CONSTRUCTION PROJECT INVESTMENTS AND INVESTMENT APPRAISAL MODELS: A CRITICAL ANALYSIS

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Abstract

All investments could be said to be alike, in the sense that every investment involves the outlay of resources in the expectation of future benefits. Similarly, every construction project investment has some “opportunity cost”, since each involves the owner in foregoing some alternative opportunity. Similarities notwithstanding, there are, great many differences among construction project investments. They differ on basic issues such as the nature of economic activity involved, the magnitude of the outlay, and on such superficial issues as the geographical location of the activity or the identity of owners. Such differences give rise to the classification, techniques, and investment appraisal models. This paper therefore, discussed the feasibility and viability appraisal and their objectives, investment incentives and Net Present Value (NPV). Also discussed are investment in projects, investment as cash flow and investment measurement.

Introduction

There is an outlay of cash in return for an anticipated flow of future benefits in a capital investment project. Some qualities of investment include security of capital, liquidity of capital, the security income, the regularity of income, the case of purchase and sale, the divisibility of holding the security in real terms and capital appreciation prospects. These qualities affect the amount of yield or rate of interest which an investor expects from the amount of capital he tied down in an investment over a period of time (Onwusonye, 2004a).

But if these qualities could be taken into consideration from the conception of the project, the amount of yield or rate of interest will worth the investment intentions. In any type of investment, two types of appraisal methods exist, which when taken care of, will yield a return. These include:
1. Feasibility Appraisal.
2. Viability Appraisal.

Feasibility Appraisal

Feasibility Appraisal is concerned with the fundamental question of practicability or possibility of the visualized or contemplated decision - be it on a development project, planning scheme, resource use, Urban renewal, an investment proposal, lending and so on. Thus, in decision valuation, feasibility appraisal answers the question; can it be done? (Umeh, 1977).

An objective becomes easier to understand and possibly to attain, when the quality of its articulation is high. According to Ikpeze (1981), cited in Akpan and Chizea (2002), a high quality of articulation could impact the following desirable characteristics on a predetermined objective: intelligibility, desirability, flexibility and feasibility. Accordingly, if objectives are not clearly understood, at least two negative results are bound to ensure. Firstly, resources cannot be purposefully harnessed, and will therefore, tend to be dissipated. Secondly, it will be difficult to generate and sustain a sense of commitment to the objective.

Furthermore, it is during the feasibility stage of the project life cycle that the possible sources of project financing would have been articulated. While discussing the project life cycle, the following were identified by Akpan and Chizea as major project phase within the cycle concept, feasibility, implementation, and commission. They went further to say that the beginning or termination of each phase could be regarded as the project control points. Management input is required before the next phase commences. In fact, projects go through various stages before they are completed.

If considered as a system, a project will be said to be dynamic as it does not maintain a static state. For example, its status changes from that of a concept, then to feasibility studies and thereafter to execution and finally completion. The successful implementation of these dynamic stages needs the

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involvement of the project manager at the early stages of the project. In most cases, the project manager gets involved from the feasibility stage to the end of the project. Unless this is done, continuity of effective project management cannot be guaranteed (Ngoka, 1987). Even, the Holy book - St Luke’s Gospel contains the following excellent Biblical thoughts on feasibility:

> Consider, if one of you has a mind to build a tower, does he first sit down and count the cost that must be paid, if he is to have enough to finish it? Is he to lay the foundation, and then find himself unable to complete the work, so that all who see it will fall to mocking him and saying, here is a man who began to build, and could not finish building? Or if a king is setting out to join battle with another king, does he not first sit down and deliberate, whether with his army of ten thousand he can meet the onset of one who has twenty thousand (LK, 14:28 - 31)?

It is easy to be a starter, but are you a sticker too? It is easy enough to begin a job; it is harder to see it through (Iroegbu, 2004). Most feasibility appraisals answer questions, which come within the six principal considerations of the following feasibility indicators:

i) Technological feasibility;
ii) Physical feasibility;
iii) Economic feasibility;
iv) Legal feasibility;
v) Financial feasibility; and
vi) Socio-political feasibility.

**Viability Appraisal**

While feasibility appraisal answers the question, “can it be done?” viability appraisal answers the complementary and very important question, “should it be done?” Thus, viability appraisal establishes whether or not it is worthwhile to take the decision which has already been established as capable of being taken. Viability appraisal gives opportunity of giving guidance on such incidental but important issues as how to develop, which of the alternative schemes or mode of development to adopt, and in appropriate cases, the phasing of development, and the best method of marketing or distributing the resultant products or amenities of sharing the benefits generated by the development (Umeh, 1977).

The use of break-even valuation as an appraisal technique also helps in determining the viability of a project, especially, when it establishes that the project can break even. This can also be used in choosing between alternative projects.

**Objectives of Feasibility and Viability Appraisal**

The objective of the Feasibility and Viability Study (FVS) is to assess the short list of options and to determine whether these are practicable with regard to the following:

i) Land and space;
ii) Planning and other concepts;
iii) Structural requirements;
iv) Mechanical and electrical engineering;
v) Cost effectiveness;
vi) Time limitations;
vii) Cost-in-use benefits;
ix) Quality standard; and
ix) Fair return on investment (Gruneberg and Weight, 1990; cited in Bamisile, 2004).

As regards building projects, feasibility and viability study should be co-ordinated by a single designated party, but will include the input of all specialist advisors available to the client. The results should be used by the client to formulate a design brief for the next stage of the project (Bamisile, stressed).
Construction Project Investments and Investment Appraisal Models: A Critical Analysis

Investment Incentives

Government encourages investment in fixed assets through the tax system. As a matter of fact, the details of such incentives are frequently altered. However, there are two basic types of investment incentives in operation. These include cash grants, which are presently payable in development areas and accelerated depreciation allowances usually referred to as capital allowances (Onwusonye, 2004b). The following examples illustrate a simple appraisal involving taxation.

Iroegbu & Partners is contemplating the purchase of an automatic articulated loader whose cash flows are estimated as follows:

Assume the following:

a) State development grant of 2% is available;
b) 100% first year allowance;
c) 50% corporation tax;
d) The existence of other taxable profits;
e) The loader has a nil scrap value at the end of 5 years;
f) The company requires a 10% return after tax; and

g) The 1430,000 is a loss on operations on capital expenditure.

### Calculate the NPV Solution

<table>
<thead>
<tr>
<th>Year</th>
<th>Project Effect of Cash-Flow</th>
<th>Tax Effects of Investment</th>
<th>Tax Effect on Profits and Losses</th>
<th>Net After Tax Cash-Flows</th>
<th>Discount factors</th>
<th>Present Values</th>
</tr>
</thead>
<tbody>
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<tr>
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<td>-300,000,000</td>
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|                       |                             |                             |                               |                          | 20,130          |

However, if taxation and incentives are not considered, the NPV will be $43610. This shows that taxation and incentives effects, improve the project performance. *N70,000 is obtained thus: 100% FYA =70,000.

Cash-flow effect = 170,000 x 50% = 50,000
Add Regional of grant = 20,000
Total = 70,000

### Investment in Projects

Real asset investment is either on single fixed assets or on a group of inter-related assets. When the group of inter-related assets provides facilities capable of completing a production or a service process, the investment activity is described as a project. Investment projects are such facilities provided by the component assets and can only be effective if operated as a unit. Hence the component assets must
Contrary to popular expectation, the basic difference between projects and single asset investment does not lie in the value of the investment outlay. The cost of a single turbine in a hydro-electricity generating plant could be many times the total investment outlay in a corn-grinding mill. In terms of our definition, the latter is a project because it can complete a processing cycle. Outlay on the hydro-electricity generating turbine is not by itself a project. The distinction must, however, be given a commonsense interpretation. It is wrong, for example, to regard the purchase of a single taxi
cap as a project, though such a cab can operate as a unit. A project necessarily involves the inter-play of a number of single assets.

**Investment as Cash Flow**

Every investment activity has definite or implied costs and benefits. In business organizations, the ultimate consequences of investment activities are expressed in terms of cash flow, i.e., the receipts (cash inflow) or payment (cash outflow) of cash by an organization. Within a period, a typical organization makes a sense of cash payments and receives a sense of cash benefits. When the cash inflow of a period exceeds the outflow, one talks of net cash inflow. Conversely, a situation of net cash outflow exists where the outflow of a period exceeds the inflow.

There are instances however, where the cost or benefits of an investment cannot be described solely in terms of cash flow. A firm could for example, donate to charity for the purpose of improving its public image. In such a case there is some difficulty in expressing the future goodwill, which accrues from the donation in precise money terms. A similar analogy applies to a firm which donates generously to a political campaign in the hope of winning government patronage if the favoured politician or political party comes to power (Okafor, 1983).

Investments whose costs and benefits are difficult to measure in terms of cash flow abound in non-profit-making organizations in both the private and the public sectors. The cost / benefit implications of government investments are not generally easy to qualify in monetary terms. A highway, for example, has direct monetary costs, such as construction and maintenance costs, and many indirect social costs, such as providing an easy escape for criminals, more accidents, disfigurement of the landscape, noise, etc. Similarly, the benefits of such a highway accrue in both monetary and non-monetary forms. Even in government business enterprises there are several benefits, which do not accrue in direct monetary forms. For instance, a government could decide to set up an under-productive factory in a depressed section of the community for the purpose of increasing local employment opportunities, Okafor maintained.

**Investment Measurement**

The need for additional investment arises only when the stock of available capital is less than the stock required to achieve the intended levels of output. For any given level of technology, the relative contribution of capital to unit output can be presumed to be fairly static for the average firm. This relationship is known as the capital-intensity factor for the production process, or the capital-output ratio. Given that relationship, the desired stock of capital for any contemplated level of output can be expressed in general terms as:

\[ K_i^d = aY_i \]  
\[ K_t = aY_{t-1} \]

As illustrated in equation (1) above, the optional stock of capital at any particular period depends on the expected volume of output and the capital intensity factor. Assuming the level of technology remains unchanged, the available capital stock, in one period, \( t \), could be related to both the output level of the previous period \( (t-1) \) and the capital intensity factor as follows:

\[ K_t = aY_{t-1} \]

When \( K_t \) is the stock of capital at a given period, \( t \), and \( Y_{t-1} \) is the output level in the previous period \( (t-1) \). Thus, subtracting equation 2 from equation 1 we have:

\[ K_i^d - K_t = aY_t - aY_{t-1} \]

It can easily be verified from the left-hand side of equation 3 that the difference between desired stock and actual stock of capital represents the desired level of investment which could be derived from the right-hand side of equation 3 thus:

\[ I_t = aY_t - aY_{t-1} \]

The speed of adjusting from \( K_t \) to \( K_i^d \) depends, among other things, on available funds and the time-lags for supplying capital goods.

Much as equation 4 gives some index of investment activity, the danger of measuring investments is a flow variable. Consequently, it must be related to, and indeed, measured as a time-rate of change in capital stock.

Once the measurement process assumes a continuous time-frame, the investment function could easily be represented by the expression time-rate of change of capital over time:

\[ \Delta k = \frac{\Delta K}{\Delta t} \]
Before concluding the discussion of the measurement problem, two other points must be made:

i) Though investment involves additions of real or financial assets, it is usually measured in terms of funds used in the process. Thus, when we talk of one’s investment in building, fixtures, vehicles and securities, we refer specifically, to the person’s outlay on those assets over a given period.

ii) There is basic difference between gross, replacement and net investment. Gross or total investment represents all outlay on capital items over a period. Replacement investment represents the outlay necessary for maintaining the present level and efficiency of capital items. Examples are provisions for wear and tear of existing assets, or replacement or purchase of additional securities to maintain the market value of portfolio. Net investment is the difference between gross and replacement investment.

Recommendations

The following recommendations are hereby proffered:

1) Before the commencement of any given project, there must be a feasibility study in order to articulate the possible sources of project financing.

2) There must also be, a viability study that will give guidance on such incidental but important issues as how to develop, which of the alternative schemes or mode of development to adopt, etc.

3) To attain a high quality in a given project, we must make sure that the quality of project articulation is very high - and this could only be gotten when objectives are (clearly understood). This is necessary to avoid negative results.

Conclusion

Though some investment activities cannot be expressed precisely in cash flow, those which could be so expressed constitute a disproportionate fraction of total investment outlay in any market economy. The analyses developed in this paper are most appropriate for evaluating the investment activities of profit-oriented enterprises. The models are, however, applicable to all investment whose cost and benefits can be precisely measured in terms of cash flow, when such investments are made by non-profit-making organization or by various levels of government provided that appropriate modifications are made to reflect the particular feature of such organization.

References


Onwusonye, S.I.J. (2004a). *Project cost control 1* (University Monograph) Owerri; Imo State University, Nigeria.
