multifactor Asset Pricing model, and no respondent was using the Fama and French Three Factor model. Most respondents (84 percent) estimated a WACC and the companies that responded showed a nearly even balance between those who used market value weights (51 percent), and those who used book value weights (49 percent). In estimating WACC, a vast majority of 69 percent of respondents reported adjusting the cost of debt for the interest tax shield and 31 percent said they did not. The majority of companies (57 percent) used the company’s discount rate in project evaluation. The second most popular alternative (22 percent) was the Cost of debt plus a risk premium, and a number of respondents (17 percent) relied on previous experience. Different discount rates for different divisions were reported by 16 percent of the companies and 13 percent of the companies reported that they would use the divisional discount rate for individual projects.
Nearly, 84 percent of the respondents said they never or rarely adjusted the discount rate over the forecasting period. For the minority who did adjust the discount rate, 58 percent said they adjusted it according to expected changes in the level of project risk, and 25 percent said they adjusted according to the term structure of interest rate. In general, the companies surveyed ignored the impact of imputation tax credits in their capital budgeting process. Only 13 companies (17 percent of respondents) said that they did make adjustments for imputation credits either to the cost of capital, or to the cash flow, or both when evaluating investment projects. The study observed that Australian corporate practice is generally consistent with the practice of Australian price regulators, except that the regulators take into account the value of imputation tax credits when computing the cost of capital while companies do not.

Brijlal and Quesada (2008) investigated capital budgeting practices in small, medium and large businesses in the Western Cape Province of South Africa. The results revealed that Payback period, followed by NPV, was preferred across different sizes and sectors of business. Moreover, 64 percent of the businesses surveyed used only one technique, while 32 percent used two to three different types of capital budgeting techniques. The large businesses favored IRR and NPV more as compared to the small businesses. Similarly most businesses used the Cost of bank loan as a basis in capital budgeting and more than two thirds of businesses used non-quantitative techniques to consider risk while investing in fixed assets.

Verma, Gupta and Batra (2009) studied 30 manufacturing companies in India and observed that with the advent of globalisation and mounting competition, companies were paying increasingly greater emphasis on making sound investment decisions. Even for projects involving small investment outlays, majority of the companies went for adoption of formal capital budgeting analysis so as to avoid any mistakes resulting in losses. Moreover, instead of relying on one single technique of evaluation, multiple techniques were applied for evaluation of investments. There was a change in trend towards increased adoption of sophisticated discounted capital budgeting practices like NPV, IRR as compared to the non-discounted capital budgeting techniques. However, among the traditional techniques, Payback Period Method was still preferred in majority of companies as a supplement to the DCF techniques.
Majority of the companies in India used the WACC to calculate the cost of capital, which is used as a discount or cut off rate in case of companies using the discounted cash flow techniques. The companies also realized that in the current unpredictable and turbulent business environment, how important it was to account for various types of risk like risk of unexpected inflation, interest rate risk, commodity price risk, foreign exchange risk etc while evaluating investment proposals. For the purpose of incorporating risk in investment decision, companies tended to adopt advanced risk techniques like Sensitivity analysis along with the traditional supplements like Shorter payback period, High cut off rates etc. A significant association was found between NPV and the size of companies. The use of NPV increased with the increase in scale of companies, confirming the belief that larger companies made more use of NPV. But payback period was preferred as a supplementary method by most of the companies irrespective of their size. It was also revealed that leaving apart Payback period method and certain risk techniques like Simulation and real options, no significant relation could be established between the CEO education and the capital budgeting techniques. In fact, it was observed that Payback period method was preferred more by the young companies and highly qualified CEOs. Similarly, no significant association was found between the age of the company and the method used except in case of Payback period, Sensitivity, and Simulation analysis capital budgeting techniques.

Bennouna et al. (2010) conducted a mail survey of 88 large firms in Canada and observed that though the trend towards sophisticated techniques have continued; however, even in case of large firms, 17 percent did not use Discounted Cash Flow (DCF). Of those which did, the majority favored NPV and IRR. Only 8 percent used the real options technique. The study suggested certain areas of improvement like administrative procedures, using Weighted Average Cost of Capital (WACC), adjusting WACC for different projects or divisions, employing target or market values for weights, and not including interest expenses in project cash flows. A small proportion of managers also felt the need to start using DCF methods. The evaluation showed that there still remains a theory-practice gap in the detailed elements of DCF capital budgeting decision techniques, and in real options.

Hall and Millard (2010) studied the application of capital budgeting techniques and the incorporation of risk into the capital budgeting process among a sampled of 67 South African industrial firms listed on the JSE Securities Exchange
for at least ten years. As per findings of the study, project definition and cash flow estimation were regarded as the most important and most difficult stages in the capital budgeting process. Financial analysis was considered to be important, but not difficult at all to the respondents – a clear indication of their level of education and work experience. However, what was disappointing was the fact that the majority relied on management subjective estimates as cash flow forecasting methods, as opposed to quantitative methods. As per the survey, the theoretically and mathematically sound NPV was considered to be more popular than the IRR in contrast to previous studies that found IRR more popular than the NPV. Regarding the incorporation of risk in the capital budgeting process, it was found that the project implementation stage is considered to be the most risky. This was in contrast to a previous study, in which respondents considered the project definition and cash flow estimation riskier. Whilst the majority of respondents used Sensitivity analysis to account for risk in the capital budgeting process, 35 percent used either changes in the cash flows or the discount rate to account for uncertainty. Lastly, it was noted that there was an increasing trend to incorporate inflation in their capital budgeting process. Further, non-financial criteria especially legal requirements seemed to play a more important role in the evaluation of capital budgeting projects than in the past with only 6 per cent of respondents never selecting investments on non-financial criteria. This trend can possibly be ascribed to the fact that the South African economic, financial and social landscape is being increasingly and stringently regulated by the government. The fact that more respondents in this study than in previous ones prefer the NPV to the IRR, as well as the greater level of risk incorporation in the capital budgeting process, is an indication of the use of an improved capital budgeting selection process by the respondents of this study.

Andor, Mohanty and Toth (2011) in their study of capital budgeting practices in ten Central and Eastern European (CEE) countries (e.g., Bulgaria, Croatia, Czech Republic, Hungary, Latvia, Lithuania, Poland, Romania, Slovak Republic, and Slovenia) observed that about 17 percent of the sampled firms do not conduct formal written capital budgeting analysis; and surprisingly, only about 61 percent of the firms that made formal capital budgeting analysis said that they used any kind of DCF-based capital budgeting technique such as NPV and IRR. However, there was a strong preference for the Payback (PB) method among the CEE sampled firms. Furthermore, the survey evidence indicated that corporate finance practice is influenced mostly by
firm size and multinational management culture and to a lesser extent by insider ownership. Large companies and multinational firms were more likely to use DCF analysis, such as NPV and IRR methods, as well as more sophisticated techniques such as Sensitivity and real option analysis than small-medium firms. The same was true for estimation of the cost of capital for different projects and the use of CAPM as a method of estimating the cost of equity. Large as well as multinational firms were likely to have the skilled manpower and the knowledge and procedures needed to make formal capital budgeting analysis using DCF and other sophisticated techniques. Finally, this study compared capital budgeting practices across 24 countries, four geographic regions, and three income groups and found significant variations in capital budgeting practices across them.

Singh, Jain and Yadav (2012) studied the current practices in capital budgeting (including real options) in Indian companies and provided a normative framework (guidelines) for practitioners based on the findings and literature reviewed. For this purpose, questionnaire survey was administered to 166 non-financial companies of the BSE 200 index. Also, secondary data for the year 2001-2011 was also collected. A total of 31 responses were received after two reminders (a response rate of 18.67 per cent). The study observed that the trend towards sophisticated techniques and sound capital budgeting decisions have continued in India. All sampled respondent firms used Discounted Cash Flow (DCF) techniques in conjunction with non-DCF techniques. There was a strong preference for DCF with 50 per cent using NPV and 78.57 per cent using IRR. Despite the recommendations of the literature on using NPV as the primary technique, this research too found that respondent firms indicated a preference for IRR compared to NPV. A sizable number of responding companies although continued to follow traditional methods, namely, Payback period (64.28 percent) and Accounting Rate of Return (39.28 percent), it is pertinent to note that the sampled companies were using these methods in conjunction with the DCF techniques. The Payback period continued to be a popular method amongst the non-DCF techniques used in evaluating capital budgeting proposals due to its simple calculation and ease of understanding. In fact, 69.23 percent companies used this method exclusively.

Consistent with financial theory, the survey revealed that the sampled companies were risk-averse. Sensitivity analysis was the most widely used tool (96.15 percent) for risk incorporation. Another notable finding was the emergence and usage
of new techniques of real options (50 percent) and abandonment options (17.64 percent), an encouraging indication of growing professionalism amongst the sampled companies. It was further observed that the majority of the sampled companies (72.41 percent) had the origination of new investment proposals at central/head office level indicating control by the top management on such decisions. In nearly half (48.27 percent) of the sampled companies, new investment proposals originated at the highest level exclusively. More than one-fourth (27.58 percent) of the sampled companies indicated that the new investment proposals originate at divisional/regional office level as well. A revealing finding of the survey was an indication of participative style of management; evidenced by nearly one-third of the sampled companies reporting that new investment proposals originated at plant level (with nearly one-tenth companies stating this exclusively). More than half of the responding companies (68.96 percent) planned their capital budgets for the next five years; in contrast, less than one-fifth (17.24 percent) of the sampled companies planned one year in advance. Further, it was satisfying to note that only a few companies used ad hoc approach (as and when opportunity takes place) to plan their long-term investments. Likewise, planning for capital projects in advance (ten years) was a rare phenomenon. The probable reason was that it is difficult to forecast revenues and costs for such a distant future in this highly turbulent business world. An overwhelming majority of the companies (86.24 percent) focused on capacity build-up by investing in the existing line of business followed by modernization/technology upgradation as the second most important constituent for capital expenditure outlay (44.82 percent of the companies). New investment in other areas (diversification) was the third important constituent for capital expenditure outlays, hinting towards aggressive expansion into other areas by more than one-fourth (27.58 percent) of the sampled companies. It was encouraging to note that capital rationing does not seem to be a relevant factor for the sampled companies as vast majorities of them (78.57 percent) denied that they forego profitable investment opportunities due to paucity of funds. The peculiarities of the market in terms of competition and sales and high fixed costs appeared to be the important factors leading to failures of capital budgeting decisions amongst the sampled companies while higher cost of capital and inefficiency in technology usage were not important factors. The study concluded that capital budgeting practices in India appear to have improved over the past decade or so with an increasing number of companies using more sophisticated DCF techniques.
To conclude, the studies till 1980’s found that usage of non-discounted capital budgeting techniques dominated the Indian Companies. Payback period was the most popular method for investment appraisal while discounted techniques of NPV and IRR were less used. For incorporation of risk in capital budgeting, Shorter payback period and Higher cut off rate were mostly used. Arbitrary rate of return or minimum acceptable rates of return were mostly used as the cost of capital. This scenario changed in 1990s with companies shifting increasingly to the use of discounted techniques of NPV and IRR. However, Payback period method still continued to be used rigorously. Sensitivity analysis was the most preferred tool for risk incorporation, though Shorter payback period and Higher cut off rates were still popular. WACC along with cost of debt were used as cost of capital.

The studies of 2000 have found the same trend with even more increased use of DCF techniques, primarily IRR and NPV. Payback still continued to be used as a supplementary tool. For risk adjustment, along with Sensitivity Analysis, scenario analysis was also used. However, Shorter payback period, Conservative estimates of cash flows and Adjusting discount rates were also quite popular. WACC dominated the cost of capital practice though cost of debt was also somewhat used. A noticeable finding by the recent research studies on capital budgeting (Anand, 2002, Verma, Gupta and Batra, 2009, Singh, Jain and Yadav, 2012) was the usage of advanced techniques like NPV with real options, abandonment options, MIRR, Simulation analysis by the Indian Corporate Sector to some extent. Thus, review of literature reveals a continuous progress and improvement by the global business as well as Indian Corporate sector in the area of capital budgeting.