Impact of firm characteristics and types of investment on capital budgeting practices in Sri Lankan listed manufacturing companies

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Abstract

A sound capital investment decision is vital to a firm's financial well-being and is among the most important decisions that firms must make. The importance has been given to capital investment in enhancing the value of firms. Techniques use to evaluate a capital investment known as capital budgeting techniques (CBTs). It is paramount important to explore the capital investment practices in Sri Lanka, with the underlying motivation of filling the gap in empirical evidence in this area. The key objective of this study is to examine the impact of firm characteristics and types of investment on CBTs applied by listed manufacturing companies in Sri Lanka. Both primary and secondary data are used for the study. Primary data are collected through a structured questionnaire while secondary data is extracted from the annual reports publish in there spective companies' web sites. Firm size, leverage, share ownership, growth and listing age have used as the firm characteristics, whereas equipment replacement, expansion of existing product and expansion into new product have used as the types of investment. Net Present Value, Internal Rate of Return, Profitability Index, Payback Period and Accounting Rate of Return have used as the CBTs. Descriptive and regression analysis are used to analyze the gathered data. Findings reported that firm characteristics have no statistically significant impact on CBTs. The impact of equipment replacement and expansion of existing product decisions were also insignificant on each CBT while expansion into new product decision was significantly associated only with PI method. The findings of the present study contradict the literature. Hence, it is important to note that majority of the studies that have reviewed in the literature focus on developed capital markets. Colombo Stock Exchange belongs (CSE) to an emerging capital market and hence characteristics that are distinct in developed capital markets may not clearly discernible in CSE.

Keywords: CBTs, Colombo Stock Exchange, Firm Characteristics, Manufacturing Companies, Types of Investment

1.Introduction

Financing decisions, investment decisions and dividend decisions have considered three main concerns in financial management, which have developed in pursuing the overall goal of maximizing shareholders' wealth. From these decisions, few of researchers have questioned

theimportance of decision making in investment within most companies in determining their long-term survival. noted that capital budgeting decisions are vital to an organization in each and every firm as it directly affects its profitability and ultimately to the survival. The rationale for that belief is that capital budgeting decisions often involve a significant capital outlay and it often comes with long lasting and recurring financial obligations.Thus, sound financial management and capital investment decision are vital to the firm's survival and long-term success.

Many studies have been conducted to find out what are the most widely used CBTs and also the relationship between firm's performance and methods of capital budgeting. But, it needs to understand more beyond just knowing that a certain technique is more widely used than another or the relation of CBTs with the firm's performance. What causes certain technique to be accepted over the others are an interesting question yet to be fully explored. What are the factors influencing the adoption of a certain technique? Are certain techniques most suitable to evaluate different types of investment? Understanding the logic behind the adoption of a particular financial measure of the appropriate type of investment can aid in selecting the right method for evaluating a particular investment. For both practitioners and researchers, more in-depth knowledge on capital budgeting contributes to better evaluation of capital budgeting decisions. As argued that not only using the correct method matters, but also correctly using the correct method is utmost important. Incorrect usage of the method results in wrong decision makes an investment and rejecting worthwhile investments. This shows the importance of CBTs in making better investment decision. For a firm operating under a different set of organizational context, is there a more appropriate method that can help in making better decisions, or would a standard method is applicable for evaluating different types of investment regardless of firm characteristics are the important aspects to be discussed under the application of capital budgeting. The study, therefore seeks to examine the actual management practices related to capital investment decisions in Sri Lanka, which will develop a rationale and theoretically valid managerial perspective in capital investment practices at the firm level.

2.Problem statement

In today's highly competitive business environment, long-term capital investments have become a critical issue. A business whose ability to effectively develop a feasible mechanism for capital budgeting, may gain a better competitive advantage to its rivalries in an environment characterised by change and volatility. Thus, the technique to be used in the evaluation process is one of the most important decisions in the capital budgeting process, knowing that each technique has its merits and demerits. Generally, investment decision-makers know the CBTs which available for evaluating their investment projects. However, there is no specific guide on whether there is a suitable CBT for a specific type of project for firms operating with certain firm characteristics (FCs).

Topics related to capital budgeting practices are frequently discussed throughout the world. Out of them,only a few similar studies pertaining to the current topic have been conducted even in developed nations. Studies conducted on this topic have come up with different findings. Several studies report that FCs and types of investment have significant impact on CBTs whereas some other studies declare that

they have no significant impact on CBTs. Thus, it is still a problem to study further. On the other hand, it is obvious that many of the studies related to this field were done in separately; look into either impact of different types of investment or impact of limited FCs on the capital budgeting practice of the firm. Looking at the gap in practice and in theory represented in the brief results of the previous studies along with theoretical assumptions, it is noticed that no agreed upon generalization can be made on the best technique to be used. Thus, this study aims to fill the gap in the literature to establish whether there is a rule of thumb for firms to use better CBT to evaluate different types of investment.

In Sri Lanka, a few empirical studies (Fernando, 2005; Nurullah & Kengatharan, 2015; Ramesh & Nimalathasan 2011; Swarnapali, 2015) have been carried out recognize CBTs applied in Sri Lankan organizations. The lack of evidence about capital budgeting practices hides the extent to which practitioners utilize their presumed knowledge in the subject or it may hide misapplications of these practices (Drury &Tayles 1997). Therefore, this study is an effort of filling that gap with giving a new insight into the applicability of the capital budgeting subject in present organizational context.

3. Objectives of the study

This study has following threefold objective:

* To examine the impact of firm characteristics on the use of CBTs.
* To examine the impact of types of investment on the use of CBTs.
* To identify the preferred CBT used for evaluating three different types of investment decisions.

4. Literature review

Capital budgeting decisions are among the most important decisions the firm has to make. The importance of capital budgeting is derived from the concept of shareholders' wealth maximization . Shareholders' wealth in turn is defined as the current price of the firm's outstanding ordinary shares. Capital budgeting theory typically assumes that the primary goal of a firm's shareholders is to maximize firm value (Dayananda et al., 2002; Nurullah & Kengatharan, 2015). A capital budgeting is a multi-faced activity which includes several sequential stages in the process . In general, the capital budgeting process is broken into four stages; project definition and cash flow estimation, project analysis and project selection, project implementation and project review (Cooper et al. 2001). A study carried out by Cooper et al. (2001) confirmed the findings of previous studies that more firms view project definition and cash flow estimation, analysis and selection as the two most important and most difficult stages of capital budgeting process.

In order to maximize the value of a firm, it is important that the optimum investment projects should be selected. Since the results from making a bad long-term investment decision can be both financially and strategically devastating, particular care needs to be taken with the investment process. There are numbers of financial techniques available for appraisal of investment proposals and can be classified as non-discountedcash flow (Non-DCF) and discounted cash flow (DCF) techniques. In practice, there are five main financial CBTs used when assessing investment projects; net present value (NPV), internal rate of return (IRR), profitability index (PI), payback period (PB) and the accounting rate of return (ARR) (Cooper et

al. 2001; Graham & Harvey 2001;. The arguments for the best techniques to be used are interesting to so many researchers. Every study is concluding a different result and generalizations. Theory suggests that NPV is the only value maximizing technique to be used in the selection process;.

In previous studies, several firm factors have been recognized as determinants of the choice of CBTs (Graham & Harvey 2001; Fernando, 2005; Ahmed, 2013; Swarnapali, 2015). These determinants are known as FCs or firm specifics. Many researchers have recognized different FCs in the purpose of identifying their impact on CBTs throughout the world (Brounen, DeJong &Koedijk 2004; Verbeeten 2006; Danielson & Scott 2006; Hermes et al. 2007; Daunfeldt & Hartwig 2011).Firm size has identified as the most dominant firm attributes. Many of the researchers (Graham & Harvey 2001; Daunfeldt & Hartwig 2011) highlighted that size of the firm influence on the choice of CBT in a firm. Contrary to the above view, a few researchers (Fernando 2005; Leon et al.2008; noted that firm size does not have any influence on the selection of CBTs. Leverage is another attribute which use to identify the impact on CBTs. Daunfeldt and Hartwig (2011) concluded that companies with a high-level of financial risk are more likely to use the non-DCF based payback method. Further, they found that high levered companies also had a tendency to use NPV and IRR methods, more extensively than low levered companies. Contrary to the above findings, Graham and Harvey (2001) found that highly levered firms are significantly more likely to use NPV and IRR than firms with small debt ratios. Thus, their findings concluded that leverage is positively correlated with the DCF techniques, whereas negatively correlated with the Non-DCF techniques. According to the findings of and Leon et al. (2008), there is no significant difference in the technique used by high and low levered firms. One of the other FCs which influence on the CBTs is the type of ownership. When both Graham and Harvey (2001) and Daun feldt and Hartwig (2011) have reported that ownership as an influencing factor of selecting capital budgeting method whereas the result of the study conducted by Leon et al. (2008) concluded that the share ownership appears to be unrelated to whether firms use DCF techniques or not. Forth important characteristic is the growth of the company. According to the findings of Graham and Harvey (2001) and Ahmed (2013), there is no difference in techniques used by growth and non-growth firms. Oppose to the above view, some researchers declared that company growth has impacted on the choice of CBT (Anand 2002; Daunfeldt & Hartwig 2011).The last aspect which consider in this study onFCs is period of listing. Exchange listing tends to increase the likelihood of cost of capital calculations significantly (Brounen et al. 2004). The relationship between period of listing and the use of CBTs has been empirically tested by an Indonesian study carried out by Leon et al. (2008). In their study, they assumed that those that have been listed over a long period of time would have been subject to much greater scrutiny than those recently listed. Therefore, they assumed that period of listing would be positively related to usage of DCF techniques. To consist with their conjecture, they affirmed that period of the listing is positively related to the use of DCF techniques and it significantly influenced on DCF techniques.

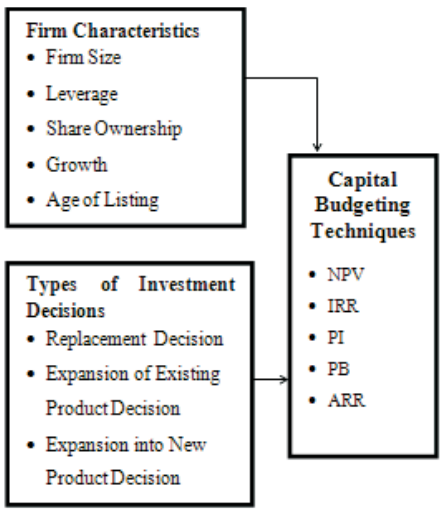
Companies run different types of investment decisions and there are many ways to classify the capital budgeting decisions.

According to both Brigham and Ehrhardt (2007) and the Institute of Chartered Accountants of India, capital budgeting decisions are classified in two ways. One way is to classify them on the basis of the firm's existence. Another way is to classify them on the basis of the decision situation. On the basis of the firm's existence, equipment replacement, expansion of existing products and expansion into new products are identified. Chen (1995) studied the use of different quantitative evaluation techniques across three types of investments: equipment replacement, expansion of existing products and expansion into new products. He found that DCF techniques are used more widely than non-DCF techniques to evaluate all three types of investments. He also found that DCF techniques are relied upon more heavily in expansion projects than equipment replacement. In a survey of small businesses, Danielson and Scott (2006) revealed the information about the types of investments the firm makes (replacement, expanding an existing product line and expanding into new product line) with the primary investment evaluation tools. The results indicated that the gut feel is more frequently used by firms that make replacement investments. Further, they highlighted that the importance of DCF analysis depends on the type of growth the firm is pursuing. The coefficient for expanding an existing product line is positive and significant for DCFs, but the coefficient for new product line is not. Firms will use DCFs to evaluate projects that extend existing product lines because future cash flow estimates can be based on past performance in this case. But, if it is contemplating a new product line, where obtaining future cash flow estimates can be difficult, the firm is less likely to use a DCF method of analysis. In addition, because of the firm's scale, market research studies to quantify future product demand (and cash flows) might not be cost effective. Hence, small firms may not rely exclusively on DCF analysis when evaluating investments in new product lines (Danielson & Scott 2006).The ARR is frequently the choice of firms pursuing growth strategy: expand product lines or new product line. The coefficients for both of these variables are positive and significant for ARR (Danielson & Scott 2006). These findings are contradictory with the previous studies which have focused on large firms. Since small firms do not satisfy the assumptions underlying in capital budgeting theory and because of these cash flow estimation challenges, it would be natural for small firms to evaluate projects using different techniques than large firms. But evidence about these differences is largely anecdotal (Danielson & Scott 2006). Eventually, they claimed that the optimal methods of capital budgeting analysis can differ between large and small firms. In a survey of South African industrial firms, studied different types of projects such as expansion of existing projects, expansion of new projects, foreign projects, abandonment of projects, general or administrative projects and social projects. From this study, a number of new trends have emerged. ARR is still the most popular method for the first traditional capital budgeting operations, namely; projects in general, expansion of existing and new projects and foreign projects. Moreover, the findings of Hall and Millard (2010) show that the preference for the NPV as a capital budgeting evaluation technique is not significantly above the IRR and is in contrast with the findings of previous studies; which cited the IRR as more popular than the NPV in most cases. When the abandonment of projects and administrative projects were evaluated, the NPV was the most popular method. According to the reviewed literature, it is still a puzzle because the result of

the survey worked out on this issue is controversial. Only a few similar studies pertaining to this area have been conducted even in developed countries. But, there are no such reported studies carried out in Sri Lankan context on this issue.

5. Methodology

This study is an explanatory type study, which was planned to identify the impact of FCs and types of investment on CBTs of listed manufacturing companies in Sri Lanka. The dimensions of firm size, degree of leverage, share ownership, growth level and age of the listing were studied under FCs. As the dimensions for the types of investment; equipment replacement, expansion of existing product and expansion into new product were considered. These eight dimensions together used to identify the prevailing situation with regard to the CBTs in Sri Lanka. Based on this, following conceptual model was derived.



Source: Researchers' Conceptualization

Figure 1 Conceptual framework of the study

The population of the study comprises all the listed manufacturing companies listed at CSE as at 10th April 2013. Since the present study has focused on the manufacturing sector, initially all the 36 (as at 10th April, 2013) listed firms in the relevant sector were chosen. Then, after screening the firms with incomplete data were left and finally only 31 firms were selected as the usable sample. The entire population has been selected as the sample of the study with the rationale made by previous studies (Ramadan 1991; Kester et al. 1999). Researchers believe that this kind of study cannot achieve its objectives if it does not separate the firms, according to the industry in which firms operate. Previous researchers have recognized this matter and conducted their studies on a base that considers the sector or the industry of the firms. Ramadan (1991) and Khamees et al. (2010), conducted capital budgeting studies on industrial firms, while Kester et al. (1999) considered the industry differences a limitation on their study. The justifications for choosing the listed companies only is briefly made because of some factors like a belief that the listed companies are more willing to give information, on the assumption that it is an accurate representation of the companies in Sri Lanka.

Both primary and secondary data were used for the study. Primary data for the analysis was obtained by using the results of a field survey. The main data gathering tool was a questionnaire which consisted by both opened and closed ended questions addressing the topic of capital budgeting practices and investment types. The questionnaire was self-administered by the respondents. Members of capital budgeting committee are the respondents of the survey and the usable response rate is very high compared to other similar studies in the field. For

example, Graham and Harvey (2001) have a response rate of 9%; Ryan and Ryan (2002), 20.5%; Daunfeldt and Hartwig (2011), 43%; Leon et al. (2008), 47.2%; Khamees et al. (2010), 65.4% and Brounen et al. (2004) report a rate of 5%, while Kester et al. (1999) show an average response rate of 15.5 percent for the five Asian countries. The survey instrument was pre-tested for clarity and accuracy. To elicit information regarding the FCs, secondary data were used and it examined the published annual reports of the three financial years from 2010 to 2012. All annual reports of this study were downloaded directly from the respective companies' web sites in the form of soft copies. The gathered data were treated and analyzed through the Statistical Package for Social Sciences (SPSS). The multiple regression analysis was run to identify the concurrent effect of the independent variables against the dependent variable

Equation (1) deals with the FCs whereas Equation (2) deals with the types of investment with the use of each CBT.

$$CBT^j_i = a0 + \beta_1 LN(SIZE)i + \beta_2 LEVERAGEi + \beta_3 OWNERSHIPi + \beta_4 GROWTHi + \beta_5 AGEi + \varepsilon_{...} \quad (1)$$

$$CBT^j_i = a_0 + \beta_6 REPLACEMENT_i + \beta_7 EXPANSION\_EX_i + \beta_8 EXPANSION\_NEW_i + e_i \ldots\ldots\ldots (2)$$

Where;

CBT^j_i is the reported use of capital budgeting technique j (j=1, 2.....5) by company *i* (*i*=1, 2...36);

a_0 = intercept;

β_i=coefficient of the regression estimates;

e = error term

Equation (1) deals with the FCs whereas Equation (2) deals with the types of investment with the use of each CBT.

6. Results

CFOs, finance controllers, finance managers and other officers of financial authority in the firm are the respondents of the present survey. Three-forth have professional experience of at least ten years. All of the respondents have financial or business related degrees and therefore had a strong theoretical background on the capital budgeting decision. The majority of the respondents involve in controlling and monitoring the entire capital budgeting process at top level in their respective organizations. The depth of knowledge and experience pertaining to capital budgeting as well as the seniority of the respondents in the industry added to the validity and reliability of the primary data sourced.The test-reset was done for estimating external reliability of the instrument, which used to collect primary data by using 12 companies with a two-week time interval. Table 1 shows the result of test-retest reliability of the instrument.

The result of the test-retest indicated only

Table 1 Test-retest of major variables

Variable	Test (T1) Mean	Re-Test (T2) Mean	(T1-T2)
NPV	3.7	3.5	0.2
IRR	3.1	3.2	(0.1)
PI	2.7	2.9	(0.2)
PB	3.9	3.7	0.2
ARR	2.7	2.6	0.1
Replacement	3.20	3.13	0.07
Ex. of Exist.	2.93	2.83	0.1
Ex. of New	3.25	3.18	0.07

Source: Survey Data, 2013

slight differences. So it ensured that external reliability of the research instrument was satisfactory. Moreover, internal item consistency, reliability was examined with Cronbach's Alpha test. All values are relatively high and indicate a high internal reliability. The results of Alpha test are given in Table 2.

Secondary data for the study was drawn from audited financial statements (i.e., income statements and statements of financial position)

Table 2 Cronbach'salpha test for types of investment

Dimension	Cronbach's Alpha
Equipment Replacement	0.847
Expansion of Existing Product	0.751
Expansion in to New Product	0.854

Source: Survey Data, 2013

of the particular companies as fairly accurate and reliable. Therefore, these data are considered reliable for the study. Necessary checking and cross checking were done while scanning data from the secondary source. All these efforts were made in order to generate validity data for the present study.

One of the most important questions that need to be answered by any study on capital budgeting practices is what the respondents' preferences are regarding the most important CBTs to be used? In order to identify the usage and the importance of CBTs, the researchers listed five CBTs and asked respondents to mark all relevant techniques as well as to rank their importance.The researchers have set a criterion to measure the use of a specific technique or a practice as a main tool if the firm applies it either *very frequently* or *frequently*. So, hence and after, a main tool is the one used by the firm either *very frequently* or *frequently*. Mean scores indicate in forthcoming Tables are the weighted average of the scores ranging from 1 (never used) to 5 (very frequently used). At the very outset there is an important thing to highlight on these results, which resolve any ambiguity in the forthcoming results. In the absence of the investment decisions like equipment replacement, expansion decisions, etc..; the respondents in general ranked their preference on CBTswas reported in Table 3. In here, respondents were asked to score how frequently they use the five identified CBTs on a five-degree scale in their day-to-day life.

Table 3 Preference of CBTs

CBT	Mean	Mode	Standard Deviation
NPV	3.87	4.00	0.846
IRR	3.39	4.00	1.145
PI	2.90	3.00	1.221
PB	3.74	4.00	1.094
ARR	2.61	3.00	1.086

Source: Survey Data, 2013

Looking at the mean scores, NPV and PB method are comparable to 3.87 and 3.74, respectively, whereas the ARR score falls behind with only 2.61. As can be seen in Table 3, NPV, PB and IRR are the three techniques most frequently used by the sample companies participating in the survey. It is further revealed that since the usage rate of NPV technique is deviated around 3.87, almost all the companies tend to use NPV as frequently. Similarly, for the PB method, frequency of usage is deviated around 3.74. Thus, the preference for the PB method is only second to the NPV method. According to the mean scores, NPV and PB are the two most popular methods among listed manufacturing companies in Sri Lanka. This is surprising because financial textbooks have lamented the shortcomings of the payback

criterion for decades (Payback ignores the time value of money and cash flows beyond the cut-off date; the cut-off is usually arbitrary). The values of standard deviations validate the above result further by having the values for NPV; 0.846 and PB; 1.094 respectively. As the lowest standard deviation carries for NPV method, it is clear that the most frequently used technique in the sample companies has been the NPV.

One of the objectives of this study was to explore the preferred CBT used for evaluating different types of investment decisions. Since the nature of the study focuses on the choice of CBTs based on the types of investment decision, the analysis takes place in the same manner. With regard to the CBTs used, respondents were asked whether they applied different techniques when they assessed selected types of investment (projects). Tables present the percentages of the use, the mean values and the standard deviations of each CBT under each investment decision situation. Tables 4, 5, and 6 show that the results of techniques of capital budgeting usage according to the types of investment decisions.

The result is in contrast with the former findings in this study (where the absence of investment types). NPV methodas the most frequently used method of sample firms in general has been changed under the different investment decision situations. The order of

Table 4: Usage ofCBTs for replacement decision

CBT	(1) %	(2) %	(3) %	(4) %	(5) %	Mean	S.D
NPV	0	16	29	26	29	3.68	1.08
IRR	0	26	23	29	23	3.48	1.12
PI	23	19	23	19	16	2.87	1.41
PB	3	6	26	26	39	3.90	1.11
ARR	10	42	29	13	6	2.65	1.05

Source: Survey Data, 2013

Table 5 Usage ofCBTs for expansion of existing product decision

CBT	(1) %	(2) %	(3) %	(4) %	(5) %	Mean	S.D
NPV	6	3	29	35	26	3.71	1.10
IRR	3	19	26	29	23	3.48	1.15
PI	23	19	19	23	16	2.90	1.42
PB	3	13	13	26	45	3.97	1.20
ARR	6	45	26	16	6	2.71	1.04

Source: Survey Data, 2013

Table 6: Usage ofCBTs for expansion in to new product decision

CBT	(1) %	(2) %	(3) %	(4) %	(5) %	Mean	S.D
NPV	3	3	29	35	29	3.84	1.00
IRR	3	10	26	39	23	3.68	1.05
PI	16	19	23	29	13	3.03	1.30
PB	3	3	23	32	39	4.00	1.03
ARR	10	35	26	16	13	2.87	1.20

Source: Survey Data, 2013

the techniques' preference has changed by becoming PB as the most popular method. Analyzing the given information above, it is revealed that the most used technique by Sri Lankan listed companies when making selected investment decisions is the PB.It is noticed that ARR is the least used technique by the firms in the sample, where the mean and the percentage of using it as a main tool are the lowest.However, it is obvious that the trend of using NPV technique for the investment evaluation purpose is increased accordance with the complexity of the

decisions. While comparing the present findings with the findings of is more consistent, the firms in their sample almost ranked the techniques in the same order that firms have in the present study except for the IRR and PI where both techniques carried the same percentage (28%) in their study. Furthermore, researchers found that the percentages of using the techniques are almost the same. For example, the percentage of using PB as a main tool for all types of investment decisions ranged from65% to 71%, the mean ranged from 3.90 to 4.00 and the standard deviation ranged from 1.03 to 1.20, these are considered very tight ranges. The similarity in the degree of using CBTsaccording to the type of investment decision was very strong that the researchers need not to use any measures other than the central tendency measures. Therefore, measures of central tendency are used in order to achieve the third objective; *Identify the preferred CBT used for evaluating three types of investment decisions*.

6.1 Multiple regression results of model I

Above findings were deviate when researchers looked at the impact of all the firm attributes together by using a multiple regression model.

A closer look at the individual coefficients in Table 7 reveals that all the variables are statistically insignificant at 0.05 and 0.01 levels. At the 95% confidence interval (CI), the value of 0 falls within the interval by supporting that FCs are not significant predictors of NPV method.

Table **7** Multiple regression results in NPV technique

Variables	Uns. Coef.		Sta. Coef.	t	Sig
	B	S.E	Beta		.
(Constant)	5.21	2.49		2.09	.05
Size	-.20	.38	-.11	-.52	.61
Leverage	.31	.49	.13	.64	.53
Growth	.01	.01	.16	.760	.45
Ownership	.01	.01	.16	.80	.43
Age	-.02	.02	-.23	-1.09	.29
R= 0. 296R square = 0. 087Adj. R square = -0. 095					
SE = 0. 886	F value =0. 479			Sig F = 0. 788	

Source:Survey Data, 2013

Table 8 Multiple regression results in IRR technique

Variables	Uns. Coef.		Sta. Coef.	t	Sig.
	B	S.E	Beta		
(Constant)	6.14	3.29		1.87	.07
Size	-.44	.51	-.17	-.86	.40
Leverage	.65	.64	.20	1.01	.33
Growth	.01	.01	.27	1.29	.21
Ownership	.01	.01	.07	.34	.74
Age	-.03	.02	-.26	-1.26	.22
R= 0.357 R square = 0.128 Adj. R square = -0.047					
SE = 1.172	F value =0.731			Sig F = 0.607	

Source: Survey Data, 2013

The multiple correlation coefficients indicate a positive, but weak to moderately strong relationship between the dependent and a set of independent variables. The R Square value represents that only 12.8% of the variation in IRR method can be explained by the FCs. Thus, R Square shows the evidence for the badness of fit of the model. The received F value also indicates that five firm attributes cannot be used to model IRR. P-values indicate that the any identified variables do not significant predictors of IRR. At the 95% CI, the values of 0 falls within the interval again indicate that FCsare not significant predictors of IRR technique.

The explanatory power of the PI method of regression model, as a whole is

small (R^2 =0.10). F value also confirmed the above conclusion representing the statistically insignificant value. Any of the five coefficients do not provide an evidence of significant which concludes that there is no impact of firm attributes on PI method.

Table 9 Multiple regression results in PI technique

Variables	Uns. Coef.		Sta. Coef.	t	Sig.
	B	S.E	Beta		
(Constant)	3.36	4.38		.77	.45
Size	.02	.68	.01	.02	.98
Leverage	-.78	.86	-.18	-.91	.37
Growth	.01	.02	.21	.99	.33
Ownership	.01	.01	.11	.57	.57
Age	-.03	.03	-.20	-.93	.36
R= 0.316 R square = 0.100 Adj. R square = -0.080					
SE = 1.564 F value =0.554			Sig F = 0.734		

Source: Survey Data, 2013

According to the Table 10, the regression as a whole is insignificant because the analysis shows a greater p-value than the significance level. Based on the p-value approach, all the variables are insignificant. Thus, it is accepted that characteristics of responded companies have no influenced on the use of PB technique.

Table 10 Multiple regression results in PB technique

Table 11 shows the linear correlation between the observed and model-predicted value of the dependent variable indicates a positive and a medium strength relationship (R = 0.345) between the dependent andthe set of independent variables.

Any of the five coefficients do not provide an evidence of significant which concludes that there is no impact of firm attributes onARR method

Table 10: Multiple regression results in PB technique

Variables	Uns. Coef.		Sta. Coef.	t	Sig.
	B	S.E	Beta		
(Constant)	.59	2.96		.20	.84
Size	.51	.46	.22	1.11	.28
Leverage	.34	.58	.12	.59	.56
Growth	.00	.01	-.02	-.10	.92
Ownership	-.01	.00	-.31	-1.61	.12
Age	.01	.02	.06	.28	.78
R= 0. 372 R square = 0.138			Adj. R square = -0.034		
SE = 1.053		F value =0.804		Sig F = 0. 558	

Survey Data, 2013

Table11 Multiple regression results in ARR technique

Variables	Uns. Coef.		Sta. Coef.	t	Sig.
	B	S.E	Beta		
(Constant)	2.79	3.14		.89	.38
Size	-.02	.48	-.01	-.04	.97
Leverage	-.27	.61	-.09	-.44	.67
Growth	.01	.01	.30	1.45	.16
Ownership	-.00	.00	-.12	-.60	.55
Age	-.00	.02	-.03	-.13	.90
R= 0.345 R square = 0.119 Adj. R square = -0.057					
SE = 1.116 F value =0.677			Sig F = 0.645		

Source: Survey Data, 2013

From the above results of multiple regressions, the researchers found that the findings of the present study do not support the theoretical assumption that the firms' characteristics influence the choice of CBTs. Thus, it is concluded that the firm size has no relationship with the CBTs. It is true that the finding of the present study is inconsistent with the findings of many studies (Drury &Tayles 1996; Graham & Harvey 2001; Verbeeten 2006). But this relation has confirmed by Fernando (2005), Leon et al. (2008) and Truong et al. (2008) which they conclude that there was no significant difference in CBTs used in terms of the firm size. The result of regression analysis showed an insignificant relationship

between the levels of firm leverage and all the capital budgeting methods. Although the present finding is inconsistent with the findings of Graham and Harvey (2001) and Daunfeldt and Hartwig (2011), this finding is in line with the finding presented by Leon et al. (2008), which concluded that the use of CBTs is unrelated to the financial leverage. This relation has also confirmed by the study of Anand (2002) who found an insignificant relationship with firm leverage and CBTs. Thus, it is concluded that the company leverage has no influence on the use of CBTs.

Current finding related to firm growth is consisted with the findings of Graham and Harvey (2001) and by reaching the same conclusion. Thus, it is concluded that the company growth has no significant impact on the use of CBTs. Moreover, results of regression analysis do not show any significant relationships between listing age and CBTs. The present finding is not consistent with the finding of Leon et al. (2008) who assert that the age of listing positively influence for DCF techniques. As identified by the researchers, it is important to report that the incorporation date and the listing date of sample companies is different. Although some of the sample companies have listed in CSE with a less period of time, those companies have incorporated in many years ago. Hence, these companies had practiced the capital budgeting for making their long-term investment decisions at the beginning of the business itself. So, the listing age would not be an influencing factor in deciding the technique of capital budgeting of the sample companies.

6.2 Multiple regression results of model II

R, the multiple correlation coefficient value of 0.391 indicates a positive and a medium strength relationship between the dependent and the set of independent variables.

Table 12 Multiple regression results in NPV technique

Variables	Uns, Coef.		Sta.Coef	t	Sig.
	B	S.E	Beta		
(Constant)	2.75	.65		4.21	.00
Replacement	.32	.25	.33	1.27	.21
Existing	-.14	.19	-.16	-.730	.47
New	.14	.24	.16	.58	.56
R= 0.391	R square = 0.153		Adj. R square = 0.058		
SE = 0.821	F value = 1.620		Sig F = 0.208		

Source: Survey Data, 2013

As depicted in Table 12, the p-value for each decision is more than 0.05. Therefore, all three types of decision are not significant predictors of NPV. The 95% CI for all the decisions, where the value of 0 falls within the interval, again indicating those decisions also are not significant predictors of NPV method.

According to the R Square value, only 7.6% of the variation in IRR technique can be explained by the types of investment. This is quitea small percent to be explained by a model. F value is indicated that none of the independent variables can explain the

outcome. The p-value for each decision is more than 0.05. Thus, all three types of decision are not significant predictors of IRR method. The value of 0 falls within interval at the 95% CI, for

three of the decisions again indicate that none of the decision is a significant predictor of IRR method.

Table 13 Multiple regression results in IRR technique

Variables	Uns. Coef.		Sta.Cof	t	Sig.
	B	S.E	Beta		
(Constant)	3.01	.92		3.36	.00
Replacement	-.06	.36	-.05	-.17	.86
Existing	-.28	.27	-.24	-1.06	.30
New	.42	.33	.35	1.25	.22
R=0.276	R square = 0.076		Adj. R square = -0.027		
SE = 1.161	F value =0.741		Sig F = 0.537		

Source: Survey Data, 2013

As depicted in Table 14, F value of 2.060 that is insignificant shows that the model is not reasonably fit for the data. However, such evidence is not adequate to validate the model. Itfurther reveals that only one variable, out of

Table14 Multiple regression results in PI technique

Variables	Uns. Coef.		Sta.Coef.	t	Sig.
	B	S.E	Beta		
(Constant)	1.33	1.14		1.17	.25
Replacement	-.24	.44	-.14	-.56	.58
Existing	-.27	.33	-.180	-.84	.41
New	.92	.41	.59	2.23	.03
R=0.432	R square = 0.186		Adj. R square = 0.096		
SE = 1.431	F value =2.060		Sig F = 0.129		

Source: Survey Data, 2013

three predictors (expansion into new product decision, $\beta = 0.92$) is statistically significant at 0.05. The coefficient shows that this variable has a significant positive impact on the PI method. The CI for expansion into new product decision is [0.073, 1.757], where the value of 0 does not fall within the interval, again indicating expansion into new product decision is a significant predictor.

As shown in Table 15, R value of 0.469 indicates a positive, but medium relationship between the dependent and the set of independent variables. Further, it depicts that only 22% of the variation in PB can be explained by the types of investment while remaining proportions are explained by the other factors which have not been considered in the current model. The investment types have a small contribution in predicting PB method and they are statistically insignificant when checking the t-test significance level. The value of 0 falls within interval at the 95% CI for three of the decisions again indicate that none of the investment decision is a significant predictor of PB technique.

The adjusted R Square showed (Table 16) that the model only explains 10.3% of the variance in the ARR. This is quite a small percent to be explained by a model. F value of 1.038 is insignificant and shows that the model is not fit for the data. The p-values for all the decisions are more than 0.05. Thus, none of these decisions are significant predictors of ARR method.

Based on the regression result, it can be

Table 15: Multiple regression results in PB technique

Variables	Uns. Coef.		Sta.Coef.	t	Sig.
	B	S.E	Beta		
(Constant)	2.40	.77		3.13	.004
Replacement	.29	.30	.24	.97	.34
Existing	-.28	.22	-.27	-1.26	.22
New	.40	.28	.38	1.44	.16
R=0.469	R square = 0.220		Adj. R square = 0.134		
SE = 0.964	F value =2.542		Sig F = 0.077		

Source: Survey Data, 2013

concluded that the investment in equipment replacement has no significant impact on the use of CBTs. The regression analyzes further indicated that there was no statistically significant relation between the use of CBTs and decision on expansion of existing product. This finding has been confirmed by Chen (1995) who assert that DCF techniques are relied upon more heavily in expansion projects than equipment replacement. According to the results it can be

concluded that investment in expansion into new

Table 16: Multiple regression results in ARR technique

Variables	Uns. Coef.		Sta. Coef.	t	Sig.
	B	S.E	Beta		
(Constant)	1.80	.86		2.09	.05
Replacement	-.27	.33	-.22	-.82	.42
Existing	.03	.25	.03	.11	.91
New	.48	.31	.43	1.54	.14
R= 0.322	R square = 0.103		Adj. R square = 0.004		
SE = 1.084	F value = 1.038		Sig F = 0.391		

Source: Survey Data, 2013

product has asignificant impact on the use of PI technique. However, all other methods do not report any significant impact with expansion into new decision.

7.Conclusion and recommendations

As a whole, given results highlighted that the most used CBT in the sample firms was either NPV or PB in general, where there is no situation of investment classification, while the least used CBT was the ARR.The results of the study further indicated that the previous ranking for investment appraisal techniques was a little bit different in the case of investment types. The results show that the traditional unsophisticated technique; the PB still enjoys a long lasting acceptance among companies in Sri Lanka when evaluating the three types of investment decisions. When the PB has been dominant, NPV technique has become the second preferred method of capital budgeting for evaluating the identified investment decisions. These findings contrast with the findings set out when the overall most important capital budgeting method was chosen. It is remarkably obvious that the acceptance of ARR has severely declined while PB even today continues to be widely used as an investment appraisal tool among Sri Lankan managers.An important caveat here, and throughout the survey, is that the responses represent beliefs. But, it has no way of verifying that the beliefs coincide with actions. In many aspects the results differ from previous surveys, perhaps because the more diverse sample. At the end it is important to note that majority of the studies that have been reviewed in the literature focus on developed capital markets. Colombo Stock Exchange belongs to an emerging capital market and hence characteristics that are distinct in developed capital markets are not clearly discernible in CSE. Given the results of the present study and the results from prior studies, researchers suggest that more empirical studies are required in this area. The research area touched by the present study could be identified as a fruitful avenue to carry out further studies.

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