

Techniques For Evaluating Projects In Nigerian Tertiary Institutions

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Introduction

It is not in doubt that educational investments are of great importance to any nation. They boost the growth rates of the nation as a whole and provide a sure key to achieving the micro and macro national objectives. It has been established that there is a strong and significant relationship between human capital and growth rates. Economists have come to agree that a nation's stock of human capital is an important component of differential growth rates. Generally speaking, education is a primary ingredient in providing equal opportunity to all members of the society as a way of cutting down or breaking intergenerational correlations of income (Hanushek, 1998:12). The benefits arising from investments in education cannot be exhausted. Essentially, educational investments are specifically measured in terms of student performance, staff welfare and available infrastructures (classrooms, libraries, offices, electricity, water, etc.). These indices are meaningful when these questions are well resolved. What is the students performance when compared with students from other parts of the world? What are the incentives and other benefits for the school staff or students? Are they enhanced when compared with others? Are infrastructural facilities available to promote academic excellence? Are projects abandoned and why? What about project failures?

In Nigeria, these questions have remained unresolved. In fact the glory of Nigerian educational system in general and tertiary institutions in particular has been on a geometric decline. It has continued to be a source of worry to every well-meaning Nigerian both home and abroad. Every group in the Nigerian society have cried out concerning the decaying state of the system. Past governments have invested without commensurate results. It calls for immediate review of the techniques used in appraising these investments especially the tangible ones. For the purpose of this paper, emphasis is placed on infrastructural investments. There have been clear cases of project failures and abandonments in Nigerian tertiary institutions. Such failures or abandonments are attributed to either lack or mismanagement of funds, improper articulation and evaluation of the project or project mismanagement. Improper articulation and evaluation of the project is a very serious factor, among others. This deficiency has not ensured rational decision-making at the various stages of the project life cycle and has resulted in misallocation of resources, long gestation periods, investment cost over-runs, high rates of institutional mortality and lopsided growth in Nigerian tertiary schools. Therefore, this paper is focused on identifying the models relevant for project evaluation in Nigerian tertiary institutions. This is with a view of distilling lesson for future project evaluation and implementation using appropriate quantitative/qualitative techniques.

Conceptual Foundation of Project Evaluation

Project is a proposal or scheme and an aspect of investment that is tangible in nature. It is quite different from the intangible (financial) investment and are distinguished in terms of definition, analytical approach, control, effect on inflation and method of assessment. Project in the context of our discussion include Hostel building, library, classrooms, supportive projects, etc. Each constitutes a critical element in the attainment of educational objective(s) of our tertiary institutions.

Evaluating any of these projects involve synthesized and sequential analysis of data relating to an investment proposal or scheme in order to determine its associated costs and benefits upon which decision is reached on the most feasible, viable and desirable project to choose (Okereke, 1997:25). Let us note that the feasibility, viability and desirability of the type of project we have in mind is not wholly based on commercial principle but on social and economic principles. The main criteria for evaluation is basically the economic viability and the opportunity cost of the project rather than the commercial profitability except on supportive projects like bookshops, etc. The criteria notwithstanding, the same technique apply to all projects. The choice of any technique depends on the advantages of each technique to the user and the type of project in question. However, it must be emphasized that a project to be evaluated should be able to cover the

investment cost and a margin to take care of the running expenses or should be able to generate so much when invested in another project. This is the opportunity cost dimension. Again, the benefits of a project should be measured based on the improvement in the performance of students, staff welfare and conducive working environment, all culminating in excellence tertiary education in Nigeria. This is the main objective of project evaluation in our tertiary educational system. Quantitatively, it involves the maximization of the present value of the stream of equity returns, which is determined using an appropriate discount rate. This is at variance with a typical firm that strives to maximize the present wealth of the firm's equity shareholders and since it is reflected in the market value of the shares, the objectives culminate in maximizing the market value of equity shares.

It is important to note here that project evaluation precedes the planning phase in the entire capital budgeting process. This phase articulates the investment strategy and provides the framework which shapes, guides and circumscribes the identification of individual project opportunities. Project Evaluation itself involves a detailed analysis of the technical, physical, economic, market, management, legal, social, political, ecological and financial aspects of the project under consideration. This analysis requires that information or data concerning the project be gathered, prepared and summarised. The result of this summary will inform the selection (acceptance or rejection) of the project using appropriate evaluation techniques.

Techniques for Evaluating the Economic Viability of a Project

Project evaluation (appraisal) techniques are best tools used in answering the question – Is the project worthwhile? A wide range of these tools are available in judging the worthwhileness of a project. They are categorised into two, viz: objective and subjective (judgemental) techniques. The latter has no scientific foundation and therefore outside the scope of this paper. We are concerned with the former (objective) technique.

Objective techniques are divided into two broad categories, namely non-discounting and discounting techniques. The key non-discounting techniques are capital Recovery Period (Payback Period) and Accounting Rate of Return. Others include emergency method and visual selection method. The principal discounting techniques are Net Present Value (NPV), Internal Rate of Return (IRR), and Profitability Index (PI) or Benefit Cost Ratio (BCR). Others include Time - Adjusted Discounting Method (TAD), Net Terminal Value (NTV) and Abandonment Value (AV).

Capital Recovery Method or payback period is the time required to repay the initial investment cost of a project from its net proceeds (Okereke, 1997:49). It is the time frame within which a project should recover or payback every capital injected therein.

Projects with equal cash inflows, the following model is applied:

$$CRP = \frac{\text{Initial Investment}}{\text{Average cash inflows}}$$

But for projects with conventional cash inflows, the payback period (PBP) is calculated by accumulating the inflows to equate the initial investment (cash outflows). Accordingly, a project is accepted if the payback period is less than the target period. And given two or more projects, the one with the least payback period is accepted.

The major draw back of this technique is that it does not consider the time value of money. However, this can be overcome by using the modified approach, which involves the conversion of the projects cashflows in their present value using appropriate discounting factors and then adding up to ascertain the period of time required to recover the initial outlay on the project (Chandra, 1996:259). Other shortcomings of the technique include – It gives return of investment rather than return on investment and assumes that cashflows within the payback period are certain. Again, it provides crude measure of the timing of project cashflows. These limitations notwithstanding, the technique has been found to be commonly used because of its simplicity. It

favours quick return-projects and investment involving small capital expenditure. Above all, it promotes a policy of caution in investment.

Accounting Rate of Return (ARR)

This is also called return on investment (ROI) or average rate of return. It is a measure of the profitability which relates income to investment. It is the ratio of average profit, after depreciation, to capital invested or ratio of average return to capital invested. Both average profit/return and capital invested are measured in accounting terms. This gives rise to a lot of variations in actual derivation of ARR.

This technique is faulted because of its inability to specify the appropriate rate of return in the light of the wealth maximization goal. Also the use of accounting data and the neglect of the time value of money is a major pitfall. These weaknesses notwithstanding, the technique is highly applied by investors because of its simplicity and consistency with the way managers measure their performance.

The decision criterion is to accept a project if its accounting rate of return exceeds a certain cut off rate of return.

Net Present Value (NPV)

Net Present Value is one of the discounting techniques. It is the present value of the discounted net proceeds expected from a project throughout its life span. In other words, the Net present value of a project is the sum of the present value of all cash flows (inflows and outflows) associated with it. According to UNIDO (1986:175), NPV is the value obtained by discounting separately for each year, the difference of all cash outflows and inflows accruing throughout the life of a project at a fixed, pre-determined interest rate. This is mathematically represented as

$$NPV = (NCF_1 \times a_1) + (NCF_2 \times a_2) \dots + (NCF_n \times a_n)$$

where $NCF_{1,2, \dots, n}$ = Net Cash Flow in years 1 to Year n

$a_1 \dots a_n$ = Discount factor in years 1 to Year n

If the difference is not directly calculated, the NPV model becomes

$$NPV = \sum_{t=0}^n \frac{F_t}{1+k}$$

$$= \sum_{t=1}^n \frac{F_t}{1+k} - I_0$$

where

F_t	=	Cash Inflow in time t
k	=	Discount rate
I_0	=	Initial investment

Note that the discount rate to apply depends on the project sponsor(s). Generally, the rate should be equal either to the actual rate of interest on long-term loans in the capital market or to the interest rate paid by the borrower. Sometimes, the rate to be chosen should be equal to the opportunity cost of investing in that particular project. It is usually the minimum rate of return on alternative investment.

The decision criteria to accept or reject a project is based on the positivity or negativity of the NPV. If NPV is positive or zero, the project should be accepted. It means that profitability is above or equal to the cut-off rate. The zero NPV means an indifferent situation or break even position. If the NPV is negative, the project should be rejected. It means that the outcome is below the cut-off rate.

Internal Rate of Return (IRR)

Internal Rate of Return is the discount rate which equates the net present value to zero. It can also be called marginal efficiency of capital or yield or rate of return over cost or trial and error method. Symbolically, IRR can be determined using the formula:

$$I_0 = \frac{F_1}{(1+k_r)} + \frac{F_2}{(1+k_r)^2} + \dots + \frac{F_n}{(1+k_r)^n} = 0$$

$$= I_0 = \sum_{t=1}^n \frac{F_t}{(1+k_r)^t} = 0$$

where

$F_{1,2,\dots,n}$	=	The cash inflows from Yr 1 to nth year
I_0	=	Initial Investment
K_r	=	Discount Rate (IRR)

The value of K_r is only derived by trial and error. It is always cumbersome and therefore a short cut formula is adopted thus

$$R_A + (R_2 - R_1) \left(\frac{V_1}{V_1 - V_2} \right)$$

where

R_A	=	Actual Rate (IRR)
R_1	=	The rate that produces positive NPV
R_2	=	The rate that produces the negative NPV
V_1	=	Positive NPV
V_2	=	Negative NPV

It is always complex choosing a rate that will generate a positive or negative NPV. It is simplified by choosing arbitrary rate, and if such rate generates positive NPV, a slightly higher rate should be used in order to generate negative NPV and vice versa.

The rate so generated is then compared with the institution's (company's) cost of capital. If it is greater, then the project should be accepted. Otherwise reject.

Investors embrace this technique not only because of the recognition of the time value of money but also the fact that it is compatible with the company's objective of maximizing the welfare of owners. However, the burdensome computation and difficulty in understanding the technique makes it unpopular in developing countries. Also the reinvestment assumption and the possibility of multiple IRR complicates the use of this discounting technique.

Profitability Index

This is also called benefit cost ratio (BCR) and it is the ratio of present of expected cash benefits at the required rate of return to the initial investment outlay. It is also defined as the ratio of the difference between the present value of benefits and initial investments to initial investments. These two measures are mathematically represented thus

$$PI = \frac{\text{Present Value of benefits (PV)}}{\text{Initial investment (I}_0)} > 1 \quad (1)$$

$$PI = \frac{\text{Present Value of benefits}}{\text{Initial investments}} - \text{Initial investments} > 0 \quad (2)$$

The decision rule for equation 1 is to accept the project if $PI > 1$ and reject if $PI < 1$ while on the second equation (not benefit cost ratio), the rule is to accept if $PI(NBCR) > 0$ and reject if $NBCR < 0$

This type of technique is only applied to projects with different investment outlays but not adopted for projects with the same investment outlay.

Discussion of Project Evaluation Techniques

This discussion is based on the results obtained from evaluating three projects – A, B, and C using some evaluation technique as shown in table 1.1 below.

Table 1.1 Result of three projects evaluated using four different techniques

Project	Techniques and Results				
	Capital Recovery period	*Accounting rate of return	NPV +	IRR	PI(BCR)
A	3 Years	(a) 20% (b) 60%	200,000	62%	2.10
B	2 Years	(a) 62% (b) 22%	4.6m	85%	4.8
C	2 Years	(a) 260% (b) 250%	16.1m	95%	6.31

* Accounting rate of return is calculated using two measures

- ratio of average profit after tax to capital invested
- ratio of average profit before tax to average capital invested

+ Calculation based on cost of capital of 30%.

From the calculations and choice of the simplest technique, payback period or capital recovery period is most suitable. However, the technique is confronted with a number of problems. It does not recognise cash inflows after the payback period and also ignores the timing of inflows in a project. These make decision on the most appropriate investment to embark upon rather difficult. For instance, from the table, capital recovery period approves the selection of projects B and C. But a very close explanation reveals that project C generates additional cash inflows after the two years.

Accounting Rate of Return (ARR) is a good tool for evaluating projects because it provides a very easy means of measuring the performance of managers. In addition, it is simple to calculate. However, the technique is not acceptable to some managers because of its inherent multiple rates arising from variations in the derivation of ARR. For instance, from the table, Project A is disqualified using the first measure in the calculation, that is, ratio of average profit after tax to average capital invested, because 20% is less than the cost of capital of 30%. But the same project A qualifies for selection using the second measure, that is ratio of average profit before tax to ratio of average capital invested. This different analysis with different decisions makes the universal acceptability of the technique questionable.

Net Present Value (NPV) is globally accepted as the most reliable technique because of its objectivity and the careful recognition of the time value of money. However, it has been criticised based on the technique's emphasis on how much the project can contribute in increasing shareholders wealth rather than how soon, as embraced by PUP technique. Incidentally, managers in developing countries are so much interested in investing in projects with quick returns. Again, from the table the three projects ABC are acceptable for selection using 30% cost of capital. But if a different discount rate is used, different results would be obtained. This is not healthy in a decision-making environment.

Internal rate of return (IRR) is another objective technique. It is similar to NPV and most times provides identical results in accept/reject situations. The time value of money inherent in this technique makes it universally acceptable. However, the tool involves some complex calculation sometimes requiring the use of computers. Projects A, B, and C with IRR values of 62%, 85%

and 95% respectively qualifying for selection but to generate these values takes more than a manual operation.

Profitability index is a good evaluation technique and provide an objective result like in NPV and IRR. From the result Project A B and C with values 2.10, 4.8 and 6.3 respectively qualify for selection. Each value is greater than one implying that each of the projects will have positive effect on shareholders wealth. This technique is criticised because it cannot be adopted for projects with the same investment outlay. Also other pitfalls inherent in discounting techniques abound in cost-benefit ratio.

Summary of the selection Rules associated with the Discussed Techniques

Decision Rule

Technique	Accept	Reject
Capital Recovery Period (CRP)	CRP > Target Period	CRP < Target time
Accounting Rate of Return (ARR)	ARR > Cut off rate (Target rate)	ARR < Cut off rate or target rate
Net Present Value (NPV)	NPV > 0	NPV < 0
Internal Rate of Return (IRR)	IRR > Cost of Capital	IRR < Cost of Capital
Profitability Index (PI)	PI > 1	PI < 1

Conclusion

Principal techniques for evaluating projects in Nigerian tertiary institutions have been objectively and critically examined and discussed. It is very obvious that each of them is associated with one limitation or the other. Given these lessons, care must be taken in the choice of a technique. It should depend on the nature and type of project. The knowledge and understanding of the analyst (Investor) on the use of a particular technique should not be ignored. The appraisal of projects using any technique should be accompanied by on-the-spot assessment of the situations surrounding the project. Again, some other qualitative factors should be appraised and incorporated in the final decision.

References

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