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The Fisher Separation Theorem and Capital Budgeting Decisions of Quoted Firms in Nigeria

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ABSTRACT

This study explored the Fisher separation theorem and capital budgeting decisions of quoted firms on the Nigerian stock exchange. A sample of 60 questionnaires were filled and returned by staffs from particular sectors like manufacturing, health and agriculture. Descriptive statistics was employed to illustrate the data while the Spearman rank order correlation test was used to determine if a significant relationship exist among the variables. From the estimates, the Net Present Value and Modified Internal Rate of Return are regularly employed by firms in making capital budgeting decisions. Also, when firms employ capital budgeting tools, it creates wealth for both managers and shareholders, providing support for the Fisher's separation theorem. Finally, a correlation coefficient of 0.827 reflect a positive and linear relationship between capital budgeting decision and Shareholders' value creation. Thus, an increase in capital budgeting decisions result to an increase in value creation. This outcome is consistent with findings from other economies and previous studies. It thus recommends that firms in the Nigerian environment should ensure they play down on shareholders' desire for dividends and instead redirect their funds to more investments by employing suitable capital budgeting decisions.

Key words: Fisher's Theorem, Capital Budgeting, Investment decisions, Performance.

INTRODUCTION

The Fisher Separation theorem was propounded by a neoclassical economist, Professor Irving Fisher [1] who emphasized that supply and demand factors are the prime forces steering an economic environment. Fisher's theorem presupposes that shareholders of corporations not only have diverse intentions from management but that they are deficient in the deep-seated knowledge of the enterprise needs and prospects required to make effective choices to generate ground-breaking long-term prosperity to the corporation. As such, management should disregard the wishes of shareholders and focus on productive opportunities by making sound investment choices by way of a satisfactory capital budgeting outcomes. Thus, they should explore various means of funding their projects such as taking on debt or bond, issuing ordinary or preference shares or going into lease contracts; in order to generate more value for their shareholders.

The Fisher's proposition is of the opinion that the principal obligation of a company's executive is to maximize the enterprise's worth. This priority is at variance with the primary assurance of shareholders which is to secure the returns on dividends and capital gains. Fisher [1] insist that a thriving establishment will disregard shareholders and go all out for determined value creation. Hence, value can be created by making good capital budgeting decisions regarding the variety of investments that the firm intends to undertake. Accordingly, capital budgeting supports a firm in making precise investment assessments that ensures business expansion and profitability, healthy financial structure; as such, it is of utmost importance to enterprise decisions.

Capital budgeting decision is a firm's decision to invest its current funds most efficiently in the long-term assets in anticipation of an expected flow of benefits over a series of years. Investment decisions require special attention because of the following reasons: they influence the organization's growth and profitability in the long run; they modify its risk level; they entail earmarking of large amount of capitals; they are unalterable, or revocable at substantial cost; and they are amongst the most challenging decisions to arrive at. It is a process of long range planning involving the investment of funds in long term activities whose benefits are expected over series of years [2]. Capital budgeting is considered a vital financial board decision. It implies buying high-priced resources to be utilized for a long period of time and this impinge on the future achievements of the firm. Choosing the right investing decision in the course of capital budgeting, helps management and the enterprise in augmenting shareholders wealth. Thus, distinguishing the right blueprints is an exceptionally important function of the capital budgeting system [3]. It is a planning machinery employed by a company to make for a better evaluation as regards how limited resources are to be allocated. Capital budgeting practices assist in ascertaining how feasible a project is. According to the Chartered Professional Accountants of Canada [4], the significance of capital budgeting is portrayed in its nature as being quantifiable and accountable. O'Sullivan and Sheffrin [5] are of the view that participating in an erroneous project means earmarking corporate resources to a plan that does not take into cognizance its risks and returns, in so doing negatively altering the wealth of shareholders. Furthermore, failure to evaluate diverse techniques effectively will adversely affect corporate earnings and competitiveness, and as such jeopardize its existence [6-8]. In another development, Fakhfakh [9] argue that in order to uphold a strong economy that tends towards sustainable growth, it is pertinent to embrace a methodical, analytical and detailed investment appraisal style that makes for sound judgment. Consequently, capital budgeting has been a focus of growing theoretic and experimental investigations in economic literature.

The separation theorem and the capital budgeting decisions of management goes to support the fact that if firms insist on carrying out a proper budgeting of their capital and apply appropriate techniques on projects to derive a positive net present value, then they will secure long term profits that will be continually enjoyed by management and shareholders. That means, if adequate decisions are employed, firms will bring to the marketplace products that will create more value by way of customer satisfaction; which will spur customers to demand more for such products, and in the long run, result in

business expansion and the subsequent appreciation of the firm's shares in the capital market.

The global economic emergencies, wavering oil prices, changes in buyers preferences and consumer lifestyles, increasing need for making things easier, as well as the substantial progress in information know-how have presented new challenges for both corporate financial managers and investment advisors. As a result, companies are required to insist on carrying out a proper investment appraisal before embarking on any project. Hence, the need to empirically explore the fisher's separation theorem and capital budgeting decision of the firms in the Nigerian economic environment to know if their performance increased or declined. This report is a deviation from previous findings as it covers diverse aspects of investment evaluation techniques utilized by corporations operating in various sectors of the Nigerian economy. Also, previous research were primarily on the dynamics of operating a certain investment appraisal system or classifying the frequently used techniques in about one or two commercial sectors. For this reason, this study is envisaged to make valuable contribution to literature that benefits both seasoned practitioners, administrators, regulatory bodies and academicians. It would assist to generate apt investment choices by using the best capital budgeting assessment technique as well as provide understanding about the employment of real options; thus, assisting firms in carrying out further enquiries in a bid to enhancing their decisions. Moreover, the study is undertaken in the Nigerian economy where firms go into huge industrial/productive activities due to the availability of funding by government agencies and parastatals like the Bank of Industry, Bank of Agriculture etc. As such, results of this study are anticipated to add a novel dimension to the investment literature and be part of the incomplete body of experiential studies on capital budgeting review systems exercised by quoted firms in Nigeria.

The rest of the report is structured as follows: a concise review of past literature; data and methods adopted to analyze it; summary of results; conclusion and suggestions.

LITERATURE REVIEW

Previous studies have investigate on the Fisher's separation theorem and the capital budgeting decision link and have produced differing results. An in-depth understanding of these literatures will make for better generalizations in the present study. Klammer [10] looked into the connection of capital budgeting practices with firm's performance. 369 questionnaires were sent to industrial firms in the US. Regression analysis was conducted and the result prove that when firms decide on an appropriate technique to adopt, it leads to future growth and stability. Haka, Gordon and Pinches [11] argued if firms employ high-tech capital budgeting systems that considers for risk and present value; then they should perform better. They controlled for changes in systematic risk, size, and industry effects, returns were performed. Their time series regression analysis concludes that the implementation of such complex capital budgeting selection procedures do not in any way lead to better firm performance. Liberatore, Monahan and Stout [12] broadened the analysis framework instituted by the Saaty's Analytic Hierarchy Process; by concentrating on basic structural decision making processes such that capital budgeting can be implemented effectively. Their study conclude that the basic framework for a more efficient

budgeting methods are by taking into consideration, the firm's mission, objectives, as well as Strategy. Lohmann and Baksh [13] exploited the Monte Carlo simulation approach to look into the functioning of the capital budgeting decision; the influence of errors in risk estimation; alongside the efficacy of the decision strategy associated with short-term capital recovery periods that helps to reduce risk exposure. The study chose six basic evaluation method such as the internal rate of return, payback period, net present value, accounting rate of return, profitability index and random selection. From the analysis, the NPV tool was established to render an appropriate risk assessment as well as presented a probable short term capital recovery; hence, invested capital will not be exposed to longer term risk. Hajdasiński [14] analyzed the classical review of the Payback Period standard for project investment and incorporated the features of the net present value method; and showed that the conventional approach in comparing mutually exclusive projects by way of the Payback Period principle remain deficient. Jog and Srivastava [15] surveyed the capital budgeting systems adopted by large Canadian corporations. The study found that the discounted cash flow approach is most often adopted, however, these firms apply a high level of judgmental bias in the appraisal of inputs into its capital budgeting activity. Peel and Bridge [16] investigated how long term planning and capital budgeting improve SME performance. Their result indicate that, while considering the level of sales growth and improving profits, small and medium term enterprises who are involved in a comprehensive strategic planning procedure have a tendency to employ formal capital budgeting techniques, comprising the net present value practice, that is consistent with shareholders' wealth maximization principle. Farragher, Kleiman and Sahu [17] surveyed the correlation between a more complex capital budgeting system and how it inspires the performance of businesses in the US. The study incorporated industry-adjusted factors like risk level, size of the firm, intensity of their capital, plus their level of effort. From the outcome of the estimation, there is no visible relationship between a sophisticated capital budgeting system and company performance. Hartman and Schafrick [18] maintain that the internal rate of return is the most superior measure of efficiency as it offers valuable information about returns on investment; and as such is a more preferable technique in determining project adequacy and the ability of the firm to function properly in the long run. Hajdasinski [19] demonstrated the concept of a true rate of return, substituting for the non-performing internal rate of return and applied in conjunction with the incremental approach, provides an adequate tool for ranking mutually exclusive projects or a project's technical or financial alternatives. Gilbert [20] further demonstrated capital budgeting by reviewing two individual capital investment decisions taken by manufacturing firms in South Africa. The outcome of the findings indicates that managers follow the discounted cash flow project evaluation methods to achieve satisfactory levels of financial performance. Block [21] employed the chi-square technique on 302 firms listed on the Fortune 1000 index and conclude that firm who draw on capital budgeting procedures in their decision-making processes of rates of return, goal setting and portfolio concerns; perform better. Block [22] employed a questionnaire review with 232 small businesses and opine that the payback period is the most preferable for small business by about 42.7 percent; because financial institutions will likely extend loans to them and this will make them achieve better performance. Chen [23] utilized the Friedman two-way analysis of variance and Mann-Whitney U test to investigate the effect of investment choices and firm's adoption of capital budgeting techniques. The study concludes that discounted cash flow

techniques is a more appropriate choice as it considers shareholders' wealth maximization. Also presented is the use of non-financial techniques in evaluating competing projects which provides for practical alternatives in the use of capital budgeting techniques. Pike [24] examined if embracing complex capital budgeting routines have resulted in effective decision-making in addition to overall profits. In a sample of 100 big UK firms over a period of 11 years, the study reports that there exist a significant increase in advanced capital budgeting techniques that consider project risk. Furthermore, senior finance managers accept as true that the acceptance of a high tech procedure result to improved efficiency in the evaluation and regulation of large capital ventures. Al-Mutairi, Naser and Saeid [25] investigate the various capital budgeting systems adopted by Kuwaiti non-financial corporations quoted on the Kuwait Stock Exchange. Employing the questionnaire approach to gather primary data, they reveal that profitability index and net present value styles are most often used; and that these choices are governed by the level professional and academic expertise of staffs and the type of the project being assessed. In conclusion, non-financial factors such as company image, tactical planning, secured environment, and employees' competences are significant when effecting capital budgeting decisions.

DATA AND METHODS

The rationale for this study is to practically investigate the fisher's separation theorem and the capital budgeting decisions of quoted firms on the Nigeria Stock Exchange; basically in the manufacturing, health and agricultural sectors of the economy. These sectors were chosen because they are involved in the production of goods and services and as such involved in the purchase of raw materials and equipment. A questionnaire was constructed in agreement with earlier studies of this nature in order to facilitate comparison and make for improved generalizations [26-28]. The questionnaire encompassed several aspects of capital budgeting systems and how it impacts on performance. It consist of two sections a and b. Section A request for the background info about the respondents; while Section B required respondents to convey their level of conformity with different features of capital budgeting decisions on a 5-point likert scale varying from strongly agree to strongly disagree. The questionnaires were given out to both top, middle and low level management along with research groups of the firms because they are the ones responsible for making capital budgeting decisions. The Cronbach's Alpha was employed to measure the core consistency or scale reliability of the sourced data [29]. The formula is:

$$\alpha = \left(\frac{k}{k-1}\right)\left(\frac{s_y^2 - \sum s_i^2}{s_y^2}\right)$$

Where $s_y^2 = the\,\text{var}ianceofthetotalcolumn$

$\sum s_i^2 = thesumofthe\,\text{var}ianceofeachterm$

In addition, descriptive statistics was used to quantitatively explain the series. The spearman's rank order correlation evaluation technique, which is a non-parametric test, was applied to explore the variables. The reason for the spearman's rank order test, is to measure the degree of connection between two sets of ranked observations [30]; and it is

valid where the two variables are interval, ordinal or ratio scales [31]. The spearman's rank order formula as given by Agresti, Wackerly, and Boyett [32] is:

$$rs = 1 - \frac{6\sum d^2}{N^3 - N} \quad or \quad rs = 1 - \frac{6\sum d^2}{N(N^2 - 1)}$$

Where $\sum d^2$ = sum of the squared differences in the ranking of the subject on the two variables. N = number of ranked subjects. The level of confidence in all tests is at 95%, which means a height of significance of 0.05. For ease of computations and accuracy of outcomes, the statistical package for social sciences software was applied to attain the spearman's rank order correlation coefficient and its tests of significance. The selection of spearman's rank order is centered on its flexibility to submit to the type and level of data collected.

Table 1: The rate of response by respondents

S/nos.	Quoted firms	Number of individuals	Response	Response rate (%)
1	Manufacturing	40	30	75
2	Health	30	20	66
3	Agriculture	20	10	50
Total		**90**	**60**	**66**

From table 1, we conclude that of the 90 questionnaire administered, only 60 were successfully returned giving a response rate of 66.7 per cent.

DISCUSSION AND FINDINGS

To evaluate the reliability of the sourced data, the Cronbach's alpha (α) was performed and gave a result of 0.81 which is ≥ 0.70. The value indicate substantial levels of reliability for the instruments; clarity and understanding by the respondents. The following questions concerning the objectives of the study were asked:

Table 2: What are the key sources of ideas for capital budgeting decisions?

Variables	Mean	Median	Standard deviation	Minimum	Maximum	Ranking
Top mgmt.	10.8	7	2.31	2	8	1
Middle mgmt.	7.9	7	1.4	2	8	2
Lower mgmt.	7.2	7	1.32	2	8	3
Research groups	5.7	7	0.61	2	8	4

From the analysis in table 2, the top management is particularly responsible for generating ideas for capital budgeting decision. This is because the result produces an average of 10.8 level of participation. This doesn't mean that all others are not involved, however they also contributed to making the process a success.

Table 3: What various capital budgeting decisions are mostly deliberated by top management?

Variables	Mean	Median	Standard deviation	Minimum	Maximum	Ranking
Replacement decisions	10.92	7	2.11	2	8	1
Modernization decisions	10.91	7	2.1	2	8	2
Expansion decisions	9.4	7	1.8	2	8	3
Diversification decisions	9.1	7	1.71	2	8	4

The result in table 3 indicates that all budgeting decisions are considered at the top level. However, replacement and modernization decisions are mostly preferential. A replacement and modernization of asset is attempt by management to improve on its operating efficiency (to remain competitive) and reduce cost.

Table 4: What are the most frequently used capital budgeting techniques?

Variables	Mean	Median	Standard deviation	Minimum	Maximum	Ranking
Accounting Rate of Return	7.75	7	1.21	2	8	5
Pay Back Period	6.14	7	1.22	2	8	7
Net Present Value	8.94	7	1.04	2	8	1
Internal Rate of Return	8.80	7	1.02	2	8	3
Profitability Index	7.68	7	1.033	2	8	2
Modified Internal Rate of Return	8.91	7	1.03	2	8	5
Equivalent Annual Cost	7.65	7	1.18	2	8	6
Real Options Valuation	7.83	7	1.25	2	8	4

The estimation in table 4 show that the NPV and MIRR method is mostly employed by firms in their capital budgeting decisions. This is supported by previous findings by [11-13, 15-16, 20, 23-25]; which gave evidence of the NPV technique as adopted by majority of the firms in their study. The Net Present Value as a discounting method of capital budgeting demonstrate that the investment's profitability is determined via the difference between the cash inflows and cash outflows. While the Modified Internal Rate of Return assumes that the cash inflows gotten from the project are re-invested at the company's cost of capital instead of the company's internal rate of return. Therefore, the MIRR provides added accuracy and precision about the project's profitability.

Table 5: What key factors are responsible for the choice of capital budgeting techniques?

Variables	Mean	Median	Standard deviation	Minimum	Maximum	Ranking
Simple to compute	7.8	7	0.9	2	8	3
Simple to employ	7.6	7	1.1	2	8	4
Educational competences of staff	6.1	7	1.4	2	8	7
Nature of the project	8.7	7	0.6	2	8	2
Data for computation is easy to get	7.5	7	1.12	2	8	5
Shows a true gauge of profitability	8.9	7	1.23	2	8	1
Cost associated with implementation of method	6.0	7	1.32	2	8	8
Time frame required for a method	7.2	7	1.25	2	8	6

In table 5, the analysis reveal a mean value of 8.9 which shows that the choice of capital budgeting technique is highly dependent on the ability of the selected technique to display a true measure of profitability. Hence, the choice of NPV and MIRR technique which features the time value of money and expresses project profitability. In addition, the nature of the project is another key determinant. The NPV and MIRR consider the riskiness of the project to give a true and fair value of its returns.

From the estimates, the cost associated with implementation and educational competencies of staffs have lower values of 6.0 and 6.1 which indicate that the firms already have staffs with the right capabilities to ensure they don't run into losses.

Table 6: What challenges do management face in the employment of capital budgeting techniques?

Variables	Mean	Median	Standard deviation	Minimum	Maximum	Ranking
It does not use cash flows	7.5	7	1.34	2	8	4
It is less objective	4.1	7	1.43	2	8	10
It does not measure true profitability	3.0	7	1.49	2	8	12
It does not necessarily maximize shareholder's wealth	3.6	7	1.45	2	8	11
It is a difficult task	5.2	7	1.38	2	8	7
It is difficult to compute	5.6	7	1.36	2	8	6
Results are less satisfactory	4.3	7	1.41	2	8	9
Capital budgeting technique is time consuming	4.6	7	1.4	2	8	8
Ambiguities in the result of the method	8.6	7	0.9	2	8	1
Costly to use	6.1	7	1.51	2	8	5
Lack of required data	8.3	7	1.1	2	8	2

Table 6 presents the challenges top management are confronted with in their budgeting decisions. Most particularly, managers are faced with ambiguities in the outcome of the method employed on its project, as well as the unavailability of vital data. The lack of

information on which a project is evaluated poses a huge challenge as it may lead to spurious estimations that may not be feasible.

Table 7: Are there other qualitative factors affecting capital budgeting decisions?

Variables	Mean	Median	Standard deviation	Minimum	Maximum	Ranking
Corporate objectives/strategy	8.6	7	0.80	2	8	4
Customer market/demand	7.4	7	1.35	2	8	12
Power	6.8	7	1.4	2	8	13
Availability of raw materials	7.6	7	1.2	2	8	10
Employees capability	7.5	7	1.31	2	8	11
Corporate social responsibility	8.8	7	0.81	2	8	3
Security	8.9	7	0.84	2	8	2
Corporate brand/image	9.1	7	0.90	2	8	1
Project location	8.3	7	1.08	2	8	6
Innovation/technology	8.5	7	1.02	2	8	5
Government regulations	7.61	7	1.3	2	8	9
Competition	8.1	7	1.12	2	8	7
Environmental factors	7.8	7	1.14	2	8	8

The result from table 7 prove that firms conduct an extensive planning system before they can embark on specific capital budgeting decisions. The firms highly consider their brand in terms of product quality and management expertise, the security of the business environment, the level of social responsibility, firm's strategy, business innovation, project location and the threat of competition. Taking all these into consideration equips top management better to deliver effective capital budgeting decisions.

Table 8: To what extent does capital budgeting decisions affect the performance of the firm?

Variables	Mean	Median	Standard deviation	Minimum	Maximum	Ranking
Decisions are mere policies to be adopted	4.3	7	1.36	2	8	3
Decisions have created wealth for shareholders	9.7	7	0.89	2	8	1
Decisions have reduced profits	3.8	7	1.42	2	8	5
Decisions maximizes value of the firm	9.3	7	0.99	2	8	2
Decisions have led to more uncertainties	4.1	7	1.39	2	8	4

Table 8 present that when firm's management disregard shareholders' desire for dividends and instead plough back these funds into profitable investments by way of proper capital budgeting decisions, then they are up for growth. The study therefore conclude that capital budgeting decisions create wealth for both managers and shareholders; at an average value of 9.7 and 9.3 per cent.

Table 9: Analysis of the Fisher Separation Theorem and Capital Budgeting Decision

		Capital Budgeting Decision		Value Creation
Spearman's rho	Capital Budgeting Decision	Correlation Coefficient	1.000	.827
		Sig. (2-tailed)	.	.000
		N	60	60
	Value Creation	Correlation Coefficient	.827	1.000
		Sig. (2-tailed)	.000	.
		N	60	60

Source: SPSS 25.0 output on research data

Table 9 reveals that the Spearman Correlation coefficient is 0.827 which reflect a positive linear relationship between capital budgeting decision and Shareholders' value creation. And the Correlation test is statistically significant with a p-value of 0.000. Positive relationship means that an increase in capital budgeting decision results to an increase in value creation. Following this finding, the null hypothesis was rejected and the study concludes that there is a significant relationship between capital budgeting decision and Shareholders' value creation; in support with the Fisher's Separation Theorem.

CONCLUSION

The justification for this study is to basically investigate the fisher's separation theorem and the capital budgeting decisions of quoted firms on the Nigeria Stock Exchange; in the manufacturing, health and agricultural sectors of the economy. In accordance with the study's objectives, specific questions were asked such as: the key sources of ideas for capital budgeting decisions, the most frequently used technique, factors responsible for the choice of technique, challenges managers face in such decisions and other likely qualitative factors that prompt capital budgeting decisions. Questionnaires were distributed to address these questions and the descriptive statistics was conducted to accurately describe the data. As well, the Spearman Rank Correlation test was performed to test if a significant relationship exist among the variables. From the analysis, the study found the following:

1. Top management is particularly responsible for generating ideas for capital budgeting decision.
2. The decisions mostly deliberated are replacement and modernization of fixed assets; in order to improve on its operational efficiency and reduce cost.
3. The Net Present Value and Modified Internal Rate of Return method are mostly employed techniques by firms in their capital budgeting decisions.
4. The major factors that determine the choice of a technique is the nature of the project, and if the technique is a true measure of a firm's profitability.
5. Ambiguities in the result of the method and the unavailability of required data are major challenges management face in making capital budgeting decisions.
6. In addition, factors like the firm's brand in terms of product quality and management expertise, the security of the business environment, the level of social responsibility,

firm's strategy, business innovation, project location and the threat of competition are taken into consideration by top management to deliver on an effective capital budgeting decisions.

7. Overall, the study found a positive linear relationship between capital budgeting decision and Shareholders' value creation; with a correlation coefficient of 82.7 per cent.

Accordingly, the study recommend that firms in the Nigerian environment should ensure they play down on shareholders' desire for dividends and instead redirect their funds to more investments; and employ suitable capital budgeting decisions techniques that considers the risk of the firm and helps create more value for the business. Further areas of research can be carried out in other sectors of the Nigerian economy such as financial services, information technology, oil & gas, construction & real estate; and even among non-quoted firms to make for more improved generalities.

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