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Viability of residential properties in Ota, Ogun state Nigeria using modified break-even valuation technique

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Abstract. Viability appraisal as a veritable tool to guide investors of proposed projects could either be carried out through any of deterministic or probabilistic approach. Both approaches with varied types of techniques have been criticized but still have their relevance in determining the viability of any given project based on required objectives. A review of earlier works on viability appraisal was carried out including that of the Nigerian experience. Observation and required measurements in the property market of the study area, Atan-Ota at Sokoto Road to be precise that lies and situates between latitude 60 40' 29.5716'' and longitude 30 11' 52.9908''. Amongst all viability techniques, the break-even viability appraisal technique was adopted for this study based on cost maximization so as to enable investors take decision on the barest minimum production level. The break-even point technique though modified using the Net Present Value (NPV) was utilized in the study area on three residential property types readily purchased. They are the 2 bedroom flat, 3 bedroom flat and 4 bedroom bungalow. It was revealed that the 3 bedroom flat is most viable as it will require the sales of 13.03 units to break-even while 2 bedroom flats will require the sale of 14.69 units to break even. The 4 bedroom bungalow will however require the sales of 17.17 units to break-even. The study thereby recommends that investors focus more on the 3 bedroom housing units in the study area for easiest attainment of the break-even point.
Keywords: Break-even point, Residential property, Viability, Nigeria, NPV

1. Introduction

Decisions are made for the investment of projects based on the assumptions that future returns will supersede every cost including the risk envisaged. In order to guarantee the certainty of this assumption an investment appraisal is required to be done through any of the techniques that will guide the investor against loss on capital defrayed. This will ascertain the worthwhileness of such investment usually regarded as its viability [1]. This is not until after the feasibility of the proposed project has been carried out. The feasibility of such proposed project will settle issues of possibility of embarking on such project. Even though feasibility and viability are two different questions to be answered in decision valuation they are erroneously juxtaposed. Feasibility answers the question 'can it be done' while viability answers the question 'should it be done'. Both concepts happen to be appose most times principally because amongst other reasons is the similar indicators (physical, financial, economic, legal, socio-political and technological) used as measurable benchmarks. In other for a proposed project to qualify it has to at least meet the minimum standard set by the indicators for both its feasibility and viability even though with varied emphasis [2]. The end result is to ascertain the viability of the proposed project, however, most often than not both terms are holistically studied. According to [3] feasibility and viability appraisal are both carried out to ascertain the market prospect for the investment proposal; estimating the cost of the project and the expected revenue; scheduling the required programme for the implementation of the proposal; evaluating the funding provisions;

and determination of the expected level of profitability of the investment proposal. Another section of your paper

The search for a method in determining the appraisal of any given project is a point of concern for all stakeholders. This explains why the concept of project appraisal dates back to decades when traditional approaches were used in taking investment decision. Such traditional methods have been regarded as being useful, however the methods were said to be wrought with shortcomings. Principal of which was the inability to effectively forecast outcomes in the future [4]. Hence, the need for "reliable methods" of measuring the potential value of capital investment proposal has been advocated [5]. Apart from certainty of investment which viability appraisal is geared towards achieving for the investor, it is required as conditions to meet either statutory approvals or needed to convince a financier for the said proposed project [6]. Viability appraisal has been divided into deterministic approach and probabilistic approach. The former which relies on best estimate has been criticized because it does not incorporate risk in its computation particularly in a country susceptible to inflationary changes and uncertainty [7]. The deterministic approach include techniques such as Residual Valuation Method, Break-Even Valuation, Developmental Valuation, Cash Flow Technique, Cost Benefit Analysis, Payback Period, Internal Rate of Return, Debt Coverage Ratio, Net Present Value, Profitability Index, Annuity Method, amongst others. The probabilistic approach incorporates risk and hinges on the premise that returns expected in future might not necessarily be gotten due to uncertainties. The probabilistic approach include techniques such as Monte Carlo Simulation, Risk Adjustment Discounted Rate technique, Risk Adjusted Cash Flow, Certainty Equivalent technique, Sensitivity Analysis and Sliced Income technique amongst others [4]; [7]. However, the adoption of the probabilistic approach in Nigeria has been discovered to be unrealistic due to the absence of data banks and computer proficiency amongst the viability appraisers [8]; [4]; [9]. There is even evidence where deterministic approach has even turned out to be valid in evaluating economic viability [10]; [11]. More so a critical look at every technique will bring out its criticism. [12] carried out a broad review of deterministic and probabilistic techniques utilizing a methodology of numerical examples. The critique by the authors for the techniques is similar to those of [13]. The authors made their contribution by recommending new technique, the "Sliced Income" technique. This was regarded as a preferred substitute to the Risk Adjusted Discount Rate and Certainty Equivalent techniques in guiding UK investors when selecting between alternative investments. The "new technique" has also gotten its dole of criticism [14]; [15]. Based on this premise, the utilization of any technique by development appraisers could be stunted. However, a justification will be to adopt any conversant technique adjusted to tackle any deficiency and ensure it meets the objective of ascertaining the worthwhileness of any proposed project. [16] have advised that while the clamour for any given technique be downplayed a conscientious knowledge of the cash flow analysis of any given project will aid in taking rational decision.

Hence, this work will be confined to one of the deterministic approach, break-even valuation. This is due to the fact that this approach stipulates when capital invested equates returns. A minimum amount of products needed to cover the fixed and variable costs from where proper estimation of revenue needed to ensure profits can begin [17]. However, for the case of this present study, the method is modified through using Net Present Value so as to eliminate uncertain future outcome [18]. The experience in the UK is a case of note where development sites in the region are assessed to determine their values based on the combination of cash flow analysis and simpler residual valuation [19]. The technique outline for this present research, modified break-even valuation, will focus on two bedroom flat, three bedroom flat and four bedroom bungalow, which have been discovered from pre-research investigation to be readily purchased compared to other property types in the study area.

Literature Review

There is evidence of competition in the market which has resulted to a wider involvement of development appraisal by other professionals amongst whom are the planners, architects, accountants, economists and construction specialists as against hither to provenance of surveyors and developers. This has been necessitated as government and other stakeholders do seek to extract developers' and/or landowners' contributions to affordable housing, public services and infrastructure amongst others [20]. Even at that there appears to be general low usage of formal feasibility and viability appraisal techniques by contractors and developers globally which has often culminated into project failures, incessant claims for variations, huge financial losses and sometimes brought about discomfort for people who came to enjoy themselves at recreational centres [21]. The worst felt of these is in redevelopment projects because of the inevitable problems of unexpected additional work, excessive requirements and scope management issues. Others are project funding not aligning with project plans, delay experienced, structural failure, cost overrun, amongst other [22].

There exist quite some few literatures from the real estate academic community on the subject area of viability. Some of which have emphasized the various criticisms of the viability techniques as evident in the over four decade's widespread academic and professional debate with failure to mirror reality and theoretical weakness [20]. Considering the competitive nature of the market the need for promptness in the focus on cost structure cannot be overemphasized. At least this will amongst others lead towards the maximization of market value which is the very essence of the breakeven valuation that will pinpoint the breakeven point. The break-even valuation is a veritable tool utilized in studying the relationship between fixed costs, variable costs and returns on the given investment. The break-even point defines when the given investment begins to generate a positive return which can be derived mathematically or graphically [17]. One major criticism of the break-even valuation technique is that there may be tendency on the continuous usage of the cost and income functions notwithstanding the changes over time [23]. This can however be mitigated by inclusion of the volatility parameter where real option volatility determines an option value which combines with project Net Present Value (NPV) to justify the project's break-even point [24]. Moreover, it is best suited for the analysis of one product at a time and its major benefit of the indication of the lowest amount of business activity necessary to prevent losses makes its adoption appropriate [23]. There appears to be no much research work carried out in relation to the break-even point valuation technique. However, certain other works have examined other feasibility and viability appraisal techniques.In Poland, [25] provided an overview of the methods of restoration and reuse (R&R) of Brownfield sites assessment. The research concentrated on the viability of R&R by making comparison with a listed building with a hypothetical new construction development. From the analysis of economic evaluation of restoration and reuse from literature review and a descriptive case study, the researchers discovered that the most suitable approach to examine the viability of a project would be the adoption of a residual approach. Evidence from the case study indicated that though R&R is feasible in the current market climate, demolition and new construction would have been more viable.

Since development viability appraisal has now become essential in UK National planning policy, through its introduction in paragraph 173 of the 2012 National Planning Policy Framework (NPPF), [26] examined the impact of Planning Practice Guidance on two specific inputs into the development appraisal/viability model. The two specific inputs which are ignoring changes in values and costs over

the development period together with instructions that comparable evidence is proof of policy compliant land prices were discovered to have basically faulted the process. This according to the researcher is a major cause of the reduction in the delivery of planning obligations. The study started with the premise that government requires that local planning authorities do not request for contributions that will stifle development but rather ensure that developers and land owners who have mostly resorted to the residual property valuation model get a 'competitive return'. In order to achieve the set down planning goals the study advocated that government needs to change the faulty approach in the delivery of her Planning Practice Guidance. Connotation between planning policy and development viability has been elucidated. According to [27] public policy and viability appraisal could be synchronized as the former could have a remarkable influence on the latter. This assertion can be said to interrelate with [28] where area-wide development viability appraisals are undertaken to determine the economic feasibility of policy targets in relation to planning obligations. [28] declared that development viability appraisal is made up of series of residual valuations of hypothetical development sites across a local authority area at a particular point in time. The valuation includes the estimated financial implications of the proposed level of planning obligations. In order to determine viability the output land values are gauged with threshold land value being critical to development viability appraisal at the policy setting (area-wide) level. [29] identified circulars and policy guidance as instruments of communicating policy requirements such that in the case of development viability there is detailed planning policy and planning practice guidance which are to be issued by the Department of Communities and Local Government. According to [30] the communication policy which comes in the form of Planning Practice Guidance issued by Government Department of Communities and Local Government will create a situation for winners of all stakeholders. Even though [31] identified the issue of asymmetry in modelling, it is advocated that development viability assessment has to apportion development gains amongst all parties. In line with this, [32] discovered that local politicians and planners had weak understanding of development appraisal while landowners and developers have major reasons to influence the viability system. More so it is the landowners and developers who commission viability assessments appraisers at the site-specific level. Hence, certain viability studies are shrouded in confidentiality and many are not released in full into the public domain. This has been earlier described by [33] as inevitably shifting the balance of power and influence between the property industry, local authorities and communities that they serve. A related research conducted by [34] was geared towards demonstrating that the shift in power and influence in viability appraisal has largely favoured the property industry over the local authorities and communities that they serve. This has been made possible as revealed by the study through three ways. Firstly, the test for economic viability has made developers and landowners with the means to challenge and even destabilize the affordable housing agenda and major concerns of the planning authorities and communities. Secondly, confidentiality clause has made the property industry to conceal the full contents of their financial viability assessment from public domain thereby creating an unequal access to information. Thirdly, the local planning authorities are at disadvantage due to inequality in technical resources and knowledge gap compared to private property developers. Most often than not the lack of expertise in viability appraisals matter by the local authorities and the communities minifies their ability to interpret, let alone challenge viability assessment. The paper concludes that even though viability assessments appear to give developers and landowners the inducement and privilege to wield greater influence over planning, it did not propose to buttress the

asymmetry amongst the property industry, local authorities and communities. The paper however advocated that a standardize valuation methodology would help curb the imbalance. The relevance of standardizing the imbalance can be related to a research where it was discovered that the continuous granting of tax exemption and subsidies on family farms by local authorities in Lithuania were superfluous. The study which aimed at assessing the impact of taxes and subsidies on the viability of family farms in relation to systemic analysis and synthesis of theoretical insights in the foreign and local scientific literature using the logistic regression analysis reveals no significant impact on the viability of the family farms in the study area [35]. Local authorities needed also to be well guided of the implementation of viability studies on traffic safety and efficiency. In order to acquire knowledge into the expectations about co-operative road vehicle systems and the propelling forces and hindrances of stakeholders' six experts and seventeen stakeholders were interviewed. Results from the structured interview analysed revealed the viability of Navigation systems, Intersection support, Traffic responsive Adaptive Cruise Control, Intelligent Speed Adaptation (ISA) and Information systems as most viable amongst all the concept of co-operative road-vehicle systems [36].

There is also an increasing pressure to reduce the inscrutable nature of certain viability studies through publications. [37] thereby advocated for the disclosure of all viability assessments that aim to reduce the policy level of public contributions. [38], further revealed in the negotiated planning obligations as the primary form of land value capture in England. The study follows the significant policy innovation of financial calculations in estimating the extent to which policies on planning obligations for actual and proposed development projects and in fact makes for the financial viability of development. This is with a view of assessing the extent to which the use of financial appraisals has offered a vigorous, just and practical procedure to support land value capture. The study however concluded that development viability appraisals are inundated with intrinsic uncertainty and that land value capture that is based on such calculations is, to some extent, unpredictable. Also, other predisposing factors are evidences of clear incentives for developers and land owners to bias viability calculations. These include economic reliance of many viability consultants on developers and land owners, lack of openness, contested or vague guidance and the opportunities created by input uncertainties for bias.

Research on viability studies has not been left out in Nigeria. For instance,[4] examined the assessment of risk in development appraisal with respect to client specific risk tolerance and perspectives. The study discovered that most development appraisers, who incorporate any analysis of risk in their development appraisal, simply chose the risk analysis approach that suited them. The researchers also noted that techniques that incorporate risk do have their own deficiencies and therefore appraisers should be conscious of the potential and limitations of each approach. [7] also investigated the applications of risk in development appraisal with particular emphasis on risk adjustment in commercial property developments in Lagos. The researcher came up with the finding that the methods of development appraisal adopted by estate surveyors and valuers on commercial property development does not integrate risk adjustment and viability which can be gotten from adoption of methods like the Certainty Equivalent Method and Monte Carlo Simulation. Hence, the researcher averred that the quality of appraisal services provided by estate surveyors and valuers in the study area were swiftly becoming inadequate. An earlier research carried out indicted estate surveyors and valuers as not carrying out extensive market survey while conducting investment appraisal thereby exposing clients to greater risk and as result apparently affecting a proposed viable investment decision [39]. [10] carried out a study amongst twenty two (22) estate surveyors and valuers in Akure,

to assess the practice of feasibility and viability appraisal and also to ascertain the reliability of the techniques employed. The study discovered that the methods readily used amongst the respondents are in the following decreasing order of application, Net Present Value (NPV); Internal Rate of Return (IRR); Payback Method; Accounting Rate of Return (ARR); Sensitivity Analysis; Residual Method and Risk Adjusted Net Present Value. The quest for reliability of the techniques indicated that the three most used which are the Net Present Value (NPV); Internal Rate of Return (IRR); Payback Method were discovered to be most reliable. Hence, notwithstanding the sophistication of much more modern techniques, the earlier techniques were discovered to be more reliable. However, the study also discovered that Weighted Average; Monte Carlo Simulation; Sensitivity Analysis; Risk Adjusted NPV; and Certainty Equivalent were rarely understood by the appraisers due to cumbersome and laborious mathematical application. These findings can be said to collaborate the findings of an earlier work also carried out in Akure [40] and the adoption of heuristic approach to project appraisal by certain appraisers [41]; [42]. These findings are in consonance with earlier declarations that even though the agitation of sophisticated method of analysis in investment appraisal has been on due to the increasing complexities in development projects [43], it has been revealed that the Net Present Value and Internal Rate of Return will still continue to remain the main appraisal techniques widely adopted due to its simplicity [44]. The cumbersomeness and complexity in determining viability of projects using the probabilistic approach spurred [45] to carry out the viability of residential properties based on risks and return on investment in Enugu, Nigeria using Arithmetic Mean Return (ARM), Standard Deviation (SD) and Coefficient of Variation (COV). The study using purposive sampling technique captured rental and capital values of ten (10) units of residential properties in each of four (4) locations of Achara Layout, New Haven, Ogui New Layout, and Ogui Road between the years 2010 and 2017. It was revealed that residential properties located at New Haven were the most secure with a risk of 2.83% and COV of 39.86% whereas properties located at Achara Layout were the least secured with a risk of 5.29% and COV of 56.28%. Performance measurement however indicated a positive relationship between risks and returns as Properties located in New Haven recorded the least return of 7.1% while Achara layout recorded the most return of 9.4%. The researchers hereby advocated caution amongst investors who needed the services of estate surveyors and valuers to interpret the viability of their investment based on their objective.

A similar approach was conducted in Onitsha, Anambra State, Nigeria [46]. The research involved a comparative analysis of the viability between residential and commercial property investment in the study area. It was based on the performances of the property types within a time span of between year 2007 and 2016. The rental and capital values of the properties which formed the data collected was analysed using Arithmetic Mean Return (AMRR), Geometric Mean Return (GMRR), Standard Deviation and Coefficient of Variation. It was revealed that commercial properties showed greater annual return of 19% compared to the residential type of 17%. However, the residential property type performed better in terms of risk of 11.34% and 0.67% risk return while the commercial property type showed 15.88% risk and 0.84% risk-return on investment. The researchers while averring the viability of both property types in the study area however advocated that investors' objectives in terms of risk or return should be a guiding factor. Periodic portfolio performance analysis was thereby recommended on a regular basis by portfolio managers in order to steadily study the property market to always ascertain its outcome for well informed decisions by investors. In terms of portfolio analysis with respect to viability of residential property, [47] carried out a study. It was to appraise the

worthwhileness of investing in various residential property types in 1004 Housing Estate in Lagos. The findings revealed that though investment in each housing type was viable, the positive relationship between the risk and returns will make the portfolio management of the various residential property types to be least attractive.

[9] in their study on viability appraisal aimed at evaluating the mode of practice of estate surveyors and valuers in Lagos metropolis while carrying out this aspect of practice. The study entailed the random selection of eighty-seven (87) estate surveyors and valuers practicing in the study area. Structured questionnaires were distributed to the respondents and data gotten were analysed through descriptive statistical tools such as the linkert scale. It was revealed that the deterministic approach particularly the payback period is the most adopted appraisal technique while the objectives of the investor is the most significant factor considered while selecting appraisal technique to utilize. The study also discovered that the variation of actual return from expected return and the difficulty in repayment of loans results when a wrong viability technique is employed. The study thereby recommended that beyond knowing the objectives of the investor, adequate knowledge of the right viability in relation to the objective of the investor will ensure that investors are guided rightly on the best course of action.

Study area

Ota can be found in Ado-Odo Local Government Area which is one of the nineteen Local Government Areas of Ogun State. This Local Government came as a result of the merger of the defunct Ifo/Ota Local Government and Ado-Odo/Igbesa Areas of the Yewa South Local Government on May 19, 1989. Ota which can also be spelt Otta has an area of 878Km2 and is the administrative headquarters of the Local Government. A traditional Awori Yoruba Folklore stipulates that Olofin's children, Osolo and EleidiAtalabi founded Ota after migrating south from Isheri. The development of the town brought its traditional rule under the purview of a traditional ruler, an Oba known as Olota of Ota, whose privileges to the throne came from the Yoruba traditional home of Ile-Ife. Ota is acclaimed to have the third concentration of industries in Nigeria making the town the industrial base of the State. It is also associated with many prominent landmarks such as the Obansanjo Farm, Canaanland (a compound that houses the mega Winners Chapel Church), Covenant University, Bells University of Technology, and the Nigerian Navy's School of Music amongst others. Amongst the various towns in Ota is one of the frontline towns, Atan Ota, also known as AtanOtta. It is situated at 6°46'0"N 2°47'60"E and 62Km northeast Cotonou (Benin Republic). It situates right on the international route linking Nigeria with the Republic of Benin and directly west of Sango Otta township. This town, Atan Ota, amongst other towns in Ota, was chosen for this study. This is due to its vast land mass still remaining to be developed and also regarded as a booming suburb of Ota. A prominent area in this axis is Sokoto Road located in Atan Ota bounded by the coordinates of longitude 60 40' 29.5716'' and longitude 30 11' 52.9908''. This is not farfetched considering the experience of influx of people over the past few years to build residential blocks from the neighbouring state, Lagos [48].

Methods

The study involved parallel research endeavours comprising predominantly of literature review and analysis of hypothetical residential property types of 2 bedroom flat, 3 bedroom flat and 4 bedroom bungalow. The location of study is presented in Figure 1
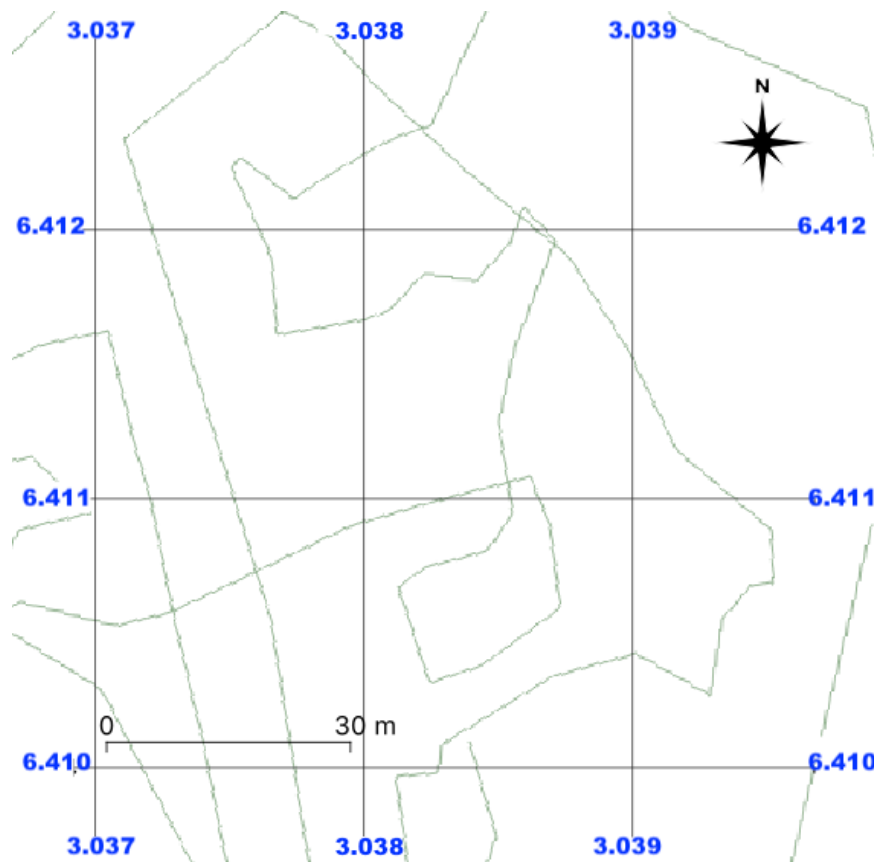
Figure 1: Map of area of study i.e., Sokoto road, Atan, Ogun State

The choices of these residential property types were as a result of pre-research investigations over the years as the highly purchased properties in the study area. The first stage of the research was to give a background of the study through a review of academic literature and publications. The literature researched covered areas on viability appraisal techniques depicting that no matter how sophisticated the model adopted there are still criticisms. In order not to jeopardize the very essence of the adoption of any given model there is need for adjustments to be made in order to circumvent the glitches. Even though research on the selected method to adopt for this work, break-even valuation technique, is sparse in academic literature, other works on various other viability appraisal models were reviewed. The methods which cut across both the deterministic and probabilistic approach were seen in both the developed economics and the developing economics particularly in Nigeria. The second stage of the research which is based on observation and measurement comprises adoption of the break-even valuation technique on the scope of residential property type of this study. The mathematical model of the break-even valuation is expatiated and data on the sale of land, construction rate and sales value of the property types were specified as gotten from monitoring of the property market and consultation with relevant consultants and stakeholders in the study area. The break-even valuation technique is then used in analysing the various property types to serve as a guide to would be investors in a town where demand for this property types have been on the increase over the years.

Break-even Point Valuation Hypothetical Case studies

Simplified examples of the modified break-even valuation technique are used to assess the three residential property types in the study area. Prior to that, the step by step approach to the break-even valuation method is portrayed before its modification using Net Present Value (NPV).

In the break-even point analysis the following equation will be a guide:

$$R = P \times Q \qquad\qquad (1)$$

Where: R = Revenues; P = Price; and Q = Quantity of production.

Costs can be expressed by the equation:

$$C = FC + VC \times Q \qquad\qquad (2)$$

Where: C = Total costs; FC = Fixed costs; VC = variable costs per a piece; Q = quantity of production.

Profit is given as follows:

$$P = R - C \qquad\qquad (3)$$

Where: P = Profit; R = Revenues, C = Total Costs.

To break even or make a zero profit, it will be required to apply the equation:

$$(R=C); \qquad\qquad (4)$$

Equation 4 can be re-written as:

$$P \times Q = FC + VC \times Q \qquad\qquad (5)$$

The production level that will result to a break-even point is gotten by amendment of the equation:

$$Q = \frac{FC}{(P - VC)} \qquad\qquad (6)$$

The equation (P – VC) represents allowance for payment of the fixed costs and profit in the venture. This is also regarded as the covering allowance. When the covering allowance is high, the venture will require smaller quantity of production to attain profit.

The hypothetical example of a developer acquiring 50 plots of land in the study area for 2 bedroom flat, 3-bedroom flat and 4 bedroom bungalow will be used for the study. A pre-research investigation revealed that such properties will be readily purchased compared to other property types. The 2 bedroom flat will be built as a block of 6 on a plot of land, the 3 bedroom flat will be built as a block of 4 on a plot of land while the 4 bedroom bungalow will stand alone on a plot of land. From observation Table 1 gives details of the property market of the concerned properties in the study area

Table 1: Details of hypothetical property types in study area

S/N	PROPERTY TYPE	AVERAGE SIZE (M^2)	CONSTRUCTION RATE /(₦/M^2)	AVERAGE COST OF CONSTRUCTION (₦)	AVERAGE PERIOD FOR SALES	AVERAGE SALES PRICE (₦)
1	2 Bedroom flat	70	60, 000	4, 200, 000	1 year	6, 000, 000
2	3 bedroom flat	90	60, 000	5, 400, 000	1 year	7, 500, 000
3	4 bedroom bungalow	125	70, 000	8, 750, 000	2 years	10, 500, 000

The average cost of construction was gotten from registered quantity surveyors practicing in the study area and that represents the variable cost. The consultation with quantity surveyors was to ascertain an accurate comprehensive construction cost for the various property types under study so as to prevent any mishap in construction [49]. The cost of a plot of land is put at ₦500, 000. 00 as derived from observation of the property market in the study area which represents the fixed cost. In modifying the break-even valuation technique the Net Present Value (NPV) is utilized. In estimating the discount rate to adopt, the average annual rental value of the property types in divided by the average sales price. The average annual rental values for the property types in the study area from observation of the property market are ₦100, 000; ₦120, 000 and ₦150, 000 for 2 bedroom flat, 3 bedroom flat and 4 bedroom bungalow respectively. This gives discount rates of 1.67%; 1.6% and 1.43% for the 2 bedroom flat, 3 bedroom flat and 4 bedroom bungalow respectively. This aided the estimation of the present value of the cost and revenue implication of the property types as evident in Table 2.

Table 2: Present value of cost and price implication of hypothetical property types in study area

S/N	PROPERTY TYPE	PRESENT VALUE OF FIXED COST (₦)	PRESENT VALUE OF VARIABLE COST (₦)	PRESENT VALUE OF PRICE (₦)
1	2 Bedroom flat	25, 000, 000	4, 200, 000	5, 901, 446
2	3 bedroom flat	25, 000, 000	5, 400, 000	7, 318, 890
3	4 bedroom bungalow	25, 000, 000	8, 750, 000	10, 206, 021

Modified break-even analysis for the various property types

2 bedroom flat

$$Q = \frac{FC}{(P - VC)}$$

Q = 25, 000, 000/(5, 901, 446 - 4, 200, 000)
    25, 000, 000/1701446 = 14.69 units

3 bedroom flat

$$Q = \frac{FC}{(P - VC)}$$

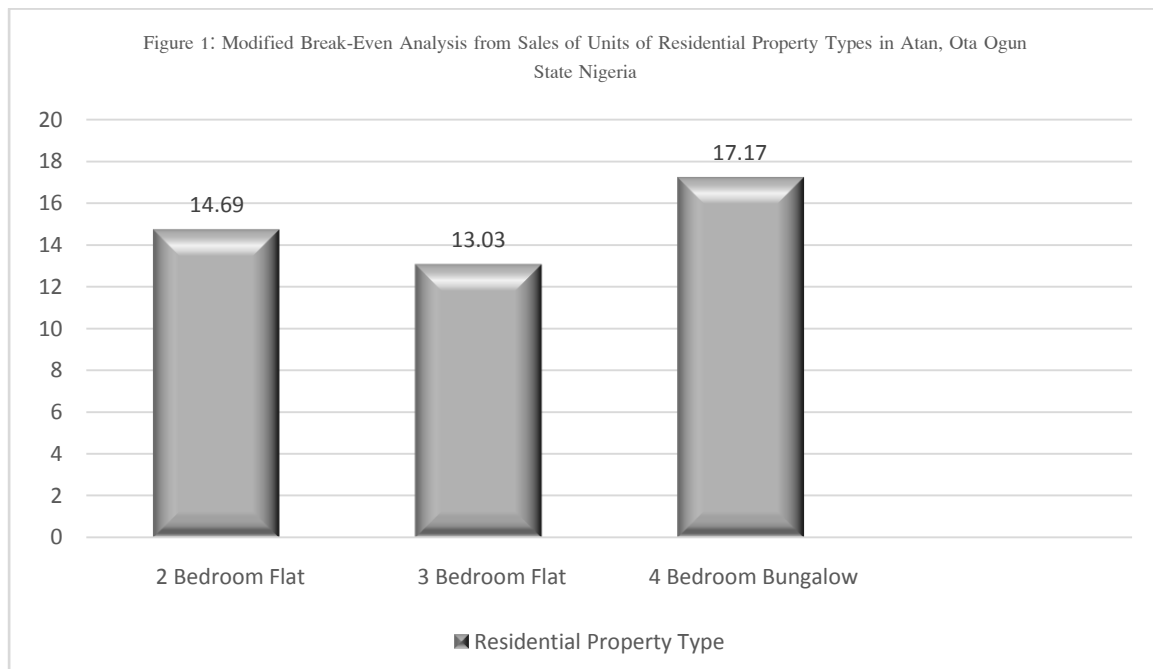Q = 25, 000, 000/(7, 318, 890 - 5, 400, 000)
    25, 000, 000/1918890 = 13.03 units

4 bedroom bungalow

$$Q = \frac{FC}{(P - VC)}$$

Q = 25, 000, 000/(10, 206, 021 - 8, 750, 000)
    25, 000, 000/1456021 = 17.17 units

Figure 1 will portray the graphic details of the result from the analysis

Figure 1: Modified Break-Even Analysis from Sales of Units of Residential Property Types in Atan, Ota Ogun State Nigeria

Discussion

From the analysis it is revealed that investment in 3 bedroom flat will break-even fastest as 13.03 units will be required. This will translate to the building of the fourth block of 4 Nos flats. As soon as one

flat in the fourth block is sold the investor has reached the break-even point while subsequent sales represent profit. For the 2 bedroom flat 14.69 units would have to be sold before the break-even point is reached. This will translate to the building of the third block of 2 bedroom flat. Hence, as soon as the third flat is sold in the third block the break-even point is reached while subsequent sales represent profit from the investment. However, it will take selling over 17 units of the 4 bedroom bungalow to attain the break-even point. This invariably makes the 4 bedroom bungalow least viable in the study area. A prudent investor will be advised to embark on the investment of the 3 bedroom flat for attainment of earliest breakeven resulting from sales of the units. The combination of viability techniques used for this study is in line with practices in the UK in order to ameliorate any glitch associated with any given technique. This has been found useful in the UK while conducting viability appraisal for development sites using the combination of cash flow analysis and simpler residual valuation [19]. The choice of this viability appraisal technique according to [9] will surely match the objective of the investor which for an emerging community such as the study area will be based principally on profit maximization. The findings of this work corresponds to the findings of [50] whose work on rental trends of residential properties in Ede, Nigeria revealed the three bedroom flat as the most viability. Unlike [45] whose work were geographically based on the viability of a residential property type in four locations in Enugu, Nigeria, this study has elucidated the viability of three residential property types in the study area. Also the approach to this study is also not in consonance with that carried out by [46]. The authors tried to compare the viability of residential and commercial property types in Onisha Anambra State Nigeria. This perhaps was as result of the incessant investment of the property types in the study area. This present study has disregarded commercial properties considering the fact that the study area is an upcoming commercial nexus. Hence, such areas will first and foremost be built up with residential real estate before any property type based on the diverse roles residential property plays amongst which is shelter, one of the basic needs of man [51]; [52]. The result from this study has also advocated the investment of only the three bedroom flat that turned out most viable and not a portfolio involving other residential property types. This is in order to discourage the diversification within a specific real estate submarket that are usually affected by similar traits [47]. The implication for practice particularly for estate surveyors and valuers is the involvement in viability appraisal as against agency, valuation and property management predominant in an emerging market as Ota where development is still budding. This will invariably begin to shift the real estate practice from the most buyout property markets in Lagos, Abuja and Port Harcourt [53] to the emerging markets such as the study area. This study will also promulgate the focus of research to viability appraisal in the study area. There have been little or no research that has focused on the study area, the viability discovered from this property type can begin to focus attention for further studies with respect to other locality not just in the study area but also in nearby communities.

Conclusion

The study has been able to look at the viability of the major property types that are readily purchased in the study area. The break-even point technique though modified using the Net Present Value (NPV) to bring the values of the properties to present worth was utilized. Findings indicate that the 3 bedroom flat has shown the most viability amongst the three property types of 2 bedroom flat, 3 bedroom flat and 4 bedroom bungalow readily sold in the study area. The breakeven point of 13.03 units as against

that of 14.69 units and 17.17 units for the sales of 2 bedroom flat and 4 bedroom bungalow respectively has made the property type most viable. Hence, the researchers thereby recommends the construction of 3 bedroom flats for sales as against other residential property types by investors in order to recoup their investment at the smallest possible sales made. More so, the viability of this venture is ascertained considering the fact that home ownership is gradually becoming the norm as against rentals due to the vibrancy in the property market and rapid development experienced in the study area. This is also in addition to the fact that the study area has brought about haven in terms of cost of acquisition for home ownership particularly for migrants from the neighbouring state, Lagos.

Acknowledgements

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