



# Capital Budgeting Decisions and the Firm's Size

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## To cite this article:

Divya Gupta. Capital Budgeting Decisions and the Firm's Size. *International Journal of Economic Behavior and Organization*. Vol. 4, No. 6, 2016, pp. 45-52. doi: 10.11648/j.ijebo.20160406.11

**Received:** December 24, 2016; **Accepted:** January 6, 2017; **Published:** February 9, 2017

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**Abstract:** This paper is an exploratory research on the application of capital budgeting techniques in Indian companies. This paper tries to explore the relationship between capital budgeting decisions and the firm's size. Firm's size has been defined as asset size, project size and turnover of the firm. This paper is based on the primary data. OLS (Observed least square Model) is used to evaluate the degree of relationship between asset size, project size and turnover of the firm with the frequency of capital budgeting techniques (FOT) and type of capital budgeting techniques (TOT) used by the companies. Using a sample size of 75 companies, the result shows that there is a positive relationship between frequency of capital budgeting techniques and application of discounted cash flow techniques with the firm's asset size, project size and turnover of the firm. Our paper provides new insights about the frequency of the capital budgeting techniques used in the firms along with the type of technique used by the companies.

**Keywords:** Capital Budgeting, Asset Size, Project Size, Turnover of the Firm, Regression Analysis

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## 1. Introduction

Capital budgeting process evaluates and selects the long term investments that are consistent with the firm's goal of maximizing owner wealth (Gitman, 2009). Brealey and Myers (2000) define capital budgeting process as a process to assess the risk, choose the right discount rate and crank out net present value. Kuchhal (1995) define capital budgeting decisions as capital expenditure decisions which have far reaching effects on the success and failure of an enterprise. According to him, capital budgeting decisions have effects on both success and failure of an enterprise. Srivastava and Mishra (2011) have defined capital budgeting decisions in relation to acquisition of an asset and generally having long term strategic implications for the firm. Different authors have different views regarding goals of capital budgeting, like maximization of owner's wealth, improving the performance of a firm, achieving overall goal of a firm, defining the strategic direction of the firm etc.

Capital budgeting techniques are divided into two categories: Non discounted cash flow techniques (traditional techniques) and discounted cash flow techniques. A non-discount method of capital budgeting does not consider the time value of money. In other words, each rupee earned in

the future is assumed to have the same value as each rupee that was invested many years earlier. Many of the limitations of non discounted techniques are taken care by discounted techniques like use of discounting factor and time value of money, which help in making a better decision. Sundem and Schall (1980) supports the same, that more sophisticated capital budgeting techniques provide superior decisions for corporate, after relating sophistication index with the growth, size, profitability. There are various factors which affect the capital budgeting decisions like size of the firm, size of the project, type of industry and type of the company etc. This paper discusses the factors affecting the type of the techniques used by the firms and the frequency of techniques used by the firms.

The paper has two objectives; first one is to find out the influence of the size of the firm on the frequency of capital budgeting techniques used by them and second is to find the influence of the firm's size on the type of capital budgeting techniques applied by the company, i.e either discounted cash flow techniques or non discounted cash flows techniques. In this paper we have taken three independent variables asset size, project size and turnover of the firm representing the size of the firm. We have used the primary data which is collected from various companies from different states. We have used Observed Least Square model to test the impact of

the predicting variables such as asset size of the firm, project size and turnover for evaluating the capital investment decisions of the firms.

We have found that variables such as asset size of the firm, project size and turnover have significant relationship with the usage of capital budgeting techniques. All three factors have a significant positive relationship with the frequency and type of capital budgeting techniques used by the firms. The finding is consistent to that to (Klammer, 1972; Andrews & Butler, 1986; Ross, 1986; Graham & Harvey, 2001; Graham & Harvey, 2002; Anand, 2002; Ryan & Ryan, 2002; Hermes and Smid & Yao, 2006).

The rest of the paper is arranged as per the followings. In Section 2 we discuss the available literature in detail. Section 3 is devoted to definition of the variables and their expected impact on the usage of capital budgeting techniques. Section 4 discusses about the research design and sample selection along with the descriptive statistics. In section 5 is devoted for the discussion, analysis, and interpretation of the regression statistics. Section 6 discusses conclusion and the research implications.

## 2. Extant Literature

According to Klammer (1972), Graham & Harvey (2001, 2002), Anand (2002) and Hermes, Smid & Yao (2006), the size of the firm is a significant factor in influencing capital budgeting decisions. According to Schall, Sundem & Geijsbeek (1978), firm size is the only environment variable of firm which appears to be consistently related to capital budgeting methods. McNich and Kudla (1981) and Drury & Tayles (1996) have worked and compared the capital budgeting techniques of large firms with small ones in US and UK respectively. McNich and Kudla (1981) say that one of the most important differences between capital budgeting for large scale and small scale firm is that in first case, decisions can be made independently of stockholder's views but in small scale and closely held firms, involvement of owners is essential in decision making process. Danielson & Scott (2006) have given reasons like small firms decisions are more compulsive then discretionary. According to Drury & Tayles (1996) though DCF techniques usage is increasing but non discounting methods continue to be used by small and large companies. They also concluded that theoretically sound capital budgeting techniques like NPV and IRR are more likely to be used by larger organizations rather than by smaller organizations. This is in consistent with US practices according to the survey done by Haka, Gordon & Pinches (1985). Various studies have been conducted on large scale companies but still the area of small firms is not completely explored.

According to Klammer (1972) & Oblak and Helm (1980), most of the U.S MNCs are using DCF techniques for evaluation of capital projects which differs from the survey report of Pinches & Lander (1997), according to them in developing countries like India, for multinationals the calculation of cash flows is one of the main issue because of

which DCF techniques are less used. From the above literature, we have seen that capital budgeting techniques are more popular with the large companies and also in particular they are taking decisions using discounted cash flow (DFC) techniques.

The type of technique is not only based on the size of the firm, in fact few large companies apply techniques according to the size of the project. According to Andrews & Butler (1986), Ross (1986), and Ryan & Ryan (2002) size of the capital budget is a significant factor in the choice of capital budgeting methodology. It depends on the size of the project that which type of capital budgeting techniques will be applied by the company a for better evaluation of the project. Ryan & Ryan (2002) have analyzed the positive relationship between sizes of the budget with the use of discounted capital budgeting techniques. Maroyi and Poll (2012) have conducted a research on listed mining companies in South Africa and found that companies use NPV technique in evaluating major projects (69%), followed by IRR (46%), PB (23%). They also found that 7.7% of the respondents do not use any technique to evaluate their project and some of the companies relied on more than one method for evaluation of the project. Thus, on the basis of the literature, our hypotheses for the study are as follows:

H1: "Do large firms use more number of capital budgeting techniques".

H2: "Do large firms use more DCF techniques for evaluating capital investment projects".

H3: "Do firms with large project size use more number of capital budgeting techniques".

H4: "Do firms with large project size use more DCF techniques for evaluating capital investment projects".

H5: "Do firms with large turnover use more number of capital budgeting techniques".

H6: "Do firms with large turnover use more DCF techniques for evaluating capital investment projects".

## 3. Definition and Estimation of Variables

On the basis of the literature review, the determinants affecting the use of capital budgeting techniques are identified. The explanatory independent variables include asset size of the firm, project size and turnover of the firm. The dependent variables are FOT (Frequency of Techniques) and TOT (Type of Technique), where the type of techniques are divided into two categories: one is discounted techniques and second is non discounted techniques. Both are taken in different coding system. TOT is converted into binary coding, where '0' is used for the companies using non discounted techniques and '1' is used for the companies using discounted techniques. FOT coding is done in 1 to 5 scales, according to the number of techniques applied by the company to evaluate the project. If a company is applying one technique then code will be "1" and if the company is using two techniques the code will be "2" and so on.

**Table 1.** Definition of variables and their Impact on different parameter of Capital Budgeting Techniques.

Variables	Description	Expected Impact on Frequency of capital budgeting Techniques used by the Company (FOT)	Expected Impact on type of Capital Budgeting Techniques used by the Company (TOT)
AS (Asset Size)*	This is the total asset base of the company	+	+
PS (Project Size)*	This is the project size of the company for formal analysis.	+	+
TO (Turnover)*	It describes the turnover scale of the company	+	+

\* The TO and AS coding is done on 5 scale basis, where: "0" is for Less Than Rs.10 Millions, "1" is for Less Than Rs.100 Millions, "2" is for Less Than Rs.1000 Millions, "3" is for Less Than Rs.10000 Millions, "4" is for More Than Rs.10000 Millions

\* The PS coding is done on 5 scale basis, where: "0" is for More Than Rs.5000 Thousands, "1" is for more Than Rs.10 Millions, "2" is for More Than Rs.100 Millions, "3" is for More Than Rs.1000 Millions, "4" is for More Than Rs.5000 Millions

## 4. Research Design and Sample Selection

### 4.1. Study Type

This study is an exploratory research. We have applied regression analysis to find the causal relationship between dependent and independent variables.

#### 4.1.1. Sample

Research is based on the primary data. The data was collected with the help of structured questionnaire from different companies across industries. The study surveys cross section of public sector and private sector firms. In all total questionnaires were sent to 250 companies through various means, and the firms responded to the survey with response rate of 30 per cent. Thus, this paper is based on the results of sample size of 75 duly filled questionnaires. The survey was designed to know about the corporate practices related to capital budgeting decisions. The sample is selected across the country.

#### 4.1.2. Sampling Method

The questionnaire was sent to all size of companies including small size, medium size and large size. We have used random sampling approach, where questionnaires were sent to companies on random basis. We have got the details of companies through database of various banks, various financing companies. Most of the questionnaires were sent to the companies directly and some questionnaires were sent to firms through banks. We selected banks on the basis of convenience.

#### 4.1.3. Statistical Tool for Analysis of Data

Questionnaires intends to explore various construct based on literature review. We have regressed the variables Project size, Asset size and Turnover with the dependent variables FOT (Frequency of Techniques) and TOT (Type of Technique) using OLS Regression.

**Table 2.** Classification of the Companies.

Type of Industry	No. of Companies	In (per cent)
Manufacturing	45	60
Services	20	26.7
Others	10	13.3

Out of the total sample of 75 companies, 45 are from

manufacturing sector, 20 are from service sector and rests 10 are from different sectors like oil, mining and engineering sectors.

### 4.2. Descriptive Study of the Sample

From the table 3, it can be seen that majority of the companies are large scale and having asset size of more than Rs.10000 millions and only 4 per cent of the total companies are having asset size of less than Rs.10 millions. And the rest 57 per cent of the companies is having asset size of more than Rs.10 millions but less than Rs.10000 millions. Table 3 elucidates the minimum project size of the firm for application of capital budgeting techniques. 69 per cent of the companies are going for formal analysis of the project is the project size is more than Rs.10 millions. Very few companies have kept the high limit for formal analysis of the projects. Only 10 per cent of the companies are going for formal analysis if the project size if more than Rs.5000 millions. 24 per cent of the companies are having turnover less than Rs.100 millions. 41.33 per cent of the companies are having turnover more than Rs.100 millions but less than Rs.10000 millions. 34.67 per cent of the companies are having turnover more than Rs.10000 millions.

**Table 3.** Description of the sample.

Variables	Characteristics	No. of companies	In ( per cent)
Project Size	> Rs.5000 Thousands	14	18.67
	> Rs.10 Millions	23	30.67
	> Rs.100 Millions	16	21.33
	> Rs.1000 Millions	13	17.33
	> Rs.5000 Millions	8	10.67
	< Rs.10 Millions	3	4
Asset Size	< Rs.100 Millions	11	14.67
	< Rs.1000 Millions	17	22.67
	< Rs.10000 Millions	15	20
	> Rs.10000 Millions	29	38.67
	< Rs.10 Millions	2	2.66
	< Rs.100 Millions	16	21.33
Turnover	< Rs.1000 Millions	12	16
	< Rs.10000 Millions	19	25.33
	> Rs.10000 Millions	26	34.67

### 4.3. Sample Statistics

Table 4 presents the descriptive statistics of variables

influencing the usage of capital budgeting techniques. The above descriptive statistics is of coded data for all the variables. The mean and median for the AS (asset Size) is 2.7467 and 3.0000. Mean of AS on the whole indicates that majority of firms have asset size more than average. Minimum and maximum values for AS are 0.00 and 4.00. Mean and median for all variables is very close, which signifies the normal distribution of data. PS is the project size of the firm.

*Table 4. Descriptive Statistics.*

Variables	AS	PS	TO	FOT	TOT
Mean	2.7467	1.6800	2.6800	2.4267	0.5333
Median	3.0000	1.0000	3.000	2.000	1.000
S. D	1.23127	1.27513	1.2320	0.91789	0.50225
Minimum	0.000	0.000	0.000	1.000	0.000
Maximum	4.000	4.000	4.000	5.000	1.000
Kurtosis	- 0.894	- 0.931	-0.429	- 0.265	- 2.036
Skewness	- 0.525	0.348	- 1.139	0.114	- 0.136

*Table 5. Regression Result for FOT and PS.*

Regression Statistics								
Multiple R	0.3376							
R Square	0.113973							
Adjusted R Square	0.101836							
Standard Error	0.869898							
Observations	75							
ANOVA								
	df	SS	MS	F	Significance F			
Regression	1	7.105864	7.105864	9.390307	0.003056			
Residual	73	55.2408	0.756723					
Total	74	62.34667						
	Coefficients	Standard Error	t Stat	P-value	Lower 95 per cent	Upper 95per cent	Lower 95.0 per cent	Upper 95.0 per cent
Intercept	2.018395	0.166855	12.09674	4.12E-19	1.685855	2.350936	1.685855	2.350936
PS	0.243019	0.079305	3.064361	0.003056	0.084964	0.401073	0.084964	0.401073

Project Size (PS) found positively influencing the number of capital budgeting techniques applied by the decision maker. Put it differently, larger projects found using more number of capital budgeting techniques to evaluate the projects. The t-statistics and its coefficient in table 5, found significantly associated with the frequency of capital budgeting techniques. The P-value of 0.003056 indicates the significance of the variable PS at 95 per cent level of confidence, which is also evident from the ANOVA table with F-value 9.39 and the significance P-value is 0.003056. While introducing PS as independent variable, with respect to frequency of capital budgeting techniques as a dependent variable, the adjusted R-Square is 0.101836. The result indicates that PS explains 10.18 per cent variations in the frequency of the techniques.

Hence the stated hypothesis 'large projects apply more number of capital budgeting techniques' is proved.

Most of the firms have indicated usage of capital budgeting techniques for small projects also. In this case median is less than the mean, which indicates most of the companies are following formal analysis of the projects with the small project size. The descriptive statistics of TO indicates that most of the firms are having higher turnover, as median value of the companies are higher than mean value. Kurtosis and skewness for all variables are within the range.

## 5. Results and Discussions

### 5.1. Expected Impact of PS, AS and TO on the Frequency of Capital Budgeting Techniques (FOT) Used by the Company

#### 5.1.1. Regression Result for FOT as Dependent Variable and PS as an Independent Variable

#### 5.1.2. Regression Result for FOT as Dependent Variable and AS as an Independent Variable

AS (Asset Size) is optimistically related to the number of capital budgeting techniques applied by the company. It basically suggests that the companies with the large asset size are using more number of capital budgeting techniques to appraise the projects as compare to the companies having smaller asset size. The t-statistics and its coefficient found significantly associated with the frequency of capital budgeting techniques. The P-value from the table 6 indicates the significance of the variable AS (Asset size) at 95 per cent level of confidence. The significant relationship between AS and FOT is also visible from table 6 with F-value of 17.8928. R-Square 0.1858 from the regression analysis signifies that AS (Asset size) explains 18.58 per cent variations in the frequency of the techniques, where AS is as independent variable, with respect to (FOT) frequency of capital budgeting techniques as a dependent variable.

**Table 6.** Regression Result for FOT and AS.

Regression Statistics								
Multiple R	0.443685							
R Square	0.196856							
Adjusted R Square	0.185854							
Standard Error	0.828213							
Observations	75							
ANOVA								
	df	SS	MS	F	Significance F			
Regression	1	12.27334	12.27334	17.89283	6.69E-05			
Residual	73	50.07333	0.685936					
Total	74	62.34667						
	Coefficients	Standard Error	t Stat	P-value	Lower 95 per cent	Upper 95 per cent	Lower 95.0 per cent	Upper 95.0 per cent
Intercept	1.518184	0.235102	6.457568	1.04E-08	1.049627	1.986741	1.049627	1.986741
AS	0.330758	0.078194	4.229992	6.69E-05	0.174919	0.486598	0.174919	0.486598

Therefore, it can be concluded that the Companies with the large asset size apply more number of capital budgeting techniques.

### 5.1.3. Regression Result for FOT as Dependent Variable and TO as an Independent Variable

TO (turnover of the firm) has a positive significant relation with the number of capital budgeting techniques applied by the company. It mainly advocates that the companies having higher turnover are using more number of capital budgeting techniques to evaluate the projects and the companies having less turnover size are using less number of capital budgeting techniques.

The t-statistics and its coefficient found radically associated with the frequency of capital budgeting techniques. There is a significance relationship between TO and FOT which can be derived from P-value. Above table 7 highlights the significance of the variable TO (turnover) at 99 per cent level of confidence, which is also apparent from the ANOVA table with F-value 19.26. If we look at the regression statistics the adjusted R-Square is 0.1979. R square in the table 7 shows that independent variable TO explain 19.26 per cent variations in the dependent variable FOT (frequency of the capital budgeting techniques).

**Table 7.** Regression Result for FOT and TO.

Regression Statistics						
Multiple R	0.456964767					
R Square	0.208816799					
Adjusted R Square	0.197978673					
Standard Error	0.822022525					
Observations	75					
ANOVA						
	df	SS	MS	F	Significance F	
Regression	1	13.01903134	13.01903	19.26687	3.76951E-05	
Residual	73	49.32763533	0.675721			
Total	74	62.34666667				
	Coefficients	Standard Error	t Stat	P-value	Lower 95 per cent	Upper 95 per cent
Intercept	1.514245014	0.228515169	6.626453	5.09E-09	1.058814946	1.96967508
TO	0.34045584	0.077563102	4.389405	3.77E-05	0.185872803	0.49503888

So, it can be derived from the above discussed results that the 'Companies having higher turnover are applying more number of capital budgeting techniques' for evaluation of the projects.

## 5.2. Expected Impact of PS, AS and TO on Type of Capital Budgeting Techniques Used by the Companies

### 5.2.1. Regression Result For TOT as Dependent Variable and PS as an Independent Variable

Table 8. Regression Result for TOT and PS.

Regression Statistics								
Multiple R	0.396694							
R Square	0.157366							
Adjusted R Square	0.145823							
Standard Error	0.464185							
Observations	75							
ANOVA								
	df	SS	F	Significance F				
Regression	1	2.9375	13.63311	0.000426				
	Coefficients	Standard Error	t Stat	P-value	Lower 95 per cent	Upper 95 per cent	Lower 95.0 per cent	Upper 95.0 per cent
Intercept	0.270833	0.089035	3.041874	0.003265	0.093387	0.44828	0.093387	0.44828
PS	0.15625	0.042318	3.692305	0.000426	0.071911	0.240589	0.071911	0.240589

PS (Project size) is positively related to the type of capital budgeting techniques applied by the companies. In this case we have categorized our techniques in two categories, one is non discounted techniques which is also known as traditional techniques and second is discounted techniques. The table 8 indicates that the companies having bigger project size are using more discounted cash flow (DCF) techniques like NPV, IRR and discounted payback period and the companies with the low project size are using traditional techniques like payback period and Accounting rate of return as compare to discounting techniques.

The t-statistics and its coefficient found significantly related with the use of DCF capital budgeting techniques. The P-value 0.000426 from the above table indicates the significance of the variable PS (Project size) at 99 per cent level of confidence, which is also apparent from the table 8 with F-value 13.63311. While establishing PS (Project size) as independent variable, with respect to type of capital budgeting techniques as a dependent variable, the adjusted R-Square is 0.1458. The result indicates that PS (Project size) explains 14.58 variations in the type of capital budgeting techniques used by the companies.

Hence it can be stated hypothesis that the 'Companies with the larger project size use more discounting cash flow capital techniques'.

### 5.2.2. Regression Result for TOT as Dependent Variable and AS as an Independent Variable

AS (Asset Size) is optimistically related to the type of capital budgeting techniques applied by the companies. From the table 9, considering AS (Asset Size) as independent variable, and TOT (Type of Techniques) as a dependent variable, we can say that the companies having large asset size are using more discounting cash flow (DCF) techniques. The t-statistics and its coefficient found highly significantly associated with the use of DCF capital budgeting techniques. The P-value from the table 9 indicates the significance of the variable AS (Asset Size) at 99 per cent level of confidence, which is also visible from the ANOVA table with F-value 13.63311. From the regression statistics, the adjusted R-Square is 0.2234 which indicates that AS (Asset Size) explains 22.34 per cent deviation in the type of capital budgeting techniques used.

Table 9. Regression Result for TOT and AS.

Regression Statistics								
Multiple R	0.483663							
R Square	0.23393							
Adjusted R Square	0.223436							
Standard Error	0.442595							
Observations	75							
ANOVA								
	df	SS	F	Significance F				
Regression	1	4.36669	22.2913	1.1E-05				
	Coefficients	Standard Error	t Stat	P-value	Lower 95 per cent	Upper 95 per cent	Lower 95.0 per cent	Upper 95.0 per cent
Intercept	-0.00856	0.125638	-0.06811	0.945884	-0.25895	0.241838	-0.25895	0.241838
AS	0.19729	0.041786	4.721391	1.1E-05	0.11401	0.280571	0.11401	0.280571

Hence the stated hypothesis 'Companies with the larger asset size use more discounting cash flow capital techniques

is established.

### 5.2.3. Regression Result for TOT as Dependent Variable and TO as an Independent Variable

TO is positively related to the type of capital budgeting techniques applied by the companies. The above tables indicates that the companies having higher turnover are using more discounting cash flow (DCF) techniques and the companies having lower turnover are using less discounting cash flow techniques.

The t-statistics and its coefficient found significantly associated with the use of DCF capital budgeting techniques. The P-value from the table 10 indicates the significance of

the variable PS (Project size) at 99 per cent level of confidence, which is also apparent from the ANOVA table with F-value 27.02269 and the significant P value. While introducing TOA (turnover) as independent variable, with respect to type of capital budgeting techniques as a dependent variable, the adjusted R-Square is 0.26017. The result indicates that variations in TO explain 26.017 per cent variations in the type of capital budgeting techniques used.

So we after analyzing the results given in the above table, we can conclude that the 'Companies having larger turnover use more discounted cash flow capital budgeting techniques.

**Table 10.** Regression Result for TOT and TO.

Regression Statistics						
Multiple R	0.51977					
R Square	0.27017					
Adjusted R Square	0.26017					
Standard Error	0.432					
Observations	75					
ANOVA						
	df	SS	MS	F	Significance F	
Regression	1	5.043091168	5.043091	27.02269	1.76279E-06	
Residual	73	13.6235755	0.186624			
Total	74	18.66666667				
	Coefficients	Standard Error	t Stat	P-value	Lower 95 per cent	Upper 95 per cent
Intercept	-0.0345	0.120092376	-0.28765	0.774432	-0.273887916	0.2048
TO	0.21189	0.040762008	5.198335	1.76E-06	0.130656023	0.293133

## 6. Conclusion

This paper investigates the determinants of the capital budgeting technique with the Indian corporate. By using regression model with a sample of 75 companies, we find that AS (asset size), PS (Project Size) and TO (turnover of the firm) are significantly positively related with both our dependent variable FOT (Frequency of Techniques) and TOT (Type of Techniques). We also find that AS (asset size), PS (Project Size) are significantly related to FOT at 95 per cent level of confidence and TO (Turnover of the firm) is significantly related at 99 per cent. AS (asset size), PS (Project Size) and TO (Turnover of the firm) are highly significantly related with TOT at 99 per cent level of confidence. The finding is consistent to that to Klammer (1972), Andrew and Butler (1986), Ross (1986), Graham and Harvey (2001), Graham and Harvey (2002), Anand (2002), Ryan and Ryan (2002) and Hermes et.al (2006). Andrew and Butler (1986) have concluded that large firms used more sophisticated techniques.

The study shows that the most significant variable among the three is TO (Turnover of the firm). Adjusted R square in case of FOT (Frequency of Techniques) and TOT (Type of Techniques) are .26017 and .198. On the basis of the survey conducted we can conclude that companies with higher turnover use discounted capital budgeting techniques and the frequency of using capital budgeting techniques is high. Overall the size of the firm has a significant relation with the capital investment decisions of the firms.

This study has conducted a survey of companies to

understand the usage of capital budgeting techniques by the firms in India. This research has answered many questions related to application of capital budgeting techniques like:

- Whether companies are applying more than one technique for evaluation of the project
- Whether the asset size, project size and turnover of the firm affect the application of capital budgeting decisions in India
- The independent variables are regressed with one new dependent variable as frequency of capital budgeting technique used by the firms (signifies the number of techniques adopted by the firm to take the final decision) which is not considered in previous researches. This will help the researchers to know the influence of the independent variables on the number of techniques applied by the firms.

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