THE APPLICATION OF RESIDUAL ANALYSIS IN REAL ESTATE

ABSTRACT
The residual appraisal technique involves a fairly simple calculation that helps property developers to determine a realistic value for the land or property purchase.

The numbers that go behind the equation may be more complex but once these have been determined the residual method of appraisal is a fairly simple calculation to perform but can prove to be incredibly powerful. Recognizing a truthful idea of land or property morals in this way helps a property developer to determine other expenditure and the maximum that they can afford to spend on say site preparation, land remediation, building costs, professional fees etc.

To achieve a profitable project outcome. The equation for the residual method of valuation in its simplest form is as follows: Land/Property = GDV – (Construction + Fees + Profit):

Residual technique is implemented when determining the value of real estate which can be subject to development, expansion, modernization or other improvements.

The paper which aimed at determining when residual technique can be use so as developers can realize a profitable project outcome, also unrevealed the rationales for residual technique and argued that residual represent the maximum bid a developer can afford to pay for a development site and that it is a WORTH to the developer but not VALUE.

Furthermore, it was also found from the literature that though the technique has its drawbacks, like other appraisal techniques but it still the best method to calculate the potential profitability of a project and should only be utilized by knowledgeable and experienced professionals. It is best done with a team of individuals who are experts in their specific areas of the process, whether it is the real estate transactions, the development, the maintenance of the property, or any other factor in the development project.

It is essential to ascertain the uses for which planning permission could be obtained and to prepare outline scheme for development or redevelopment of the site. There may be a number of
alternatives schemes, in which case it is necessary to determine which will give the greatest return.

1.1 INTRODUCTION

In USA, the residual appraisal technique or ‘residual approach’ refers to a method of appraisal, based on the income approach, that is used to estimate the value of a plot of land excluding any buildings thereon, or to estimate the value of a building separate from the land.

An income is assessed that is considered appropriate to the plot of land, or the building – usually by deducting from the income receivable from the land and buildings together an income estimated as appropriate for the land, or buildings, alone.

Generally, in real estate development circles the residual technique of valuation is an essential valuation tool for any aspiring developer as it helps to quickly identify the value of a development site.

The development valuation which is also known as residual technique is adopted in the valuation of development property. This may be of bare land which is to be developed or land with existing buildings which are either to be altered and improved, an exercise commonly termed refurbishment, or to be demolished and redeveloped with entirely new buildings.

The application of the residual technique of valuation is based on the principle that the price to be paid for a property that is suitable for development is equal to the difference between (i) the completed value of the highest and best form of permitted development and (ii) the total cost of carrying out that development. Thus, the net capital value of the completed development is assessed (after deducting any costs of sale) on the assumption that it has been developed for the most valuable form of development, and from that value is deducted the cost of all construction and building work required to carry out the development (including all ancillary costs, e.g. purchase costs, letting fees, finance, etc.), as well as an appropriate allowance for profit on the development.
It is essential to ascertain the uses for which planning permission could be obtained and to prepare outline scheme for development or redevelopment of the site. There may be a number of alternatives schemes, in which case it is necessary to determine which will give the greatest return.

1.2 Aim and Objectives

This journal therefore aims to determine precisely when Residual technique can be use so as developers can realize a profitable project outcome, A few case studies are employed to demonstrate how residual technique are being calculated and applied accordingly.

1.3 Objectives of the Study

1. To highlight various components of the residual technique and calculation
2. To present procedures for calculating residual valuation
3. To evaluate residual appraisal technique
4. To indicate what residual represents in real Estate development appraisal
5. To present rationale for residual technique
6. To point out purposes of residual technique
7. To outline limitations of residual technique

1.4 Research Question

1. How can residual appraisal technique be evaluated?
2. What are the components of residual technique and its calculation?
3. What does residual represents in real Estate development appraisal?
4. What are the purposes of residual appraisal technique?
5. What are the rationales for residual appraisal technique?

6. What are the major drawbacks or limitations for residual appraisal technique?

2.1 CONCEPTUAL FRAMEWORK

2.2 Components of the Residual Technique and Calculation

(a) Gross Development Value (Proceeds of Sale)

This is realized from the disposal of the developed property. The essence of the valuation approach is to determine the surplus available after meeting costs. The proceeds of sale are the whole of the anticipated money to be realized from the development. It is true that they will not be receivable until the work is completed which may be at some considerable time in the future. Gross Development Value highlights what the final capital value of the completed development is projected to be when it is eventually sold to an interested party. The GDV part of the residual equation is based on current values and not projected values.

(b) Cost of Sale: The main costs incurred in a sale of the interest will be agents’ fees, including advertisement costs and legal fees including the consent fees where a purchaser intends to retain the property, it has been shown that the realizable value need to be determined, nonetheless. Since it is the net realizable sale proceeds which are required, the costs of sale which would be incurred are incorporated in the valuation.

(c) Cost of Development: Under this sub-heading, the major cost elements are as follows:

- Cost of Building: In the preliminary stages, the costs of development will need to be estimated. Estimates are normally based on the prevailing costs of building per square
meters of the gross floor area. As the scheme details become more advanced it may be appropriate to prepare a priced specification or even a priced bill of quantities. In addition to the actual costs of building the professional fees for the service of the design team are payable.

- **Miscellaneous Items:** All sites are different and have unique features, which may require various special costs. Typically such items include demolishing existing building, (which will depend on the nature of construction and the salvage value), site clearance costs and, filling of uneven land and where necessary, costs of diversion of services. These items are sometimes difficult to predict since they are not known at the time of valuation. The solution to the problem, therefore, is to allow some general sum for such contingencies. On the other hand, it can be said that these are part of the general risks of development, which are reflected in the allowance for profits.

- **Cost of Finance:** Considerable sums of capital need to be spend to carry out a development and this money is often raised from banks or other lending institutions, particularly in the case of medium to large-scale commercial developments. The cost of borrowing the money (which will be repaid on the completion and the development) is the interest charged at an agreed rate.

**(d) Developer’s Profits:** As for any risk enterprise, a person undertaking a development will seek to make a profit on the operation. Target level of profit will depend on the natures development and all associated risks, the competition for development scheme in the market, the period of the development (the longer the period the higher the profit sought)and the general expectation in relation to that form of development. Consequently, it is not possibly to lay down firm limits of required profits levels as this varies from one investor to the other, which is often conditioned on situations faced and individual expectation. The profit is related to the cost involved and, sometimes, to the development value. The profit is the gross profit to the developer before meeting his general overhead and tax. Hence developers may seek say 20%-25% gross profit on the capital value of investment.

**(e) Land Value:** At this stage, the valuer has determined the net proceed of sale, and the total cost of development and profit thereon. The difference between these figures represents the sum available to spend on land costs. In situations where building cost exceed net proceed of sale, this
shows that there is negative value for that development and thus the land (site) is not suitable for that particular development, unless some other form of development that is less expensive will be embarked upon. Alternatively, the proposed development may be scale shown (in terms of magnitudes or reduced number of floors) or the development may be done in phases.

2.3 The Rationale for Residual Technique

(i) The developer knows what the finished development will sell for (following a valuation)

(ii) The developer knows what it will cost to build

(iii) The other costs involved are the holding charges (interest on the money borrowed whilst the property is being built) and the acquisition fees

(iv) The Residual is the amount left over which can be advised should be the top end that the developer should pay for the land

3.1 Residual Represents the Following;

Maximum bid a developer can afford to pay for a development site. It would be advisable to offer less for a higher profit. It would also be advisable to find out the asking price in case it is much lower. Why pay £338,708 for land if the seller only wants £250,000.

Highly individual input data. The development could take longer than a year. Costs could escalate or be less than expected. The interest rate the developer is charged by the lender can vary. There may be other costs which need to be taken out (for example knocking down an existing building or removing poor contaminated soil)

It is therefore a calculation of WORTH to the developer. It is not a calculation of VALUE

3.2 Residual Technique for Land and Property

The residual technique of valuation involves a fairly simple calculation that helps property developers to determine a realistic value for the land or property purchase.
The numbers that go behind the equation may be more complex but once these have been determined the residual method of appraisal is a fairly simple calculation to perform but can prove to be incredibly powerful.

Identifying a realistic idea of land or property values in this way helps a property developer to determine other expenditure and the maximum that they can afford to spend on say site preparation, land remediation, build-costs, professional fees etc. to achieve a profitable project outcome.

The equation for the residual method of valuation in its simplest form is as follows:

\[ \text{Land/Property} = \text{GDV} - (\text{Construction} + \text{Fees} + \text{Profit}) \]

Where:

- **Land/Property** = Purchase price of land/property/site acquisition
- **GDV** = Gross development value
- **Construction** = Building and construction costs
- **Fees** = Fees and transaction costs
- **Profit** = Developers profit required

Going into further detail, the amount available for land/site purchase is one of the biggest components of the residual valuation equation as it can identify exactly how much you should initially pay for the development site or building.

It is important to remember that your residual valuation figure, or what you can afford to pay for the site, is unlikely to be the same as the seller’s asking price but this is where good negotiation skills come in to play.

**3.3 PROCEDURES FOR CALCULATING RESIDUAL VALUATION**
1. Determine the value of the final project i.e. GDV (Gross Development Value) which is the value of the final project after the development has taken place. How to determine GDV.

Gross Rent \( A \)

Less outgoing (say \( \text{@ 20\%} \)) \( B \)

Net rent \((A-B)\)

Capitalize the net rent by the appropriate rate of \( Yp \) \( C \)

**Gross Development Value (GDC)**
\((A-B)C\)

2. Determine the Cost of Redevelopment (D) ie Area x Unit rate of Construction

Assuming the total Area \((LxB)\) m\(^2\) x N/m\(^2\) (from comparison)

**Note:** cost include cost of renovation, cost of repairs and cost of development. (E)

3. Determine cost of capital (interest on capital @ certain rate)
4. Determine the legal, management and other fees (F)
5. Determine the cost of disposal, be it sale or letting at certain percent of sale or letting proceeds (G)

The summation of all determinants from stage 2 to 5 will be deducted from GDV to arrive at the residual value as follows;

\[ \text{GDV} - (A-B)C \]

Less costs \( D \)

\( E \)

\( F \)
3.4 When to Use the Residual Appraisal Technique

This method is ideal when an individual or entity wants to develop or redevelop property, most often to be resold or utilized in some other way to make a profit. This is done with both residential and commercial properties. This method is often used before buying or developing the land to determine whether or not the purchase and development will be profitable after calculating what will be paid for the developmental land.

It is important for developers to use this method when purchasing land/property so that they do not buy the land at a cost that would stand to make them lose money instead of profiting from the project. A development analysis should be completed to determine the ideal budget to make the purchase and development project profitable. In practice, it is the principal means of development analysis and is widely adopted as the basis for setting up the budget for most development projects.

It has been said, in connection with an application to the Lands Tribunal to determine compulsory purchase compensation, that “it is a feature of the residual valuation that comparatively minor adjustments to the constituent figures can have a major effect on results …” and “once valuers are let loose on residual valuations, however honest the valuers and however reasoned their argument they can prove almost anything”, First Garden City Ltd v Letchworth Garden City Corporation (1966) 200 EG 123, 460. Accordingly, the residual valuation will be accepted by the Lands Tribunal as a method of ‘last resort’. The residual appraisal is a crucial part of this development analysis, and can involve calculating many varying costs that come along with land development. Some of these considerations include (but are certainly not limited to) cost of construction, building period, investment yield, rent, fees, property taxes, finance costs, and any other additional costs.

4.1 Let us consider the following examples.

4.1.1 Case study1
Planning permission has been given for housing development on 8 hectares of freehold land ripe for building. The proposed development would afford 160 plots of an average frontage of 12.5 metres. It is estimated that such redevelopment will be completed in 3 years and that 1000m² of road will be necessary at the cost of N500/m². By comparison with similar land sold in the neighborhood, the value of the plot will be N120,000 each. Assess the market value of this land.

Note: To obtain the area of the road where it is not given, divide the total plot area given by 2 and then multiply the result by the area of the frontage given. E.g.

\[
\text{Area of road} = \frac{160 \times 12.5}{2} = 1000 \text{ meters}
\]

**Solution:**

Capital Value 160 plots @N120,000 = N19,200,000

i. Cost of road 1000m² @ N500/m² = N5,000,000

ii. Allow for fee @ 5% of cost (5000,000 x 5)

\[
100
\]

= N250,000

iii. Interest on capital @ 8% for 1½ years

\[(1+i)^{1.5} - 1 = \left(\frac{A-1}{i}\right) \times 5000,000\]

= 611,844.62

iv. Advertisement, legal fee & estate agency Say 5% of C.V

= 960,000

v. Developer’s profit, say 20% of C.V.

= 3,840,000

**TOTAL COSTS**

= N10,661,844.62

The value of bare site =

\[
\text{Capital Value- Development Costs}
\]

= N19,200,000 - N10,661,844.62

= N8,538,155.38
PV of ₦8, 538, 155.38 for 3 years @ 7.5% = 0.8049606 x ₦8, 538, 155.38
= ₦6, 872, 878.68

The amount that should be paid for the land ₦6, 872, 878.68

4.1.2 Case Study 2

A vacant and partially dilapidated church building in the centre of a Local Government headquarters is being offered for sale at ₦2.5 million. A local property Development company is interested in converting the building into a small specialty shopping centre on two floors. The reconstructed building will be approximately 3000m² gross in size providing about 2,000m² of net lettable floor space divided into 18 units of between 50 and 25m². Rental income is predicted to average out at around ₦300 per m². An investment return of 7.5% is sought. Building costs are estimated at ₦550 per m². Building finance is available at 1.4% Per month and the development will probably take 21 months to complete and let. Costs of development will also include the following:

1. Professional fees at 15% of building costs
2. Contingency at 5% of building costs plus professional fees
3. Promotional cost say ₦50,000.00
4. Finance costs
5. Letting fees at 10% of rent
6. Sale fee at 3% of GDV
7. Land costs
8. Acquisition at 4%, and
9. Finance on land acquisition at 14% for 21 months.

Calculate what will be the likely level of profit to the development company.

Solution

Valuation

**Gross Development Value**
Rental Value 200m² @ ₦300/m² 600,000

YP in Perp at 6% 16,666.7

Gross Development Value 10,000,000

Development costs:

(1) Building costs (3000m² @ ₦550/m²) 1,650,000
(2) Professional fees at 15% 247,500
(3) Contingency at 5% of (1) and (2) above 94,875
(4) Promotional cost 50,000
(5) Finance on (1) to (4) above at 1.4% per Month for 18 months for, 80% of
Total sum = (1+i)^n — 1 x 18 months 464,459
(6) Letting fees at 10% of rent
(N600, 000 X 0.1) 60,000
(7) Sale fees at 3% of GDV
(10,000,000 x 0.03) 300,000
(8) Land cost 2,500,000
(9) Acquisition cost of land at 4%
1.4% for 21 month 100,000
(I+i)^n - I x N 2,600,000 881,532
Total development cost N6,348,505
Development Profit in 21 months N3,651,494
(i.e. 10,000,000-6,348,505)

PV of N1 in 21 months at

1.4% per month 1/A 0.74676

Net present Value of Developers N2, 726,927.50

Profit on cost in 21 months

\[
\frac{\text{N3, 651,494} \times 100}{\text{N6, 348,505}} = 57.52\%
\]

Profit on cost now

\[
\frac{\text{2,726,927.50} \times 50}{\text{6,348,505}} = 42.95\%
\]

Profit on value in 21 months

\[
\frac{\text{N3651, 494} \times 100}{\text{N 10,000,000}} = 35.61\%
\]

Profit on value now

\[
\frac{\text{N2, 726,927.50} \times 100}{\text{N10, 000,000}} = 27.27\%
\]

Investment return on cost

\[
\frac{\text{N600, 000} \times 100}{\text{6,348,505}} = 9.45\%
\]

**Assumption/Notes:**
1. The location of the shopping centre is assumed to be in Ikeja Local Government Area of Lagos State.
2. Analysis of similar development assumed to produce a freehold yield of 6%
3. It is assumed that total loanable funds of development will be obtainable as it becomes necessary. The interest charged is therefore, based on proportion of the loan.

**4.2 Evaluation of Residual Appraisal Technique**

There are several methods for valuation of sites, land, and property. One of these methods is the **residual method**, which is used to estimate the value of land or buildings that are going to be developed and/or redeveloped. This is used to attempt to calculate the potential profitability of the property after development. Specifically, the method calculates the **residual land value**, which is the value of the site or land after development has been completed, minus the cost of purchase, plus developing, maintaining, or reselling the land.

The method does have its drawbacks, and should only be utilized by knowledgeable and experienced professionals. It is best done with a team of individuals who are experts in their specific areas of the process, whether it be the real estate transactions, the development, the maintenance of the property, or any other factor in the development project.

**4.3 Securing Property Development Finance**

The residual method of valuation approach to property development appraisal is a great way of establishing accurate figures for many important aspects of a project and is highly recommended to any developer considering a new venture.

Such a prudent approach is an essential component of any property developers risk management strategy, it will also be an essential requirement should you look to secure any form of property development finance as it demonstrates to any lender a clear, financially sound and well thought-out approach.

**4.4 Purposes for the Residual Technique**

Because it is highly individual in nature it is……

- A calculation of worth, not value
- Therefore used more in negotiation than in valuation (i.e. making a bid for a development opportunity)
- It can support valuation BUT ‘Market Value’ requires comparable with a very careful analysis

4.5 Advantages of Residual Technique

(a) It is Easy to use

(b) Highly flexible (can add to the Gross Development Cost sub categories if needed)

(c) Uses market data

(d) It can be used with ICT

(e) Mirrors the developers approach

4.6 Limitations of Residual Technique

- It’s artificial. There is much more to it than that. For example, will the work be completed on time?
- Assumes cost of development is borrowed up front. Therefore Interest is overstated.
- Reality is normally that no more than half of the capital is borrowed at any one time. A simple trick would be to divide the interest in half. The figure it comes out as would be closer to the correct figure.
- Only as accurate as the input values
- It Fails to account for the ‘S’ curve of development

‘S’ Curve

£% spent

Time
As illustrated in the above curve, more is spent towards the end of the project. Typically about 40% will be spent in the first half of the time period with 60% spent in the last half the time period.

5.1 CONCLUSION AND RECOMMENDATION

5.1.1 CONCLUSION

The importance of project appraisal prior to project execution cannot be overemphasized. It helps to guide the investors/developers in taking decisions, whether to embark on the project or not. It gives the prospective investors the chances to choose between two or more projects and plays a vital role in diversification of investments. The appraisal methods given in this paper help in determining the worthwhileness of a project. The accuracy of any projections appraisal report depends on the competence of the appraisers, the comprehensiveness of the report and the ability to gather appropriate data for the study.

Residual technique is used to calculate the value of a site with development OR refurbishment potential. It represents the MAXIMUM bid a developer should normally make.

Residual is WORTH, not VALUE

5.1.2 RECOMMENDATION
It is important for developers to use this method when purchasing land/property so that they do not buy the land at a cost that would stand to make them lose money instead of profiting from the project.

A development analysis should be completed to determine the ideal budget to make the purchase and development project profitable. In practice, it is the principal means of development analysis and is widely adopted as the basis for setting up the budget for most development projects.

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