



## Valuation of Machinery and Equipment: Is it Inter-disciplinary, Multi-disciplinary or Collaborative?

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### **Author's contribution**

*The sole author designed, analyzed and interpreted and prepared the manuscript.*

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### ABSTRACT

Property valuation as a professional exercise occupies a unique position different from related concepts of 'valuation', 'assessment', 'evaluation' and 'measurements' that are pervasive in accounting, engineering, quantity surveying and medicine, among others. This paper therefore reflects on the lingering feud between estate surveyors and valuers (ESV) and engineers in Nigeria on issues that borders on competence for professional valuation of assets in the nature plant, equipment and machinery (PEM). Through a perspective discourse that analyses required inputs for property valuation and the strengths and weaknesses of each group, the paper found that ESV could neither maintain monopoly for the exercise nor are engineers capable of usurping the practice based on their subsisting academic and practice focus. It therefore concludes that ultimately, holistic property valuation need evolve as an interdisciplinary field independent of real estate discipline while in the interim, collaboration of multiple disciplines involving ESV, engineers and other allied professionals should be adopted for PEM valuation. The paper is aimed at disabusing the mind of both parties and concentrates on required objectivity that would improve professionalism in the valuation of all strands of property assets.

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## 1. INTRODUCTION

Modern living and business are increasingly knowledge-driven. The knowledge areas are however wide and cannot reposit in any single individual or group. Thus, to accelerate development in an increasingly sophisticated world, the pursuit of knowledge has to be segregated into fields and disciplines – arts, humanities, basic science, social science, applied science and engineering. It would be foolhardy in this modern age for any discipline to feel self-sufficient in disregard of complimentary knowledge areas from proximate fields. This is even more crucial when practical human needs are to be addressed in their often, intricately interwoven framework.

This paper has been prompted by a lingering feud between two allied fields in Nigerian professional cycle which rather than harmonise their areas of comparative strength for fulfilled client service, have apparently engaged in a subtle war of wits. The grouse has been on competence for professional valuation of plant, equipment and machinery (PEM) between the Nigerian Institution of Estate Surveyors and Valuers (NIESV) and the Nigerian Society of Engineers through her offshoot (Institute of Appraisers and Cost Engineers – IACE). Unfortunately, the general society or rather, their clients become the loser as neither group is prepared to learn from the other, each claiming sufficiency of knowledge from her compact-box disciplinary focus. This paper therefore sets to examine whether PEM valuation is a purely technical exercise, a normal commercial analysis or a blend of both on one hand, and whether the contentious valuation service should be handled as an interdisciplinary, multidisciplinary or collaborative exercise, on another hand.

## 2. SOME CONTENTIOUS ISSUES AT STAKE

The two professions have maintained extreme positions while deriding the other on fundamental issues. First, the engineers, through a submission to the Association of Professional Bodies of Nigeria (APBN) asserted that their one-year course in ‘engineering economy’ as undergraduates has equipped them more than they could have benefited from a 5-year course in property valuation [1]. The author belonged to

the crop of candidates that entered the 5-year estate management course under the same engineering technology faculty in the revered Nigeria’s University of Ife (now Obafemi Awolowo University) and were subjected to similar courses for the first three years. Definitely, this perception cannot be substantiated before the faculty that produced both as the ‘gap’ in the knowledge acquired by the two could not have been anything wide. Incidentally, there were just two universities in Nigeria offering estate management at the time (Ife and Nsukka).

Some statutory extracts were also assembled by engineers to justify a wrestle of PEM valuation from Nigerian estate surveyors and valuers (ESV). Unlike the 1975 Estate Surveyors and Valuers Registration Decree which was direct in its nomenclature, construction and provisions in regard of the power on valuation, none of the subsequent statutes that dated between 1990 and 2004 being cited by engineers had any such primary motive or direct provision on valuation of any property type. Nevertheless, it is believed engineers do not need express statutory entrenchment to prove their relevance on a professional assignment, especially PEM valuation.

Plant and machinery is well acknowledged to be a specialized aspect of property valuation [2-4]. Though each landed property is held to be unique (in location, design, construction, legal right, occupation, condition etc), the complexity of intricately assembled metal, pipes, cables and other accessories to produce motion and satisfy desired form of manufactured products should certainly present more challenging features and configurations. If ESV with their real property background is more confident to unearth the tricks behind each landed property, engineers who were behind the design, fabrication and installation of the PEM items must also be expected to possess better understanding here.

An ESV argued that knowledge of machine is not particularly significant in its market valuation [5]. On the contrary however, another ESV acknowledged that plant and machinery is a ‘specialized aspect of valuation and requires robust understanding of machines, tools, equipment etc’ [4]. To say valuers do not need knowledge of machine or production process must be re-appraised. Except for undeveloped

properties or those ripe for redevelopment, the state or condition of the physical attributes of a landed property constitutes major influence on value. If the valuer do not have requisite knowledge of the 'brick and mortar' of landed property, he may not be able to satisfactorily assess its condition as at the date of valuation. In fact, the latest competency framework for registered ESV as prefaced by the current Chairman of the statutory regulatory body for the profession in Nigeria (Estate Surveyors and Valuers Registration Board of Nigeria-ESVARBON) expressly required professional 'knowledge of construction, building technologies and materials (ESVARBON, n.d). If such knowledge of building design and construction therefore matters to real property valuation, we definitely could not play down knowledge of machines and their operations in the pre-valuation assessment stage for PEM. From another perspective, one would wonder if we can meaningfully ascribe value to a second-hand vehicle that has not been test-driven for the condition of its component parts to be ascertained. Often, we would require mechanical and electrical knowledge to interpret the performance of the engine, transmission, exhaust, fuses, ECU, brakes, bearings etc.

A typical ESV as he stands today, do not singularly possess all it takes to value PEM and many have not shied away from this, apart from a deluge of literature from within and outside Nigeria in its support [2,3,6,7]. To have expressed concern on information bordering on installation expertise and maintenance in the course of PEM valuation is tantamount to a need for expanded approach [8]. Plant and machinery is one of the subject courses under the Nigerian estate management and valuation education curriculum, though only introduced over the last two decades. The inadequacy however remains in the insufficient integration of adaptable topics on machines and their maintenance, production layout and processes which could have lengthened the scope of the subject beyond one academic session [9].

On their part as well, the Nigerian engineers apparently stumbled on the prospects awaiting them in PEM by chance, in 1988 [10]. To date however, engineers have not sought to acquire adaptive knowledge or certification on valuation basics but opted to float a parallel professional body – IACE – for self-accreditation as Valuers. The adequacy of their engineering knowledge in

meeting requisite competencies for property valuation must also be examined.

### 3. DATA FOR PROPERTY VALUATION

A vital issue easily glossed over is that the subject of valuation is often not the physical materials like a parcel of land, a building structure, an assembled item of machinery or furniture per se but the 'property rights' inherent in them for a given client at that point in time. This is again one of the reasons why valuation is not just about costing and depreciating on basis of technical characteristics. Several professionals could interpret this on the surface from their various perceptions but what is intended carry legal and financial implications beyond any layman's construction. Whoever wants to engage in professional property valuation must necessarily have background legal and commercial knowledge to decipher the nature and quantum of this as well as modalities for translating the inherent rights into figures. It was partly on this strength that an ESV would disagree on the emphasis on technicalities of PEM items by engineers. Actually, for purposes of valuation where the assets are valued in-situ, say for investment (such as admission of partnership and capital floatation), profitability analysis is more germane than technical condition. The inadequacy of cost-based approach to in-situ valuation of plant and machinery has also been corroborated [11].

Apart from the foregoing, valuation of properties is generally required to elicit three types of data: property-specific, market and macroeconomic. The first category defines the actual subject of valuation in terms of its nature, physical features (internal and external), size or quantum, and condition. Except the subject of valuation is distinctively identified in all necessary ramifications (physical and legal), it becomes difficult to comprehend or appreciate the valuation carried out on it. This is an area where engineers could easily claim superior competence on PEM assets as the background of ESV is skewed towards real property.

Next is market data and this involves situating the relative economic position of the property within its operative market setting (in terms of prevailing prices of its contemporaries). Being a market player, ESV traditionally maintains databank of market transactions and trends in various property assets and regularly engages in their analyses. When engineers for instance,

decide to join the train of professional valuers, they would have to come out of the workshops and become active and regular market participants as the requisite data cannot be reliably scooped on ad hoc basis.

Finally, there is need to analyse macroeconomic variables (fiscal, monetary and capital-market related) influencing the sector of the property market in which the subject of valuation situates. This is pertinent to reflect on the earlier two data types in drawing a conclusion on sustainable value. In doing this, the skills at play would often defy the mathematical logic an engineer is accustomed with.

#### **4. CONTEXTS OF ASSESSMENT AND VALUATION**

The generic use of 'valuation' to capture all forms of assessment (including qualitative evaluation) has probably become the albatross around professional misconceptions and abuse. Many fields engage in different forms of 'valuation', 'evaluation', 'assessment' etc perhaps, in relation to their methods, products and practices. 'Valuation' in quantity surveying is aimed at estimating the worth of contracts and works-in-progress. In business accounting, valuation is a more discreet activity concerned with unexhausted capital investment on assets for the purpose of preparing annual financial returns. Accordingly, the focus is on actual expenditures (or invested capital) as proved by documentary evidences unlike professional valuation that seeks to determine unbiased exchange worth. Much as the terminology in each of these coincides with the activities of professional valuation, neither of them assumed the role of a property valuer. Medical personnel would often evaluate the condition of his patient, the effectiveness of a treatment mode and the efficiency of a particular apparatus or equipment used. He nevertheless would not thereby present himself as a valuer. When an engineer also has instruction to assess a machine, a production method or a particular plant layout, the essence is often to ascertain the technical or functional state of the machine, the efficiency of production method or the plant layout against predetermined criteria. None of these constitute valuation from the perspectives of financial transactions or investments.

Notwithstanding, assessment is actually a vital ingredient in valuation but not its substitute. In the health sector, surgeons know their limit and

would often refer a patient for proper medical diagnosis and analysis prior a decision on nature and extent of operation required. Similarly, property assets are in various forms and had succinctly been classified into real properties, personal properties and intrinsic properties [5]. By training and orientation, the valuer would seldom possess sufficient understanding of the nature of the different assets he is expected to value, hence his need to make recourse to experts in related fields. If a surgeon must demonstrate the use of bone distractor to a valuer and in the process comment on its functional state, he has not done the valuer's work for him but only provided some important data input for his use. Where the surgeon has been hired by the valuer for this purpose, he becomes an ancillary service provider for fee and this could not give rise to the issue of superiority between them.

#### **5. ENGINEERING ASSESSMENT, PROPERTY VALUATION AND MANUFACTURING**

Valuation is built on information at different aggregate levels, from specific technical details to macroeconomic trends [12]. The ease of access to the necessary information varies from one subject of valuation to another and this determines the complexity involved in each exercise.

Manufacturing activities are diverse in nature (food and confectionaries, household items, textiles, metal, ceramics, petrochemicals, automobiles etc) and rely much on machines and equipment of various forms. These are in addition to buildings and structures which themselves could range from simple through complex to specialized, custom-built types that flush into machinery. The implication here is that mere identification and inventory of assets could become a daunting task, aside from their valuation. Traditionally, the design, construction and maintenance of these assets fall into the domain of engineering. In some instances, they may need to handle or superintend their operations. From time to time as well, situations arise for the engineer to assess the functional or technical state of a machine for purposes of:

- i) ascertaining whether to repair, refurbish or replace (partially or wholly);
- ii) assessing mechanical and electrical risks, including accident analysis;

- iii) determining its ergonomics, operability and serviceability;
- iv) establishing conformity assessment under a Machinery Directive or customized evaluations; and
- v) ensuring compliance to quality standard.

Carrying out any of the foregoing tasks did not prime facie, presume a desire to advise on investment worth or ascertain monetary value of PEM for financial or market transaction purposes. Nevertheless, results of such assessment or analysis afford easy understanding of the characteristics and condition of the items (property-specific data) as input to professional valuation. This is akin to the diagnosis a laboratory scientist offers a medical practitioner or surgeon which has not replaced the latter's relevance. For the engineer to transform from technical analyst to market and financial adviser without appropriate background knowledge, skills and experience however, could therefore amount to juxtaposing and misconstruing concepts. Fig. 1 illustrates the

typical areas of comparative competencies of the ESV and Engineer when confronted with assessment and valuation of an industrial machinery. When the ESV receives instruction to value, he seeks after necessary documents (legal and financial) to properly define and authenticate the scope of his engagement. Thereafter, he must liaise with the technical expert (perhaps, the plant engineer) for precise identification and detailed description of the items, usually with the engineer playing the lead roles here. Often, this process must be accompanied by condition assessment of each item or line of machinery installation. Collation of data (documentary and physical) would thereafter be jointly reconciled.

Also of note in PEM valuation is the place of technical efficiency [13]. Assessment of technical efficiency of machinery and equipment is a vital input to their valuation especially, if they are to be disposed (either in-situ as a going concern or on break-up basis). For break-up valuation however, the type of condition assessment

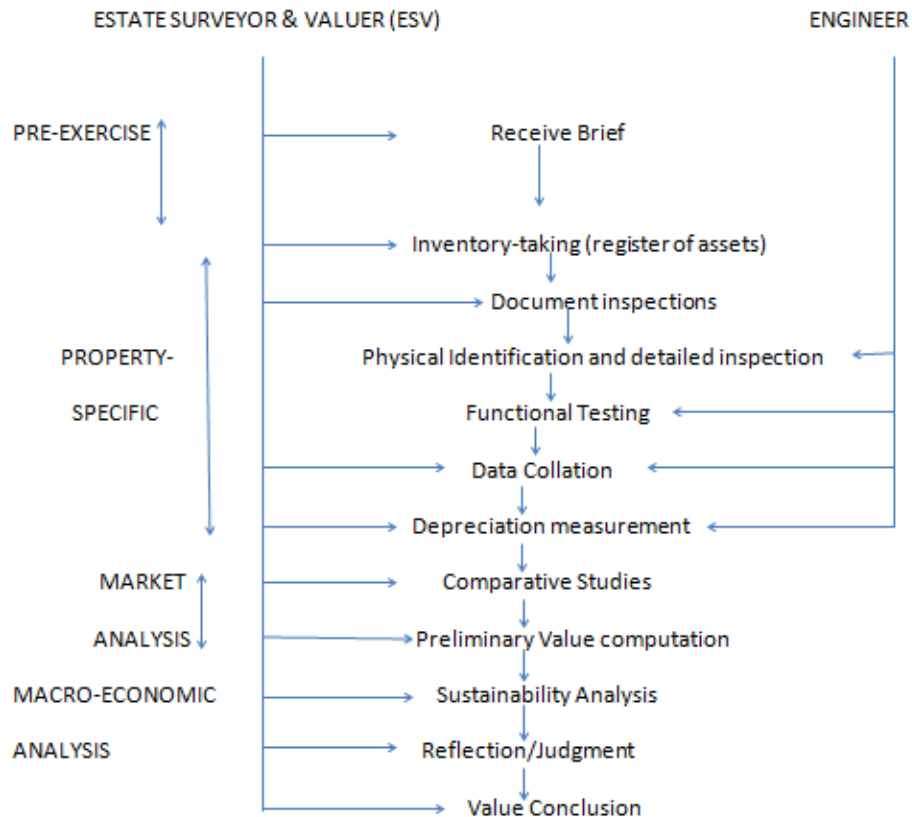


Fig. 1. Simplified typical procedure and responsibilities in machinery valuation

required would differ and the interest may shift to cost of de-installation and adaptability to a proposed use. Depending on the circumstance therefore, the measurement of depreciation, as depicted in Fig. 1 could be carried out solely by an ESV or in conjunction with the engineer. In any case, valuation for exchange is not necessarily between buyers and sellers as there can be scores of purposes and corresponding concepts (or premises) of value within different economic and financial scenarios whereby only a market player would be able to decipher.

## 6. WHO IS A PROPERTY VALUER?

Valuation of property assets for various purposes is a service and by nature and scope, it is distinct from activities of assessment, evaluation and measurements that are incidental to allied professional services in accounting, quantity surveying and engineering. It has its discipline and this must be nurtured and not bastardised.

When IVSC threw up the question of the appropriate definition of a professional valuer between 2010 and 2011, they received as varied answers as the number of respondents [14]. In this light, the reference to the valuation duties in IACE as 'engineering appraisal (valuation)' was invariably a technical assessment misconstrued as substitute to the conventional market valuation of professional property valuers [15]. While the Nigerian ESV cannot boast of monopoly of knowledge and competence in all valuation subjects, his disposition (academic and practice) only places him at an advantage over other proximate professionals. To acquire full competence in the valuation of all forms of property assets, the ESV need to a pursue adaptable knowledge in various other subjects of valuation beyond his subsisting real estate orientation. This would invariably require that his academic and practice focus be devolved into optional core valuation and real estate sub-fields. Otherwise, for quality service in an increasingly complex society, the ESV must be prepared to collaborate with specialist experts (like engineers) when required. A similar practice was reported to be operational among valuation firms in Kenya [3].

Nevertheless, professional engineers, quantity surveyors and accountants can explore their proximate knowledge areas by pursuing a full property valuation career. Many estate surveyors and valuers also discovered themselves to be

somewhat richer in knowledge about land than most legal practitioners but rather than appropriate to themselves the designation of 'land lawyers,' many went ahead to formally obtain full training and registration as lawyers.

## 7. INTERDISCIPLINARY, MULTIDISCIPLINARY AND COLLABORATIVE SERVICES

A complex professional service can either be accessed from several disciplines at the same time (multi-disciplinary route) or alternatively, from one or more disciplines jointly combining resources and efforts (inter-disciplinary route). Multidisciplinary service falls under two subdivisions – a firm offering more than one type of professional service by having multiple professionals on board, and several professional firms offering the same service concurrently. The first category is designed for services that do not fall within the exclusive competence of members of one profession and the inherent opportunities and challenges involved has been studied [16]. The arrangement, it was reported, would afford easy coordination of related services, expand the scope of business of firms and could mean possibility of reduced fees being charged to clients through high volume of business. However, it could also lead to conflict of interest because where one firm is offering different services, checks and balances may be lost. Apart from these is the likelihood that non-specialisation could also mean insufficient expertise in some services from any of the professions. For instance, we could have engineers, estate valuers and accountants jointly running the same consultancy firm for the purpose of engaging in the professional valuation of all forms of property assets. Here, it would be unethical for the same firm involved in professional valuation of assets to also act as accountants in preparation of financial reports.

The second multi-disciplinary approach relates to two or more independent firms concurrently engaged in rendering the same or similar services. This engenders competition that could spur efficiency as well as reducing service cost to beneficiaries. It is nevertheless bedeviled with inconsistencies in approach and quality of solutions being proffered to similar problems. It also becomes more tasking to the service provider as it tantamount to a reversal to subsistence production.

In a similar vein, inter-disciplinary service could take two forms: An integrated approach where a service that cuts across two or more professions is carved out for specialized participation based on training curriculum adapted from the relevant fields, or alternatively, by collaboration among allied professional firms in the delivery of services that require their joint inputs. Interdisciplinary approach has been defined as 'inquiries which critically draw upon two or more disciplines and which lead to an integration of disciplinary insight' [17]. Interdisciplinary approach is however predicated on integration of academic curriculum across disciplines. This would be achievable in valuation when the various strands of professional property valuation are configured together under one disciplinary focus – property valuation – embracing real properties (land, buildings and structures), personal properties (machinery, equipment, vehicles, furniture, fittings and other tangible assets) and the intrinsic properties in-built in individuals (perhaps, copyright and patents) and firms (such as licenses, goodwill, trademarks).

For a field like property valuation attracting the interests of built environment professionals, engineers and those in accounting and finance, this first option would be a fairly long-term proposition as the foundation must be laid in the academia. A study had found that such interdisciplinary approach creates cognitive development which allows students to see relationships among content areas and understand principles that cross curricular lines [18]. Invariably, it was stressed, their psychosocial development gives them the ability to understand people and to look at situations from various viewpoints. Presently however, inter-disciplinary participation by collaboration is considered apt. It may be slightly more expensive compared to multi-disciplinary route, but ensures integration of knowledge and expertise for top quality service delivery with tendency for cross-sectional consistency in the approaches to resolving related problems.

A manufacturer with investments in land, buildings, machinery, furniture, vehicles, and intangible assets would be more relaxed when the valuation of these multiple assets are being coordinated by a consultancy firm reputed with needed expertise and experience unlike sourcing separately for expert land valuers, machinery valuers, furniture valuers, intangible valuers etc. Even if he could secure them all, there would be agitations on the comparability of their respective

definitions of value, appropriateness and consistencies of the principles each built into the exercise and whether it is rational to sum up their different figures of value. If the latter action (summation of figures) is carried out, the opportunity of expert reflection on this new figure (a vital aspect of professional property valuation) would be missing.

The professional owes his client quality service and where some of the requisite knowledge and experience to accomplish this reside in another; he has the obligation of accessing such in an ancillary manner. Valuation of properties for various financial, business and statutory purposes is one type of service that embraces assets with differing nature and attributes and the knowledge of which would be essential input into value determination. Though the ESV has the necessary market and economic disposition alongside the tools and methodologies for valuation, the understanding of the specific features of the asset would often require that he engages allied specialist professionals.

## 8. CONCLUSION

Professionalism is about efficiency but this is in various dimensions and perspectives. When a crime is committed, the moralist explores the intention; a legal expert probes the circumstance while the populace weighs the impact. All are trying to judge the case but by viewing the same action from different perspectives, their various conclusions, though rational on their individual merits, tend to differ. Where the goal is the same therefore, variations in perceptions must be effectively coordinated. The old saying 'all professions are conspiracies against the laity' is perhaps more apt to valuation [19]. Several professional groups engage in it in spite their varied background and yet each claim sufficient competence. Multiple disciplines offering the same or similar services put the society in confusion and danger of improvised services. If engineers, estate surveyors and valuers and other allied professionals are acknowledged to be proficient in aspects of property valuation, it should not be difficult to formulate a mid-way discipline and profession with core valuation focus. The pursuit would then be property valuation in its holistic approach rather than strands of real property valuation by a group, machinery valuation by another and agricultural or intellectual property valuation by yet different other professionals. This is a refinement of such calls earlier made for a separation of valuation





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