Literature Review of Capital Budgeting Practices with Special Reference to Capital Intensive Industries of India

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Abstract

The following literature review dealt with a review of past studies conducted on capital budgeting and its related aspects. Both foreign and Indian studies on capital budgeting were included as part of the study. The review tried to critically analyze each and every aspect of every individual study from methodology to statistical tools being applied and findings. An attempt was made to find the relevant gaps in previous studies. It was identified by the review that non - sophisticated methods of capital budgeting and risk assessment are still being used, and this needs to be studied. Additionally, risk assessment methods were revealed to be not sophisticated, which can become part of a future study. This also included a method to adequately incorporate risk information in the capital budgeting process.

Keywords : Asset, budgeting, capital, intensive, IRR, Monte Carlo, NPV, payback, project, risk, sophistication, WACC

JEL Classification : D81, D83, G31, G32, G34

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The present literature review deals with the aspect of investment or capital budgeting. Capital budgeting may be explained as the firm's decision to invest its current funds most efficiently in fixed assets in anticipation of expected continuous flow of benefits over a series of years. It is the process of making informed investment decisions in capital expenditure. Investment decisions are important because they determine the long term value of a firm by influencing its growth, profitability, and risk. Once a decision is taken regarding purchase of a fixed asset, it will have a long term implications on all aspects of a firm. A non performing asset becomes a long term liability as it is difficult to dispose off such an asset.

The scope of the literature review includes capital budgeting and related aspects. Review includes studies on capital budgeting conducted in India and abroad. Review of other financial aspects unrelated to capital budgeting have been excluded for the purpose of literature review.

There are several commonly followed capital budgeting abbreviations used in the literature review. These are used frequently in the document. Their explanations are as follows :

NPV - Net present value

IRR - Internal rate of return

MIRR - Modified internal rate of return

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PB - Payback period

DPB - Discounted payback period

ARR - Accounting rate of return

PI - Profitability index

EVA - Economic value added

MVA - Market value added

WACC - Weighted average cost of capital

DCF - Discounted cash flow

Latest Foreign Studies Showing Lack of Sophistication

(1) Brief Summary of Review : Recent studies conducted after 2000 presented a different picture than what should have been the way according to academic literature. Academic literature claimed net present value or NPV to be the most financially sound method of capital budgeting. It is considered superior as it takes into account the time value of money and provides sound results in other conditions where internal rate of return or IRR fails. Payback period method was found to be considered a very crude method of capital budgeting, which does not take into account the time value of money. The greatest drawback of the method revealed by studies was that payment occurring after the payback period was ignored. Apap and Masson (2004) ; Arnold and Hatzopolous (2000) ; Bennouna, Meredith, and Marchant (2010) ; Chan, Haddad, and Sterk (2008) ; Daunfeldt and Hartwig (2012) ; Graham and Harvey (2002) ; Haka (2006) ; Robbins and Kester (2011) ; Lam, Wang, and Lam (2007) ; Rossi (2015) ; Truong, Partington, and Peat (2008) ; and Verbeeten (2006) identified that although firms are increasingly moving towards adoption of sophisticated capital budgeting practices, the use of crude methods like payback period are not on the decline. Furthermore, Verbeeten (2006) applied the most rigorous statistical tools like utilizing control variables and applying multiple regressions to gather deep insights about capital budgeting practices. The most convincing arguments were presented by the study of Verbeeten (2006). However, studies like Ryan and Ryan (2002) presented a contrasting picture of capital budgeting, which showed that sophisticated methods like NPV were the most preferred by Fortune 1000 firms. Nevertheless, the study still claimed that the size of the budget had a positive correlation with NPV or IRR method. This implied that small size investments still found little favour for being analyzed by the NPV method.

In fact, it was noted by the studies mentioned earlier that smaller firms, and even larger firms going in for smaller investments tended to rely more on the payback period method as opposed to the more sophisticated NPV or IRR methods. It is understandable that capital budgeting involves the collection of relevant data, which requires an inherent cost. Unsophisticated methods of capital budgeting like payback period may help firms in cutting costs while making capital budgeting decisions, but the cost of making an error in these decisions may prove to be higher than the saved cost.

Risk assessment was found to be another important factor to consider in the capital budgeting process, which is generally treated lightly. An incorrect risk assessment was revealed to lead to inaccurate discount or hurdle rate being used by the firm. An inaccurate discount or hurdle rate was further discussed to be able to lead the firm to a wrong capital budgeting decision. Arnold and Hatzopolous (2000) ; Chan, Haddad, and Sterk (2008) ; Robbins and Kester (2011) ; Lam et al. (2007) ; and Rossi (2015) claimed that risk assessment methods being followed by most firms were not sophisticated. Hence, this points to another research gap. Research needs to be done for the exact reasons for not following sophisticated methods of risk assessment. The proposed study should reveal the appropriate methods for risk assessment, and the proper way to incorporate risk in the capital budgeting process. The Table 1 presents the total picture of the review.

Table 1. Table of Summary of Literature Review of Foreign Studies

Authors	Lack of Sophistication of Capital Budgeting Identified by	Lack of Sophistication of Risk Assessment Identified by	Any Other Gap Identified
Apap and Masson (2004)	NPV found to be difficult to compute.	NA	NA
Arnold & Hatzopolous (2000)	Smaller firms still found to prefer the payback period.	Limited tendency was found towards sophistication of risk assessment.	WACC was revealed to be used by only half of the respondents.
Bennouna, Meredith, & Marchant (2010)	Payback period was revealed to be still popular then. Considerable number of firms were found to prefer IRR over NPV.	Risk assessment was revealed to be done by sensitivity and scenario analysis.	WACC was not utilized by a few firms. Single discount rate was found to be used for all projects by a few firms.
Chan, Haddad, & Sterk (2008)	ARR and payback methods were still found to be popular.	Risks of projects were revealed to be not being differentiated.	NA
Daunfeldt & Hartwig (2012)	Smaller firms and low leveraged firms were found to find favour with methods other than NPV and IRR.	NA	NA
Graham & Harvey (2002)	Smaller, low leveraged, non dividend paying firms were revealed to be less likely to use NPV/IRR.	NA	NA
Robbins & Kester (2011)	Payback period method was found to be finding favour.	Sensitivity and scenario analysis were popular.	Most respondents were found to be using a single discount rate.
Lam, Wang, & Lam (2007)	ARR was found to be the most popular method.	NA	Risk incorporation was inadequate as shorter payback was being used.
Rossi (2015)	Payback period method was still found to be the most popular.	Non quantitative risk assessment methods were being followed.	Considerable number of firms miscalculated cost of capital by taking cost of loan as the same or by using past experience.
Truong, Partington, & Peat (2008)	Payback period method was still popular.	NA	Single discount rate was being used for all projects.
Verbeeten (2006)	Size was found to have correlation with sophistication of capital budgeting methods being applied.	Financial uncertainty was found to have a correlation with sophistication of capital budgeting method being applied.	NA
Ryan & Ryan (2002)	Size was found to have a correlation with NPV or IRR methods.	NA	NA
Haka (2006)	NA	Risk and uncertainty were found to be difficult to estimate, yet it was emphasized that these should be incorporated into the capital budgeting process.	NA
Clancy & Collins (2014)	NA	A need was envisaged for a research to ascertain effect of benefits on perception of risk.	A need was envisaged to study industry effects, effects of cognition, strategic criteria, and size limits on the capital budgeting process.

(2) Literature Reviews : Individual literature reviews are presented in reverse chronological order. The latest reviews are more relevant and are presented first, while the older ones are placed later.

An exploratory study was done by Rossi (2015) through both qualitative and quantitative methods to understand different aspects of capital budgeting practices in southern Italy. Potential respondents were carefully selected from AIDA, a detailed database of companies in Italy. Descriptive approach was also supplemented by a chi-square test to understand the association among different variables. The response rate was 30%, which may be considered above average for a total number of targeted respondents of 240. A higher sample size usually provides a normal distribution in which statistical tests may be appropriately used. The most surprising observation was that 98 firms reported that they did not use capital budgeting at all. Results showed that the payback period method was the most popular method with 36.62% of the respondents utilizing it. NPV method came second with 33.8% of the respondents utilizing it. Other methods like IRR, profitability index, and ARR were revealed to be very unpopular as compared to the first two. In addition, according to the study by Rossi (2015), 70% of the respondents were found to follow non - quantitative methods of risk assessment.

Studies have also ventured into finding the relation between use of capital budgeting methods and other independent variables. Daunfeldt and Hartwig (2012) utilized multiple variable regression analysis to identify the factors responsible for selection of particular capital budgeting methods in Swedish listed companies. The time period of the study was from 2005 to 2008. The study tried to go beyond mere descriptive statistics and yielded results, which can be interpreted more liberally. Questionnaires were sent to prospective respondents multiple times, and they were also encouraged to respond by calling on phone. Response rates reached more than 35% by adopting this approach. Large companies were found to use sophisticated capital budgeting methods more than smaller ones. High leverage firms were shown to be more inclined to use NPV and IRR than low leveraged ones. Management owned firms were shown to be reducing use of sensitivity analysis.

An attempt was made to update the previous findings on capital budgeting practices being followed at listed Irish companies by Robbins and Kester (2011). Postal questionnaires were used for the survey which also hid the identity of the respondents. The merit of such an approach is that response rate becomes high, but the demerit is that further probes cannot be done, and doubts cannot be clarified. Response rate was 41.9% for the study. All the respondents utilized the DCF methods, with NPV being the most preferred one followed by the payback period method. Sensitivity analysis and scenario analysis were revealed to be the most preferred methods for risk assessment.

Gervais, Heaton, and Odean (2011) emphasized the fact that the risk profile of the financial manager influenced the capital budgeting process. Overconfident managers were revealed to be attractive to firms. These overconfident managers were found to be more prone to accepting riskier projects.

Clancy and Collins (2014) conducted an in-depth study of previous literature reviews on capital budgeting. The duration of the literature review was a decade long. Hence, the study did not incorporate advancements in capital budgeting over a long period of time. The study tabulated literature by topic and method of research, by journal and topic, and by journal and method of research. It was identified that there was a need to research the decrease in the perception of project risk with an increase in benefits.

Bennouna et al. (2010) tried to update the studies conducted on Canadian firms to ascertain their capital budgeting practices. The study tried to maintain a similar sampling pattern followed by previous studies, which subsequently helped in enabling comparison. Literature review included in the study was very thorough and elaborate. Usable responses were received from only 88 firms, and no test was done for non - response bias, which was a slight demerit. A surprising revelation was that 17 of the 88 firms did not use the DCF methods ; 94.2% of the respondents preferred NPV, while 87.7% preferred IRR. However, 78.5% of the respondents were still found to be utilizing the payback period method. Despite the theoretical superiority of NPV over IRR, there was slight preference revealed for IRR over NPV by 42.3% of the respondent firms. The use of risk analysis tools was found to be increasing with sensitivity analysis, scenario analysis, and risk adjusted discount rate being the main ones.

Truong, Partington, and Peat (2008) conducted a study on capital budgeting practices of listed Australian firms. The methodology of the survey was special in the sense that the respondents were offered the final results, and most of the respondents chose not to be anonymous. This showed their eagerness to respond. The questionnaire had limited and concise questions with options for open ended answers ; 87 responses were received, which is a good number. Partially filed responses were not ignored and their information was also analyzed, which showed efficient use of information. The findings showed that NPV and payback period were the most favoured capital budgeting methods. Most of the firms were found to be relying on more than one capital budgeting methods.

Chan, Haddad, and Sterk (2008) tried to extract information on capital budgeting practices being followed by Chinese firms. The survey method just utilized improved versions of questionnaires and survey instruments used by Graham and Harvey's (2002) and Gitman and Forrester Jr.'s (1977) studies. Hence, the information extracted only remained limited to some extent. All the 54 firms contacted sent usable responses, which raised the suspicion of receiving biased responses. The contacted persons, however, were senior managers with sufficient experience in the firms, and therefore, most suited to provide the required information. While 88.9% of the respondents were found to be using the NPV method as a primary method, ARR was also popular as a primary method for 66.7% of the respondents ; 83% of the sampled firms were revealed to be utilizing the payback period method as a secondary method.

Haka (2006) conducted a detailed study of literature review spanning from 1582 to 2001. The study investigated historical development of capital budgeting in great detail. The study revealed a thorough analysis of literature. Detailed analysis was done on why academically strong methods took a long time to become acceptable. The study conducted a detailed research on probably a rare occasion where post audit studies of capital budgeting were analyzed. Research revealed that firms did not use capital budgeting audits very extensively. Even if they did, they didn't abandon non performing projects prematurely.

Lam et al. (2007) investigated building contractors in Hong Kong to analyze their capital budgeting practices. The questionnaire used was a modified version of the one used by another author, and hence, may have been limited in nature. The study confirmed that payback period and ARR were still being preferred as the best methods, and NPV and IRR methods had not picked up. Risk was identified as being treated important by the study, but the corresponding incorporation was not adequate as shortening payback and increasing discount rate were the methods used.

Verbeeten (2006) tried to analyze the relationship between uncertainty and the application of sophisticated capital budgeting practices in Dutch organizations. The sample size was more than adequate for the study. Factor analysis was beautifully used to understand various aspects of uncertainties. Control variables were identified, and correlation was used to understand the relationship between various variables. Different types of uncertainties were correlated with capital budgeting methods, and the results were analyzed. The best part of the study was the use of multiple regression to study the impact of uncertainty on sophistication of capital budgeting methods being used. Financial uncertainty was revealed to be the greatest factor in application of sophisticated methods. Size was revealed to be correlated with sophistication of capital budgeting methods.

Apap and Masson (2004) investigated the evolving nature of capital budgeting practices in publicly marketed utility firms. Forty four usable responses were received after pursuing 207 utility firms, which presented itself as an average response rate. The study mentioned that there was unavailability of published literature in capital budgeting of utilities, but there was a famous study by Brigham and Pettway (1973) which was missed. It highlighted how capital budgeting in utilities had to be very different from traditional capital budgeting practices. Surprisingly, 12 utilities were found not to use capital budgeting methods. NPV, IRR, and payback period methods were revealed to be utilized for the longest period. Most emphasis has been made on NPV in recent years as per the study.

Ryan and Ryan (2002) studied capital budgeting practices being utilized by Fortune 1000 firms ; 205 usable

responses were received for the study, which is a good number to work with. Personalization and conciseness of the questionnaire may have reduced the limitations of response bias to some extent. Likert scale was adequately defined for the study. The study presented an altogether different picture than those shared by other studies by claiming that sophisticated capital budgeting methods like NPV were more preferred by Fortune 1000 firms. The study was markedly different from other studies in the sense that statistical tool like Pearson chi-square test was effectively utilized by it to further extract insights. It was concluded that size of capital budget had a positive correlation with utilization of NPV and IRR methods.

Graham and Harvey (2002) conducted a survey on 392 CFOs about their preferential aspects of capital budgeting, cost of capital, and capital structure. The literature review restricted itself to the capital budgeting part of the research. The scope of the study was kept very wide, which may distract a respondent. The study sampled a large cross section of firms and was very much likely to be largely representative. The conducted study was a survey based descriptive analysis and lacked hypothesis testing. The best part was that responses were analyzed with the firm characteristics. The study was also unique in the sense that very specific and qualitative questions were asked. Larger firms were revealed by the authors to be more likely to use NPV values than smaller firms. Similarly, highly leveraged firms were more inclined to use NPV/IRR methods than others. Public/dividend paying firms were more likely to use NPV/IRR than others.

Arnold and Hatzopolous (2000) tried to investigate capital budgeting practices of UK firms to analyze the gaps between theory and practice. The methodology followed was a structured survey method, but with encouragement for open ended answers. The benefit of such an approach was that the responses with open ended answers and insights were assumed to offer more appropriate responses ; 96 usable responses were received, which provided a fairly normal population to analyze. The findings were compared with earlier studies of similar nature, which provided a means to understand changes. The findings of the study supported the theory that larger the size of firms, higher was the tendency to use the NPV method. Smaller firms had more tendencies to use the payback period method along with IRR. The payback period method's popularity has not diminished over the years as per the study. There was limited tendency towards sophisticated assessment of project risk.

Ann, Farragher, and Leung (1987) surveyed capital budgeting practices of large firms in Singapore, Hong Kong, and Malaysia and revealed that these firms used a combination of simple and complex methods to take of capital budgeting decisions. They were also less likely to undertake analysis of risk involved in the projects. The limitation of the study was the unavailability of literature review of capital budgeting in large firms in the South East Asian region.

Latest Indian and Nearby Studies Showing Lack of Sophistication

(1) Brief Summary of Review : Indian literature reviews were found to be low in number as compared to the foreign ones. The revelations, however, were not very different from those of foreign ones. Anand (2002) ; Yadav (2013) ; Batra and Verma (2017) ; Jain and Yadav (2005) ; Jape and Korde (2014) ; Kengatharan (2016) ; Nurullah and Kengatharan (2015) ; Roy and Hota (2014) ; Singh, Jain, and Yadav (2012) ; and Verma, Gupta, and Batra (2009) revealed how non - sophisticated methods of capital budgeting were still in use in conjunction with sophisticated capital budgeting methods. Payback period method was found to be popular with smaller firms or even with larger firms for smaller size investments. Payback period method is not academically recommended and has many demerits. Batra and Verma (2017), however, claimed that the theory practice gap has been decreasing in recent years. Nevertheless, the tendency to utilize non - DCF methods in conjunction with DCF methods has not diminished.

In a rather contrasting observation, Roy and Hota (2014) did not find size to have a correlation with the capital budgeting method being used. The most apparently in - depth study was conducted by Batra and Verma (2017).

The study was also the one with the most convincing arguments. Hence, a research gap is apparent even in case of Indian studies. Research needs to be done to understand the exact reasons why non - sophisticated methods are still in use and the way forward to make sophisticated methods applicable to smaller and other firms not being able to utilize the same.

It was also revealed by studies that risk assessment is not conducted by following the modern sophisticated methods of Monte Carlo simulation or decision tree analysis. Most of the studies highlighted the fact that firms usually relied on sensitivity and scenario analysis to conduct risk assessment. Anand (2002) ; Batra and Verma (2017) ; Jain and Yadav (2005) ; Kengatharan (2017) ; Nurullah and Kengatharan (2015) ; and Verma et al. (2009) identified that outdated methods like sensitivity and scenario analysis were still popular with firms. Hence, a gap is apparent and research needs to be done to ascertain the exact reasons why sophisticated methods are not utilized to conduct risk assessment. The summary of literature review is presented in the Table 2.

(2) Individual Literature Review : Individual literature reviews have been presented in a reverse chronological order. The recent studies are presented earlier while the older ones are presented later.

Table 2. Table of Summary of Literature Review of Indian and Nearby Studies

Authors	Lack of Sophistication of Capital Budgeting Identified by	Lack of Sophistication of Risk Assessment Identified by	Any Other Gap Identified
Anand (2002)	IRR was preferred over NPV.	Sophisticated methods of risk assessment were found to be not popular.	Single discount rate was used for all projects.
Yadav (2015)	Payback period was found to be the most popular method.	NA	NA
Batra & Verma (2017)	Non DCF methods were still popular.	Sensitivity analysis was found to be still popular.	NA
Jain & Yadav (2005)	NPV was found to be the least favourite method.	Sensitivity analysis was found to be still popular.	NA
Jape & Korde (2014)	IRR was preferred over NPV.	Risk assessment methods were not found to be sophisticated.	Discount rates were not being risk adjusted.
Kengatharan (2016)	Payback period and ARR methods were still popular.	NA	Elements of behavioural finance came into picture.
Nurullah & Kengatharan (2015)	Payback period method was found to be still popular by then.	Sensitivity and scenario analysis were found to be still popular for risk assessment by then.	NA
Yadav (2013)	Payback period and ARR were found to be the popular methods.	NA	Only a small minority of small scale industry was found to be involved in true capital budgeting.
Roy & Hota (2014)	Use of payback period method was not found to be decreasing.	NA	NA
Singh, Jain, & Yadav (2012)	IRR was preferred over NPV.	NA	NA
Verma, Gupta, & Batra (2009)	Payback period method was still popular and IRR was preferred over NPV.	Sensitivity analysis and shorter payback were used as risk incorporation methods.	NA

A recent study was conducted on Indian companies listed on the BSE to understand their latest capital budgeting practices by Batra and Verma (2017). Final usable sample consisted of 77 respondent firms. The draft questionnaire was prepared by reviewing just one research paper and then refining it subsequently. Hence, the study may have left other aspects not covered by that research paper. The study reported that capital budgeting decisions were taken mainly by senior and top level management, and that about four-fifths of the respondent firms invested in projects for expansion of existing business. It was revealed that 91% of the sampled companies utilized sophisticated DCF methods in one form or another. The study tried to emphasize the fact that theory - practice gap in capital budgeting has reduced in latest years. The non - DCF methods had surprisingly not reduced in preference, with 84.5% of the sampled companies utilizing a combination of both DCF and non - DCF methods.

Batra and Verma (2017) identified that the utilization of NPV and IRR increased with an increase in size of investment, while utilization of payback period remained almost constant with increasing investment sizes. In a contrasting observation, larger firms were found to be more preferential in utilizing the payback period method, while the smaller firms were reluctant to utilize it. The sophisticated methods of capital budgeting were revealed to be increasingly preferred by firms with increasing sales. However, a 10% level of significance reduced the significance of this finding. Nevertheless, the findings were consistent with the observations of Graham and Harvey (2002) and Ryan and Ryan (2002). Older and experienced firms were found to prefer the payback period more than younger ones. Younger firms were found to be more likely to utilize advanced sophisticated methods. Risk assessment was revealed to be done by utilizing sensitivity analysis by about 56% of the respondent firms. In contrast to previous studies, a detailed study on risk and its types was conducted in the present study.

Kengatharan (2017) conducted a survey of 186 CFOs in Sri Lankan firms to understand the moderating effect of uncertainty between capital budgeting practices and their performance. The sample size considered for the study was suitably large. The questionnaire used was an already verified version used by previous research studies. Rigorous statistical tests were utilized to check significance and make inferences. It was revealed that increased social uncertainty hampered the positive relationship between sophisticated capital budgeting practices and performance. The study indirectly highlighted the fact that risk assessment and incorporation were not adequate in current firms. Future studies may investigate this aspect.

Kengatharan (2016) conducted a study on capital budgeting practices being followed in firms and worked on the scope for improving them. The methodology followed was studying literature review articles and finding gaps in them to go for future research. The searching and selecting criteria of research papers were very effective, and only empirical studies with peer review were considered. The study revealed the fact that there were limited studies on capital budgeting practices in developing countries. Among the methods, NPV, IRR, PB, and ARR were predominantly used and had been widely studied.

Nurullah and Kengatharan (2015) analyzed capital budgeting practices of listed firms in Sri Lanka. CFOs of 32 listed firms of Colombo Stock Exchange were surveyed. The questionnaire selected was totally based on few earlier papers and may have lacked the ability to enquire new aspects ; 80% response rate appeared abnormally high and may have included biased responses. The chi - square test was effectively utilized to analyze the relationship amongst various variables. NPV and IRR were revealed as the most preferred methods for capital budgeting. Moreover, increasing capital budget had an effect on enhanced utilization of NPV, IRR, and payback period. Sensitivity and scenario analysis were found to be the most preferred methods for risk assessment.

A study on capital budgeting practices being followed by entrepreneurs in Delhi was conducted by Yadav (2015). The study relied on primary data as well as secondary data. The demerit in the primary data was that it was collected from employees of the firms who may not have complete control over capital budgeting practices. Response rate was quite high for the study with 75% for a targeted list of 20 entrepreneurs. Payback period method was always preferred by 48.4% of the entrepreneurs, while IRR and NPV methods were always preferred by 27.6% and 25.7% of the entrepreneurs as per the study.

Roy and Hota (2014) updated the knowledge of capital budgeting practices of modern Indian companies by surveying 30 listed companies on NSE. The questionnaires were carefully pre-tested, reminders were periodically sent, and a few of them were personally visited to gather data from these companies. In contrast to earlier mostly descriptive studies, statistical tools like Z - test and chi-square test were used. The study threw light on the fact that 28 of the 30 respondent firms utilized sophisticated DCF methods of NPV or IRR. Additionally, 24 of the 30 respondent firms utilized more than one method of capital budgeting. The use of non - DCF methods like payback period method was surprisingly revealed to be utilized by 24 of the 30 respondent firms. Firms taking loan from the market were found to be more inclined to use IRR. The size of investment was revealed to have no relevance to capital budgeting methods being utilized.

Jape and Korde (2014) investigated the theory practice gap in corporate finance practices in Mumbai based firms. Literature review was adequately done in the paper, and the necessary gaps were identified. The necessity of devising a different capital budgeting method for small firms because of their limited ability to forecast cash flows was understood well enough. Anomalies in capital budgeting like preference of IRR over NPV and non - sophistication of risk assessment methods were highlighted. Failure to include latest research was a serious limitation of the study.

Yadav (2013) conducted a study on capital budgeting and concluded that the process of capital budgeting was more important for small scale firms because of the lack of diversification. The unsophisticated methods of payback and ARR were still popular and only a small minority of the small scale industries were involved in true capital budgeting.

Gupta (2013) conducted a study on 75 firms and concluded that size and social cost benefit had a positive relationship with the frequency of usage and application of DCF methods in capital budgeting.

Singh et al. (2012) published a study conducted on Indian firms about their latest capital budgeting practices and provided a suitable normative framework. Questionnaire surveys were only administered to 166 non - financial firms of BSE 200 Index, and hence, included only large well established firms. The study included both primary as well as secondary data. The questionnaire was elaborate and probing. It was revealed that DCF techniques were used in conjunction with non - DCF techniques. It was established that three fourth of the sampled firms utilized IRR as compared to half of the sampled firms, which utilized NPV.

Gupta and Mohanty (2012) conducted a study on 75 firms and concluded that size, social cost benefit, and risk were vital factors that influenced the capital budgeting method which was being used. Primary data was used for the study, and regression analysis was used to arrive at the conclusion. The sample size was comparatively small with respect to the number of variables under study.

Cost of capital is an important factor in capital budgeting as per theory. Mukhopadhyay (2010) researched theories of cost of capital and critically evaluated each one of them.

Verma et al. (2009) were involved in a study on capital budgeting practices conducted on 100 diverse Indian manufacturing firms. The questionnaire used was elaborate. Sufficient diversity was maintained for the sampled firms. Great pains were taken to convince the CFOs of the confidentiality of the survey. Size of the capital budget, education of CEOs, and age of the company were exclusively studied to find their effect on capital budgeting. It was revealed that IRR, NPV, and payback period were the most preferable methods. Most of the firms used more than one capital budgeting method. In practice, IRR was preferred over NPV. Sensitivity analysis and shorter payback period were found to be the prominent ways to incorporate risk by the authors. Larger firms were found to be more inclined to use NPV.

Khata (2008) explained the risks the financial managers were taking by considering IRR as the more preferred method of capital budgeting.

Jain and Yadav (2005) conducted a study on public sector undertakings in India and identified details of capital budgeting preferences of these firms. The study was done on 137 PSUs which were likely to be representative of the population. The questionnaire used for the study seemed to be exhaustive with focus on different aspects of

capital budgeting. The study was conducted from 1991 to 2003 and was likely to include dynamics of capital budgeting. In addition, a vast majority of PSUs were incorporating a combination of traditional and discounted cash flow techniques for capital budgeting purposes. The most popular methods mentioned by PSUs were the IRR, payback method, and ARR in that order as mentioned by the authors. NPV and profitability index were surprisingly found by the authors to be the least preferred methods by the PSUs. It was also apparent that PSUs make use of multiple capital budgeting techniques to make a decision.

Jain and Yadav (2005) identified that among the risk incorporation methods, sensitivity analysis was found to be the most popular method followed by shorter payback period and higher required rate of return for risky projects. The respective percentages were 59%, 33%, and 23%. Sensitivity analysis was the most preferred method for manufacturing PSUs with 75% of the PSUs supporting it. Service PSUs, on the other hand, were revealed to go for shorter payback period, with around 46% PSUs going for it.

Anand (2002) conducted a survey of 81 CFOs in India to understand their corporate finance practices. The nature of the survey was broadbased and tried to understand the various interrelationships among different variables. The final questionnaire was made very concise, and at the same time, quite investigative by incorporating sub - parts, which helped in getting a suitable response rate. Mann-Whitney U test was effectively utilized to check if responses varied by characteristics of the firm. IRR was revealed to be preferred over NPV by the study. Large firms were found to be more likely to use NPV, while smaller firms were more likely to use the payback period method. High growth firms were found to be more likely to use IRR. The sophisticated methods of risk assessment like Monte Carlo and decision tree analysis were revealed to be not popular amongst firms.

Gaps Identified

The main gaps identified through the literature review are as follows :

(1) It has been revealed that non - sophisticated methods of capital budgeting are still being used along with sophisticated methods. Although use of methods like NPV have picked up and are preferred as well, non - academically recommended methods like payback period are still being used by smaller firms or for smaller investments. Hence, there is a need for research to find the exact reasons for the continuation of use of non - sophisticated capital budgeting method like payback period.

(2) Risk assessment is another area of concern where developments have not picked up as revealed by the literature review. Firms were found to be still popularly utilizing sensitivity and scenario analysis and incorporating this risk information by changing discount rates in an unscientific manner. Modern sophisticated methods like Monte Carlo analysis and decision tree analysis were revealed to be used by only a few firms. With modern systems and technology available at hand, doubt is raised why firms are not able to utilize these in an efficient way for risk assessment. Future studies may investigate the exact reasons why firms are not utilizing the sophisticated methods of risk assessment, and find ways to assess risk in an efficient way.

(3) Risk needs to be properly incorporated into the capital budgeting process. Gaps have been found in both capital budgeting practices and risk assessment. Risk has to be adequately incorporated into capital budgeting so as to make sound decisions. This is an indirect gap revealed from the studies. Future studies may find out ways by which risk is adequately incorporated in the capital budgeting process.

Conclusion

Enough studies have been conducted with regard to capital budgeting practices. Capital budgeting is a difficult process in which considerable information has to be collected to be able to make a sound decision. An incorrect capital budgeting decision may have consequences for many years. Investment in a loss making capital item is difficult to dispose off, as there would be less buyers available to pay the original price. Literature review has revealed that although sophisticated capital budgeting practices have kept pace and the theory - practice gap has reduced, there is still a gap present. Smaller firms have still been found to utilize non - sophisticated payback period method which is academically not recommended. Payback period method also does not take into account time value of money and ignores all cash inflows after the payback period. Hence, there is an immediate need to conduct research to find out the exact reasons why smaller firms go in for the payback period method instead of sophisticated ones like NPV. Future research may also find efficient and cost effective ways to conduct sophisticated methods of capital budgeting like NPV for smaller firms or for smaller investments.

Risk assessment was revealed to be carried out in an outdated manner by utilizing sensitivity and scenario analysis, which can, at best, present point estimates. This information is inadequate in the modern scenario where a deep knowledge of risk has to be gathered so as to incorporate this information in capital budgeting to make sound decisions. New methods of risk assessment like Monte Carlo simulation provide risk information, which is much more than point estimates. This improved risk information can also be more accurately incorporated in the capital budgeting process. Future studies may find the exact reasons why modern sophisticated methods are not utilized for risk assessment. Future studies may also find ways to conduct risk assessment in a cost-effective and efficient way.

Managerial Implications

Previous research has sufficiently presented the fact that risk is not being adequately incorporated into the capital budgeting process. Directors of firms may see it as worthwhile that investment is made on new tools and technologies so that risk is adequately incorporated into the capital budgeting process. An error in incorporating risk may translate into huge losses for many years. Hence, investments in such tools are a managerial necessity and not a luxury.

Firms should find ways to conduct sophisticated capital budgeting methods like NPV for smaller investments in a way which incurs the least cost and makes use of NPV viable and desirable even for such smaller investments. This ease of use of NPV would motivate firms to train non - financial experts taking decisions on future projects so that they get well versed with NPV.

Limitations of the Study and Scope for Future Research

The limitations of the study are as follows:

(i) Literatures reviewed were limited in number.

(ii) Financial data in countries such as India are difficult to get. Hence, doubts can be raised on any study based on primary financial data in India.

(iii) Most of the literatures used descriptive studies without utilizing rigorous statistical tests.

(iv) There is a shortage of studies on capital budgeting in India which get published in high impact factor journals (unlike foreign studies).

Literature review revealed that there are considerable theory - practice gaps in both capital budgeting as well as in risk assessment methods. As risk assessment methods have not advanced, there are high chances of risk being not adequately incorporated into the capital budgeting process. There have been many examples of firms using arbitrary methods of shortening the payback period or increasing discount rates as per rules of thumb. Hence, research needs to be done so that risk information is adequately incorporated into the capital budgeting process in a scientific and logical manner.

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