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The Effectiveness of Capital Budgeting Techniques in Evaluating Projects' Profitability

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Abstract

This study was conducted to examine the effectiveness of capital budgeting techniques on the evaluation of projects' profitability. To achieve this objective, research questions were raised, hypotheses were formulated and tested with the chi-square (X2) statistical test; and relevant literature was reviewed. The accessible population for this study was all the sixty-five (65) quoted companies in Rivers State with a sample size of fifty-six (56) companies. A simple random sampling technique was used to select members of the sample frame. The questionnaire, which was administered on the General Managers of the selected companies, was the major data collection instrument employed in this study. From the results of our analysis, the following findings were made: (i) the various capital budgeting techniques used in evaluating the profitability of a project are- pay-back, accounting rate of return, net

present value, internal rare of returns, profitability index, and net terminal value (ii) the most significant factor influencing the choice of capital budgeting techniques is the wealth maximization factor, (iii) the capital budgeting technique lacks relevance in evaluating projects under conditions of risk and uncertainty, (vi) the most effective capital budgeting technique for evaluating the profitability of risk-free projects is the net present value (v) taxation has no significant effect on project evaluation. It was therefore recommended that in an environment of risk and uncertainty as we are today, the traditional capital budgeting techniques are not effective in evaluating the profitability of a project; therefore the risk-adjusted discount rate and the certainty equivalent techniques are to be adopted.

Key words: Capital budgeting Techniques, Project Profitability

Introduction

Economic activity is directed towards satisfying human wants, that is, the consumption of goods and services. Investment is an intermediate step in this process in that some consumption is postponed in the expectation that greater consumption will be possible in the future because of the greater returns generated by the investment. In general, investment decisions always involved the balancing of consumption and investment alternatives over time so that rational investment s decision making must be concerned with the time preferences of the owners of the capita!, i.e. do they wish to consume today or invest in the hope that more will be available to consume tomorrow. According to Masa, Imegi and Akenbor (2007), investment decisions relate to the corporate decision to invest its resources in the most efficient manner in business activity with the hope that the activity will, in turn, generate a stream of future returns over time. It asks the question; into what uses do we put the available funds of the business such that we become better in the future? It is the responsibility of the financial experts in collaboration with the accountants to analyse and decide on the type of asset to commit a firm's funds in anticipation of future returns.

Investors commit their resources into a project for obvious reasons. Gitman (1974) identified the following reasons for investment. These are cost reduction, revenue-increasing, and legal requirements. The investment made in order to reduce operational costs is called cost reduction investment. The most common example of this investment is the replacement decision whereby an old asset is scrapped and the modern version is bought. The old asset may have been functioning at residual efficiency whereas the new one will almost invariably be an improved version of the old one. Revenue-Increasing investment takes the form of expansion, to produce a greater output of existing products or to produce new product. It has been suggested that some expenditure on advertising should be treated as capital expenditure and would fall under this category though this runs counter to generally accepted

accounting principle (GASP). More so, government and community laws and regulations may compel a business to make certain investments without any direct compensatory revenue. In the short-run, these investments are cost increasing. Obvious examples of such investments are measures taken by a business to protect life, safety and health of its workforce and the general public. Of increasing importance at the present time is the investment to protect the environment by way of antipollution measures such as the social responsibility project of a business. Though these investments do not produce revenue directly, to regard them as unproductive is to take an over-narrow view of the interest of the business.

Where the reason for investment is to increase revenue, the investor may either invest in securities or physical assets or both. The investment in securities (equity shares, preference shares, debentures, treasury bills, certificate of deposits etc is called financial assets investment, and the technique for evaluating the feasibility of such investment is called portfolio management. But investment in physical assets (land and buildings, machineries, plant and equipment, etc.) is called real asset investment, and the profitability of such an investment is evaluated and measured using the capital budgeting techniques, e.g. capital recovery method, accounting rate of returns, net present value, internal rate of returns, and profitability index (Henshaw and Smith, 2000).

Because of the long-run nature of physical asset investments, the amounts of finance involved, and the irreversibility of such investments, decisions on investments are invariably taken by the highest level of management.

The decision makers need to be provided with a full analysis of the financial implications of the project and this is the task of the accountant. The accountant draws together the estimates, data, judgments' of the various functional specialists (sales, engineering, production etc), adds his own expertise in financial and tax matters and then suitably analyses the resulting data using appropriate appraisal techniques and presents the analysis to the decision makers. The accountant does not take the investment decision nor does he provide all the basic information alone. He performs an essential role in collating and analyzing the data generated and presenting the appraisal (Welkazi and Sharpiro, 2000).

According to Meigs, et al (1981) a business may benefit from good capital budgeting decisions and suffer from poor ones for many years. Many non-financial factors are also considered in making capital budgeting decisions. For example, many companies give high priority to creating new jobs and avoiding layoffs. However, it is also essential that investments in plant assets earn a satisfactory return on the funds available to finance the project and the company will not be able to generate sufficient funds for future investment projects. The capital budgeting techniques are classified into two - non discounted cash flow and discounted cash flow techniques.

The non-discounted cash flow techniques (capital recovery method and the accounting rate of returns) analyse projects without giving consideration to the time value of money, whereas the discounted cash flow techniques (net present value, internal rate of returns, and the profitability index) do consider the time value of money in project evaluation. Henshaw and Smith (2000) noted that these techniques of project evaluation seem to be adequate and effective for use only in a riskless environment. But in contemporary business environment, risks of diverse dimensions, such as socio-cultural risks, political risks, economic risks, etc have become a regular phenomenon. Therefore, the problem of this study is to investigate how effective are the capital budgeting techniques in evaluation projects' profitability. This necessitates the following questions:

i) What are the various capital budgeting techniques used in evaluating projects?

ii) What is the most significant factor influencing the choice of capital budgeting technique in evaluating the profitability of a project?

iii) How relevant are the capital budgeting techniques in the evaluation of risky projects?

iv) Which of the capital budgeting techniques is more effective in evaluating risk-free projects' profitability?

v) Does the act of ignoring taxation in capital budgeting decision has any effect on projects' evaluation?

Research Hypotheses

For the purpose of this research work, the following hypotheses shall be tested

H_{0i}: The capital budgeting techniques are not significantly relevant in the evaluation of risky projects.

H_{0ii}: The act of ignoring taxation in capital budgeting decision has no significant effect on project evaluation.

H_{0iii}: The net present value method is not the most effective capital budgeting technique n evaluating the profitability of a project.

Literature Review

A very important part of the accountant's job is to provide information which will assist in making effective decisions concerning the investment of capital funds. This is the process known as capital budgeting. Capital budgeting techniques are those techniques used for evaluating investments in long-term assets. Adeniji (2004)

classified these techniques into two broad groups-traditional and discounted cash flow as represented in the diagram below:-

Figure 1 Model of Capital Budgeting Techniques
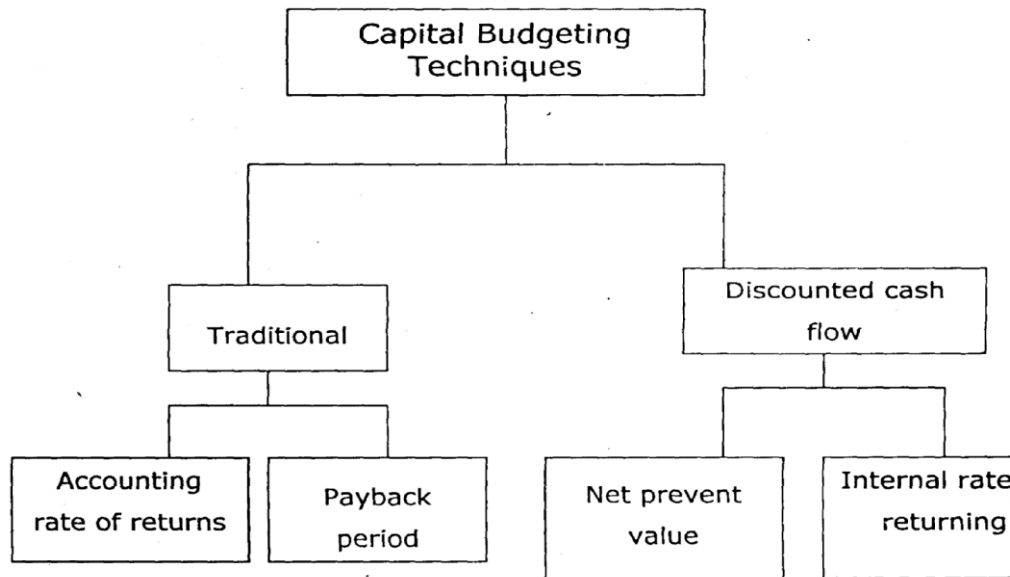
Source: Adeniyi A. Adeniji (2004).

Accounting Rate of Returns

The accounting rate of returns method of evaluating a project is to estimate the return on investment that the project should yield. If the computed value of return on investment exceeds a target rate of return for a single project, it is advisable to undertake the project otherwise the project should be rejected. But where multiple project proposals are being considered, the project proposal with the highest return on investment is the most viable. The accounting rate of returns is defined as:

ARR = <u>Estimated average annual earning</u> x 100%

Estimated average capital

There are certain merits and demerits for using the accounting rate of returns for project evaluation. The merits include: it is simple to calculate and understand; it considers all the cash flows associated with the entire life of the project; it is comfortable for managers in a divisionalized structure because it is a rate of returns approach and project viability or otherwise is easy to identify. The demerits include: it ignores the time value of money by assuming that N10,000 in one year for instance,

will have the same value even in the years time; it ignores the impact of risks on project viability; it uses accounting depreciation rather than capital allowances; it ignores the actual size of the cash flow; it ignores the effect of working capital on the project viability (Belkaoni, 1980).

The Payback Period Method

The CIMA (1991) defines payback as the time required for the cash inflows forma capital investment project to equal the cash out flow. When deciding between two or more projects, the usual decision is to accept the one with the shortest payback. Payback is commonly used as a first screening method. That is, when a capital investment project is being considered, the first question to ask is, "How long will it take to pay back its cost? The firm may have a target payback period, and so it would reject a capital project unless its payback period is less than a certain number of years, perhaps five years, depending on the company policy. The specific approach to be adopted din the process of identifying the actual payback period will depend on the nature of the cashflow; i.e., whether the cashflow is constant or unequal throughout the duration of the project. Where the cashflow is evenly, the formula approach for payback period is appropriated, and it is defined as;

$$\text{Pay-back period} \quad = \quad \frac{\text{Cash Outflow}}{\text{Average Annual Earnings}}$$

But where the cash flow is unequal over the duration of the project, the cumulative approach is appropriate. Belkaoni (1980) identified the following as the merits and demerits of the pay-back period method. The merits include; it is simple to calculate and understand; it represents a quick screening device for an investor facing liquidity problem; by relying on the actual cashflows; payback period represents an objective measure of evaluating projects; it may be used as a safeguard against risk; it can be used to identify the project breakeven period or the margin of safety. He equally outlined the following demerits; it ignores the time value of money; it ignores cash flows immediately after the payback period; it ignores the wealth maximization objective of the firm; it ignores the impact of risk on project evaluation; the choice of cut-off payback period is arbitrary; it may lead to excessive investment in short-term projects.

Adeniyi (2004) asserted that in spite of the theoretical limitations of the payback period method, it is the one that is most widely used in practice. He offered the following reasons for its usage: it is easily understood by all levels of management; it provides an insight on how quickly the initial can be recouped; most managers see risk as time-related i.e. the longer the period, the greater the chance of failure; where a firm faces liquidity constraints and requires a fast repayment of investments, the pay-back period is more useful; it is appropriate in situations where

risky investments are made in uncertain markets that are subject to fast design and product changes or where future cash flows are particularly difficult to predict.

Net present Value (NPV) Method

The first two capital budgeting techniques discussed above are traditional in nature, in the sense that they ignore the time value of money in their approach. But the net present value is discounted cash flow technique which takes into account both the time value of money and &so total profitability over a project's life.

Net present value is the value obtained by discounting all cash outflows and inflows of a capital investment project by a chosen target rate of return or cost of capital. The present value of cash inflows minus the present value of cash outflows is the net present value. Henshaw and Smith (2000) highlighted the following conditions for the viability of a project under the net present value; if the net present value is positive, it means that the cash inflows from a capital investment will yield a return in excess of the cost of capital, and so the project should be undertaken if the cost of capital is the firm's target rate of returns; if the net present value is negative, it means that the cash inflows form a capital investment will yield a return less than the cost of capital, and so the project should not be undertaken if the cost of capital is the firm's target rate of returns; if the net present value is exactly zero, the cash inflows from the capital investment will yield a return which is exactly the same as the cost of capital, and so if the cost of capital is the firm's target rate of returns, the project be only just worth undertaking. The net present value function is defined as;

$$ NPV = \left[\Sigma \frac{Cf}{(1+r)^n} \right] - 1 $$

Where:

Cf = Cash inflows

n = Duration of the project

r = Rate of discount or cost of capital

I = Initial Investment or Cash Outflows.

The following are the advantages and disadvantages of the net present value method. The advantages are: it is consistent with the theory of wealth maximization; it considers the time value of money; it makes use of all the project cash flows

throughout the duration of the projects life; it is a clear cut method of either accepting or rejecting the project.

The disadvantages are: the method ignores the impact of risk on project evaluation; divisional manager may not be comfortable by relying on the method for performance evaluation, because it is not a rate of return method; it may mislead the investor or firm because it does not represent the actual returns associated with the project; it over-relies on the accurate estimation of the market determined cost of capital.

The Internal Rate of Returns (IRR) Method

This is the discount rate or the cost of capital that will equate the sum of present values of a project to zero. It is the rate of discount in which discounted cash inflows and outflows of a project are balanced. In other words, internal rate of returns is the maximum rate of interest a firm can afford to pay if a project is financed with borrowed funds and the project cash inflows are to be used to liquidate the loan. It is equally the minimum rate of interest a lender is willing to accept for releasing fund to the borrower. Conventionally, if the internal rate of returns exceeds the prevailing rate (i.e. external rate of return or cost of capital), the project is considered viable.

The internal rate of return is defined as:

$$\left[\Sigma \frac{Cf}{(1+r)n} \right] - 1 = 0$$

Where

Cf	=	Cash Inflows
N	=	Duration of the project
I	=	Initial Investment or cash outflow
r	=	Internal rate of returns

The internal rate of returns is usually computed through the trial and error approach. Lucey (1984) advanced two basic techniques for computing the internal rate of returns. These are the formula method and the present value profile method. Welkazi and Shapiro (2000) and Lamido (2002) identified the following advantages and disadvantages of the internal rate of returns method of project evaluation. The advantages are: it makes use of all cash flows associated with the entire life of the project; it is a rate of return method, which is considered to be appropriate for performance evaluation under a divisionalized structure; it is easy to adopt in

accepting or rejecting a project by merely comparing the rate of return with the cost of capital.

The Profitability Index

This is also a discounted cash flow method, which is determined by the ratio of the sum of present values of cash inflows to the capital outlay.

Profitability index is defined as:

$$PI \quad = \quad \sum \frac{\left[cf(1+r)-n\right]}{I}$$

Where

cf   =   cash inflows

r   =   Discount rate

n   =   Duration of the project

I   =   Initial Investment or cash outflow

Conventionally, a project is said to be viable if the profitability index is greater than one.

Lamido (2002) identified the following advantages and disadvantages of the profitability index. The advantages are: - it is similar to the NPV method, usually giving the same result on individual projects; it can be used to rank divisible projects in conditions of capital rationing. The disadvantages are: it indicates relative returns and is not an absolute measure; it may rank projects incorrectly. If cash is not rationed, it is preferable to look at the NPV, which is an absolute measure; there is a challenge in establishing what the initial investment may be. The method works better only if the project has an outflow of cash at time zero, followed by cash inflows, which be at various times.

The Time Value of Money

The discounted cash flow is a capital budgeting technique that is based on the concept of the time value of money, i.e. a naira earned or spent sooner is worth more than a naira earned or spent later. Yanzaki (2002) advanced various reasons why a naira at present may worth more than a naira in the future. The reasons are: the business world is full of risk and uncertainty, and although there might be the promise of money to come in the future, it can never be certain that the money will be received until it has actually been paid; this is an important argument that risk and uncertainty must always be considered in investment appraisal. But this augment does

not explain why the discounted cash flow technique should be used to reflect the time value of money. If there were no inflation at all, discounted cash flow techniques would still be used for capital budgeting; inflation for the moment, has been completely ignored; it is obviously necessary to allow for inflation;

An individual attaches more weight to current pleasures than to future ones, and would rather have a naira to spend now than to spend such a naira tomorrow. One reason suggested to justify the use of the discounted cash flow technique is this subjective time preference of individuals who have the choice of consuming or investing their wealth. It has been argued that the return from investments must therefore be sufficient to persuade individuals to prefer to invest now. Adeniji (2004) noted that such time preference is measured by discounting. Money is invested now to make profits (more money or wealth) in the future.

Discounted cash flow techniques can therefore be used to measure either; what alternative uses of the money would earn (NPV) method), i.e. assuming that money can be invested elsewhere at the cost of capital; what the money is expected to earn (IRR method).

It was suggested earlier that the return on investment technique for investment appraisal and the payback technique each suffer from serious disadvantages. One ignores the timing of benefits, and the other ignores the total amount of benefits. Discounted cash flow takes both the timing of cash flows, and the total amount of cash flows into consideration. If the financial objective of a company is to achieve a return on investments that equals or exceeds the cost of the funds that would have to be invested to pay for the capital expenditure, then the DCF provides a technique for checking whether the required rate of return would be achieved or is the IRR higher than the cost of funds needed to finance the investment? More so, the corporate objective of the firm should be to maximize the wealth of its shareholders. The fundamental theory of share values is based on DCF principles. This theory states that the value of a company is the discounted value of all this expected future dividend payments to shareholders, and since dividend payments come from cash profits, the value of a company is the present value of all its future expected cash profits. A new investment with an expected NPV that is positive should, in the theory, add to the company's value by the amount of the NPV.

Since DCF is therefore relevant in financing decisions and also to the corporate objective of maximizing shareholder wealth, you might well appreciate its importance as a technique in financial management (Adeniji, 2004).

Welkazi and Sharpiro (2000) stated that the assumption underlying the use of DCF criteria in capital budgeting is the maximization of wealth. This is clearly an important consideration for profit-making public companies, whose share prices are

quoted publicly, and it is also of importance for investment by government or nationalized industries, and by private companies. They further stated that a word of warning about DCF is perhaps in order. Having suggested that DCF is valuable technique for investment appraisal, it ought to follow that firms, which use DCF make more successful capital budgeting decisions than firms which do not use DCF. However, Karzq, Gordon and Pincher (1985) as quoted by Adeniji (2004) have a different opinion. According to them, the use of DCF does not result in better project evaluation.

Capital Budgeting Decisions and Risk Factor

An essential characteristic of capital budgeting decision making is orientation to the future-a future which, by its very nature, is uncertain. In fact, some capital budgeting techniques as we have discussed so far in this project, appear to assume that risk can be ignored. As this assumption is relaxed, project evaluation becomes increasingly complex. The risk dimension to capital budgeting, however, is a crucial factor in the valuation of assets and other projects. Indeed, it is quite feasible that acceptance of a profitable but highly risky investment proposal increase the perceived riskiness of the total business and result in an actual reduction in the value of the firm.

Bax (1996) defined risk as an exposure to a loss as a result of the difference between actual outcome and expected outcome. In other words, it refers to the set of unique consequences for a given decision which may be assigned subjective probabilities. Bax (1996) further stated that the capital budgeting techniques are not relevant in the selection of risky projects, except the techniques are adjusted accordingly. He illustrated this case with the use of the Net Present Value (NPV).

Consider the case of a businessman contemplating three investment options with vary degrees of risk. The distribution of possible outcomes for these options is given in the figure 2.

Clearly, while the NPV criterion is appropriate for investment A, where the cash flows are certain, it is no longer appropriate for the risky investment options B and C, at last without adaptation. The whole range of possible outcomes may be considered by obtaining the mean of the NPV distribution weighted by the probabilities of occurrence. The NPV rule may then be applied by selecting projects offering the highest expected net present value. From the above table, we observed that the three investment options offer the same expected NPV of N9,000. The big question is, would the businessman view all the three option as equal? The answer to this question lies on the businessman's attitude towards risk, for while the expected outcomes are the same, the possible outcomes vary considerably. Thus, although the NPV criterion provides a single measure of profitability, which may be applied to

risky investments, it does not by itself provide an acceptable decision criterion (Elekwachi, 2005).

Figure 2- NPV Distribution of Possible Outcomes for three Investment options

Investment	NPV (N)	Prob.	Expected NPV (N)
A	9,000	.1	9,000
B	-10,000	0.2	-2,000
	.10,000	0.5	5,000
	20,000	0.3	6,000
		1.0	9,000
	-55,000	0.2	-11,000
C	10,000	0.5	5,000
	50,000	0.3	15,000
		1.0	9,000

Source: Innocent A, Elekwachi (2005).

According to Pandy (1979), the effect of risk on capital budgeting decision can be analysed using either the risk-adjusted discount rate or the certainty equivalent. These methods involve the direct adjustment of the present value formula previously used in accordance with perceived differences in project riskiness.

Risk-Adjusted Discount Rate

The risk-adjusted discount rate is derived by simply altering the standard present value formula, by substituting a higher discount rate (k) for the risk free rate (r) employed in the conventional present value formula. In this case, present value is computed as defined by the function;

$$PV = \sum \frac{ERn}{(1+k)n}$$

Where Ern = expected return in the nth period

K   =   r + P

r   =   risk free discount rate

P   =   risk -premium

Ekanem and lyoha (2002) note that since K is greater than r, the effect of risk adjusted discount rate is to lower the present value of a risky investment. When a project is presumed to be very risky, a higher risk premium is allocated to the project.

ii) **Certainty Equivalent** - The certainty equivalent is used to evaluate two mutually exclusive investments having uncertain cash flows. All that is required is to adjust the present value of a certain return through the numerator of the conventional present value formula. In this case, present value is defined by the function;

$$PV \qquad \Sigma \frac{Y_n ER_n}{(1+r)n}$$

Where $ER_n =$ expected return in the nth period

$Y_n \qquad =$ the probability of nth returns

$r \qquad =$ Risk-free discount rate

Based on the above, very risky projects will attract low certainty equivalent while less risky projects will attract a high certainty equivalent. But it should be noted that they certainty equivalent is not constant but varies over time. A project may be very risky at the beginning but with the passage of time, the project may become less risky, probably because a significant market may have been established. In a situation as this, the certainty equivalent will increase.

Capital Budgeting and Taxation

Taxation forms an important element in capital budgeting decisions. As the objective of financial management is the maximization of shareholders wealth, the firm is only interested in the after tax cashflows of a project (i.e. it is only interested in those cash flows, which are available for its shareholders. Adeniji (2004) and Lamido (2002) therefore noted that cashflows should be reduced by the tax charge which they bear. Adeniji (2004) further stated that any tax relief, such as capital allowances, which are attached to the project should also e taken into account. In order to determine the timing of cash flows arising from taxation effects, a number of assumption are normally made, although it is important to act in accordance with the "tax law" if any: The simplifying assumptions are: the basis of the tax liability is the net cashflow resulting from the project; the firm has sufficient profits from other projects to utilize all allowances, in full, as soon as they are available; regarding the timing of tax payments and savings, the simplest assumption is that they are lagged by one year from the original cash flows to which they relate. However, care must be taken with the situation where tax payment or receipts are stated to be made or received one year after the end of the financial year in which the original cash flows

occur. In this circumstance, the tax effect can be lagged by two years. For instance, if a firm has a year ended 31 December 2001, the effect of which will not be realized in cash flow terms until 3Vt December, 2002; generally, we assume that rate of corporation tax will remain constant over the life of payment we could cope with a future change of rate but it is extremely unlikely that we would ever be in a position to predict this eventuality in practice; in the same way that additional receipt will give rise to payments, it is assumed that additional cost will give rise to tax savings; working capital cash-flows are assumed to have no tax implications whatsoever.

Pandy (1979), Lamido (2002) and Adeniji (2004) highlighted the following importance of taxation in capital budgeting. The interest payable on loan is tax deductible. The implication of this is that tax reduces the cost of debt and by extension the weighted average cost of capital; it cannot be assumed that the tax consequences are the same for the projects. Projects, which promise identical pre-tax cash flow may produce very different post-tax cash flows if, for example, capital expenditure is awarded different levels of capital allowance; management should be aware of the likely impact of change in the tax system or rates on the desirability of each project, i.e. sensitivity; where a firm has erratic profit levels, the taxation consequences of a project are dependent not only on the project itself but also on the success of the rest of the firm.

Methodology

For this study, the target population was all quoted companies in Nigeria. It should however, be pointed out that it is usually not possible to deal with entire target population, considering the time and resources available. The researcher identified only that portion of the population is known as the accessible population. The accessible population for this research work was all the quoted companies in Rivers State. However, available records revealed a total of sixty-five (65) of such companies in Rivers State and the Taro Yemen function was used to determine the sample size as shown below.

$$N = \frac{N}{1 + N(e^2)}$$

Where

N = Population size (65)

e = Level of significance (0.05)

Substituting values;

$$n \quad = \quad \frac{6}{1 + 65\,(0.05)^2} \quad = \quad \frac{65}{1.1625} \quad = \quad 56 \text{ samples}$$

Thereafter a simple random sampling method was used to select members of the sample frame, so as to give each company an equal chance of being selected as a member of a sample frame. Although different instruments are available for the collection of data such as the questionnaire, personal interview, observation, and experimentation. For the purpose of this study, the instrument for collecting data was mainly the questionnaire. Simple percentages were used in the analysis of the data while the statistical method of analysis that was used for testing the hypotheses in this study is the chi-square(X^2) test.

Chi-square (X^2) formula that was used for the computation is given as:

$$X^2 \quad = \quad \sum \frac{\left(0_f - e_f\right)^2}{e_f}$$

Where

X^2 = chi-square

0_f = observed frequency

e_f = expected frequency

Conclusively, if the computed value of Chi-square is less than the tabular (X^2), the null hypothesis will be accepted otherwise it will be rejected and the alternate hypothesis will be accepted.

Data Presentation and Analysis

The various data for this study were collected using the questionnaire and personal interviews.

Based on the data collected through these sources, a detailed analysis is given to the research questions, and hypotheses earlier formulated were tested to facilitate the outcome of the study. Although fifty-six (56) companies were selected for this

study, this analysis was based on forty-nine (49) companies because seven (7) companies provided incomplete information and they were excluded from the study.

In analysing the research questions that were not stated as hypotheses, simple percentages were used. The respondents were asked to indicate the capital budgeting technique(s) used by the firm and their responses are presented in table 1.

Table 1: The Capital Budgeting Technique(S) Used by Organizations

Responses		Frequencies	Percentages
a)	Pay-back period	10	20.41%
b)	Accounting rate of returns	9	18.37%
c)	Net present value	14	28.57%
d)	Internal rte of returns	7	14.29%
e)	Profitability Index	4	8.16%
f)	Net Terminal Value	5	10.20%
Total		**49**	**100**

Source: Survey Data 2014.

The data presented above shows that 10(20.41%) of the respondents indicated the pay-back period as the capital budgeting technique used in their organization; 9(18.37%) suggested the accounting rate of return; 14(28.57%) stated the net present value; 7(14.29%) revealed the internal rate of return; 4 (8.16%) indicated the profitability index; while 5 (10.20%) stated the net terminal value.

The respondents were asked to indicate the most confronting capital budgeting decisions and their responses are presented in table 2.

Table 2: The most confronting form of capital budgeting decisions

Responses		Frequencies	Percentages
a)	Accept-reject	15	30.615
b)	Mutually-exclusive	20	40.82%
c)	Capital rationing	14	28.57%
Total		**49**	**100**

Source: Survey Data 2014.

As presented in the table above, we observed that 15 (30.61%) of the respondents indicated the accept-reject, as the most confronting form of capital budgeting decisions; 20(40.82%) suggested the mutually-exclusive decision, while 14(28.57%) stated the capital rationing decisions.

The respondents were asked to indicate the frequency of making capital budgeting decisions and their responses are presented in table 3.

Table 3: Frequency of making capital budgeting decisions

Responses	Frequencies	Percentages
Ease of computation	5	10.20%
Consideration for the time value of money	12	24.49%
Consideration for performance evaluation	3	6.12%
Consideration of the impact of risk	11	2.24%
Consideration of the total project cash flows	2	4.08%
Consideration of liquidity crisis	3	6.12%
Consideration of wealth maximization	13	26.57%
Total	**49**	**100**

Source: Survey Data 2014.

The questionnaire analysis show that 5 (10.20%) of the respondents suggested the ease of computation as the most significant factor influencing the choice of capital budgeting decision for project evaluation; 12 (24.49%) indicated consideration for the time value of money; 3(6.12%) stated the consideration for performance evaluation; 11(2.24%) revealed the consideration of the impact of risk; 2 (4.08%)consider the total project cash flows; 3(6.12%) consider liquidity crisis; while 13 (26.53%)indicated the consideration for wealth maximization.

The respondents were asked to indicate the frequency of making capital budgeting decisions. A cross-sectional analysis of the respondents indicated that the net present value (NPV) is the most effective capital budgeting technique for project evaluation. The reasons advanced for such include:

i)   It makes use of all projected cash inflows of the project;

ii) It considers the time value of money;

iii) It is consistent with the theory of wealth maximization;

iv) It can easily be adjusted to incorporate the impact of risk.

The respondents were asked to indicate the relevance of taxation in capital budgeting decision and their responses are presented in table 4.

Table 4: The major reason for the relevance of taxation in capital budgeting decision

Responses	Frequencies	Percentages
a) Cost of capital	22	44.89%
b) Tax differentials	8	16.32%
c) Sensitivity problem	12	24.49%
d) Nature of profit	7	14.29%
Total	**49**	**100**

Source: Survey Data 2014.

Analysis of the questionnaire shows that 22 (44.89%) of the respondents indicated the cost of capital as the major reason for the relevance of taxation in capital budgeting decision; 8(16.32%) suggested the tax differentials; 12 (24.49%) revealed the sensitivity problem; while 7 (14.29%) stated the nature of profit.

A cross-sectional analysis of the respondents indicated the following alternative techniques in evaluating risky projects;-

i) the risk-adjusted discount rate method;

ii) the certainty equivalent method

Test of Hypotheses

The aim of this section is to test the hypotheses stated earlier for the variables under study, in order to be able to generalize the results of our findings without much difficulty.

Hypothesis 1

H_0:   The capital budgeting techniques are not significantly relevant in the evaluation of risky projects.

To test the null hypothesis the data presented below were used:

Table 5: Chi-square Contingency Table for Hypothesis I

	Responses	0f	ef	(0f-ef)	$(0f-ef)^2$	$(0f-ef)^2/ef$
a)	Highly relevant	9	9.8	-0.8	0.64	0.06
b)	Relevant	12	9.8	2.2	4.84	0.49
c)	Irrelevant	13	9.8	3.2	10.24	1.04
d)	Highly Irrelevant	11	9.8	1.2	1.44	0.15
e)	Indifferent	4	9.8	-5.8	33.64	3.43
Total		**49**	**49**	**-**	**-**	**5.17**

Source: Researcher's Computations 2014

Expected frequency (ef)   =   No. of respondents
                                               No. of categories

     i.e. $\frac{49}{5}$ =   9.8

Chi-square (χ^2) computed   =   5.17

Degree of freedom   =   K – 1 i.e. 5-1 = 4

Level of significance   =   0.05

Chi-square (χ^2) critical   =   9.49

Decision Rule: Since chi-square (χ^2) computed 5.17< chi-square (χ^2) critical 9.49, hence the null hypothesis is accepted. This implies that capital budgeting techniques are not significantly relevant in the evaluation of risky projects.

Hypothesis 2

Ho: The Net Present Value (NPV) is not the most effective capital budgeting technique in evaluating the   profitability of a project.

In testing the null hypothesis, the table below provides the data for the analysis.

Table 6: Chi-square contingency table for Hypothesis 2

	Responses	0f	Ef	(0f-ef)	$(0f-ef)^2$	$(0f-ef)^2$/ef
a)	Pay-Back period	10.	8.17	1.83	3.35	0.41
b)	Accounting rate of return	7	8.17	-1.17	1.37	0.18
c)	Net present value	15	8.17	6.83	46.65	5.71
d)	Internal rate of return	10	8.17	1.83	3.35	0.41
e)	Profitability Index	5	8.17	-3.17	10.05	1.23
f)	Net Terminal value	2	8.17	-6.17	38.07	4.66
	Total	**49**	**49**	**-**	**-**	**12.60**

Source: Researcher's computations 2014.

Expected frequency (ef)　　=　　$\dfrac{\text{No. of respondents}}{\text{No. of categories}}$

　　　　i.e.　$\dfrac{49}{6}$　=　8.17

Chi-square (χ^2) computed　　=　　12.60

Degree of freedom　　=　　K – 1 i.e., 6-1 = 5

Level of significance　　=　　0.05

Chi-square (χ^2) critical　　=　　11.07

Decision Rule:

　　Chi-square (χ^2) computed 12.60 > chi-square (χ^2) critical 11.07, hence the null hypothesis is rejected. This implies that net present value is the most effective capital budgeting technique in evaluating the profitability of a project.

Hypothesis 3

H_o:　　The act of ignoring taxation in capital budgeting decision has no significant effect on project evaluation.

In testing the null hypothesis, data generated from the questionnaire were used as presented in the table below.

Table 7: Chi-square contingency table for Hypothesis 3

Responses		0f	ef	(0f-ef)	(0f-ef)^2	(0f-ef)^2/ef
a)	Strongly Agree	12	9.8	2.2	4.84	0.49
b)	Agreed	14	9.8	4.2	17.64	1.80
c)	Disagreed	10	9.8	0.2	0.04	0.01
d) Strongly disagreed		8.	9.8	-1.8	3.24	0.33
e)	Indifferent	5	9.8	-4.8	23.04	2.35
Total		**49**	**49**	**-**	**-**	**4.98.60**

Source: Researcher's computations 2014

Expected frequency (ef)   =   <u>No. of respondents</u>
                                     No. of categories

        i.e. $\frac{49}{5}$ =   <u>9.8</u>

Chi-square (χ^2) computed   =   4.98

Degree of freedom   =   K – 1 i.e., 5-1 = 4

Level of significance   =   0.05

Chi-square (χ^2) critical   =   9.49

Decision Rule:

Chi-square (χ^2) computed 4.98 < chi-square (χ^2) critical 9.49, hence the null hypothesis is accepted. This implies that the act of ignoring taxation in capital budgeting decisions has no significant effect on project evaluation.

Conclusion and Recommendations

Effective project evaluation such that the viability of an investment can be reasonably determined, is worthwhile. Therefore, any study conducted to improve the effectiveness of capital budgeting techniques in evaluating projects, is a useful venture.

From the result of our analysis, it was observed that quoted companies often make capital budgeting decisions, and the major reason for their investment in physical assets is to increase their revenue base. This finding agrees with the view of Gitman (1974). However, the most confronting form of capital budgeting decisions faced by companies is the mutually exclusive decisions, concerning investment in projects that are mutually exclusive, but this seems not to be in agreement with

Megginson (1997). It was also gathered that the most significant factor influencing the choice of capital budgeting decision for project evaluation is the consideration, for wealth maximization and this supports Welkazi and Shapiro (2000), hence the Net Present Value (NPV) was identified as the capital budgeting technique adopted by companies. But in some cases, capital rationing is also important in capital budgeting where management policy is that retained earnings should be purely used in financing investments.

We also observed that a cross-section of the respondents indicated the net present value of the most effective capital budgeting technique for risk-free project evaluation. This however negate the view of Adeniji (2004) who asserted that the payback period is the most effective capital budgeting technique; it makes use of all projected cash inflows of the project; it considers the time value of money as a result of inflation; it is consistent with the theory of wealth maximization; it can easily be adjusted to incorporate the impact of risk. However, the relevance of taxation in capital budgeting decision is as a result of the cost of capital, view equally expressed by Pandy (1979) and Lamido (2002).

From this study, we equally found that capital budgeting decisions are restricted to top management because of the huge financial involvement, since it is very protracted to reverse the project ones started. It was also discovered that the selected quoted companies consider working capital to a low extent in capital budgeting decisions. It was also gathered from the study that tow alternative capital budgeting techniques are available in evaluating the profitability of risky projects. These techniques are – the risk-adjusted discount rate, and the certainty equivalent.

Having analysed the findings from this study together with the conclusion drawn, the following recommendations are therefore made:-

i)   The Net Present Value (NPV) should be adopted as the capital budgeting technique in evaluating the profitability of risk-free projects.

ii)   The effect of taxation should be ignored in capital budgeting decisions.

iii)   Adequate consideration should be given to working capital in making capital budgeting decisions.

iv)   The risk-adjusted discount rate and the certainty equivalent should be used in evaluating the profitability of risky projects.

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