

EXAMINING HEURISTICS FOR BUILDING - WORK-IN-PROGRESS VALUATIONS IN NIGER STATE NIGERIA

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Abstract

Where an investment decision on building work-in-progress (BWIP) is premised on the judgment of value, the technique of assessment must be accurate. The heuristic technique has not been able to achieve this goal. Frequent transactions in BWIP in Niger State necessitate the search for an alternative technique.

This paper therefore aims to:

- identify and analyze the purposes of BWIP valuations in Niger State, Nigeria,
- examine the suitability of using heuristics in determining the cost of building work-in-progress, and
- investigate the veracity of the use of the Nigerian Building and Road Research Institute (NBRRI)'s template of elemental percentage rates for the cost of incomplete buildings in the state.

Data were obtained from estate surveyors and valuers (ESVs), registered quantity surveyors in the state, the Niger State Housing Corporation and the NBRRI. The analysis showed, among others, that heuristics, although not suitable, was the most prominent technique adopted by the ESVs for costing BWIP. Similarly, the use of NBRRI's template for costing BWIP for residential bungalows in Minna - the Niger state capital - was validated.

Key words: *building, elemental cost, heuristics, valuation, work-in-progress.*

JEL Classification: *K11, L85, Q15, R30.*

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1. Introduction

The use of heuristics for solving problems has been acclaimed, among others, by operational researchers and management scientists in the early and middle twentieth century (HILBERT 1928; POLYA 1945). Its near perfect answer to issues of a given uncertainty underscores its wide application. Valuation of building work-in-progress or incomplete real estate is one of the situations where heuristic behavior was conspicuously evident in the practice of property valuation by estate surveyors and valuers (ESVs) in Nigeria (ADEGOKE 2006; IROHAM 2012). It has also been shown that South African property investors often made use of heuristics in their decision-making processes (LOWIES, HALL, CLOETE 2016). Both the International Accounting Standards Board (IASB 2008) and the International Financial Reporting Standards Council (IFRSC 2010) preferred the use of the discounted cash flow (DCF) technique for the valuation of incomplete real estate. Members of the Nigerian Institution of Estate Surveyors and Valuers (NIESV), however, favor the use of the depreciated replacement cost (DRC) method for such valuations (NIESV 2006). Since the incidences of building

work-in-progress have become commonplace in the landscape of Nigeria, the search for an appropriate technique to assess their market values has become increasingly imperative.

DRC can only be fully adopted for the valuation of a complete real estate. Where landed property is not completed, but a bill of quantities (BOQ) is available, the level of construction work carried out on the subject property can be determined therefrom and the DRC of the building obtained to process its market value. Where there is no BOQ, oftentimes ESVs in Nigeria resulted to the use of heuristics to extract the percentage of work executed on the subject building (ADEGOKE 2006). In the twilight of the twentieth century, the Nigerian Building and Road Research Institute (NBRRI 1992) developed percentage rates for each element of a typical residential bungalow in Nigeria which could also be adapted to determine the building cost. Can the percentage of building work-in-progress be accurately assessed by heuristic behaviors? Could the NBRRI rates provide a useful lead to the accurate cost of such incomplete buildings? These are some of the questions that the study seeks to answer.

The study area is Niger State of Nigeria. The state is situated in the North-central geopolitical zone of the country. According to the Niger State Geographic Information (NIGIS) Agency, the state is located between Latitudes 8.02°N and 10.20°N and Longitudes 3.38°E and 7.03°E (NIGIS AGENCY 2017). It is subdivided into 25 local government areas with Minna, Bida, Suleja and Kontagora as its four major cities. NIESV and the Nigerian Institute of Quantity Surveyors (NIQS) have branches in the state. The two higher institutions where there are registered ESVs and registered QS in academics in the state are the Federal University of Technology, Minna and the Federal Polytechnic, Bida.

2. Literature review

Valuation principles on building-work-in progress (BWIP) have not been fully developed in the Nigerian market. The Financial Management Act of Australia recognized building work-in-progress and required it to be valued for accounting purpose. Similarly, the Building Work Contractors Act of South Australia (SOUTH AUSTRALIA LEGISLATION 2015) defined it as building, development or integration work, under construction that would take a period of time to complete. Purposes for which incomplete properties are valued in Michigan, United States include insurance, probate, sale, accounting and taxation (MICHIGAN COMPILED LAWS 211.27 VOL 1). The purposes for which properties are valued in Nigeria, on the other hand, include sale, probate, acquisition & compensation, merger, financial accounting, transfer of title and insurance (BABATUNDE 2003; OLAYONWA 2012; OGUNBA 2013). Studies that specifically discussed the purposes for which incomplete real estate are valued in the study area are nonetheless scanty. The basis of valuation for probate and sales is the market value (IFEDIORA 2009), while that of financial accounting, according to the Institute of Cost and Public Accountants (ICPA 2016), is the book value or the DRC. The basis of insurance valuation in Nigeria is the reinstatement value (KALU 2007).

Both the International Accounting Standards Board (IASB 2008) and the International Financial Reporting Standards Council (IFSRC 2010) required incomplete properties to be valued by the DCF technique. DRC, however, is the method adopted in assessing the market values of incomplete properties for very many purposes in Nigeria (NIESV 2010). DRC valuation as depicted by Nigerian valuation scholars (KALU 2007; IFEDIORA 2009; OLAYONWA 2012; OGUNBA 2013) can only be accurately carried out where there is an availability of the correct building cost. Where the buildings are incomplete, the use of DRC is required to be complemented by another model before the cost of the building under valuation can be accurately measured. This is the main crux of the present study. Issues and literature relevant to the objectives of the study are therefore carefully reviewed in this section of the work.

A heuristic technique, according to a mid-twentieth century scientist (POLYA 1945) was "any method adopted to solve a problem which was not guaranteed to be perfect, but sufficient for the immediate purpose." Examples of this method included the use of rule of thumb, conventions, experience and intuitive judgment (IROHAM 2012). The use of heuristics was a common behavior amongst ESVs and appraisers in Nigeria and South Africa (ADEGOKE 2006; ADEGOKE, ALUKO 2007; ADEGOKE, OLALEYE, OLOYEDE 2013; LOWIES, HALL, CLOETE 2016). The rule of thumb, as a component of heuristics (IROHAM op.cit.) was described by the Merriam Webster Dictionary as a procedure based on experience and common sense which was not intended to be scientifically accurate. It is a principle, procedure, or rule that is based on experience or practice, as opposed to a specific and scientific

calculation. The rule of the thumb was a part of the heuristic behavior of the Nigerian ESV (IROHAM et al. 2013). Its results were not usually optimal (IROHAM et al. 2014). The use of heuristics for valuation of incomplete real estate amongst ESVs in Niger State is still a matter of conjecture since it has not been sufficiently verified by any formal exercise.

Variance in property value could arise with the use of poor modeling behaviors among real estate valuers (BRETTEN, WYATT 2001; AYEDUN, OLOYEDE, DURODOLA 2012). Heuristic behaviors of Nigerian valuers had previously been assessed as not producing reliable property values (ALUKO 2003; ADEGOKE 2006). For property values to be reliable and sustainable, valuers were required to continuously update their knowledge and valuation techniques and modeling (WARREN-MYERS 2012, 2016; BABATUNDE 2017).

The elemental cost equation model, which is still in its infancy, was derived from the research work of the Nigerian Road and Building Research Institute (NBRRI 1992; BABATUNDE 2011). The concept was earlier mooted by some Nigerian valuation scholars (AJAYI 1998; IFEDIORA 2005). These scholars recognized the challenges in the use of the conventional heuristics to determine the cost of building work-in-progress. Some British authors had earlier suggested that, when the valuer was faced with the crisis of value sustainability and an accurate assessment of the percentage of work done in an incomplete building, he should prepare an approximate bill of quantities in various trades and apply prices to them, including the labour contents (BRITTON et al. 1980). It was later discovered that the Nigerian estate valuer did not have the expertise to comply with the latter counsel (AJAYI 1998). The Elemental Cost Technique (ECT) was consequently recommended (AJAYI 1998). The outcome of the heuristic technique or heuristic behavior of assessing the cost of BWIP was similarly described as guesswork (BABATUNDE 2011). The use of the elemental cost equation (ECE) model derived from the NBRRI's elemental percentage rates on a residential bungalow, which are presented in Table 1, was consequently suggested as an option (BABATUNDE op.cit.).

Table 1

Percentage of elements of work on residential bungalow in Nigeria

Main element	Sub-element	Sub-element % cost	Main element %cost
Foundation and Plinth	i. Excavation and earth work	1.05	9
	ii. Anti- termite treatment	0.37	
	iii. Plain in-situ concrete (1:3:6)	3.98	
	iv. Block work	3.15	
	v. Damp roof course	0.45	
Floor	i. Hardcore under floor	2.48	10.0
	ii. RCC (1:2:4)	7.52	
Wall	i. Hollow sancrete block work	12.34	17.08
	ii. RCC in Beams,lintels	4.74	
Roof	i. Wall plates,rafters purlins etc	7.05	15.3
	ii. Corrugated Asbestos cement and finishes	8.29	
Doors and Windows	i. Flush and pannelled doors	1.65	3.0
	ii. Metal work louver windows and fittings	1.35	
Finishes	i. Plaster work	3.76	27.6
	ii. Rendering	1.25	
	iii. Painting on walls	6.53	
	vi. Painting on wood	0.86	
	v. Painting on metal work	0.38	
	vi. Glazing	6.00	
	vii. Paving	2.36	
	viii. Floor finish	3.82	
	ix. Ceiling	2.64	

Internal Services	i. Sanitary appliances and installations	2.60	11.07
	ii. Cold water installations	1.47	
	iii. Electrical installations	7.0	
External Services	i. Sanitary works on drains, pipework & manholes	2.73	6.95
	ii. Septic tank	1.56	
	iii. Soak-away pit	1.19	
	iv. Water and electricity connection from the mains	1.47	

Source: NBRRI (1992).

It was, however, observed that there was the possibility of minor variations in the percentage cost of the elements depending on the location, design, cost of materials, labour and use of different specifications (BABATUNDE 2011). It was, therefore, posited that the variation could range from -5% to +5 % of the figures given in Table 1 (BABATUNDE op.cit.). The “elemental cost equation (ECE) model” developed from the NBRRI table was adopted to determine the percentage of the elemental cost of a residential bungalow in Nigeria baring the consideration of variations as earlier stated (BABATUNDE 2011). The ECE model requires the ESV to develop competence in the extraction of the bill of quantities of merely one or two elements (not all the elements of the building as earlier suggested by British scholars (BRITTON et al. 1980). The ESV could select a simple element, say paintwork, and follow the following procedure: estimate the cost of the element of building that is easy for the valuer to extract; obtain the percentage allocation of the subject building element from Table 1, set up an equation where the percentage cost equals the actual cost of the subject element, and use the equation to determine the cost of the entire building, as if completed.

The model, as established (BABATUNDE 2011) was presented as $C = \frac{E}{EP}$, where: C was the total cost of the entire building, E was the cost of the single building element extracted, and EP was the percentage rate of the element on the NBRRI table. It was also postulated (BABATUNDE op cit.) that, where the total cost of the building had been determined through the elemental cost equation, the level of work extracted from the NBRRI elemental percentage rate could be applied to measure the cost of the incomplete building. The model’s limitation, however, lies in its ability to only assess the quantity of work executed on a residential bungalow.

3. Data and Methods

The study population consisted of 13 practicing firms of estate surveyors and valuers, ESV (P), 15 estate surveyors and valuers in academics, ESV (A), who were lecturers at the Federal University of Technology, Minna (FUTM) and the Federal Polytechnic, Bida (FPB), and 15 registered quantity surveyors (all in Niger State). The list of the ESV firms and ESVs in academics in Minna and Bida was obtained from the NIESV Directory 2014 and confirmed by the latest branch directory in the state. That of the QS was obtained from the Niger State Branch of NIQS’s Directory 2015. Having determined the total enumeration of the sampled population, the survey in this study made use of three sets of data, namely: (i) percentage of elemental cost of a typical residential bungalow in Nigeria by NBRRI, (ii) summary cost of each element of House No. 267 extracted from the bill of quantities prepared and used by the developer of Talba Housing Estate, Minna for her prototype three bedroom bungalow and obtained from the Niger State Housing Corporation, and (iii) primary data generated through a survey conducted by means of a questionnaire. The questionnaire comprises two sets of questions, each of which was structured according to the objectives of the study. The first set was administered to the 13 practicing firms of ESV in Niger State and the 15 ESVs who were lecturers at FUTM and FPB, while the second one was similarly administered to the 15 registered QS in the state. The questionnaire for the ESVs consisted of two questions, the first of which was perceptual while the second question tested their aptitude. The QS were only required to answer the aptitude question. In order to properly respond to the aptitude question, the respondents were provided with the floor plan and all relevant drawings of House No. 267, a three bedroom bungalow at Talba Estate, along Bida Road, Minna, Niger State, as the sample for the survey. They were further mobilized to inspect the bungalow. The property had been roofed but neither finishing work nor external works on it had been carried out. Details of construction works consisted of strip type foundation with damp proof course, a reinforced concrete floor which had not yet been finished, walls made of blockworks which were neither plastered nor painted, and a roof that was constructed of timber trusses and clad with long

span aluminum sheets. Windows and doors were yet to be installed in the building. Descriptive statistics and the Spearman correlation model were the tools of analysis.

All of the 13 ESVs (P) and the 15 ESVs (A) in the study area received the questionnaire, but only 12 ESVs (P) (92.23 %) and 10 ESV (A) (66.67%) returned them completed. 15 QS were provided with the questionnaire, with only 9 of them having completed and returned them, indicating a 60% response rate. The collected data are presented in Tables 2, 3, 4 and 5.

Table 2

ESV (P)'s response on ranking of valuation purposes of incomplete properties in Niger State

ESV(P)	Sale	Title transfer	Inheritance	Mortgage	Financial Accounting	C of O	Insurance	Merger	Compulsory acquisition
ESV P1	1	4	8	3	7	2	6	9	5
ESV P2	1	4	7	3	9	2	5	8	6
ESV P3	1	3	8	4	9	2	6	7	5
ESV P4	2	1	6	3	9	4	5	8	7
ESV P5	1	4	6	2	8	3	5	9	7
ESV P6	1	2	6	4	9	5	3	8	7
ESV P7	2	3	6	1	5	4	8	9	7
ESV P8	1	4	5	2	8	3	7	9	6
ESV P9	2	5	3	1	8	7	6	7	4
ESV P10	1	4	7	3	9	2	5	8	6
ESV P11	1	4	8	3	7	2	6	9	5
ESV P12	2	3	6	1	5	4	8	9	7

Source: own study.

Table 3

ESV (A)'s response on ranking of valuation purposes of incomplete properties in Niger State

ESV(A)	Sale	Title transfer	Inheritance	Mortgage	Financial Accounting	C of O	Insurance	Merger	Compulsory acquisition
ESV A1	2	5	8	3	6	2	4	8	7
ESV A2	1	6	7	3	9	2	5	8	4
ESV A3	1	5	8	2	9	2	6	7	3
ESV A4	2	5	6	3	9	4	4	8	7
ESV A5	1	5	6	2	8	3	4	9	7
ESV A6	2	5	6	4	8	5	3	7	9
ESV A7	1	3	6	2	5	4	8	9	7
ESV A8	1	5	5	2	6	3	8	9	7
ESV A9	2	5	3	1	6	7	8	7	4
ESV A10	1	6	7	3	9	2	5	8	4

Source: own study.

Table 4

Mode of assessment of percentage work on incomplete buildings by ESV (P)

S/N	Mode of assessment	Frequency
i	Experience/Intuitive Judgment	1
ii	Conventional practice/ Rule of thumb or heuristics	3
iii	Request from/ Engagement of a QS	4
iv	Extraction of bill of quantities	2

*Source: own study.***Table 5**

Mode of assessment of percentage work on incomplete buildings by ESV (A)

S/N	Mode of assessment	Frequency
i	Experience/ Intuitive Judgment	1
ii	Conventional practice/ Rule of thumb or heuristics	6
iii	Request from/ Engagement of a QS	4
iv	Extraction of bill of quantities	1

Source: own study.

4. Empirical results

4.1 Analysis of ESV's responses on purposes of incomplete real estate valuation

The data in Table 2 were further analyzed and the results displayed in Table 6. Both the public and the private sectors of the Niger state economy rely heavily on revenue from transactions in sale, mortgage, the processing of certificates of occupancy, transfer of title and insurance. Decisions on such transactions, therefore, require accurate valuation estimates of the subject properties.

Table 6

Weighted scores and ranking of purposes of valuation of incomplete properties in Niger State by ESV (P)

S/N	Item	Weighted score	Rank
1	Sale	104	1st
2	Mortgage	90	2nd
3	Processing of certificate of occupancy	80	3rd
4	Transfer of title	79	4th
5	Insurance	50	5th
6	Compulsory Acquisition	48	6th
7	Inheritance/ probate	44	7th
8	Financial accounting	27	8th
9	Merger or takeover bid	20	9th

Source: own study.

Ranking of purposes of valuation of incomplete properties by ESV(A) was analyzed and the result, displayed on Table 7, was similar to that of the ESV(P) on Table 6 excepting that while ESV(P) ranked compulsory acquisition and inheritance/ probate 6th and 7th respectively, ESV(A) ranked them 7th and 6th respectively. Attempt to show whether there was a statistically close and positive relationship between the opinions of ESV (P) and ESV (A) on the purposes of valuation of incomplete properties was also made. The presentation and analysis were displayed on Tables 7 and 8 respectively.

Table 7

Weighted scores and ranking of purposes of valuation of incomplete properties in Niger State by ESV (A)

S/N	Item	Weighted score	Rank
1	Sale	86	1st

2	Mortgage	75	2nd
3	Processing of certificate of occupancy	67	3rd
4	Transfer of title	50	4th
5	Insurance	45	5th
6	Inheritance/ probate	42	6th
7	Compulsory Acquisition	41	7th
8	Financial accounting	25	8th
9	Merger or takeover bid	20	9th

Source: own study.

The statistical analysis of the relationship of the responses of both ESV (P) and ESV (A) on the ranking of valuation purposes of incomplete properties was made and presented in Table 8.

Table 8

Spearman correlation co-efficient (ρ) of ESV (P)'s & ESV (A)'s responses on the purposes of valuation of incomplete properties in Niger State

S/N	Item	r ₁	r ₂	d	d ²
1	Sale	1	1	0	0
2	Mortgage	2	2	0	0
3	Processing of certificate of occupancy	3	3	0	0
4	Transfer of title	4	4	0	0
5	Insurance	5	5	0	0
6	Compulsory Acquisition	6	7	-1	1
7	Inheritance/ probate	7	6	1	1
8	Financial accounting	8	8	0	0
9	Merger or takeover bid	9	9	0	0
					$\sum d^2 = 2$
$\text{Spearman correlation } (\rho) = 1 - \frac{6 \sum d^2}{n(n^2 - 1)}$					
$\text{Spearman correlation } (\rho) = 0.983$					

Source: own study.

The results in Table 8 indicated that there was a very high correlation between the responses on the purposes of valuing incomplete properties by the ESV (P) and the ESV (A) in the state. The result was a confirmation by both categories of estate valuers in the state that the eight items on the table were the purposes for which BWIP valuations were required in the state.

4.2 Mode of assessment of percentage work on incomplete buildings

The findings in Table 9 indicated that the use of heuristics for the valuation of BWIP was the most prominent amongst ESV (P) and ESV (A) in the Niger State. 11 ESVs (modal class) adopted the use of heuristics (conventions, rule of thumb, and experience and intuition) for the valuation of incomplete properties. 8 ESVs engaged RQS for the cost of buildings, while only 3 ESVs were able to extract bills to determine cost of buildings.

4.3 Percentage of work executed on House No. 267, Talba Estate

House No. 267 Talba Estate comprised the case study. As highlighted in the literature, the elemental percentage rates of a typical residential bungalow by NBRRI were verified in this subsection for possible adaptation.

4.3.1 Cost of three bedroom prototype bungalow at Talba Estate

Evidence of the full cost of House No. 267 at Talba Estate as extracted from its prototype in the developer's file at the Niger State Housing Corporation is provided in detail in Table 10.

Table 9

Mode of assessment of percentage work on incomplete buildings by ESV (P) and ESV (A)

S/N	Mode of assessment	f(P)	f(A)	f(P&A)
i	Experience/Intuitive judgment	1	1	2
ii	Conventions, Rule of thumb, etc.	6	3	9
iii	Request from/ Engagement of an RQS	4	4	8
iv	Extraction of bill of quantities	1	2	3
$\sum f$		12	10	22

Source: own study.

Table 10

Cost of three bedroom prototype bungalow at Talba Estate

S/N	Variables	Cost (₦)
i	Unit cost of three bedroom bungalow (BOQ)	2,852,404.66
ii	Professional fees (10% of cost)	285,240.47
iii	Cost and fees (i plus ii)	3,137,645.13
iv	Cost of finance (10% of iii)	313,764.51
v	Total Building cost (iii plus iv)	3,451,409.64
vi	Add developer's profit	862,852.41
	Sale Price	4,314,262.05

Source: Niger State Housing Corporation 2015.

4.3.2 Percentage quantum of work on House No. 267

Foundation works, damp proof course with floor slab, sandcrete wall and roof work had been completed on House No. 267. On the basis of this evidence and in accordance with the NBRRI rates in Table 1, 51.38% of construction work had been carried out on the building. This percentage was verified amongst ESVs and the QS in the study area. The cost of the incomplete House No. 267 was therefore determined at ₦1,465,565.51 exclusive of professional fees and cost of financing.

Table 11 presented the elemental costs extracted from the developer's BOQ and their computed percentages for House No. 267 at Talba Estate (TE) Minna.

Table 11

Building elements, elemental cost and percentage of House 267 Talba Estate

Building elements	Cost (₦)	Cost (₦)	Percentage (%)
Foundation and plinth		256,145.90	8.98
Hardcore with RCC under floor		280,961.86	9.85
Wall: Block work with RCC in beams & lintels		487,761.19	17.10
Wall plates, rafters, purlins, with cladding and finishes		439,270.32	15.4
Doors and windows		86,998.44	3.05
Finishes:	Plaster work	107250.43	

	Rendering	35.655.06		
	Painting on walls	186,262.02		
	Painting on wood	24.530.68		
	Painting on metal work	10,268.66		
	Glazing	171.144.28		
	Paving	67.316.69		
	Floor finish	108,961.86		
.	Ceiling	75,303.48	786,693.16	27.58
Services:	a. Internal		316.046.43	11.08
	b. External		198.527.36	6.96
Total			2,852,404.66	100

Source: own Study.

A comparative analysis of the BOQ prepared by the developers of Talba Housing Estate for House No. 267 in Table 11 was made with the NBRRI elemental percentage rates of building cost. The results have been displayed in Table 12.

Table 12

Comparison of BOQ and NBRRI percentage rates on building elements

Building elements	Percentage (%) BOQ	Percentage (%) NBRRI)	Percentage (%) Difference
Foundation and plinth	8.98	9.00	-0.02
Hardcore with RCC under floor	9.95	10.00	-0.05
Wall: Block work with RCC in beams & lintels	12.03	12.08	-0.05
Wall plates, rafters, purlins, with cladding and finishes	15.35	15.30	+0.05
Doors and windows	3.05	3.00	+0.05
Finishes	27.58	27.60	-0.02
Services (Internal)	11.10	11.07	+0.03
Services (External)	6.96	6.95	+0.01

Source: own Study.

Upon further analyzing the findings in Table 8 by using Spearman correlation, the results showed a coefficient value (ρ) of 0.9999, indicating that the rates produced by the BOQ and NBRRI were perfectly and positively associated and, by extension, could be regarded as being similar. Table 13 presented the analysis of the aptitude of the three categories of respondents regarding the percentage of work carried out on House No. 267 Talba Estate, Minna.

Findings from Table 13 showed that only 1 ESV (P) out of 12, 1 ESV (A) out of 10, and only 4 QS out of 9 could estimate the percentage of work carried out on the subject building correctly. Since only 44.44% of the QS's work was accurate, it implied that the 8 ESV (P) and the ESV (A) or (36.36% ESVs) who relied on QS's advice on the cost of buildings in the study area might be 55.56% inaccurate.

Table 13

Analysis of the aptitude of respondents on the percentage level of construction work on House No. 267, Talba Estate

S/N	Level of construction	Appropriate percentage	ESV(P)		ESV(A)		QS	
			f(c)	f(w)	f(c)	f(w)	f(c)	f(w)
i	Foundation (completed)	8.45 -9.35	1	11	2	8	5	4
ii	Hard core with DPC and reinforced concrete floor	9.5-10.50	1	11	1	9	4	5
iii	Foundation; and hard core floor with DPC and reinforced concrete (completed)	17.95-19.95	1	11	1	9	4	5
iv	Blockworks completed to eave level	16.15 -17.85	1	11	2	8	4	5
v	Aggregate work in (iii) plus blockworks completed to eave level	34.10-37.80	1	11	1	9	4	5
vi	Roofing (completed) without ceiling	14.35-15.86	1	11	1	9	4	5
vii	Addition of work (in v& vi above)	48.45-53.66	1	11	1	9	4	5

*where f(c) and f(w) represent the frequency of respondents who are correct and wrong respectively

Source: own Study.

5. Discussion and conclusions

The discoveries made through the analysis of data in this study have necessitated the need for an urgent search for an appropriate technique of assessing cost of BWIP in Niger State, Nigeria. The results may be adopted to articulate numerous conclusions.

Firstly, sale, mortgage, processing of certificate of occupancy, transfer of title and insurance were the major purposes for which valuation of incomplete properties or BWIP were required in the state. Since the valuation of BWIP is needed for these critical socio-economic purposes, the necessity for accurate market value assessment has consequently become vital. Transactions in real estate market value for sale, mortgage and insurance purposes should therefore attract accurate assessment in order to prevent avoidable losses by the parties.

Secondly, heuristics, although not suitable for the assessment of the cost of incomplete buildings, was the most prominent mode of determining their costs in the state. Only 2 ESVs out of 22 surveyed and 4QS out of 9 enumerated could determine the percentage cost of the building elements of the uncompleted House 267, Talba Estate correctly.

Thirdly, the reliance of a large percentage of estate surveyors and valuers on registered quantity surveyors in Niger State for advice on cost of BWIP may not produce an accurate cost-estimate of such buildings. This therefore implies that if the ESV requires an accurate estimate of building cost, he has to upgrade his skill by developing some level of competence in the extraction of bills of quantity of buildings.

Fourthly, the ESVs in the state could adapt the percentage rates produced by NBRRI for the elemental cost of a building which was tested in this study for the costing of BWIP. The NBRRI rates have been considered suitable enough for the formulation an elemental cost equation model for the

determination of the cost of incomplete residential bungalows in the study area. NBRRI rates for other categories of buildings are presently not available.

Arising from the foregoing inferences, the following recommendations are made:

Since the heuristic technique could not correctly assess the cost of BWIP, its use for such a purpose should be discontinued forthwith. Similarly the development of alternative techniques has become necessary.

Also, as a result of observable deficit in ESVs' knowledge of valuation of BWIP, both the curricula of NIESV professional examinations and higher institutions offering Estate Management should be made to include the extraction of bills of building quantities. Since the study has equally established that the percentage rate of NBRRI is valid for the assessment of each element of a residential bungalow in Nigeria, the cost of any element of a residential bungalow could consequently be easily determined if the entire cost of the bungalow is assessed by ECE model. The drawback in the NBRRI template is that it could not be applied to other classes of incomplete buildings, such as two- or multiple-floor residential buildings, commercial buildings (such as shops and offices), and industrial buildings (such as factories and warehouses). It is therefore necessary for the ESVs in Nigeria to liaise with the Nigerian Building and Road Research Institute to develop models that could solve the riddles still surrounding the inaccurate assessment of the cost of such buildings when they are incomplete.

Finally, the study suggests that if valuations of incomplete residential bungalows are to be carried out by DRC method, the cost of those buildings should either be determined through the extraction of a BOQ or through an elemental cost equation model derived from NBRRI elemental percentage rates (provided the valuer has considerable competence in the extraction of the bill of a single element of such buildings). It equally cautions valuers not to adapt the NBRRI rates for the determination of the cost of other classes of incomplete buildings in Nigeria until research works on them are concluded, tested and published.

6. References

- ADEGOKE O.J., 2006, *A Study of Valuers' Heuristic Behaviour and Valuation Reliability in Lagos Metropolis*, An unpublished M.Sc. thesis submitted to the Department of Estate Management, Obafemi Awolowo University, Ile - Ife , Nigeria.
- ADEGOKE O.J., ALUKO B.T., 2007, *Heuristic Behaviour in Valuation Practice in Lagos Metropolis*, The Estate Surveyor and Valuer 30(1) pp. 5-12.
- ADEGOKE O.J., OLALEYE A., OLOYEDE S.A., 2013, *A Study of Clients' Perception on Mortgage Valuation Reliability*, African Journal of Environmental Science and Technology 7(7) pp. 585-590.
- AJAYI C.A., 1998, *Property Investment Valuation and Analysis*, De-Ayo Publications, Ibadan.
- ALUKO B.T., 2003, *Examining Valuer's Judgment in Residential Property Valuations in Metropolitan Lagos, Nigeria*, Journal of Property Management 25(1) pp. 98 - 107.
- ALUKO B.T., 2007, *Reliability of Mortgage Valuation for Institutional Lending in Nigeria*, International Journal of Strategic Property Management 8(4) pp. 193 - 203.
- AMCON, 2010, *Guidelines for the Preparation of Foreclosure Valuations by Registered Estate Surveyors and Valuers*, Asset Management Corporation of Nigeria Publication, Abuja.
- AYEDUN C.A., OLOYEDE S.A., DURODOLA O.D., 2012, *Empirical Study of the Causes of Valuation Variance and Inaccuracy in Nigeria*, International Business Research 5(3) pp.71-80.
- BABATUNDE I.O., 2003, *Modern Techniques of Property Valuation*, Jitaset Publishers, Abuja, Nigeria.
- BABATUNDE I.O., 2011, *A Critical Examination of Mortgage Valuation Methods in Niger State*, An unpublished M.Tech thesis, Federal University of Technology, Minna, Nigeria.
- BABATUNDE I.O., 2017, *Reliability of the Liquidation Valuation Models of Selected Real Estate Collaterals in Niger State*. Environmental Technology and Science Journal 8 (1) pp. 1-206
- BRETEN J., WYATT P., 2001, *Variance in Commercial Property Valuations for Lending Purposes: an Empirical Study*, Journal of Property Investment and Finance 19(3) pp. 267- 282.
- BRITTON W., DAVIES K., JOHNSON T., LAWRENCE M., REES W., 1980, *Modern Methods of Valuation*, 7th edition, Estate Gazette Limited, London.
- HILBERT D., ACKERMANN W., 1928, *Principles of Mathematical Logic*, Springer, Verlag.
- IASB 2008. *IAS 40, Investment Property under Construction*, International Accounting Standards Board Publication, London.

- ICPA, 2016, *Concept of Depreciated Replacement Cost in Asset Valuation*, Institute of Cost and Public Accountants Publication.
- IFEDIORA B., 2005, *Valuation Mathematics for Valuers and other Financial/Investment Analysts*, Immaculate Publications Limited, Enugu, Nigeria.
- IFEDIORA G.S.A., 2009. *Appraisal Framework*, Institute of Development Studies, Enugu, Nigeria.
- IFRS, 2010, *IFRS 13, Fair Value Measurement of Investment Properties*, International Financial Reporting Standards Council Publication.
- IFRS, 2011, *Facts Sheet IAS 40 on Investment Property*, International Financial Reporting Standards Council Publication.
- IROHAM C.O., 2012, *Heuristics in Property Investment Valuation in Nigeria*, A published PhD thesis, Covenant University, Ota, Nigeria.
- IROHAM C.O., OGUNBA O.A., OLOYEDE S.A., OMIRIN M.M., 2013, *Factors Affecting the Usage of Major Heuristics in Property Investment Valuation*, *Journal of Sustainable Development Studies* 4(2) pp. 114-133.
- IROHAM C.O., OGUNBA O.A., OLOYEDE S.A., 2014, *Effect of Principal Heuristics on Accuracy of Property Valuation in Nigeria*, *Journal of Land and Rural Studies* 2(1) pp. 89-111.
- KALU I.U., 2007, *Property Valuation and Appraisal*, BON Publications: Owerri Imo State.
- LOWIES G.A., HALL J.H., CLOETE C.E., 2016, *Heuristic – Driven Bias in Property Investment Decision-Making in South Africa*, *Journal of Property Investment and Finance* 34(1) pp. 51- 67.
- Merriam Webster Dictionary, *Definition of Rule of the Thumb*.
- Michigan Compiled Laws 211.27(1).
- NPC, 2006, *Population of Niger State in 2006*, National Population Commission Publication.
- NBRRI, 1992, *Percentage Rates of Building Elements of Residential Bungalow in Nigeria*, Research Publication of the Nigerian Building and Road Research Institute Abuja, Nigeria
- NSHC, 2015, *Building Drawings and Bill of Quantities of Prototype Three-Bedroom Bungalow at Talba Estate*, Niger State Housing Corporation Archive.
- Niger State website (www.nigerstate.gov.ng) (retrieved on 15/06/16), Information on Niger State boundaries with other states in Nigeria and the Republic of Benin.
- OGUNBA O.A., 2011, *Valuers' Perception of Depreciation Models in DRC Valuations*, *Journal of Property Investment and Finance* 29(2) pp. 190-209.
- OGUNBA O.A., 2013, *Principles and Practice of Property Valuation in Nigeria*, Atlantis Books, Ibadan.
- OLAYONWA G.O., *Property Valuation from Methods to Applications 2nd Edition*, Debo Publishing Company, Iwo, Nigeria.
- POLYA G., 1945, *How to Solve it: A System of Thinking which Can Help you Solve any Problem*, Princeton University Press.
- SOUTH AUSTRALIA LEGISLATION, 2015. *Building Contractors Act, 1995 as Amended*.
- The Financial Management Act of Australia, www.treasury.nt.gov (retrieved on 15/06/16).
- NIESV, 2010, *Guidelines on foreclosure valuations for Asset Management Corporation of Nigeria*, Nigerian Institution of Estate Surveyors and Valuers' Publication.
- NIESV, 2014, *Directory of the Nigerian Institution of Estate Surveyors and Valuers*.
- NIQS, 2015, *Directory of the Niger State branch of the Nigerian Institute of Quantity Surveyors*.
- WARREN-MYERS G., 2012, *The Value of Sustainability in Real Estate: a Review from Valuation Perspective*, *Journal of Property Investment and Finance* 30(2) pp.115-144.
- WARREN-MYERS G., 2016, *Sustainability Evolution in the Australian Property Market: Examining Valuers' Comprehension, Knowledge and Value*, *Journal of Property Investment and Finance* 34(6) pp. 578-601.