

## An Examination of the Relationship between Capital Investment Appraisal Techniques and Firms' Growth and Survival in Nigeria

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**Abstract:** *The long-term nature of decisions on investment activities need adequate capital budgeting, which is based on the selection of the optimal sources of financing. Based on assessment of the firm value of the company to decide whether to join an investment or not. To this end, this paper studied investment and project appraisal as a tool for sustainable growth and value creation. The survey research design was adopted in the research methodology with the questionnaire instrument administered on a randomly selected sample of 80 respondents. Having presented the data collected in tables with analysis done using simple percentages, the ANOVA (F-Ratio) test was used to test the formulated hypotheses. The results of the study revealed that there is a significant relationship between capital investment appraisal techniques and firms' sustainable growth and value creation and sound financial management is critical to the survival and long-term success of firms Based on the findings, it was recommended among others that the expected returns on investment exceed the anticipated risk of such an investment to ensure that the firm maintains a sustained growth that will eventually expand its ability to create.*

**Keywords:** *Investment Appraisal, Investment Decision, Returns on Investment (ROI), Investment Discounted Cash Flow (DCF)*

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### I. Introduction

Investment appraisal techniques take a significant role in investment decision-making. Generally an organisation continuously invest its resources in new plants or machinery or any other capital assets for expansion of its operations or replace the capital assets for its continuous operation and improving its efficiency. The main objective of the investment appraisal is to maximize the organisation's profits and optimizing the return on investment. This can be achieved by increasing revenues and reducing costs in a contemporary business environment, investment decision making involves material and non-material assets alike. Traditionally, the investment decision hinges on material assets, and its purpose is to increase the value of material assets. In the realm of knowledge economy, however, intellectual capital, or non-material assets, is where the decision-maker places an emphasis, adding to the pronounced complexity of investment decision making.

The investment decision revolves around return on investment (ROI). It is noteworthy, however, that the owners and managers might perceive it differently. The owner would focus on establishing a favourable yield ratio, aware of the risks inherent in a potential investment decision. The manager, on the other hand, would rather respond to the challenge of creating a strategic framework to produce a favourable yield ratio. In order to foresee the benefits of the investment decision in the future, the managers need to identify the optimal way to allocate the proceeds of capital investments. Investment decisions may be viewed in the context of an investment project. If the value of the investment project is higher than the planned investment, this is considered to be a positive signal, because the integration and valorization of the time frame and the risks of future cash flows, define the feasibility of the investment decision and the investment project in its entirety. The investment decision-maker is aware that a funding decision might be reversed. When it comes to accumulating the funds to support business operations, responsibility for the funding decisions rests with the manager. When a company needs financial support for an investment activity, the managers, in agreement with the owners, might invite investors to provide for cash and, in return, either share the profit directly or in a number of fixed installments.

The choice of funding is vital, and it is exactly what makes the investment decision feasible or not. All investment decisions are strategic in nature, having long-term effect on the performance of the company, which is why the selection of a source of funding is in close correlation with the quality of the investment decision. Having passed and implemented the funding/investment decisions, the management accepted the obligation to pay the borrowed funds back in a specified period of time. It is therefore of utmost importance to integrate the liabilities stemming from the choice of funding into all other decisions, lest there should be a conflict of interest within the company.

In making investment and financial decisions, the managers should share the same set of information, emerging from a serious political, economic and technical analysis. Likewise, feed-back from the surroundings should complement the knowledge of the relevant industry and its trends.

### **1.1 Objectives Of The Study**

The objective of this research is to provide the right capital budgeting technique mix that would enhance proper financial planning that will aid sustainable growth, value creation, liquidity, stability and the profitability of firm.

However, the following objectives are therefore considered.

- i. To determine with a significant degree of certainty the appropriate investment appraisal techniques in corporate decision making
- ii. To investigate the extent to which project / investment appraisal contribute to the sustainable growth of firms
- iii. To determine the extent to which investment appraisal as a tool affects corporate financial planning
- iv. To critically examine the impact of investment appraisal techniques on firm's value creation

### **1.2 Research Hypotheses**

The hypothetical postulations for this study are formulated below:

#### **Hypothesis I**

Ho: There is no significant relationship between capital investment appraisal techniques and firms' sustainable growth and value creation

#### **Hypothesis II**

Ho: Sound financial management and capital investment decision making are not critical to the survival and long-term success of firms

## **II. Theoretical Framework**

The search for reliable techniques for investment decision-making is currently one of the problems facing firms. More accurate and reliable capital budgeting is therefore needed by firms if they are to be viable and have a sustainable growth, remain competitive and optimize their value. Capital budgeting techniques are probably one of the least understood tools of financial management and as a result, one of the least used by small organizations (Baird, et al., 2004).). The theoretical framework of this study is based on the Modigliani and Miller's neo classical theory of finance and investment (1958) as discussed below. Modigliani and Miller's theory on investment (1958) 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 the small firms. Hastie (1998) on the contrary regarded the financial theory that recommends the utilization of sophisticated techniques such as net present value to improve decision making and maximize the value of the firm as unwarranted. Hastie objected to these assumptions (a statement that is assumed to be true and from which a conclusion can be drawn) because there are many more "apparently acceptable" projects than a firm can approve either because of limited capital or raw materials or because of limited management or technical talent which is common amongst small firms. Hastie noted that the use of incorrect assumptions has been a more significant source of bad investment decisions than the use of simple measurement techniques. Investment decision making could be improved significantly if the emphasis were placed on asking the appropriate strategic questions (important) and providing better assumptions rather than on increasing the sophistication of measurement techniques.

Adler (2006) argued that discounted cash flow (DCF) should be removed from financial theory as it is increasingly irrelevant to contemporary business practice and can be dangerous in evaluating proposed projects. He further illustrated that DCF can be used accurately from the position of hindsight, but it is little help in predicting the future course of business. He argued that a "gut feeling" can be put to better use than strict mathematical models of potential profits in deciding to pursue a new venture. He concluded that DCF is meaningless and as such should not be applied in evaluating capital budgeting decisions or rather should be replaced with less restrictive and more optimistic methods. The internal rate of return (IRR) method assumes re-investment of the funds at the IRR. Finally, the net present value (NPV) method requires an appropriate discount rate to value expected cash flows. The NPV method may

underestimate the value of the investment project and may cause the management to pass up valuable investment opportunities, therefore, in general, they do not provide owner/managers with the flexibility they need when making strategic investment decisions.

## **2.1 Review Of Current Literature**

A lot of surveys have been done all around the world about capital budgeting practices and the most effective factors on investment appraisal technique's selection. Numerous authors have assessed adoption of DCF methods in investment appraisal (Ross, 1986 in America and Sangster, 1993 in the UK).

One of the good one was presented in 1969 by Mao. He compared capital budgeting in theory and practice. In his survey, among eight companies which questioned about most used capital budgeting techniques, he found that the Payback period is primarily a risk measure. Accounting profit is especially important if the company is widely held and relies on external sources of financing. Internal rate of return is most likely to be the major criterion in closely held firms which are less worried by erratic patterns in their per share earnings, which finance themselves and which make many small investments so that the risk in any one investment is not critical.

Capital investment appraisal literature is based on the assumption that the objective of a firm's manager is to maximize firm value, that is, the wealth of its shareholders. Therefore, capital investment appraisal and cost of capital estimation are major decisions that the financial manager has to make. In this process, it is crucial that management use accurate methods that will result in the maximization of shareholder wealth (Ryan and Ryan, 2002). In fact, managers should undertake capital investment projects only if they add to the value of the firm, which means that managers should identify and undertake all projects that add value to the company so as to maximize shareholder value (Gilbert, 2005).

"Profitable capital investment leads to the growth and prosperity of an economy. If profitability is low, investment will shrink. The investor needs tools to predict the profitability of proposed investments" (Remer and Nieto, 1995). Over the last four decades, the academic community has been proposing several methods that can improve the capital investment decision making process of companies (Farragher et al., 2001). There are many methods and techniques available to help the investor to make wise economic decision. For a comprehensive review of the capital investment appraisal methods see Remer and Nieto (1995). In the following paragraphs only a brief summary of the main methods (or the ones that have been used more for longer time) is presented, distinguishing between those that do not take into account the time value of money from those who do. Additionally, a brief reference to more sophisticated methods will be done.

In the first group (non-discounting cash flows methods) one can identify two criteria: the payback period (PBP) and the accounting average rate of return (ARR). The payback period is based on the idea of how much time is needed for the project to generate cash flows sufficient to recover the initial amount invested. It can be also used as a criterion for acceptance or rejection of projects in the case that the payback period is above or below a certain number of years previously defined.

The main advantages of this method are: ease of understanding; simplicity of implementation; provides an idea of the degree of liquidity and risk of the project; and in times of huge instability, the use of this method is a way to increase the security of investments.

Despite these advantages, the payback method has two important drawbacks. First, it ignores the cash flows occurring after the payback time, which can lead to the rejection of profitable projects that require a longer recovery period. Second, the payback period, in its original version, does not consider the time value of money in calculating the cash flows. This is inconsistent with the basic principles of financial mathematics. One way of overcoming this problem is to calculate the payback period by discounting (at the appropriate discounting rate) the expected future cash flows.

The accounting average rate of return (ARR) is computed as the ratio between the project's estimated average profit and the average accounting value of the investment (Brealey and Myers, 1998). This ratio is compared with the firm's accounting rate of return or other benchmark external to the firm (e.g. the industry average value).

The main advantages of this method are its simplicity of understanding and usage, given that the figures used in calculations are those provided by accounting reports. However, this method presents some important weaknesses. First, it does not take into account the time value of money. Second, being based on accounting earnings and not on the project's cash flows, it is conceptually incorrect. Finally, there is the need to set a target rate of return as a prerequisite to apply ARR as an appraisal method (Akalu, 2001).

In the second group of methods (discounting cash flow methods, DCF) one can distinguish between the net present value (NPV) and the internal rate of return (IRR). The net present value (NPV) method is based on the discounting of expected future cash flows of a investment project. More specifically, it states that the present value of the project's inflows (or benefits) must exceed the present value of its outflows (or costs) if a

project is to be selected. The cash flow stream includes all the payments and receipts associated with the investment project during its economic life, and it should be discounted at the opportunity cost of capital, which should reflect the risk of the project and the financing mix (Damodaran, 2001). This criterion for evaluating projects presents the following set of advantages. First, the NPV is based on the concept of cash flow. Second, in its computation all the cash flows generated by the project are included. Finally, the cash flows are discounted at the appropriate rate of return. However, this method of investment appraisal has some drawbacks. First, it requires the a priori determination of the discount rate (which sometimes is difficult especially due to the determination of the risk premium). Second, in the presence of mutually exclusive projects, if they have a different economic life and/or initial investment amount, the NPV may lead to different decision rules (Akalu, 2001). That is, the values obtained for NPV are not directly comparable.

Finally, the NPV criterion is indifferent regarding the amount of initial investment needed. The internal rate of return (IRR) is a method for evaluating investment projects widely used because it employs a percentage rate of return as the decision variable (Steiner, 1996). The IRR is determined by calculating the discount rate for which the NPV is zero. The criterion for a decision on the acceptance or rejection of a proposed investment is by comparing the IRR with the opportunity cost of capital. Thus, one should only accept to undertake a project for which the IRR exceeds the opportunity cost of capital. According to Akalu (2001), the IRR has the advantage of being simple to interpret (as it shows percentage benefits from the given investment) and it is easier to apply than other discounted cash flow methods given that the discount rate need not be computed in the application.

On the other hand, Brealey and Myers (1998) highlight the following problems that arise with the use of IRR. First, for non-conventional cash flows (i.e. positive cash flows mixed with negative ones), there is the problem of multiple IRR. Second, in the case of mutually exclusive projects, NPV and IRR methods can lead to different conclusions about what project should be accepted. Finally, in the calculation of the IRR is the underlying assumption that the cash flows that are being generated by the project during its economic life are reinvested at the IRR. However, this seems a rather unrealistic assumption, particularly when high values are obtained for the IRR.

Given the uncertainty that involves the capital investment decision process and some shortcomings of the NPV method (deriving from some underlying hypothesis), there is a growing body of theoretical developments (see, for example, Dixit and Pindyck, 1994, and Trigeorgis, 1993) claiming for the adoption of the same reasoning as in financial options. These more sophisticated methods for project evaluation are known as real options models. In this context, an investment can be seen as a future option, which entails rights but not obligations to take some action in the future (Dixit and Pindyck, 1994). In spite of these theoretical developments, there is, however, a small usage of these more sophisticated methods by firms.

From these studies some conclusions can be highlighted. Firstly, discounted cash flow (DCF) methods are generally preferred over non-DCF (Ryan and Ryan, 2002). Secondly, there has been a shift from the use of the internal rate of return method to the net present value criterion methods, and a decrease in the use of the payback period method (Remer and Nieto, 1995a). Thirdly, the trend of applying ARR in major projects is declining (Akalu, 2001). Therefore, one can say that the analytical techniques used by executives have increased in terms of sophistication (Hermes et al., 2006). Or, as pointed out by Pereiro (2006: 163), "the constant preaching of financial economists on the advantages of discounting valuation techniques has paid off: while such techniques were used by only a minority of practitioners in the 1970s, they are now employed by a majority of corporations and advisors".

Fourthly, survey results also show that even though over time the use of the PB method has declined as a primary tool for project evaluation, it remains to be an important secondary instrument CFOs use (Hermes et al., 2006).

Fifthly, larger firms are more likely to use DCF methods (Graham and Harvey, 2001, and Ryan and Ryan, 2002).

Sixthly, there are some differences among industries in the degree of usage of more sophisticated capital investment appraisal methods (Moore and Reichert, 1983). Finally, it has been observed that when DCF methods are used, they are used in conjunction with other techniques that are both theoretically deficient and redundant (Gilbert, 2005).

## **2.2 Trends in Capital Budgeting Decision Techniques**

Several studies have dealt with capital budgeting practices of firms in Canada over the past fifty years. More than a decade has passed since the most recent study. In other words there is a long gap from the last study in 1999 to the present, and it is the intent of this research to partially fill the gap. More current studies exist for Australia, the UK and US (Farragher et al., 1999; Graham and Harvey, 2001; Ryan and Ryan, 2002). The deficiency in the literature is a Canadian phenomenon and the present study is partially justified on the basis that investigation has continued in other countries.

Both NPV and IRR are consistent with the goal of maximizing a firm's value, use cash flows and consider cash flow timing. 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.

### **2.3 Investment Appraisal Methods**

Capital investment appraisal methods or "capital budgeting practices" are tools for decision making and have been defined in the literature as the methods and techniques used to evaluate and select an investment project. Some of these methods are very simple (e.g. payback period) while others are particularly sophisticated and complex (e.g. Net Present Value, Real Options Reasoning). Simpler methods do not take into account the time value of the money and do not include the risk dimension. All these methods are well documented and explained in the literature. However, there is little empirical evidence on the factors that explain the use of the different techniques by firms.

Traditionally, the use in a systematic manner, on one hand, and of more sophisticated capital investment appraisal methods, on the other hand, has been identified with larger firms. Nevertheless, since the 1990s that organizational change and the democratization of information technologies (Sangster, 1993) may have contributed to change such status quo. Therefore, this research work seeks to show which internal and external variables influence and explain the use of CIAM namely, the pressure of competitive environment, firm's strategy, production technologies and firm's age. Several studies on the impact of such variables on management systems can be found in the literature (Abernethy and Lillis, 1995; Langfield-Smith, 1997). For example, using data from a survey, Baird et al. (2004) found that activity based management practices are particularly associated with unit size, innovation, outcome orientation and tight versus loose control.

According to Maheswari (1994), in an investment appraisal, the following important factors are considered as the factors which are affecting capital investment decisions:

1. The amount of investment.
2. Minimum rate of return on investment.
3. Estimated life of the investment.
4. Return expected from the investment.
5. Ranking of the investment proposal.
6. Working capital required.

In general, the firms have a limited funds for capital investment, the amount of investment is taken into account in the decision making, of which project should be chosen. In this way the projects should be arranged in ascending order based on the amount of capital investment. The minimum rate of return is usually decided on the basis of the cost of capital. If the cost of capital is given 10% the management will not accept the project which gives the rate of return at less than 10%. The projects are selected on the basis of cash flow approach for assessing benefits from capital investment. If two or more proposals are available, the proposals are ranked on the basis of their profitability. Then the proposal which has most profitable will be chosen.

CIMA (2000) identified the following steps in the process of developing a new programme of capital investment.

1. Identification of an investment opportunity.
2. Consideration of the alternatives to the project being evaluated.
3. Acquiring relevant information
4. Detailed planning.
5. Taking the investment decision:

The identification of an investment opportunity is the most difficult part of the capital investment process. Indeed for many business, and particularly small ones, it is the only stage. Projects are undertaken without any form of sophisticated investment appraisal. The different investment alternatives ought to be identified and compared. Because, normally, there are two or more investment projects are available. Acquiring the relevant data to form the basis for an informed decision is one of the most important aspects in practice. Large capital investments that turnout to be unprofitable can usually be abandoned only at a substantial loss, and therefore the time and efforts spent in market research and acquiring data about relevant costs and benefits is rarely wasted. This activity helps to focus manager's mind on the reality of the projections as they are once forecasting and so weed out poor projects at an early stage before they are subjected to intensive financial scrutiny.

### **2.4 Empirical Review**

Capital budgeting decisions are crucial to an organization's success for several reasons. First of all, capital expenditures typically require large outlays of funds. Secondly, organizations must ascertain the best

way to raise and repay these funds. Thirdly, most capital budgeting 17 decisions require a long-term commitment and finally, the timing of capital budgeting decisions is important. When large amounts of funds are raised, organizations must pay close attention to the financial markets because the cost of capital is directly related to the current interest rate.

The need for relevant information and analysis of capital budgeting alternatives has inspired the evolution of a series of models to assist organizations in making the "best" allocation of resources. Among the earliest methods available were the payback models, which in simple terms determine the length of time required for the organization to recover its cash outlay, and the return on investment model, which evaluates the project based on standard historical cost accounting estimates.

The next group of models employs the concept of the time value of money to obtain a superior measure of the cost/benefit trade-off of potential projects. More current models attempt to include in the analysis non-quantifiable factors that may be highly significant in the project decision but could not be captured in the earlier models.

Capital budgeting decisions are extremely important and complex and have inspired many research studies in the past. For instance, in an in-depth study of the capital budgeting projects of 12 large manufacturing firms (Ross 1972), that although techniques that incorporated discounted cash flow were used to some extent, firms relied so much on the simplistic payback model, especially for smaller projects. Also, when discounted cash flow techniques were used, they were often simplified. For example, some firms' simplifying assumptions include the use of the same economic life for all projects even though the actual lives of individual projects might be different. Furthermore, firms often did not adjust their analysis for risk (Ross, 1986).

Also in 1972 Thomas P. Klammer surveyed a sample of 369 firms from the 1969 Compustat listing of manufacturing firms that appeared in significant industry groups and made at least \$1 million of capital expenditures in each of the five years 1963-1967. Respondents were asked to identify the capital budgeting techniques in use in 1959, 1964, and 1970. The results indicated an increased use of techniques that incorporated the present value (Klammer 1984).

### III. Research Methodology

This study employs the survey research design. The data was obtained from both primary and secondary sources, where the data analyzed were collated using the questionnaire instrument administered on a sample size of 80 respondents randomly selected. To verify the reliability of the measuring instrument (questionnaire) developed for the purpose of this study, it was subjected to pre-trial tests. The reliability of the questionnaire instrument was revealed by the accuracy of the questions formulated and the degree to which different respondents give consistent answers.

The data collected were presented in tabular forms after summarizing and classifying them. The tabulated data was then analyzed using the simple percentage method to compare the responses. A higher percentage mean acceptance while a lower percentage means rejection and the formulated hypotheses tested using the Analyses of Variance (ANOVA) statistical method at 5% level of significance.

### IV. Data Presentation And Analysis

#### 4.1 Test of Hypotheses

##### Hypothesis I

Ho: There is no significant relationship between capital investment appraisal techniques and firms' sustainable growth and value creation

**Table 1: There is a significant relationship between capital investment appraisal techniques and firms' sustainable growth and value creation**

Response	Shareholders	Management	Investors	TOTAL
SA	15	9	4	28
A	12	9	3	24
D	6	8	2	16
SD	7	4	1	12
$\sum X$	40	30	10	80
$\sum X^2$	454	242	30	1760

Source: Computation from responses to Question 1

**Table 2: ANOVA analysis of the relationship between capital investment appraisal techniques and firms' sustainable growth and value creation**

Source of Variation	DF	SS	MS	F-Ratio	F- Critical
Between Group Treatment	2	116.33	58.335	6.91	4.26
Within Groups Treatment	9	76	8.444		
Total	11	192.33			

F- Critical value of 5% level of significance with degree of freedom 2 to 9 is 4.26

Source: Researcher's computation.

**Decision/ Inference:**

Since the calculated value of 6.91 is greater than the critical value of 4.26, we reject the Null hypothesis (Ho ) and accept the Alternative Hypothesis (Hi). It is therefore concluded that there is a significant relationship between capital investment appraisal techniques and firms' sustainable growth and value creation.

**Hypothesis II**

Ho: Sound financial management and capital investment decision making are not critical to the survival and long-term success of firms

**Table 3: Sound financial management and capital investment decision making are critical to survival and long-term success for firms**

Response	Shareholders	Management	Investors	TOTAL
SA	14	8	3	25
A	14	9	4	27
D	6	6	1	13
SD	6	7	2	15
ΣX	40	30	10	80
ΣX <sup>2</sup>	464	230	30	174
				8

Source: Computation from responses to Question 2

**Table 4: ANOVA analysis of the critical importance of sound financial management and capital investment decision making to the survival and long-term success of firms**

Source of Variation	DF	S S	M S	F-Ratio	F- Critical
Between Group Treatment	2	116.33	58.335	7.09	4.26
Within Groups Treatment	9	74	8.222		
Total	11	190.33			

F- Critical value of 5% level of significance with degree of freedom 2 to 9 is 4.26

Source: Researcher's computation.

**Decision/ Inference:**

Since the calculated value of 6.91 is greater than the critical value of 4.26, we reject the Null hypothesis (Ho ) and accept the Alternative Hypothesis (Hi). It is therefore concluded that sound financial management and capital investment decision making are critical to the survival.

**V. Conclusion**

There is a relationship between the firm's overall goal, financial management and capital budgeting. This is as a result of the fact that investment appraisal is the planning process to make a rational use of funds for long-term investment initiative, thus, in order for an organisation to identify a realistic need for long-term capital, the prerogative is to have a full picture of its own competence (incorporating its goals with finance sourcing). Capital investment appraisal process is very useful in order to make right financial and consequently management decisions.

Again, it was discovered that there is a significant relationship between capital investment appraisal techniques and firms' sustainable growth and value creation. This is in line with the fact that the efficiency of financial management is judged by its' success in achieving the firm's goal. Since the objective of a firm's manager is to maximize firm value, that is, the wealth of its shareholders, the goal of the firm's manager is to maximize firm value, that is, the wealth of its shareholders. The decisions made by managers during the capital budgeting process determine the future growth and productivity of the firm

Furthermore, sound financial management and capital investment decision making are critical to survival and long-term success for firms. Managers should undertake capital investment projects only if they add to the value of the firm. The benefit-cost ratio of a capital project set against economic criteria should be

evaluated to ensure that the expected returns on individual or group project (s) exceed the anticipated risk on them.

The following recommendations are made based on the study.

1. Investment appraisal techniques adopted in Niger Mills Company Plc is worthwhile and profitable. The management of the business enterprise should ensure that these techniques are improved upon to further strengthen their stakes and lots in the future. The management should try meeting the anticipated results. For this purpose the deviations and reasons for deviations should be discovered, and then corrective actions can be made.
2. Actual market opportunity and the changes to be arisen in costs should be taken in to account. The expected returns on investment should exceed the anticipated risk of such an investment to ensure that the firm maintains a sustained growth that will eventually expand its ability to create value.

Future research on the determinants of the capital spending should incorporate a measure of inclusiveness of various stakeholders in the capital planning process.

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