

Assessment of the Reliability of Techniques Employed in Feasibility and Viability Appraisal

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Abstract

The complexities of the property development process involving numerous different professionals and the expenditure of large amount of money have resulted in different attitudes to property development especially in the face of inevitable uncertainty. Feasibility appraisal is concerned with the fundamental question of the practicability or possibility of the proposed decision, or development scheme while viability appraisal is concerned with the equally important and second question of the worthwhileness of the proposed decision. Thus, in the process of ascertaining the worthwhileness or not of a project, various viability appraisal techniques available to an appraiser from which the most appropriate one that meets the investors' objective(s) is chosen so as meet the objective of the investor which is to maximize profit while also minimizing risk. The study focused on the assessment of the reliability of techniques employed in feasibility and viability appraisal by Estate Surveyors and Valuers in Akure. Questionnaires were administered to 22 practicing Estate Surveying and Valuation firms out of which only 16 were retrieved and valid for analysis. Findings revealed that 43.75% of the respondents rarely secure instructions to carry out feasibility and viability appraisal on most developmental projects, while NPV ranked 1st as the most adopted and reliable appraisal technique whenever feasibility appraisal is being executed. It was also revealed that most of the Estate Surveyors and Valuers are aware of the availability of other modern appraisal techniques that incorporates risk but cannot use it as a result of its sophisticated nature. The study therefore recommended that the feasibility and viability appraisers should embrace modern techniques that incorporate risks to further enhance the accuracy of appraisals in line with global best practice and also to upgrade themselves by ensuring that the tools employed for investment analysis should be able to cope with modern day technology and situation.

Keywords: Appraisal, Feasibility, Modern techniques, Risk, Uncertainty, Viability

1.0 INTRODUCTION

In many developing countries, many projects in property development are springing up without giving feasibility and viability studies its critical position in the overall development process. Feasibility and/or viability studies are only required as "mere conditions" for meeting either statutory approvals or securing development finance. In such situation, the prospective investor would have made a decision to execute the project before carrying out a feasibility and/or viability study. This often leads to disastrous effects on the overall performance and the final outcome of some projects.

The complexities of the property development process involving numerous different professionals and the expenditure of large amount of money have resulted in different attitudes to property development especially in the face of inevitable uncertainty. Also, so many people's savings, insurance policies and pension funds are tied up in this potentially risk taking activity. It is therefore not surprising that sophisticated methods of research development feasibility are necessitated before a project proceeds. Feasibility appraisal is concerned with the fundamental question of the practicability or possibility of the proposed decision, or development scheme while viability appraisal is concerned with the equally important and second question of the worthwhileness of the proposed decision.

In the process of determining if a project is worthwhile or not, there are various viability appraisal techniques available to an appraiser from which the most appropriate one that meets the investors' objective(s) is chosen. Since the objective of an investor is to maximize profit at the same time minimize risk, it becomes necessary for an appraiser to choose prudently, a technique that best meets the objective of the investor. Most prospective investor do take an irrevocable decision to execute a project even before carrying out a feasibility and viability study. This often led to disastrous effect on the overall performance and the final outcome of some projects.

The constant failure of development projects in Nigeria is no doubt a major concern to all the participants in the real property and construction sector which might be as a result of the inappropriate method adopted by the professional involved while other professionals adopt a single method which might also be as a result of lack of awareness or preference for such method. Moreover the development appraisal techniques being used by professionals have been criticized on the basis of their simple assumptions about incidence of cost and finance charges (Darlow, 1999).

This study therefore seeks to assess the reliability of techniques employed in feasibility and viability appraisal by practicing Estate Surveyors and Valuers firms in Akure. Questions relating to the appraisal techniques commonly used, reliability of the techniques used for executing feasibility and viability appraisal work, the level

of awareness, understanding and applicability of modern appraisal techniques that incorporates risk were addressed in the study.

2.0 JUSTIFICATION OF THE STUDY

Several research work on the viability appraisal, techniques employed, and problems of wrong decisions made in the face of alternative investment opportunities has been carried out by different researchers. Ogunba et al (2005) examined the assessment of development appraisal risk with reference to client specific risk tolerance and perspectives. The study discovered that most development appraisers, who include an analysis of risk in their development appraisal, simply picked the risk analysis approach that suited them. It was also noted that risk analysis techniques possess their own shortcomings and therefore appraisers should be aware of the potential and limitations of each approach. Ojo (2006) also researched on the development appraisal techniques and risk adjustment in commercial property developments in Lagos, and came up with the finding that the quality of appraisal services rendered by the Estate Surveyors and Valuers in the study area was fast becoming inadequate. It was discovered that the various methods used by practitioners on commercial property development appraisal does not incorporate risk adjustment and variability, such that methods which include Certainty Equivalent Method and Monte Carlo Simulation, which highly incorporate risks, were rarely used.

3.0 LITERATURE REVIEW

Odeyomi (2007) opined that there are two main methods for determining the profitability of or otherwise of real estate project and they are the traditional and modern methods. The traditional method includes: Accounting rate of return, Payback period and Residual method, while the modern method includes: Net present value, Internal rate of return, Net terminal value, Discounted payback period and Discounted probability index. Okoh (2008) elaborated that the two main methods of determining the profitability of or otherwise of real estate project can also be referred to as the accounting (traditional) and discounting (modern) methods. Modern method of viability appraisal involves discounting process. Okoh (2008) noted that the discounting system determines the present value of a future stream of income which is based on the principle of time value of money. This time value of money suggest the differentials between these two methods.

Accounting Rate of Return

This technique compares the profit earned by the project to the initial investment required for the project. This is employed to measure the rate of return at which profit is expected to be made from an investment, the profit generated from the invested is expressed as a percentage of the capital outlay. Thus a project with higher rate of return is preferred. This method can be carried out based on different criteria such as first year profit criteria, average profit criteria, peak profit criteria and total return on investment criteria.

First year profit criteria: The method considers the profit realized in the first year to determine the rate of return of the project or its profitability.

Average Profit Criteria: The method considers all the profits over the whole of the project life. It expresses the projects average profit level as a rate of return on initial investment.

Peak Year Profit Criteria: The basic assumption here is that the highest profit rate of return is in some ways a guide to the average profitability of the project. This assumption may not be valid for a project with a relatively low peak profit but which reaches its peak early may be better than one which reaches its peak later in life. The reason is that the high early profit can be reinvested.

Total return on investment: The method considers the total return in the investment before the deducting of the cost of the project. The excess is used to determine the return on investment (Michael 2003).

Payback Period

Payback period calculates the time taken by a project to recoup the initial investment. The method selects the project with the shortest length of time to recover the capital outlay on the project. It involves choosing the project whose net incomes are big enough to recoup the sum invested within the earliest possible time (Moth, 1993). However, Ogbuefi (2002) observed that a shorter payback period does not necessarily imply an inaccurate indication as to whether one investment is more profitable than the other. This is one of the major shortcomings of this method as it ignores the time period the cash inflows will continue after the end of the payback period. Another criticism leveled against this method is that it often ignores the time value of money. Besides these shortcomings, Payback method can be used to carry out investment analysis especially in a situation where the primary motive of investor is quick recovery of capital. It may also be beneficial in an investment environment characterized by high economic and political instability of risks.

Michael (2003) added that the main objective to the payback period method is that it tells nothing about the rate of returns on investment that is being achieved after the initial outlay has being covered, and rate of return is the key measure of performance. The payback method also ignores the timing of cash flows.

Residual Method

The residual method is once the most commonly used approach in the financed analysis of the development

proposals. However, the increasing complexity of development projects has required more sophisticated method for analysis (Raymond, 2001). The method can be used to carry out viability appraisal of a proposed project. Ogbuefi (2002) mentioned that the method is used to price the bare site for development or dilapidated building in a prime location that requires development. The price of land got is regarded as latent value of the site. The latent values of the site can only be got upon the expenditure of money to develop or improve the site. There are three types of latent values that can exist on site:

- The latent value of bare site that planning permission has been granted
- The latent value of an existing building where planning permission has been granted for change of use or for general upgrading of the building.
- The latent value of an existing building where planning permission has been granted to demolish it for a new one.

In the adoption of the method, the following will be ascertained:

- Gross development value of the completed proposed project
- Total cost of construction which will include the professional fees, contingencies, developer's profit, cost of finance and agencies fees
- Subtracting the total cost of construction from gross development value to get surplus for land.
- Ascertaining the site value from surplus for land

Discounted Cash Flow

Comparison is not so simple when the alternatives being considered have varying cost and incomes generated over different period of time. A technique used to overcome this difficulty is known as "discounting" that is to bring all future amounts, revenue and expenditure, to present day values using a given rate of interest known as the discount rate; by so doing a cash flow becomes a discounted cash flow (DCF) (Grange, 1989).

Discounted cash flow is a technique developed for financial appraisal as a tool to assess the overall profitability of the project, increasingly the technique is being used by property valuers and analysts, very largely because as financial institution become more involved in property development and investment, they found the traditional approach of surveyor to be quite acceptable. It copes with incomes and expenditures varying in amounts and in time periods (monthly or yearly or any other), in other words, "the time value" of money is taken to consideration. It can be also be used to compare capital project but there are some evidences to suggest that in practice similar are used (such as payback) (Moth, 1993).

The discounted cash flow technique is used to establish and compare the return on investment in projects by discounting future cash flow to establish their present value. It focuses on cash inflows and outflows rather than on net income as computed in the accrual accounting sense (Michael, 2003). Discounting cash flow technique (DCF) is referred to as time adjusted technique in that the analysis takes into consideration the effect of time on the value of money. Cash flow analysis dealt under the time unconscious is an estimation of various cash flows connected with the project and adjusted by any gain or losses that may have arisen there from. The discounted cash flow technique introduces the concept of present value in order to reduce to manageable proportion the time-dimensions involved in the investment projects analysis. In other words, each item of cash flow is time adjusted using.

$$PV = 1 / (1 + r)^n$$

Where "n" is the timed element in months or years "r" is the discount factor. This is very important because it brings both the cash inflows within the same time adjusted basis.

Under the discounted cash flow technique, if the cash flows are of equal magnitude from year to year, the appraisal involves the use of present value of one naira per annum or years purchase. If on the other hand, the cash flows are fundamentally of divergent magnitudes from time to time, individual cash flows are discounted using the present value of one naira (Ogbuefi, 2002). According to Isaac and Enever (2002) the technique is based on calculating the present worth of future sums of money, either income or expenditure.

Therefore, to produce a DCF, the valuers have at least three forms of interest rate to choose from:

- The rate which has to be paid for borrowing capital (the borrowing rate)
- The rate which could be earned if the capital was invested elsewhere (the opportunity rate).
- The rate of return which the investor requires to compensate for the risk involved the loss of immediate consumption and inflation (the target rate).

A DCF calculation works out the present value of an investment over a period of years at an assumed rate of interest. The present value is compared with the initial cost and actual rate of return is the discount rate required to equalize the present with the original cost. This rate of return is compared with target of return to see if the investment is viable. Alternative investment can be evaluated by comparing their rate of return (Michael 2003).

Steve (1997) identified that the two main appraisal techniques known as DCF methods are NPV and IRR while according to Ogbuefi (2002), the two basic techniques of discounted cash flow analysis in common use are:

the external rate of return (EER) and the Internal rate of return (IRR), each of which can be modified or adapted to depending on the circumstance of the particular case.

Net Present Value (NPV)

The NPV method works on the simple, but fundamental principle that an investment is worthwhile undertaking if the money got out of the investment is at least equal to if not greater than the money put in (Steve 1997). The decision rule is: accept all investments with a positive or zero net value (as they produce a return either equal to or greater than their cost), and reject all those with a negative net value.

NPV according to Isaac and Enever (2002) is the surplus of gross present value (GPV) over the initial investment. That is $GPV - \text{initial investment} = NPV$. In an efficient market, one may interpret the NPV as a measure of the increase in market value that will arise as a result of the acceptance of the project. The NPV shows the surplus or deficit of discounted cash inflow over discounted cash outflow. If the net present value is positive, the project is viable. The method involves the determination of the following

- The project cash outflow
- The project cash inflow
- The discounting factor
- The present values of the cash flow

Internal Rate of Return

The internal rate of return (IRR) is the maximum rates of interest which an investor could afford to pay if the project were to be financed by borrowed funds and the project cash flow as they appeared were used to repay the loan and interest. If this rate were paid, the investor would be made neither better off nor worse off by the project acceptance. The investor would just break even on any project financed in this manner. Thus the IRR for any project represents the maximum rate of interest that can be paid to finance a project without causing any harm to the investors. The decision rule for project acceptance follows logically from these; undertake all the projects with an internal rate of return greater than or equal to the cost of borrowed money (Moth, 1993).

Steve (1997) said internal rate of return is that the rate of interest at which all the future cash flows is discounted in order to get zero Net present value. It is that rate at which the discounted cash inflow is equal to discounted cash outflow (hence the method could be seen as an arithmetic result of the NPV method). The IRR of project whose cash flow extend over more than three points in time, try and error methods are usually employed. The rate is found by trial and error, by applying present values at different rates of interest in turn to the net cash flow. Alternatively, a higher rate with negative net present value and a lower rate with positive net present value are got before using linear interpolation to arrive at the internal rate of return.

$$IRR = Ldr + (Hdr - Ldr) \times LrNPV / LrNPV - HrNPV$$

Where Ldr = Lower discounting rate

Hdr = Higher discounting rate

LrNPV = Lower rate Net present value

HrNPV = Higher rate Net present value

Internal rate of return is the highest rate of interest which an investment can be funded in order to generate sufficient cash flow so as to pay back the initial outlay at the end of the life span of the project; project is accepted if the IRR is greater or equal to a predetermined opportunity rate (Moth, 2002).

Net Terminal Value

Net terminal value is also known as future terminal value. The method compounds cash flow instead of discounting it like net present value. However, the income flows will be re-invested at a known compound interest rate at the end of each year.

Overall Rate of Return

Overall rate of return can be got by deducting the total discounted cash outflow from total discounted cash inflow. Place the difference on initial capital to get a rate of return. It can also got by placing net present value on the capital layout to get the rate of return.

Discounted Profitability Index (DPI)

This is defined as the ratio of the present value of the project cash inflow to the present value of the project cash outflow.

$$P.I = P.V \text{ of cash inflows} / P.V \text{ of cash outflows}$$

If the index is less than 1 the project is not viable. If the index is greater than 1 the project is viable. The excess of the index above 1 is regarded as the cushion or the security. The project with the highest profitability index is considered the most viable. Ranking of the index forms basis of selecting among alternatives the most cost effective and highest profitable investment (Gaylon and Phillips, 2003).

Discounted Payback Period

The method is designed to overcome the criticism of the traditional payback method. The discounting factor focuses on when the time value of money will recoup the capital outlay. The method is a version of the net present

value with an aborted life span (Ansar 2002). This is the period in which the discounted cash flow will recoup the capital invested.

Monte Carlo Simulation

Hertz (1964) developed the Monte Carlo theory approach to simulation as an alternative technique. Probability distributions for each factor that affect the investment decision are estimated and the possible combinations of the value for each factor are simulated in order to determine the range of possible outcomes and the probability associated with each possible outcome. This approach attempts to show an arithmetic relationship between the expected risk and the expected return required by investors under conditions of market equilibrium, from which a Risk adjusted Discount Rate would be derived and used for discounting the expected outcome. The model introduces various ways through which all the variables that influence the investor's rate of return could combine thus making provision for uncertainty. It is therefore seen as a technique more relevant to investment appraisals than others.

Certainty Equivalent Approach

This approach was developed by Hillier (1964) in the United States. The approach to adjusting for project's risk is to first adjust the cash flows of the investment to cash flows that were considered achievable with a reasonable and calculable degree of certainty. The cash flow streams, converted into a stream of certainty equivalent cash flows, are discounted at the riskless rate of discount.

Sensitivity Analysis

This technique is used to determine what effects changes in variables are likely to have on the returns. It follows a process where each estimate is taken in turn (with a ceteris paribus assumption holding all other variables constant) to see the extent to which it can vary before the investment's positive NPV is reduced to zero.

4.0 METHODOLOGY

The target population of this study are the Estate Surveyors and Valuers who are duly registered with Estate Surveyors and Valuers Registration Board of Nigeria (ESVARBON) and are practicing in Akure. According to 2012 directory of Nigerian Institution of Estate Surveyors and Valuers (NIESV), there are twenty-two (22) Estate Surveying and Valuation firms in Akure duly registered with NIESV. Questionnaires were administered to these twenty-two (22) out of which only sixteen (16) were retrieved and employed for the validity of the study. Closed/ Structured questionnaires were designed and distributed to the targeted population. These questionnaires contained all the relevant information necessary to arrive at a reasonable conclusion. Descriptive statistics was then used in the analysis of the collected data. The result from the analysis of these data form the basis for inference made in this study.

5.0 RESULTS AND DISCUSSION

Table 1: Frequency of Executing Feasibility and Viability Appraisal

Response	Frequency	Percentage
Not at all	2	12.50
Rarely	7	43.75
Always	5	31.25
Often	2	12.50
Total	16	100.00

Source: Field Survey, 2013

Table 1 showed the responses of Estate Surveyors and Valuers as to the instructions received for carrying out feasibility and viability appraisal. The Table revealed that 43.75% of the respondents rarely secure instructions to carry out feasibility and viability appraisal while 12.50% often received such instructions. This implies that developers rarely engage the services of professionals before embarking on development projects.

Table 2: Frequency of Usage of Feasibility and Viability Appraisals Techniques

Appraisal Techniques	Most Often Used	Often Used	Seldom Used	Not Used	Mean Value	Rank
Payback Period	3(18.75)	8(50.00)	3(18.75)	2(12.50)	2.75	3
Residual	2(12.50)	2(12.50)	4(25.00)	8(50.00)	1.88	6
ARR	2(12.50)	2(12.50)	5(31.25)	7(43.75)	1.94	4
NPV	10(62.50)	4(25.00)	2(12.50)	0(0.00)	3.50	1
IRR	8(50.00)	5(31.25)	2(12.50)	1(6.25)	3.25	2
Sensitivity Analysis	2(12.50)	3(18.75)	4(25.00)	6(37.50)	1.94	4
Risk Adjusted NPV	0(0.00)	4(25.00)	3(18.75)	7(43.75)	1.56	7

Source: Field Survey, 2013 *Note: Figures in brackets represents percentage

Table 2 showed the frequency of the techniques used for feasibility and viability appraisals by Estate

Surveyors and Valuers. The respondent's opinion were ranked to ascertain the most frequent method employed. The table revealed that NPV is the most adopted appraisal technique with a mean score of 3.50 thereby ranking 1st followed by IRR and Payback period with mean scores of 3.25 and 2.75 respectively. This suggest that these are the most common methods that the appraisers were familiar with in the study area, hence the preference for its high usage compare to other methods available.

Table 3: Reliability of the techniques used for feasibility and viability appraisals

Appraisal Techniques	Highly Reliable	Reliable	Fairly Reliable	Not Reliable	Mean Value	Rank
Payback Period	8(50.00)	6(37.50)	2(12.50)	0(0.00)	3.38	2
Residual	2(12.50)	4(25.00)	6(37.50)	4(25.00)	2.25	7
ARR	3(18.75)	3(18.75)	7(43.75)	3(18.75)	2.38	6
NPV	10(62.50)	4(25.00)	2(12.50)	0(0.00)	3.50	1
IRR	8(50.00)	5(31.25)	2(12.50)	1(6.25)	3.25	3
Sensitivity Analysis	5(31.25)	4(25.00)	3(18.75)	4(25.00)	2.63	4
Risk Adjusted NPV	2(12.50)	6(37.50)	6(37.50)	2(12.50)	2.50	5

Source: Field Survey, 2013

From the Table 3, the perception of the Estate Surveyors and Valuers as to the reliability of the viability appraisal techniques when used were revealed. The respondent's opinion shown in the table reveal that NPV technique is the most reliable appraisal technique with a mean score of 3.50. This is followed by payback period which ranks second, IRR ranked third while sensitivity analysis, Risk adjusted NPV, ARR and residual method ranked fourth, fifth, sixth and seventh respectively. This suggest that despite the non-usage of most of the modern techniques by the appraisers they still regarded the modern techniques as a reliable method. This can be attributed to the fact that it takes into consideration the time value of money.

Table 4: Level of awareness, understanding and applicability of modern appraisal techniques that incorporates risk

Appraisal Techniques	Aware	Not Aware	Understand	Don't Understand	Can Use	Can't Use
Monte Carlo Simulation	10(62.5)	6(37.5)	4(25.00)	12(75.00)	2(12.50)	14(87.5)
Certainty Equivalent Technique	8(50.00)	8(50.00)	0(0.00)	16(100.00)	0(0.00)	16(100.00)
Weighted Average Approach	9(56.25)	7(43.75)	5(31.35)	11(68.75)	3(18.75)	13(81.25)
Sensitivity Analysis	10(62.5)	6(37.50)	4(25.00)	12(75.00)	4(25.00)	12(75.00)
Risk Adjusted NPV	7(43.75)	9(56.25)	3(18.75)	13(81.25)	4(25.00)	12(75.00)

Source: Field Survey, 2013

The level of awareness, understanding and applicability of those modern appraisal techniques that incorporates risk was revealed in Table 4. The responses showed that 62.5% are aware of the availability of Monte Carlo Simulation and Sensitivity Analysis, 56.25% and 43.75% aware of Weighted Average Approach and Risk Adjusted NPV respectively as a tool for incorporating risk while 100%, 75% and 81.5% of the respondents opined that despite the availability of the tool, they do not understand the usage which therefor contributes to the high degree of avoidance of application of the method. This suggest that most of the Estate Surveyors in the area do execute feasibility and viability appraisal. Thus they do make use of appraisal techniques that they are conversant with its application as they are aware of the more accurate the modern method that incorporate risk but they can adopt it due to its sophisticated nature.

6.0 CONCLUSION AND RECOMMENDATIONS

The study established the wide adoption of NPV method in determining the viability of real estate investment projects by most practicing Estate Surveyor and Valuers in the course of executing feasibility and viability appraisal. The overriding reason can be adjudge to being its recognition of the time value of money as the future is uncertain. It was also established that NPV is the most reliable when used by the appraisers for investment appraisals since those modern methods that incorporate measurement of risk and uncertainty are not been embraced in practice. The modern appraisal techniques have been developed to deal with the problems inherent in the traditional method of appraisal; these modern methods has been tested in the developed countries and found to be more effective and efficient to deal with the persistent problems encountered in the process of adopting the traditional methods of appraisal. In Nigeria, the application of appropriate modern appraisal method is a difficult task for most investment appraisers as it requires critical analysis of various tools which some deem it too cumbersome or requires rigorous mathematical application in which most of them are not too vast in its application;

thereby facing some difficulties while trying to adopt the modern methods. Based on the study, the following are therefore recommended to further enhance the accuracy of the appraisal techniques.

- (i) The Estate Surveyors and Valuers who are the viability appraisers should embrace modern techniques that incorporate risks to further enhance the accuracy of appraisals in line with global best practice.
- (ii) Appraisers should consider the unstable nature of the economy while carrying out the feasibility studies
- (iii) The challenges posed to investment appraisal decision should be borne in mind to avoid misleading of clients.
- (iv) Appraisers should endeavor to upgrade themselves by ensuring that the tools employed for investment analysis should be able to cope with modern day technology and situation.

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