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Adequacy Of The Frequently Used Techniques In Property Investment Performance Evaluation

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Abstract

The objective of investment analysis is not to find the "best" investment in terms of highest future income and lowest risk but to find the investment providing the best value for money. Techniques commonly used in property investment evaluation and their adequacy were examined. The sample frame considered for the study comprises 318 practicing firms registered with the Nigerian Institution of Estate Surveyors and Valuers (NIESV), Lagos State Branch. A systematic random sampling technique was adopted in sample selection, yielding a total sample of 63 firms. Questionnaires were designed to elicit information on techniques used in property investment evaluation and their adequacy. A total of 47 complete questionnaires (74.6%) were retrieved and analysed using relative importance index and correlation matrix. The study revealed that break-even analysis ratio, valuation methods, standard deviation, decision trees, profitability index, sensitivity analysis, internal rate of return and compound annual growth are frequently used techniques, as opposed to gross rent multiplier, debt coverage ratio, cash-on-cash return, loan to value ratio, coefficient of variation, capital asset pricing model (CAPM), variability and beta, and arithmetic and geometric mean techniques which, while not frequently used, are nonetheless considered adequate. Furthermore, a correlation matrix confirms a strong positive relationship between frequency of use and adequacy of use across the assessed evaluation techniques. The study recommends that real estate investors and estate surveyors and valuers broaden their knowledge on under-utilised techniques, including gross rent multiplier, debt coverage ratio, cash-on-cash return, CAPM, variability and beta, to capture inherent investment risk during evaluation.

Keywords: Commercial property, Investment techniques, Investor, Performance, Nigeria

1. Introduction

The essential objective of investment is to maximize returns while minimizing risks, such that the basic aim of investment analysis is to assess the value of investments and to compare them with market prices to enable sensible buy and sell decisions to be made (Fraser, 1993). Accordingly, Krystalogianni, Matysiak and Tsolacos (2004) affirmed that investors will tend to buy those investments whose assessed value exceeds the market value, that is, those with the highest Net Present Value (NPV). However, the objective of investment analysis is not to find the "best" investment in terms of highest future income and lowest risk, but to find the investment providing the best value for money (Fraser, 1993). According to Gotze, Northcott and Schuster (2008) property investment appraisal requires many pieces of information and has multiple aims, including: identifying risks and uncertainties, incorporating options and increasing flexibility, reducing complexity, identifying and exploiting synergistic effects, formulating targets, achieving early warning of problems, coordinating functional plans and sub-plans, enabling control processes and securing information.

Furthermore, there are three steps involved in the evaluation of an investment: estimation of cash flows; estimation of the required rate of return (the cost of capital); and the application of a decision rule for making the choice. The investment decision rules are referred to as investment appraisal techniques. A sound appraisal technique should be used to measure the economic worth of an investment project. A number of investment appraisal techniques are in use in practice, and they may be grouped into discounted cash flow techniques and non-discounted cash flow techniques. However, the discounted technique is said to give a true measure of profitability (Brueggeman & Fisher, 2008). The basic purpose of systematic

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appraisal is to achieve better spending decisions for capital and current expenditure on property investments. An understanding of discounting and Net Present Value (NPV) calculations is fundamental for the proper appraisal of real estate projects and investments (Abeysinghe, 2010). Notwithstanding, Larsen (2024) warns that both the IRR and NPV provide simple benchmarks that can mislead decision-makers who are not familiar with the nuances of both techniques, underscoring the continuing need to evaluate a broader range of performance assessment methods.

In the context of portfolio investing, real estate is traditionally considered an "alternative" investment class (Woychuck, 2012). That means it is a supplementary investment used to build on a primary portfolio of stocks, bonds and other securities. Woychuck (2012) affirmed that one of the beneficial features of real estate is that it produces relatively consistent total returns that are a hybrid of income and capital growth. In that sense, real estate has a coupon paying bond-like component in that it pays a regular, steady income stream and a stock-like component in that its value has a propensity to fluctuate. Hence, the need arises for critical consideration of the adequacy of techniques used by real estate practitioners and investors in ascertaining the profitability index of property investment in Lagos.

Real estate investment constitutes a large portion of the total wealth in Nigeria, although the estimated value is yet to be fully ascertained. Little is known about the risk and return characteristics of such investments to enable future planning and forecasting. The traditional method of property valuation commonly used by practitioners has been faulted for its failure to account for the risk inherent in the investment during analysis (Udoudoh & Ekpo, 2018). Hence, an alternative Discounted Cash Flow (DCF) procedure evolved to calculate the present value of a property investment by taking into consideration the sensitivities of property investment to changes in the force of real interest, force of real rental growth and force of inflation. However, so long as traditional methods of valuation prevail, a rational investor must use both methods to identify mispriced property assets. This paper therefore evaluates the commonly used techniques by real estate practitioners and investors for property investment appraisal and risk analysis.

The study was guided by four interrelated research questions. First, it sought to identify the specific techniques employed in evaluating the performance level of property investment. Second, it examined how these techniques are perceived by industry stakeholders, particularly estate surveyors and valuers and investors, both generally and within the study area. Third, it investigated which of the identified techniques are most frequently used by these stakeholders in their investment decision-making. Finally, the study interrogated whether the techniques currently in use are adequate for the purpose of property investment performance evaluation. The overarching aim of this paper was to identify and evaluate the techniques commonly employed in property investment performance evaluation. In pursuit of this aim, the study sought to achieve four specific objectives, aligned directly with the four research questions above. The first was to identify and examine the techniques used in evaluating commercial property investment yield and rate of return. The second was to assess the perception of these techniques among estate surveying firms and investors within the study area. The third was to assess which of these techniques are most frequently applied by these stakeholders within the study area. The fourth was to determine the adequacy of the techniques currently in use for assessing property investment performance among these key stakeholders. The scope of this paper is confined to an examination of the techniques commonly employed by Estate Surveying Firms, comprising estate surveyors and valuers and investors within these firms, in the evaluation of property investment performance in Lagos, Nigeria. While investors, financiers and property managers are recognised more broadly in the literature as stakeholders in property investment performance evaluation, this study specifically sampled Estate Surveying Firms registered with the Nigerian Institution of Estate Surveyors and Valuers (NIESV), Lagos State Branch; financiers and property managers, as distinct, separately sampled categories, fall outside the scope of the present study and are recommended as a direction for future research. Beyond identifying the techniques in use, the study further investigated the frequency with which they are applied and the extent to which they are considered adequate, with a view to establishing which techniques are most appropriate for adoption in future property investment performance evaluation exercises.

2. Evaluating Property Performance

In evaluating property investment performance, the use of historic data, in particular, rental values is inevitable as a measure of performance. Moreover, rental value and growth cannot be determined without the interplay of demand and supply mechanisms, which often determine the rent a prospective investor will be willing to pay for the use of land. Thus, market price and yield of property

investments are determined by the interaction of the demand for, and supply of, property investments considered as standing properties let to tenants (Fraser, 1993; Weber, 2013). Investment demand determines price, yield and rental value. The supply of property investments has three main sources: standing investments being re-sold; newly developed property being sold for the first time; and transfers from owner-occupation.

The essence of investment performance measurement technique is to monitor the degree of achievement of the targets set in terms of returns and risks, to draw conclusions from the analysis of historic performance figures, and to plan future activities at an acceptable level of risk (Hargitay & Shi-Ming Yu, 2005). Furthermore, Bertus, Hollans and Swidler (2008) stated that there are two principal modes of performance appraisal: the historic or retrospective mode, and the prospective mode. The measures and indicators used in both modes are the same, but while the retrospective mode can be objectively determined, the indicators of prospective performance can only be assessed on a subjective basis. Agava and Gamu (2024) further demonstrate that macroeconomic variables particularly interest rates, inflation and GDP growth exert significant influence on residential real estate investment returns, advocating the adoption of more sophisticated risk-adjusted performance measures such as the Cornish-Fisher value-at-risk and modified Sharpe ratio models for investment analysis in Nigeria.

2.1 Measures of Real Estate Investment Performance

Property investment performance measurement is a science which deals only with the past (Baum, 2007). It is different from portfolio analysis, which is relevant to the present, and portfolio strategy, which is relevant to the future. It deals wholly with delivered returns and not expected or required returns. Performance measurement, according to Baum (2007), makes use of the following measures:

- Income Return: the net rent received over the measurement period divided by the value at the beginning of the period: $IR = Y_{0-1} / CV_0$
- Capital Return: the change in value over the measurement period divided by the value at the beginning of the period: $CR = (CV_1 – CV_0) / CV_0$
- Total Return: the sum of income return and capital return: $TR = IR + CR$
- Internal Rate of Return (IRR): the most accurate and complete description of historic return, as it takes cognizance of cash flows and cash invested in each period.

The measure and indicators of performance are expected to express, in quantitative terms, the achievement of targets and objectives in the context of the market which generates the risk-return relationships. The rate of return is regarded as the most important measure of performance (Hargitay & Shi-Ming Yu, 2005). As regards the protection of investment growth, income and stability, Hargitay and Shi-Ming Yu (2005) identified key benchmarking indicators, including: gross rent multiplier, cash-on-cash return, profitability index, internal rate of return, debt coverage ratio, loan to value ratio, capitalization rate, net cash flow and break-even ratio. Okoh (2008) further identified methods of measuring property investment risks as standard deviation, coefficient of variation, mean-variance criterion, sensitivity analysis, decision trees and simulation techniques. Jagun (2020) highlights that inadequate attention to risk management in feasibility and viability appraisal processes remains a significant weakness among Nigerian estate surveyors and valuers, and recommends the incorporation of systematic risk management frameworks into appraisal conduct. Similarly, Patrick and French (2016) caution that the IRR should be used in conjunction with other analyses to appraise projects, since IRR projections can be misleading when applied to investments with unusual cash flow profiles.

2.2 Conceptual Framework

The twenty-seven techniques examined in this study were derived from a systematic review of the property investment appraisal literature. The benchmarking indicators identified by Hargitay and Shi-Ming Yu (2005), gross rent multiplier, cash-on-cash return, profitability index, internal rate of return, debt coverage ratio, loan-to-value ratio, capitalization rate, net cash flow and break-even ratio, form one major source. A second source is the risk-measurement methods catalogued by Okoh (2008): standard deviation, coefficient of variation, mean-variance criterion, sensitivity analysis, decision trees and simulation techniques. A third source is the discounted and non-discounted cash flow techniques discussed by Gotze, Northcott and Schuster (2008) and Brueggeman and Fisher (2008), including net present value (reflected in the study as expected net present value), internal rate of return, payback period, discounted payback period, scenario analysis (scenario testing) and the capital asset pricing model (CAPM). The remaining techniques, valuation methods, rate of return, capitalization, risk-return analysis, average mean, arithmetic and geometric mean, compound

annual growth, and variability and beta, reflect established professional practice as documented by Baum (2007), Chandra (2010) and Fraser (1993). This literature-derived list was subsequently validated for relevance to the Nigerian context prior to questionnaire administration.

According to Gotze, Northcott and Schuster (2008), the recommended analytical methods for appraisal are generally discounted cash flow techniques which take into account the time value of money. Investors may generally prefer to receive benefits as early as possible while paying costs as late as possible; costs and benefits occur at different points in the life of the investment or project, so the valuation of costs and benefits must take into account the time at which they occur. This concept of time preference is fundamental to proper appraisal, and it is therefore necessary to calculate the present value of all costs and benefits (Weber, 2013). The key analytical methods are discussed below.

Net Present Value Method (NPV)

In the NPV method, the revenues and costs of a project are estimated, then discounted and compared with the initial investment. The preferred option is that with the highest positive net present value. Projects with negative NPV values should be rejected because the present value of the stream of benefits is insufficient to recover the cost of the project. Compared to other investment appraisal techniques such as the Internal Rate of Return (IRR) and the discounted payback period, the NPV is viewed as the most reliable technique to support investment appraisal decisions (Larsen, 2024). However, there are some disadvantages with the NPV approach: if there are several independent and mutually exclusive projects, the NPV method will rank projects in order of descending NPV values, yet a smaller project with a lower NPV may be more attractive due to a higher ratio of discounted benefits to costs, particularly where affordability constraints apply.

Discount Rate

The discount rate is used to convert costs and benefits to present value to reflect the principle of time preference. The calculation of the discount rate can be based on a number of approaches, including the social rate of time preference, the opportunity cost of capital, and the weighted average method, amongst others. The same basic discount rate — usually called the Test Discount Rate (TDR) — is commonly used in cost-benefit and cost-effectiveness analyses of public sector projects.

Internal Rate of Return (IRR)

The IRR is the discount rate which, when applied to net revenues of a project, sets them equal to the initial investment. The preferred option is that with the IRR greatest in excess of a specified rate of return. An IRR of 10% means that with a discount rate of 10%, the investment breaks even. Patrick and French (2016) advise that the IRR should be used in conjunction with other analyses to appraise projects, as IRR projections can be misleading for investments with unusual cash flows.

Payback and Discounted Payback

The payback period measures the length of time that it takes to recover the initial investment. However, this method takes no account of the time value of money and does not account for earnings after the initial investment is recouped. The ordinary payback period should not be used as a standalone appraisal technique for property investment projects. The discounted payback period variant measures the time it takes to cover the cost of a project by adding the net positive discounted cash flows arising from the project and provides a useful performance indicator.

Sensitivity Analysis

Sensitivity analysis is the process of establishing the outcomes of the cost-benefit analysis which are sensitive to assumed values used in the analysis. If an option is very sensitive to variations in a particular variable (e.g. occupier demand), then it should probably not be undertaken. Sensitivity analysis requires exploratory analysis to ascertain the most sensitive variables and should lead to a risk management strategy involving risk mitigation measures (Udoudoh & Ekpo, 2018).

Scenario Analysis

Scenario analysis recognises that the various factors impacting upon the stream of costs and benefits are interdependent. This approach assumes that altering individual variables whilst holding the remainder constant is unrealistic. Scenario analysis uses a range of scenarios where all factors can be reviewed and adjusted within a consistent framework — best case, worst case, etc. — and for each scenario identified, a range of potential values is assigned for each cost and benefit variable.

Risk Analysis

This is the uncertainty of future returns, which could be a result of volatility in the price of competitive investments. Risk is expressed as: risk = f (price volatility of one type of investment versus price volatility of another or the overall market). Various types of risk include business risk, currency risk, default risk, inflation risk, interest rate risk, liquidity risk and political risk. Ogunba, Ayodele and Akpan (2024) demonstrate that complementing traditional

deterministic NPV and IRR appraisals with formal risk and uncertainty analysis (using certainty equivalent and real options models) provides significantly more robust investment advice, particularly in periods of economic volatility in African markets.

The adoption of these techniques in practice, however, is uneven. Mohammed (2017), surveying valuation firms in Lagos and Abuja, found very low usage of explicit discounted cash flow models among Nigerian valuers, attributing this to limited client demand, perceived difficulty of the models and absence of in-depth training . Ayitey, Tudzi and Gyamfi-Yeboah (2012) similarly argue that the conventional capitalization method remains dominant across Sub-Saharan African property markets despite the theoretical soundness of the DCF approach, while Gamage and Perera (2025), using a Delphi study of Sri Lankan valuers, demonstrate that DCF adoption in emerging markets requires pragmatic, locally adapted input variables rather than a wholesale transfer of developed-market practice. Frodsham (2024) further observes that a global professional shift toward explicit DCF modelling, as recommended by the Royal Institution of Chartered Surveyors, has implications for data availability and practitioner training that are particularly acute in markets such as Nigeria's. On the risk-measurement side, Effiong and Ogbuefi (2019) found that standard deviation-based risk measures tend to underestimate downside risk in Nigerian real estate relative to more sophisticated downside-risk measures, while Tembo and Okoro (2025), examining South African real estate investment trusts, shows that rankings of investment performance can differ substantially depending on which risk-adjusted measure (Treynor, Sharpe, Sortino, Jensen Alpha) is applied. Closer to the present study's methodological approach, Oyetunji and Oyetunji-Olakunmi (2017) and Ogunnowo, Iroham and Oloke (2021) both employed Relative Importance Index rankings to assess professional practice among Estate Surveying and Valuation firms in Lagos, lending methodological precedent to the RII-based ranking approach adopted here. Abdulai (2024) adds a cautionary note, showing that even within a single, well-established valuation method (the residual method), inconsistent application of financial viability decision rules can materially affect outcomes, reinforcing the present study's concern with the adequacy, and not merely the popularity, of appraisal techniques in use.

3.0 METHODOLOGY

This study adopted a survey research design, which is well suited to eliciting structured, comparable data on professional perceptions and practices across a defined population (Effiong & Ogbuefi, 2019). In a related study of corporate investment in commercial real estate with costly reversibility, Wiley (2012) used four variables to evaluate investment performance: purchase price, sale price, rent and occupancy ratio; for any of the techniques examined in the present study to be meaningfully applied, comparable underlying variables are essential. The sample frame considered for the study comprises the 318 practicing firms registered with the Nigerian Institution of Estate Surveyors and Valuers (NIESV), (Lagos State Branch 2012) directory. A systematic random sampling technique was adopted in the sample selection: with a population of 318 firms and a target sample size of 63, a sampling interval (k) of approximately five was applied ($k = N/n = 318/63 \approx 5$), such that every fifth firm was selected from an alphabetically ordered list of registered firms, commencing from a randomly selected starting point between 1 and 5, yielding a total sample size of 63 firms. The questionnaire was structured into four sections. Section A elicited background information on the respondent and firm, including category of respondent (estate surveyor and valuer or investor) and position held within the firm. Section B presented the twenty-seven techniques derived from the literature and asked respondents to indicate their perception of, and familiarity with, each technique, directly addressing Research Question 2. Section C asked respondents to rate the frequency with which each technique is used in practice on a five-point Likert scale (1 = never used, 5 = always used), addressing Research Questions 1 and 3. Section D asked respondents to rate the perceived adequacy of each technique for property investment performance evaluation, also on a five-point Likert scale (1 = highly inadequate, 5 = highly adequate), addressing Research Question 4. Data were analysed using the Relative Importance Index (RII) and mean ranking to assess the frequency of use and perceived adequacy of each technique, and to isolate the most frequently used and most adequate techniques; this approach follows methodological precedent set by Oyetunji and Oyetunji-Olakunmi (2017) and Ogunnowo, Iroham and Oloke (2021) in comparable studies of Lagos-based Estate Surveying and Valuation firms. A Pearson correlation matrix was further employed to determine the strength and direction of the relationship between the frequency of use and adequacy of each technique, directly addressing Research Question 4. The Relative Importance Index results (Table 1) and the correlation matrix (Table 2) are presented in full in the main Results section of this paper.

It is generally opined that real estate investments are related to general economic activity and the prosperity of a nation. This study is therefore

significant as it focuses on investment techniques crucial to measuring the actual risk taken and returns earned by commercial real estate investors. It also examines adequacy of techniques used to aid error-free evaluation of property investment performance. Nnamani (2016) corroborated this concern, finding that estate surveying and valuation firms in Nigeria largely do not adopt probabilistic methods of risk analysis, relying instead on simpler risk-adjusted discount rate and sensitivity analysis approaches. This is a finding with direct implications for the diversity of techniques assessed in the present study.

4. Study findings

This section presents the study's findings in the order of the four research questions set out in Section 1: Section 4.1 describes the characteristics of the achieved sample; Section 4.2 addresses Research Questions 1 to 3 (the techniques identified in the literature and confirmed in the field, stakeholder perception of these techniques, and their frequency of use); and Section 4.3 addresses Research Question 4 (the adequacy of the techniques and the relationship between frequency of use and adequacy).

4.1 Sample Characteristics

The characteristics of the respondents are given in terms of their category of participation in property investment and position in respective organisation. Of the 47 retrieved questionnaires (74.6% response rate), 41 (87%) were Estate Surveyors and Valuers while 6 (13%) were investors. The distribution based on position held showed 64.4% as staff members, 24.4% as principal partners, 8.9% as associate partners and 2.2% as consultants.

4.2 Research Questions 1 to 3: Techniques Identified, Their Perception, and Frequency of Use

In response to Research Question 1, twenty-seven techniques used in evaluating the performance of property investment were identified from the literature and confirmed as being in use, to varying degrees, by respondents in the study area; these are listed in full in Table I. In response to Research Question 2, respondents' perception of these techniques was captured through their rating of both the frequency with which each technique is used and its perceived adequacy, on the basis that a technique's perceived frequency of use and adequacy, taken together, constitute a direct measure of how that technique is regarded by practising estate surveyors and valuers and investors in the study area. Research Question 3, concerning which techniques are most frequently used, is addressed by the Frequency of Use columns of Table 1.

Table 1 presents the frequency of use as well as the adequacy of techniques used for commercial property investment performance evaluation. The study observes that the most frequently used techniques were also considered the most adequate. These techniques constitute the first seven among others, and they are: internal rate of return, rate of return, capitalization, payback period, valuation methods, expected net present value and net cash flow. Capitalization, which is the most frequently used (mean = 4.39), is the third most adequately used (mean = 4.16). The expected net present value, third in frequency of use, came sixth in adequacy of use. Rate of return and payback period occupy equal positions in both frequency and adequacy rankings.

Table I: Frequency and Adequacy of Use of Techniques for Determining Commercial Property Investment Yield

Technique	Frequency of Use			Adequacy of Use		
	Std. Dev.	Mean	Rank	Std. Dev.	Mean	Rank
Internal rate of return	1.045	3.93	5	0.749	4.31	1
Rate of return	0.446	4.18	2	0.652	4.22	2
Capitalization	0.784	4.39	1	0.785	4.16	3
Payback period	1.091	4.00	4	0.395	4.12	4
Valuation methods	1.194	3.73	7	0.925	4.05	5
Expected net present value	0.495	4.17	3	0.632	4.00	6
Net cash flow	0.976	3.78	6	0.577	4.00	6
Risk-return analysis	0.854	3.28	11	0.749	3.98	8
Average mean	1.033	3.16	12	0.688	3.95	9
Loan to value ratio	0.872	3.12	13	0.852	3.90	10
Debt coverage ratio	0.882	3.08	14	0.792	3.85	11
Break even ratio	0.855	3.61	8	0.675	3.79	12
Cash on-cash return	1.091	3.00	15	0.682	3.79	13
Sensitivity analysis	0.790	2.91	16	0.687	3.67	14
Gross rent multiplier	0.745	3.34	10	0.693	3.66	15
Scenario testing	0.989	2.70	18	0.675	3.58	16
Profitability index	0.836	3.46	9	0.709	3.56	17
Compound annual growth	0.908	2.81	17	0.788	3.39	18
Arithmetic average mean	0.830	2.50	22	0.909	3.38	19
Capital asset pricing model (CAPM)	0.608	2.27	26	0.693	3.34	20
Standard deviation	0.724	2.55	21	0.722	3.32	21
Mean variance criterion	0.555	2.45	24	0.634	3.19	22
Co-efficient of variation	0.745	2.66	19	0.621	3.17	23
Simulation	0.890	2.50	22	0.615	3.15	24
Geometric mean	0.789	2.35	25	0.726	3.10	25
Decision trees	0.826	2.58	20	0.661	3.05	26
Variability and beta	0.495	2.16	27	0.764	3.05	26

Source: Authors' Fieldwork

4.3 Research Question 4: Adequacy of Techniques and the Relationship between Frequency of Use and Adequacy

Research Question 4 concerns whether the techniques currently in use are adequate for property investment performance evaluation. This is addressed in two complementary ways: first, through the Adequacy of Use columns of Table I, which show that techniques such as internal rate of return (mean = 4.31), rate of return (mean = 4.22) and capitalization (mean = 4.16) are rated most adequate overall, and that several techniques rated highly adequate, including gross rent multiplier, debt coverage ratio, cash-on-cash return, loan to value ratio, coefficient of variation, CAPM, variability and beta, and arithmetic and geometric mean, are nonetheless comparatively under-used, indicating a gap between perceived adequacy and actual practice; and second, through the correlation matrix in Table II, which tests directly whether frequency of use and adequacy move together across the twenty-seven techniques.

Table II presents the correlation matrix of the frequency and adequacy of use of the techniques. The findings indicated that strong positive relationships exist between the frequency and adequacy of use for: valuation methods (0.752), standard deviation (0.795), break-even ratio (0.727), decision trees (0.717) and profitability index (0.640). Others with positive relationships include sensitivity analysis (0.595), internal rate of return (0.590) and compound annual growth (0.531).

Table II: Correlation Matrix of Techniques Adequacy

and Frequency

	Rate of Return	Sensitivity analysis	Scenario testing	Payback period	Expected net present value	Stimulation	Average mean	Every day valuation	Risk-return analysis	Gross resnt multiplier	Cash on-cash return	Profitability index	Internal rate of return	Debt coverage ratio	Loan to value ratio	Capitalization	Net cash flow	Break even ratio	Standard deviation	Co-efficient of variation	Mean variance criterion	Decision trees	Compound annual growth	Capital asset pricing model(CAPM)	Variability and beta	Arithmetic average mean	Geometric mean
Rate of Return	-.230	-.026	-.002	.142	.172	.339*	.259	.036	.157	.057	.213	.417**	-.106	-.057	.049	.114	.183	-.261	-.040	-.115	-.214	-.112	.225	.178	-.167	.233	.091
Sensitivity analysis	.220	.595**	-.187	.426**	.203	-.026	-.346*	-.268	.248	.286	-.026	-.144	-.031	-.018	.235	.492**	.370*	.097	.248	.084	.138	.109	-.061	-.271	-.117	-.347*	.180
Scenario testing	.407**	.000	.050	.168	-.160	-.190	-.056	-.479**	-.108	-.136	-.308*	-.465**	.023	-.177	-.105	.126	-.042	.188	-.452**	-.395**	-.376*	-.387*	-.355*	-.496**	-.399**	-.578**	-.381*
Payback period	-.021	.135	-.259	.237	.512**	.254	-.032	-.287	.483**	.457**	.202	-.018	-.192	.489**	.541**	.536**	.454**	-.099	.100	.000	-.070	-.276	.239	.271	-.030	.127	-.167
Expected net present value	-.433**	.463**	.073	.269	.160	.262	.311*	.135	.012	.387*	.042	.076	-.101	-.201	.027	.176	.171	-.419**	-.089	-.179	-.190	-.197	.158	.040	-.169	.125	.239
Stimulation	.314*	-.007	-.226	.240	.274	.322*	-.315*	-.439**	.262	-.197	.056	-.298	-.117	-.018	.013	.420**	.328*	-.060	-.057	-.178	-.151	-.082	-.218	-.331*	-.459**	-.436**	-.415**
Average mean	-.140	-.250	-.161	-.154	-.076	.244	.376*	.068	-.153	-.380*	.106	.056	-.572**	-.186	-.190	-.292	-.318*	-.230	-.407**	-.409**	-.368*	-.399**	-.374*	-.324*	-.376*	.028	-.347*
Every day valuation	-.199	.296	.369*	-.257	-.172	.310	.484**	.752**	.254	.016	.210	-.029	-.067	.317	.350*	.052	-.187	-.071	.204	.347*	.346*	.018	.000	.324	.246	.417*	-.070
Risk-return analysis	.322*	.082	-.040	.050	-.184	-.357*	-.220	.074	-.140	-.318*	-.142	.098	-.091	-.196	-.081	-.034	-.193	.352*	.180	-.045	-.013	-.024	-.314	-.281	-.132	-.173	.077
Gross resnt multiplier	.400*	-.230	-.343*	.122	-.018	-.515**	-.312	-.357*	-.311	-.225	-.210	-.181	-.178	-.459**	-.385*	-.235	-.177	.156	-.023	-.236	-.186	-.251	-.423*	-.593**	-.156	-.181	.126
Cash on-cash return	.377*	-.412**	-.435**	.120	.000	-.094	-.063	-.330*	-.119	-.494**	.138	.032	-.486**	-.366*	-.287	-.222	-.189	.032	-.316*	-.401**	-.359*	-.407**	-.570**	-.593**	-.440**	-.157	-.280
Profitability index	-.331*	-.083	-.321	.088	.485**	.431**	-.048	.033	.186	-.057	.463**	.640**	-.471**	-.035	.064	.050	.247	-.407*	.216	-.052	-.075	.131	.184	.155	-.262	.253	.148
Internal rate of return	.025	.340*	.446**	.075	.039	.249	.163	.054	.434**	.446**	.045	-.167	.590**	.533**	.485**	.515**	.240	-.057	.115	.396*	.391*	.288	.580**	.551**	.402*	.134	.078
ebt coverage ratio	.239	-.382*	-.313	.118	-.004	-.216	-.202	-.127	-.036	.069	.031	.067	.090	.254	.245	.053	.249	.674**	-.218	.045	-.013	.222	-.027	-.186	.054	-.063	-.042
Loan to value ratio	.201	-.343*	-.495**	.312*	.322*	.024	-.152	-.257	.118	.301	.338*	.217	-.125	.217	.326*	.148	.436**	.467**	-.104	.143	.090	.249	.206	-.026	.100	.097	.133
Capitalization	.082	.238	.354*	.075	-.049	.194	.166	.235	.303	.380*	.154	-.281	.560**	.473**	.491**	.431**	.313*	.203	.040	.510**	.482**	.429**	.330	.294	.411**	.098	.147
Net cash flow	.756**	-.044	-.162	.280	.184	-.437**	-.512**	-.435**	.384*	.169	.106	-.196	.369*	.365*	.361*	.422**	.183	.278	.410*	.504**	.497**	.028	-.133	.069	.467**	.146	.214
Break even ratio	.658**	-.048	-.213	.237	-.081	-.234	-.251	-.147	.106	-.073	-.022	-.292	.266	.120	.257	.260	.206	.727**	.045	.213	.172	.263	-.247	-.414*	-.007	-.178	-.020
Standard deviation	.486**	.282	-.162	.132	.407*	-.096	-.323	-.175	.481**	-.034	.140	.076	-.015	.068	.357*	.399*	.064	-.050	.795**	.281	.238	-.070	-.088	.089	.000	.221	.243
Co-efficient of variation	.502**	.178	-.350*	.321	.424*	-.061	-.429**	-.359*	.450**	-.067	.107	.027	.001	-.008	.237	.452**	.295	.098	.711**	.236	.186	.127	-.024	-.069	-.050	.062	.199
Mean variance criterion	.391*	.168	-.055	.084	.200	.173	-.140	-.089	.403*	.183	.147	-.312	.287	.413*	.471**	.460**	.317	.411*	.369*	.527**	.471**	.534**	.150	.129	.233	-.003	-.039
Decision trees	.240	.154	.034	.321	.229	.332*	-.127	-.153	.276	.213	.109	-.336*	.322	.229	.317	.390*	.425**	.376*	.147	.338*	.405*	.717**	.369	.074	.083	-.197	-.117
Compound annual growth	.584**	.158	.118	.431**	.298	.008	-.184	-.289	.575**	.395*	.180	-.302	.429**	.446**	.564**	.591**	.392*	.394*	.479**	.651**	.692**	.413*	.531**	.381*	.512**	.136	.139
Capital asset pricing model(CAPM)	.042	-.071	-.112	.505**	.375*	.004	.000	-.461**	.073	.193	.135	.032	-.132	-.183	.009	.222	.366*	.091	-.051	.014	.072	.284	.372	-.088	.036	-.067	.344*
Variability and beta	.000	-.133	-.218	.025	.077	-.169	.024	-.331*	-.128	-.052	-.041	-.076	-.244	-.133	-.146	-.007	.000	-.121	-.026	.065	.048	.045	-.057	-.204	.191	.072	.336*
17-17Arithmetic average mean	-.012	-.331*	-.430*	.034	.190	-.150	.044	-.161	-.187	-.168	.201	.298	-.491**	-.120	-.039	-.098	.000	-.023	-.047	.002	-.026	.081	-.134	-.269	.067	.270	.411*
Geometric mean	.041	-.145	-.282	.354*	.422*	-.213	-.061	-.436**	.060	.176	.110	.204	-.404*	-.295	-.093	-.061	.113	-.059	.204	-.044	-.005	-.078	.267	-.013	.086	.180	.441**

5.0 DISCUSSION OF FINDINGS

Findings of this study reveal techniques commonly

used by Estate Surveyors and Valuers in the evaluation of commercial property investment in Lagos. The result shows that techniques frequently used by respondents are also considered adequate in determining property investment performance. These include internal rate of return, rate of return, capitalization, payback period, everyday valuation, expected net present value and net cash flow. Udoudoh and Ekpo (2018) similarly affirm the widespread professional use of the DCF and related techniques, while identifying the application of DCF to be justified by its capacity to explicitly incorporate the risk inherent in the investment through sensitivity testing of cash flow assumptions.

The correlation matrix results showed that a strong positive relationship exists between the frequency and adequacy of use, first with standard deviation (0.79), everyday valuation (0.75), break-even ratio (0.72), decision trees (0.71) and profitability index (0.64). Others with positive relationships include sensitivity analysis (0.59), internal rate of return (0.59) and compound annual growth (0.53). This finding does not necessarily mean that techniques with high correlation coefficients are the most frequently or adequately used; rather, it implies a degree of association between frequency and adequacy of usage.

Findings further showed that techniques with lower coefficient values, such as risk-return analysis (0.14), gross rent multiplier (0.2), cash-on-cash return (0.13), debt coverage ratio (0.2), loan to value ratio (0.3), coefficient of variation (0.2), CAPM (0.8), variability and beta (0.1), arithmetic average mean (0.2) and geometric mean (0.4). This imply that they are not frequently used, though this does not mean they are not adequate as property performance evaluation techniques. Rather, their under utilisation may be attributed to time constraints, rigorous computation and large data requirements. This aligns with Nnamani (2016)'s finding that probabilistic techniques remain largely unadopted in Nigeria, despite their recognised adequacy, principally due to practical constraints on data availability and professional competence. Jagun (2020) reinforces this concern, noting that systematic risk management is insufficiently embedded in appraisal practice among Nigerian estate surveyors and valuers.

In the context of the broader literature, Agava and Gamu (2024) demonstrate that more sophisticated performance measurement tools which include the modified Sharpe ratio and the Cornish-Fisher value-at-risk model provide superior insights into investment risk and return profiles in Nigerian property markets, suggesting that the field would benefit from wider adoption of these techniques beyond the simple IRR and rate of return measures that dominate current practice. Furthermore, Larsen (2024) and Patrick and French (2016) caution that exclusive reliance on IRR and NPV benchmarks can lead to misleading investment conclusions, reinforcing the recommendation in the present study for practitioners to broaden their analytical toolkit.

Ogunba, Ayodele and Akpan (2024) further demonstrate, using a Victoria Island, Lagos commercial property case study, that complementing traditional deterministic NPVs and IRRs with risk and uncertainty analysis using certainty equivalent models and real options analysis produces substantially more robust appraisal advice. Their findings lend direct support to the present study's recommendation that practitioners should move beyond frequently used techniques to embrace a fuller range of risk-reflective evaluation methods.

It is worth reconciling the present finding, that internal rate of return and related discounted cash flow measures rank among the most frequently used and most adequate techniques, with Mohammed's (2017) finding of very low uptake of explicit discounted cash flow models among Nigerian valuers more broadly. The apparent tension is best explained by a distinction between simple and explicit DCF applications: the internal rate of return and expected net present value techniques assessed in the present study are typically applied in their simpler, implicit form, whereas Mohammed (2017) and Ayitey, Tudzi and Gyamfi-Yeboah (2012) were concerned specifically with the more demanding, rental growth-explicit DCF models recommended for sophisticated investment appraisal. This suggests that Nigerian Estate Surveying Firms have adopted the foundational logic of discounted cash flow analysis without necessarily adopting its more elaborate variants, a pattern consistent with Gamage and Perera's (2025) observation that DCF adoption in emerging property markets tends to proceed pragmatically rather than through wholesale transfer of developed-market practice. The finding that risk-assessment techniques such as standard deviation, coefficient of variation and CAPM are comparatively under-used, despite being rated adequate, further echoes Effiong and Ogbuefi's (2019) caution that standard deviation-based risk measures are widely applied in Nigerian real estate despite evidence, from their own downside-risk analysis, that such measures can understate true risk exposure; and it resonates with Tembo's (2025) demonstration that the choice of risk-adjusted performance measure can materially change an investment's assessed standing. Taken together, this

body of recent evidence reinforces the present study's recommendation that practitioners in the study area would benefit from broader, not merely more frequent, use of the risk-assessment techniques already available to them.

6.0 CONCLUSION AND RECOMMENDATION

This study examined the techniques used in evaluating the performance of property investment among Estate Surveying Firms in Lagos, Nigeria, and their adequacy for that purpose. The conclusions are presented below in relation to each of the study's four research questions. On Research Question 1 (techniques used), the study identified twenty-seven techniques in use, spanning discounted cash flow techniques, non-discounted/traditional techniques, and risk-assessment techniques, confirming that Estate Surveying Firms in the study area draw on a broad, literature-consistent repertoire of appraisal methods rather than a narrow subset. On Research Question 2 (perception of the techniques), respondents perceived the discounted cash flow and traditional return-based techniques, internal rate of return, rate of return, capitalization and payback period, most favourably, while more computationally demanding risk-assessment techniques such as CAPM, variability and beta, and simulation were perceived as less familiar and less frequently applied, though not necessarily less valid. On Research Question 3 (most frequently used techniques), the study revealed that break-even analysis ratio, valuation methods, standard deviation, decision trees, profitability index, sensitivity analysis, internal rate of return and compound annual growth are among the most frequently used techniques, as opposed to gross rent multiplier, debt coverage ratio, cash-on-cash return, loan to value ratio, coefficient of variation, capital asset pricing model (CAPM), variability and beta, and arithmetic and geometric mean techniques, which are comparatively under-used. On Research Question 4 (adequacy of the techniques), the study found that techniques frequently used were also, in the main, adjudged to be adequate; however, several of the under-used techniques listed above were nonetheless rated adequate by respondents, and the correlation matrix confirmed statistically meaningful positive relationships between frequency of use and adequacy for a subset of techniques, most strongly for valuation methods, standard deviation, break-even ratio, decision trees and profitability index. This combination of findings indicates that adequacy alone does not fully explain observed patterns of use, and that under-utilisation of adequate techniques is better explained by practical constraints such as time, data availability and computational complexity than by any deficiency in the techniques themselves.

Based on the findings, the study recommends that real estate investors and estate surveyors and valuers should broaden their knowledge and practical application of under-utilised but adequate techniques, including gross rent multiplier, debt coverage ratio, cash-on-cash return, loan to value ratio, coefficient of variation, CAPM, and variability and beta, to better capture the inherent risk in property investment performance evaluation rather than relying predominantly on traditional valuation methods. Given the evidence from recent scholarship that macroeconomic variables significantly influence property investment returns in Nigerian markets, and that deterministic NPV appraisals can provide misleading advice in volatile economic conditions, professional training and continuing development programmes for estate surveyors and valuers in Nigeria should incorporate probabilistic and risk-adjusted appraisal methods as standard competencies.

Conflict of Interest

The Author declares no conflict of interest. This research received no specific grant from any funding agency in the public, commercial, or not for profit sectors

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