A Survey of Capital Budgeting Techniques Applied by Sugar Companies in Western Kenya

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ABSTRACT--- ***Capital budgeting models have been and continue to remain the predominant means for evaluating and selecting amongst investment opportunities. Firms that choose correctly reap improved financial performance while those that get the decision wrong either suffer losses as a result of making the ill-fated decision or incur a significantly high opportunity cost in the event that they chose not to invest. This study seeks to provide empirical evidence on the current state of practice of capital budgeting techniques among sugar companies in Western Kenya. The findings of the study indicate that most of the sugar companies use a simple payback period as opposed to discounted techniques. This research adds to the body of knowledge on capital investments in general and discounted cash flow analysis in particular, by showing the theory practice gap.***

Keywords--- Capital budgeting, investment opportunities, simple payback period, discounted techniques

1. INTRODUCTION

It is self-evident that in each investment project that companies do, or try to do; they take into account strategic, qualitative and financial aspects (Druly and Tyles, 1997). Although main course of academic literature has stressed the importance of financial appraisal techniques particularly the discounted cash flow methods in investments, companies sometimes accept also projects that aren't financially sound. Sometimes it may be that a corporation faces a situation where it must undertake a project, which has negative net present value, due to strategic reasons or any reasons well known to the management. (Karim et.al, 2010; Myers, 1984).

According to subsequent Kenya Sugar Board Reports, the sugar industry plays a significant role in social-economic development of the Kenyan economy yet self-sufficiency in sugar has remained elusive over the years as consumption continues to outstrip supply. A substantial amount of capital is tied up in stalled factory expansion equipment in companies such as Nzoia and Chemilil, Muhoroni is under receivership and Miwani went under. The Kenya Sugar Board Strategic Report (2009-2014) indicates that the industry wants to enhance its competitiveness through cost reduction strategies and efficiency improvements and expanding product base. This calls for numerous capital investments. The problem however remains on how they will validate the investments they intend to undertake based on the practices they have been used to.

Academic literature, in particular that devoted to finance theory, has indicated that discounted cash flow models, such as NPV, are desirable for decision-making concerned with capital investment because an increase of NPV is connected directly with increased corporate value (Shinoda, 2010; Myers 1984). This research therefore seeks to find out how sugar companies appraise their capital budgets and whether their intuitions are consistent with what financial theory prescribes.

2. LITERATURE REVIEW

The guiding theory for this research is Modigliani and Miller Theorem (1980). This theorem states that, in the absence of taxes, bankruptcy costs, and asymmetric information, and in an efficient market, a company's value is unaffected by how it is financed, regardless of whether the company's capital consists of equities or debt, or a combination of these, or what the dividend policy is. The theorem is also known as the capital structure irrelevance principle. Modigliani and Miller (1958) argue that managers should ignore financing and dividend decisions as irrelevant and focus on positive net present value (NPV) investment opportunities that would maximize the value of the firm. Thus

the analytical framework for determining a project's NPV as derived from discounted cash flows analysis (DCF) came to provide a rational basis for collective decision-making. The classical theory by Modigliani and Miller (1958) identifies sophisticated evaluation methods as a tool for maximizing the profitability of firms.

Capital budgeting, which can be described as the formulation and financing of long-term plans for investment; Byers, (1997) is one of the most important responsibilities of the owners/managers of firms. The decisions made during the capital budgeting process determine the future growth and productivity of the firm. Capital budgeting and the estimation of the cost of capital (the rate of return that a firm must earn on its investments to ensure that the minimum requirements of the providers of capital are met) are the most important financial decisions facing owners/managers of firms (Martins 2011). The capital budgeting techniques fall under discounted, non- discounted methods and new methods.

DCF analysis can be divided into two main categories, the net present value method (NPV) and the internal rate of return method (IRR) (Carter and Ejara (2007). The logic behind DCF analysis is to forecast relevant future cash flows and take the issue of time into account by discounting the cash flows back to present value. The process is performed by the help of a discount rate, representing opportunity costs and risk. The aim of this cost-benefit analysis is to find expected present value of future income and costs, and to compare this value with projects' investment costs (Bennouna et. al 2010). The difference between the present value of net income and the project's investment costs is the project's expected net present value (NPV).

Both NPV and IRR are consistent with the goal of maximizing a firm's value because use cash flows and consider cash flow timing (Tayler,2004). With NPV, the present value of future cash flows is generated and when compared with initial outflows, an investment project is seen as acceptable whenever a positive NPV is the outcome. IRR is a percentage rate that equates the present value of future cash inflows with the present value of its investment outlay. Finance theory asserts that NPV is the best method for evaluating capital investment projects.

In a normal project, cash outflows are followed by annual cash inflows and under these circumstances, NPV and IRR lead to the same investment decisions (Akalu 2001). Problems with the IRR technique occur in two cases and may lead to incorrect capital budgeting decisions. When project cash flows are abnormal this may lead to multiple IRR calculations, affecting both independent and mutually exclusive projects. When investment projects are mutually exclusive, scale and time differences may lead to incorrect investment decisions and this is a problem associated with the reinvestment rate assumption (Brigham and Ehrhardt, 2002).

Other than the net present value and the internal rate of return, discounted payback period and profitability index are also other types of discounted methods which are currently in use. The discounted payback period represents the time it takes for the present value of a project's cash flows to equal the cost of the investment. The findings of the survey conducted by Ryan and Ryan (2002) indicate that USA firms use simple payback period and discounted payback period higher than they use of NPV and IRR despite many finance textbooks claiming they are not consistent with what finance theory prescribes. The profitability index is determined by dividing the present value of each proposal by its initial investment. A project is acceptable if its profitability index is greater than 1.0 and the higher the profitability index, the higher the project ranking (Reinford, 2001).

The payback period and the accounting rate of return are the two main types of non-discounted methods. CIMA (2002) defines payback as 'the time it takes the cash inflows from a capital investment project to equal the cash outflows, usually expressed in years'. When deciding between two or more competing projects, the usual decision is to accept the one with the shortest payback. Payback is often used as a "first screening method". This implies that when a capital investment project is being considered, the first question to ask is: 'How long will it take to pay back its cost'? Several surveys for example Ryan and Ryan (2002), Graham and Harvey (2002), pointed out that the traditional payback period was the most utilized method of appraising the capital budget.

The accounting rate of return is the ratio of the project's average after-tax income in relation to its average book value (Copper, 1999). Accounting rate of return (ARR) evaluates the project based on standard historical cost accounting estimates. The accounting rate of return also referred to as the book rate of return, bases project evaluation on average income and on accounting data rather than the projects cash flows. Unlike the payback period, this technique produces a percentage rate of return figure which is then used to rank the alternative investments. Drury and Tayles (2007) points out that, non-discounted techniques such as payback period and accounting rate of rate are the most applied appraisal techniques by the companies that do not employ discounted techniques.

One of the main developments in the capital budgeting literature over the last decade has been real options. Most capital investment projects have options (for example, option to expand or to abandon) that have value (Ross et al., 2005). Conventional DCF analysis should be complemented by real options analysis in order to determine the true NPV (Amram and Howe, 2002). However, NPV is often calculated without identifying and considering real options. Previous empirical literature found that a relatively small number of firms employed real options (Block, 2007; Graham and

Harvey, 2001; Ryan and Ryan, 2002). In Kenya, there appears to be a complete absence of research regarding their use which will be furthered by the findings of this research.

3. METHODOLOGY

This research followed a descriptive research design. According to Ranjit (2005), descriptive studies are undertaken to understand the characteristics of organizations that follow certain common practices. This was a census study of the nine sugar companies in western Kenya. Target group of this research was all chief finance officers, or equivalent, of the nine sugar companies in Western Kenya (A list of the companies is in the appendix). Some of the organizations in this target group were quite small, which meant that no named chief finance officer was found. In these cases the questionnaire was administered to the person who is responsible for the financial analysis in the firm.

Data was collected from the respondents through a self- administered questionnaire using the key informant method. Chief finance officers were the main respondents and only one respondent was involved. The questionnaire was administered through drop and pick method. The researcher approached each company, introduced herself to the relevant respondents explaining to them the nature and purpose of the study then left the questionnaire with the respondents to be completed and picked later.

The questions required responses in three forms numerical ratings (on a five-point scale) expressing subjective estimates of quantifiable characteristics (such as frequency of use of each of the capital budgeting techniques) , yes / no responses to questions asking , for example , the treatment of inflation and a numerical figure stating for example the number of employees for open-ended questions .

All completed questionnaires were edited to ascertain that they are complete and consistent across respondents and to identify omissions. Data was then be coded under different variables with their frequencies. Data was analyzed using descriptive statistics. Descriptive statistics included measures of location (mean) and measures of dispersion (standard error mean). The statistical analysis was conducted by using SPSS 12.0 statistical program and the results presented in frequency tables and pie charts.

Due to the highly theory based approach to the questionnaire, it was estimated that some of the respondents might not know all different techniques and methods stated in it. A separate attachment containing definition was constructed and attached to the questionnaire. Definitions were partly developed by the researcher and partly derived from current literature. To ensure validity construction of the questionnaire was built so that the respondents would have minimal possibility to false interpretations among the different questions and answer options.

4. RESEARCH FINDINGS

4.1Response Level, Data Coding and Cleaning

Although the survey was to cover all sugar companies in operation by August 2012, (A copy in appendix ii) data was collected from eight sugar companies out of the targeted nine which represented a 88.8% response rate therefore the effective population was eight companies. Data was coded and then cleaned to check for consistency. Data was then analyzed using SPSS version 12.0 statistical program.

4.2 Findings on Respondent and company demographics

Respondent demographics are shown in Table I. Based on the characteristics of the companies; a picture emerged of CFOs aged in their 40s (75%), with a Master's degree typically an MBA (50%) who had been in their current position for less than four years (62.5%). Most of the companies surveyed were labour intensive with 50% of them with employees over one thousand. 62.5% of the companies are publicly owned with a majority commanding an asset base of below ten billion shillings. An interesting fact is that 50% of these companies are highly levered with a debt to equity ratio of above 50%.

4.3 Common investment decisions and their time horizon

Most of the surveyed companies are currently investing in new products and services (50%). Since sugar manufacture produces a varied variety of inputs for manufacture of different products such as ethanol and electricity, most companies have diversified into the manufacture of such. Investment into new equipment and replacement of old equipment is also a major investment each carrying 25%. New equipment is needed since new products call for new investments in equipments. Replacement of equipment is also a major investment because most companies are using old equipment which leads to constant breakdowns (KSB2012-2014). The time horizon of investment calculations in most companies is ten years (50%) while 37.5% have investment calculations of five years. This is expected because most of these new projects are capital intensive and an extensive duration of time is needed for the project to be able to pay back.

Table1: Respondent and firm demographics

Demographics	**n**	**%**
Age		
<40	6	75
40-49	2	25
Tenure		
<4years	5	62.5
4-9 years	3	37.5
Level of education		
Undergraduate	4	50
Masters	4	50
No. of employees		
Below 1000	4	50
1000-1500	2	25
1500-2000	2	25
Ownership structure		
Public	5	62.5
Private	3	37.5
Assets owned		
0-10 billion	5	62.5
11-20 billion	2	25.5
21-30 billion	1	12.5
Debt Ratio		
Nil	2	25
Below 50%	2	25
Above 50%	4	50

4.4 Extent of use of capital budgeting techniques

The extent to which different financial appraisal techniques are used is shown in Table iii. These findings are similar to those reported by previous surveys. The survey findings indicate that non discounting methods continue to be used by most of the companies. Previous studies have suggested that payback is the most widely used method and according to the results presented in table iii 87% of the respondents use a simple payback period. The justification for using the payback method, as a simple proxy measure to capture the impact of liquidity constraints and risk, have been documented in the literature (e.g.. Pike, 1985).

Table 2: Frequency of use of capital budgeting techniques

	Never/ Rarely (%)	**Regularly/Always (%)**
Internal rate of return	37.5	62.5
Payback period	12.5	87.5
Discounted payback period	62.5	37.5
Accounting rate of return	50	50
Net present value	37.5	62.5
Real options	75	25
Profitability index	62.5	37.5

For DPP, the payback periods needed to recover initial investment given accumulated amounts of the present value of cash inflows are calculated. Thus, in DPP, the time value of money is considered under the aspect of cash inflow. According to the findings of this survey, 37.5% of the respondents use this method. This reveals that sugar factories consider payback period to be an important decision tool when making investment decisions. This supports what extant literature has documented (e.g. Graham and Harvey (2001) and Ryan and Ryan (2002).

Accounting rate of return which considers accounting income is also an important decision tool when making investment decisions in sugar companies. 50% of the respondents regularly and always use this method. The only

justification for using the accounting rate of return method can may be because top management believes that reported profits have an impact on how financial markets evaluate a company. This is further reinforced in many companies by linking management rewards to short-term financial accounting measures. Thus a project's impact on the financial accounting measures used by financial markets would appear to be a factor that is taken into account within the decision-making process.

The results of this survey indicate a huge margin of firms that are using the discounted methods. For the surveyed companies IRR is used 62.5% regularly and always. This is the same practice for NPV which constitutes the same percentage. In this research, an overwhelming percentage of firms (62.5 percent) correctly compute NPV or IRR on a cash flow basis rather than accounting income. Interest expense and other financial costs however are incorrectly treated with 75% not deducting interest and other financing costs from income to arrive at cash flows.

Despite the drawbacks of IRR, it seems that managers find it naturally attractive because it appraises investment value in percentage terms, which can be easily compared across capital budgeting projects. The respondents who use discounted techniques favour NPV over IRR when evaluating projects. Possible explanations for more widespread use of DCF are the availability of computer software that greatly facilitates computations such as Microsoft excel (Pike, 1996 ;), and improvement in the formal education level of managers (Sangster, 1993) as 50% of the respondents have an MBA. 37.5% of the respondents use profitability index regularly and always. This indicates that it is the least used discounting technique.

Although academic literature has emphasized the use of real options for companies who are faced with strategic options, this development is rarely employed by sugar companies. Only 25% regularly and always use this technique. The reasons for not using real options as Block,(2007) pointed out may include skepticism, complex and cumbersome techniques, lack of management support, DCF being considered a proven method, and real options being seen as too risky.

Project related financial parameters such as expected cash outflows and inflows, macroeconomics (for example the inflation rate), and post-audit review data were satisfactorily acquired from firms' capital budgeting information systems. Conversely, project expected economic life and cost of capital and required returns were less frequently obtained from the information system (a quarter indicated often or very often available). All the companies conduct post-audits of major capital investment projects even though suitable data from the information system was not always reported as being available.

Generally, the surveyed companies use more than one method to evaluate investments. Most of the organizations used a combination of appraisal techniques. For example 62.5 per cent of those organizations which often or always used the payback method combined it with a discounting method and 50 per cent of those firms often always using the accounting rate of return also combined it with a discounting method. Although previous research has highlighted the fact that firms use a combination of techniques, it is unclear which techniques are considered to be most important in the decision-making process.

5. CONCLUSIONS AND RECOMMENDATIONS

According to previous surveys conducted for example Graham and Harvey (2001) and Ryan and Ryan (2002), payback period is the most utilized capital budgeting appraisal technique used. The findings of this survey reveal that it is still the most utilized by sugar companies (87.5%). It can therefore be concluded that despite the fact that it does not take into account time value of money it is still considered a superior appraisal tool even in Kenya. Although many authors have for many decades warned of the disadvantages of using the payback criterion it is a surprising and noteworthy gap between academic theory and practice. Although NPV and IRR are highly utilized (62.5%) project appraisal techniques, a number of firms favor NPV as compared to IRR. Financial theory advocates using the superior NPV. However as extant literature has pointed out the current theory as it is misapplied or misused.

A theory-practice gap remains in the DCF application among firms in the sugar industry. Apart from some firms not using DCF, several areas of DCF analysis were misapplied. Training for managers and analysts should be provided to ensure capital budgeting tools, in general, and DCF, in particular, is applied in accordance with normative textbook approaches. Moreover a small percentage of sugar firms not embracing DCF techniques should be encouraged to do as it is superior compared to the traditional methods.

6. LIMITATIONS AND FURTHER RESEARCH

The survey conducted was not without limitations. One of the main short-comings of the survey was that it was limited to sugar companies in Western Kenya. Thus the capital budgeting techniques used may not be a good representative of all companies in Kenya or may not apply to other sectors. Responses by individual CFO's or those responsible for capital budgeting may be their personal point of view and therefore they may not reflect the practices of companies they represent. Additionally the focus of this study was on selected aspects of capital budgeting which is the project appraisal. However successful use of the appraisal techniques is one of the many decisive factors leading to

successful capital investment. Other capital budgeting phases for example, generating investment ideas are important and were ignored. Finally, some of the respondent organizations have bureaucratic organizational procedures which prolonged the period for data collection.

Little is known about the extent, and the approaches which are used to incorporate those benefits that are difficult to quantify (Sometimes referred to as real options) into the financial appraisal. It is unlikely that such information can be ascertained directly from questionnaire surveys and there is a need for future research to concentrate on in depth field studies which describe how the cash flow estimates are derived. Secondly, a further research is needed to identify organizational procedures which lead to the utilization of a given appraisal technique. Finally, since finance theory recommends the use of sophisticated techniques such as the NPV or IRR; further research is needed to identify whether the use of a given capital investment technique leads to improved financial performance or not.

7. REFERENCES

1. Adler, R.W., "Strategic Investment Decision Appraisal Techniques: The Old and the New". Business Horizons, vol. 43, no.6, pp. 15-22, 2000.
2. Akalu, M.M., "Re-examining the project appraisal and control: developing a focus on wealth creation", International Journal of Project Management, Vol. 19 No. 7, pp. 375-85, 2001.
3. Anderson, J., Narus, J. and Van Rossum, W.,"Customer value propositions in business markets", Harvard Business Review, Vol. 84 No. 3. 2006.
4. Alkaraan, F. and Northcott, D., "Strategic capital investment decision-making: A role for emergent analysis tools? A study of practice in large UK manufacturing companies", British Accounting Review, vol. 38, no. 2, pp. 149-173, 2006.
5. Arnold, G.C. and Hatzopoulos, P.D., "The Theory-Practice Gap in Capital Budgeting: Evidence from the United Kingdom". Journal of Business Finance & Accounting,, vol. 27, no.5, pp. 603-626, 2000.
6. Bennouna K.et al., "Improved capital budgeting decision making:evidence from Canada", Management Decision, Vol. 48 no. 2 pp. 225 – 247, 2010.
7. Byers .S.et al., "Capital investment analysis for managers", Management Decision, Vol. 35 no. 3 pp. 250 – 257,1997.
8. David Brookfield,"Risk and capital budgeting: avoiding the pitfalls in using NPVwhen risk arises", Management Decision, Vol. 33, no. 8, pp. 56 – 59, 1995.
9. Carter.T. and D. Ejara, "Value innovation management and discount cash flow". Journal of Management Decisions, Vol. 46, no. 1, pp. 58-76, 2007.
10. Drury, C. and Tayles, M., "The misapplication of capital investment appraisal techniques", Management Decision, Vol. 35 No. 2, pp. 86-93. 1997.
11. Graham, J.R. and Harvey, C.R., "The Theory and Practice of Corporate Finance: Evidence from the Field", Journal of Financial Economics, vol. 60, pp. 187-243, 2001.
12. Hall, J.H. "Investigating aspects of capital budgeting process used in evaluation of investment projects". South African Journal of Economics and Management Sciences, vol. 3, no. 3; pp. 353-368, 2000.
13. Martins. A., "The valuation of privately held firms and litigation: a case study", International Journal of Law and Management. vol.5, no.3.pp. 207-220, 2011.
14. Myers, S., "Finance theory and financial strategy: The New Corporate Finance: Where Theory Meets Practice", Irwin/McGraw-Hill, New York, 1999.
15. Pike, R.H., "A longitudinal survey on capital budgeting practices", Journal of Business Finance & Accounting, vol.23, no. 1, pp. 79-92, 1996.
16. Ryan, P. A. and G. P. Ryan, "Capital Budgeting Practices of the Fortune 1000: How have things changed?" Journal of Business and Management, vol. 8, no.4, pp.355-364, 2002.
17. Sangster .A., "Capital investment appraisal techniques: a survey of current usage". Journal of Business Finance and Accounting, vol. 20, no. 3, pp. 307-332, 1993.
18. Shinoda.T., "Capital Budgeting Practices in Japan- A focus on the use of capital budgeting methods". Economic Journal of Hokkaido University. vol. 39, pp. 39-50, 2010.