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A Framework for the Development of a Mass Valuation Standard in South Africa

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DECLARATION

I, *Steven Piet Ngubeni*, declare that this is my own unaided work. The sources used in the thesis have been acknowledged and properly referenced. This study has never been submitted to any other university for academic examination.

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Steven Piet Ngubeni Date

DEDICATION

My father : John Ngobeni

My late brothers : Wisani, Ntsanwisi, Joseph and Maxangu Ngobeni

My late sisters : Tinyiku, Kanelani and Constance Ngobeni

My late leader : Victor “Slovo” Khanye

My late confidant : Ronald “Skokis” Du Toit

My late son : Ntsako (Njabulo) Clarence Ngubeni

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ABSTRACT

The observed prevalence of objections to the municipal valuation rolls in the metropolitan municipalities in South Africa suggests the existence of valuation inaccuracy. Research has revealed that valuation inaccuracy is more prevalent in mass valuation compared to single property valuations. It is also attributable to the absence or lack of valuation standards guiding professional valuers on mass valuation. Most countries using ad valorem tax subscribe to the notion of standardising valuation practices with the hope of improving valuation accuracies. Thus, the international valuations fraternity takes a leaf from the International Association of Assessing Officers (IAAO's) Standards for Mass Appraisal of Real Property.

The research also revealed that while many countries recognise the IAAO's standards, there is a compelling case for localisation of mass valuation standard. South Africa, as a free-market economy, is no exception to this international movement. The localisation of standards by its very nature requires a clearer understanding of the local socio-economic and cultural contexts. Thus, the main objective of this study was to investigate and evaluate the use of valuation principles and practices for mass valuation with a view to designing a framework for the development of a mass valuation standard for the South African property market.

A mixed method approach, which entails collecting requisite information through interviews, surveys, focus group discussion and secondary (example property) data, was adopted for the study. Consequently, purposive and snow-balling sampling techniques were used to identify the interviewees, survey and focus-group participants, while the example property data was supplied by the City of Johannesburg. The data collected through interviews and focus-group discussions were analysed using the data analysis spiral approach. The data collected through the questionnaire was subjected to a simple statistical analysis. Additionally, statistical tests including, the Assessment Sale Ratio

(ASR), the Price-Related Differential (PRD), the Price-Related Bias (PRB), the Coefficient of Dispersion (COD), the Mean Absolute Percentage Error (MAPE), and the Root Mean Squared Error (RMSE) were used to analyse the sampled property data.

The results garnered from the analysis of the interviews, and the questionnaire survey, revealed imperfections in mass valuation accuracy and uniformity in South Africa. The results on the selected statistical measures show the scores of 0.97 for the ASR, 1.022 and -1.01 were for PRD and PRB, respectively. In addition, the scores for the COD, RMSE and the MAPE were found to be 9.60%, R40 000.00 ($2 281.52) and 23.5% respectively. The scores on the first three statistical measures are all within the parameters of acceptability of the IAAO standards, while the last three measures do not have predetermined standards. Overall, the results suggest negligible degree of inaccuracy and lack of uniformity which denotes under-valuation in some property classes such as the agriculture, industrial and commercial properties.

These results of the study led to the development of a framework for the development of mass valuation standard for South Africa. It also led to the formulation of questions for the focus-group discussions, which were used to test and validate the proposed framework. These questions focused on whether the proposed framework offers' solutions aimed at improving valuation accuracy in South Africa. The proposed framework addresses (1) the process of developing the standards and (2) high-level discussion of substantive contents of the standards. Thus, the proposed framework was affirmed by both focus groups, since it provides a simplified guide that stakeholders involved in the development of mass valuation standard could use.

Keywords: mass valuation, mass valuation standard, South Africa, valuation accuracy, valuation inaccuracy

OPSOMMING

Die waargenome voorkoms van besware teen die munisipale waardasierolle in die metropolitaanse munisipaliteite, in Suid-Afrika, kan grootliks toegeskryf word aan waardasie-onakkuraatheid. Navorsing het aan die lig gebring dat waardasie-onakkuraatheid meer algemeen voorkom in massawaardasies teenoor enkel eiendomswaardasies. Dit kan ook toegeskryf word aan die afwesigheid of gebrek aan waardasiestandaarde wat professionele waardeerders op massawaardasies lei. Die meeste lande wat *ad valorem*-belasting gebruik, onderskryf die idee om waardasiepraktyke te standaardiseer met die hoop om waardasie-akkuraatheid te verbeter. Die internasionale waardasie gemeenskap neem kennis van die "International Association of Assessing Officers" (IAAO) se standaarde vir massa waarde bepaling van vaste eiendom -"Standards for Mass Appraisal of Real Property".

Die navorsing het ook aan die lig gebring dat alhoewel baie lande die IAAO se standaarde erken, daar 'n behoefte bestaan om massa-waardasiestandaarde meer relevant van toepassing op Suid-Afrika te maak. Suid-Afrika, as vryemark-ekonomie, is geen uitsondering op hierdie internasionale tendens nie. Om dit te kan doen, vereis uit die aard van die saak 'n beter begrip van die plaaslike sosio-ekonomiese en kulturele omstandighede. Die hoofdoel van hierdie studie was dus om die gebruik van waardasiebeginsels en -praktyke vir massawaardasies te ondersoek en te evalueer met die oog op die skep van 'n raamwerk vir die ontwikkeling van 'n massawaardasiestandaard vir die Suid-Afrikaanse eiendomsmark.

'n Gemengde metode, wat die insameling van vereiste inligting deur middel van onderhoude, opnames, fokusgroepbespreking en sekondêre data (voorbeeld eiendomme), is vir die studie gebruik. Gevolglik is die doelgerigte en sneeubal steekproefnemingstegnieke gebruik in die identifisering van die opname-respondente, onderhoud- en fokusgroep deelnemers. Die data vir die voorbeeld eiendomme was voorsien deur die Stadsraad van Johannesburg. Die data wat

deur middel van onderhoude en fokusgroepbesprekings ingesamel is, word met behulp van die spiraalbenadering tot data-analise ontleed. Die data wat deur die vraelysopname ingesamel is, is aan ‘n eenvoudige statistiese ontleding onderwerp. Daarbenewens is ‘n statistiese verhoudingsanalise gebruik om die sekondêre data van die Stadsraad van Johannesburg te ontleed. Die verhoudingsanalise behels die assesseringsverkoopverhouding (ASR), die prysverwante differensiaal (PRD), die prysverwante vooroordeel (PRB), die verspreidings-koffisiënt (COD), die gemiddelde absolute persentasiefout (MAPE) en die wortelgemiddelde kwadraatfout (RMSE) wat gebruik word om die gemonsterde eiendomsdata te ontleed.

Die resultate wat uit die ontleding van die onderhoude en die vraelysopnames verkry is, het die onvolmaakthede in massa-waardasieakkuraatheid en eenvormigheid in Suid-onderstreep. Die resultate op die geselekteerde statistiese maatstawwe toon dat die tellings van 0,97 vir die ASR, 1,022 en -1,01 onderskeidelik vir PRD en PRB was. Daarbenewens is bevind dat die tellings vir die COD, RMSE en die MAPE onderskeidelik 9.60%, R40 000.00 ($2 281.52), en 23.5% is. Die tellings op die eerste vier statistiese maatreëls is almal binne die parameter van aanvaarbaarheid van die IAAO-standaarde, terwyl die laaste twee maatreëls nie voorafbepaalde standaarde het nie. Oor die algemeen dui die resultate op ‘n mate van onakkuraatheid en ‘n gebrek aan eenvormigheid wat tot onderwaardering in sekere eiendomsgroeperings lei soos landbou-, industriële en kommersiële eiendomsklasse.

Hierdie resultate van die studie het gelei tot die daarstelling van ‘n raamwerk vir die ontwikkeling van massawaarderingstandaarde vir Suid-Afrika. Dit het ook gelei tot die formulering van vrae vir die fokusgroepbesprekings, wat gebruik is om die voorgestelde raamwerk te toets en te bekragtig. Hierdie vrae het daarop gefokus of die voorgestelde raamwerk oplossings bied wat daarop gemik is om waardasie-akkuraatheid in Suid-Afrika te verbeter. Die voorgestelde raamwerk spreek (1) die proses om die standaarde te ontwikkel en (2) hoëvlakbespreking van substantiewe inhoud van die standaarde aan. Die voorgestelde raamwerk

is dus deur beide fokusgroepe bevestig, aangesien dit ‘n vereenvoudigde riglyn bied wat gebruik kan word deur belanghebbendes wat betrokke is by die ontwikkeling van massawaardasiestandaarde.

Sleutelwoorde: waardasie akkuraatheid, waardasie onakkuraatheid, massa waardasie, massa waardasiestandaarde

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF EQUATIONS

ABBREVIATIONS AND ACRONYMS

AI	Artificial Intelligence
ANN	Artificial Neural networks
ASA	American Society of Appraisers
AVM	Automated Valuation Models
BC	Buffalo City Metro
BNS	Biological Neural System
BPVA	Black Professional Valuers Association
CAMA	Computer-Assisted Mass Appraisal
CBD	Central Business District
CoCT	City of Cape Town Metropolitan Municipality
COD	Coefficient of Dispersion
CoGTA	Cooperative Governance and Traditions Affairs
CoJ	City of Johannesburg Metropolitan Municipality
CoT	City of Tshwane Metropolitan Municipality
COV	Coefficient of Variation
CPD	Continued Professional Development
CPI	Consumer Price Index
DALRRD	Department of Agriculture, Land Reform and Rural Development
DCF	Discounted Cash Flow
EVS	European Valuation Standards
EMM	Ekurhuleni Metropolitan Municipality
FL	Fuzzy Logic
FLA	Fuzzy Logic Approach
GDP	Gross Domestic Product
GEAR	Growth Employment and Redistribution
GUI	Graphical User Interface
GV	General Valuation
GWR	Geographically Weighted Regression
HR	Hit Ratio

HPM	Hedonic Price Models
IAAO	International Association of Assessing Officers
IPD	Investment Property Databank
IVS	International Valuation Standard
IVSC	International Valuation Standard Committee
JHB	Johannesburg
LMs	Local Municipalities
LPI	Land Parcel Identifier
MAPE	Mean Absolute Percentage Error
MPRA	Municipal Property Rates Act (Act 6 of 2004)
MRA	Multiple Regression Analysis
MVS	Mass Valuation Systems
OLS	Ordinary Least Squares
OVG	Office of the Valuer-General
PRE	Property Rates Expert
PVA	Property Valuation Act (Act 17 of 14)
PVG	Professional Valuer in Government
PVPS	Professional Valuer in the Public Sector
RICS	Royal Institute for Chartered Surveyors
RMSE	Root Mean Squared Error
ROI	Return On Investment
SA	South Africa
SACPVP	South African Council for Property Valuers Profession
SAIV	South African Institute for Valuers
SALGA	South African Local Government Association
SAM	Spatial Analysis Models
SAPOA	South African Property Owners Association
SEM	Spatial Errors Model
SLM	Spatial Lag Model
SRM	Spatial Regression Model

TEGoVA	The European Group Valuers of Fixed Assets
UCT	University of Capet Town
UK	United Kingdom
US	United States
USA	United States of America
VAB	Valuations Appeals Board
WLS	Weighted Least Squares

CHAPTER 1

INTRODUCTION AND BACKGROUND

"The mere formulation of a problem is far more essential than its solution, which may be merely a matter of mathematical or experimental skills. To raise new questions, new possibilities, to regard old problems from a new angle requires creative imagination and marks real advances in science."

(Albert Einstein)

1.1 INTRODUCTION

Mass appraisal (valuation) is a process of valuing a universe of properties through the usage of common models, methodologies and data, and subjecting the outcomes to statistical testing (Baranska, 2013). A standard is understood to be a quality acceptable to most people including valuers, clients, authorities and the public (Anghel, 2012). Accordingly, the mass property valuation standards are expected to provide a framework that guides the practice of value estimation for a universe of properties relative to different classes of properties. Conventionally, different approaches are employed by valuers to determine the market value of properties.

However, the use of any valuation approach is predicated on client requirements and best use of a property. In the case of municipal general valuations, the valuation date, accuracy and uniformity fairness are paramount definition of such a need. The guidance notes or 'red book' and mass appraisal standards designed by the Royal Institution of Chartered Surveyors and the IAAO and adopted by several countries relative to their contextual settings, have proven to be useful tools in ensuring accuracy, uniformity and vertical equity in the assessment of single and mass appraisal of properties.(IAAO, 2013).

Over the years, the South African Council for Property Valuers Profession (SACPVP) has designed a regulatory framework relative to the local property

market for single valuations of property. However, the developments in the South African property market in the last few decades have witnessed a surge in the assessment of several properties for mortgage underwriting and municipal property taxation. These developments and the surges in the objections relating to the municipal valuation rolls elicit the need to standardise the practice of mass valuation in South Africa to guide the property valuers and other property analysts in line with the international best practice.

This chapter provides the background to the study, the motivation for and rationale of the study, the research problem, the research questions, the research objectives, the research methodology and the contribution of the study to the body of knowledge. Finally, the last section outlines the structure of the thesis.

1.2 BACKGROUND TO THE STUDY

One of the sources of revenue for most local government or municipal councils in the world is the imposition of property tax (Craythorne, 2003). Thus, most local governments or municipalities worldwide have always carried out mass property valuations as a basis for ascertaining the rates and taxes to levy. While it is acceptable to manually estimate market values over several properties, the limitations arising from valuers' subjectivity, time, cost and insufficient comparable properties have rendered the use of traditional valuation methodologies practically impossible (Adair and McGreal, 1988).

Computerised valuation techniques were designed to complement the valuers' role in ascertainment of market values over several properties. These techniques, especially the hedonic regression, is widely used in municipalities that have introduced the value-based assessment of property prices for property taxation. In South Africa, properties are subject to three types of taxation: capital gains tax, transfer duty tax and property rates tax (World Bank, 2020). However, until the year 1993, property taxation only applied to the former white areas. Black townships were not subjected to property taxation due to the apartheid property ownership patterns. The practice was extended to black

townships in 1993 and in 2004, municipalities began to make use of the ad valorem taxation approach, meaning reliance is placed on the market values of the properties for the imposition of property taxation (Craythorne, 2003).

There are three spheres of government in South Africa, namely the National Government, Provincial Government and Local Government (Municipalities) (South Africa, The Constitution, 1996). Furthermore, local government is categorised into three municipalities: Category A (Metropolitan Municipalities), Category B (Local Municipalities), and Category C (District Municipalities) (South Africa, 1998). There is a total of 257 municipalities, constituted of eight (8) metros, 205 local municipalities and 44 district municipalities (SALGA, n.d.). The responsibility for levying property rates in South Africa resides with local government and particularly the Category A and B municipalities.

The revenue collected by these municipalities from the property rates and taxes accounts for R18 billion per annum, which is approximately 17,5% of the total revenue in the municipalities in South Africa, on average (World Bank, 2020; Statistics SA, 2018). This revenue is largely used municipalities for urban management and to fund infrastructure development and maintenance of basic and related services (Franzsen and Olima, 2003; Craythorne, 2003). Even though it has always been reported that property taxes are the fairest form of taxation in South Africa, fairness and equality of value and rate remain very sensitive issues when dealing with the compilation of the valuation roll for the imposition of property rates (Franzsen, 2009). Objections and representation as well as the court challenges against the municipal valuation rolls support this assertion.

For this reason, amongst others and guided by Section 229(1)(a) of the Constitution of the South Africa, which empowers the Categories A and B municipalities to levy rates on any property within its demarcation, parliament passed the Municipal Property Rates Act (MPRA) (South Africa, 2004) to further regulate the business of property rates and taxes. Amongst other issues, the MPRA requires that municipalities must conduct general valuations as frequently as possible. More specifically, the MPRA provides that each

municipality must compile the municipal valuation roll at least for every four or five years which must depict the prevailing market value for every land parcel within the municipal jurisdiction. In the same vein, the MPRA provides the basis for the use of valuation standards during the municipal valuation process.

Section 45(1) of the MPRA requires that all properties be subjected to the generally recognised valuation practices, methods and standards and that the basis for valuation remains the market value. However, this remains a challenge because South Africa does not have its own standards specific to the country. To this end, South African places reliance on court rulings, and to some degree, on the IAAO standard which is an international standard. While these have momentarily abated the prevailing challenges, several court cases stemming from dissatisfied taxpayers and other clients reveal the need to have country-specific mass valuation standard for South Africa.

There are previous studies in existence relative to designing valuation standards including country-specific standards, including Anghel (2012) and the Royal Institution for Chartered Surveyors (RICS), (2014) on China, the UK, the USA and Brazil; Narayan, Biswas and Sahib (2017) on Fiji; and Kara, Çağdaş, Işıkdağ, van Oosterom, Lemmen and Stubkjær (2017) on Finland. These studies capture the underlying philosophies and the contextual settings of property markets behaviours of the different countries analysed. However, it is difficult for findings from these studies to be implemented in other countries, especially South Africa, with its uneven property taxation rates courtesy of the unsavoury history of apartheid without understanding the contextual problems and the South African property market dynamics. Furthermore, these studies do not address the framework for the development of a mass valuation standard such as the one desirable for South Africa.

1.3 PROBLEM STATEMENT

Channing (2013) noted that most of the challenges raised by the public during objections and representations are attributable to the inconsistent application of valuation procedural principles. For instance, it is accepted and common

practice that the choice of a valuation approach(es) must be informed by the best use of the subject property (i.e., the property being valued). Court cases showed that inconsistencies often arise because valuers use their discretion on the choice of valuation approach to be employed when determining property values. In the case of *Atholl Developments (Pty) Ltd v Valuation Appeals Board for the City of Johannesburg (CoJ VAB) and another* (2014), the question of powers and procedures were raised but the valuation outcome is predicated on the approach used to determine the value of properties. The court, however, decided that due to lack of substantial evidence, the correct valuation approach should be used by the CoJ VAB.

The decided case in the preceding paragraph is one of the many cases arising from the misuse of valuation methods among valuers during municipal valuations in South Africa. It is undisputed that when a wrong valuation approach, method or model is used, there tends to be either over-valuation or under-valuation of a property. This problem escalates when several properties are involved in the assessment. More than three decades ago, Adair and McGreal (1988) observed the limitation of using the traditional valuation methodologies in the assessment of properties because of the valuers' subjectivity and inconsistency. While the traditional methodologies are generally deemed adequate in the assessment of a single property, it becomes problematic when the scope is widened. Hence, it is argued that the inability to use automated valuation techniques for assessment of a group of properties is the cause of a wide gap in the assessed values and the market price in the local property market.

The assessed value of a property is used to determine the amount of tax paid to municipalities in South Africa. Consequently, a misleading value estimate would mean that the taxpayer is either heavily taxed if the property is overpriced or inadequately taxed if the property is undervalued. The problem of under-valuation breeds disputes between the South African Property Owners Association (SAPOA) and the CoJ (Channing, 2013). The court found that municipalities sometimes deliberately under-value residential properties, which

subsequently leads to a lower municipal rate and tax revenues. Similarly, municipalities over-value commercial properties in order to subsidise the loss incurred as a result of undervaluing residential properties. In the end, the courts directed that in determining the market values of properties, municipalities should always strive for improved valuation accuracy and consistency.

Smith (1986) noted that inconsistencies stem from two fronts: (1) differences in the underlying valuation theories; and (2) the valuation applications that are inconsistent with the theoretical principles. If allowed to persist, inconsistencies can lead to inaccurate valuation conclusions, wide disparities amongst valuers assessing the same property, and even lowered public confidence in the professional valuers. There is a growing debate on how to tackle problems of inconsistencies and inaccuracies in valuation of properties (Kauko and d' Amato, 2008; Gonzalez, 2008). Other countries have faced similar challenges in the past leading to the establishment of the International Valuation Standards (IVS).

However, while the scope of IVS is applicable to single property valuation in every country, local market indices must of necessity be factored in for effective application. For instance, the developed countries have matured property markets while developing countries, especially sub-Saharan Africa like South Africa are still in the process of maturing. To accommodate mass valuation, the combination of the 1984 standard on mass appraisal with standards on the application of the three approaches to value occurred in 2002. The 2002 standard was also revised in 2012 to the standard on mass appraisal of real property (IAAO, 2013a). Harris County Appraisal District (2013), as well Kauko & d'Amato (2008) asserted that Europe, USA and Canada had been using the uniform mass valuation standard approach in their mass appraisals, especially as it applies to ad valorem taxes. These countries preferred to adapt the international standards on mass appraisal of real estate which were first adopted in 1984 by the IAAO.

Even though it is asserted that some municipal valuers in South Africa do make use of the IAAO's Standard on Mass Appraisals, there is no evidence in

literature suggesting that there is a concerted effort and commitment to that effect (SAIV, 2015). Evidently, there is a general concern within the property valuation discipline in the country relative to the extent of applicability of the IAAO's Standard on Mass Appraisals in the property market. Logic demands an answer as to why do the valuers in South Africa avoid the use of IAAO's mass valuation standard? Anecdotal evidence suggests that the IAAO standard is not fully compatible with the municipal valuation legal and policy framework. The foregoing reveals that South Africa does not have any compulsory and country-specific standard on mass valuation (SACPVP, 2021). There is, however, some degree of reliance on the standard on mass appraisal of real property by the IAAO, which is largely used in the Americas, Australia and Europe.

As observed in SAIV (2015), municipal valuers in South Africa simply pick and choose some sections from the International Mass Valuation Standard of the IAAO and apply these during the municipal valuation process. Although, to some extent, the MPRA directs that valuations for rating purposes must be carried out in accordance with the acceptable valuation practices, methods and standards (South Africa, 2004:34), this still leave valuers to apply discretion. Until November 2020, such a standard as required by the MPRA, did not exist in South Africa. Instead, the valuation fraternity was left with the option of IAAO's standard on mass appraisal of real property. One notable concern in the application of the IAAO's Standard on Mass Appraisal of Real Property for the South African property market remains the contextual differences that exist among developing countries and developed countries. Thus, a country-specific standard that accommodates components of the local market and international markets backed with a legal framework is needed for effectiveness.

1.4 RESEARCH QUESTION

From the above problem statement, it can be understood that there is a problem of valuation inaccuracies in municipal valuations in South Africa, which is a result of lack of or non-use of mass valuation standard. Arising from this

problem, an answer to the following research question must be provided by the study:

How can South Africa develop mass valuation standard to improve valuation accuracy, especially for municipal valuations?

1.5 RESEARCH AIM

The aim of this study is to investigate and evaluate the usage of mass valuation principles and standards in the South African property market, especially for mass valuation. This is with the view to developing a framework that can serve as a guide to policy makers in the overall development of mass valuation standard for South Africa in line with international best practice.

1.6 RESEARCH OBJECTIVES

The research aim stated above is guided by the following research objectives for its achievement:

1. To investigate and discuss the generally accepted valuation approaches and models for mass valuation in the world.
2. To investigate and discuss the existence, the extent and the causes of valuation inaccuracy in the world, as well as the existence of valuation standards.
3. To test, discuss and confirm the existence, and the extent, of mass valuation inaccuracies in South Africa.
4. To identify and investigate the critical factors affecting the improvement of accuracy and uniformity in mass valuation in South Africa.
5. To develop and validate a framework for a mass valuation standard aimed at improving valuation accuracies in South Africa's municipal valuation.

1.7 RESEARCH METHODOLOGY

The philosophical grounding of the study remains the pragmatist worldview. As discussed in Maxwell (2000), this philosophy leads to a mixed approach, which,

in essence, employs both the qualitative and quantitative approaches, albeit with the concomitant bias and ratio of the mix.

The qualitative underpinnings were applied in pursuance of the first objective in the reviewing of the literature on the valuation approaches for mass valuation. In relation to the second objective, the quantitative analytical approach was employed when assessing the valuation rolls versus the market sales to establish the degree of accuracy of the market values depicted in the municipal valuation rolls. In pursuance of Objectives 3 and 4, the research used semi-structured interviews and focus-group discussions which involved municipal valuers and assistants as the underpinnings of the qualitative approach. Objective 5 is derived mainly from qualitative analysis of the primary and secondary data obtained during the study.

As a start, the study reviewed all the available and relevant literature in the form of academic papers, conference papers and academic textbooks. This literature review was guided by the study rationale, research problem and research objectives. Relevant studies conducted globally on the subject were also reviewed. Desktop study and analysis were then conducted. Included in the study and analysis were the reports submitted by the municipal valuers to motivate for the adoption of the valuation rolls by councils which were also reviewed.

The empirical component of the study included conducting semi-structured interviews with the valuers involved in the compilation of the valuation rolls for all metros which in South Africa i.e., Tshwane Metro, Johannesburg Metro and Ekurhuleni Metro, eThekwini Metro, City of Cape Town Metro, Buffalo City Metro and OR Tambo Metro. Cognizant of the possibility that the same valuer may be involved in more than one municipal valuation, all the valuers involved, whether permanent or consulting, whether municipal valuer or assistant, were interviewed for all the metros in the study. The data arising out of the responses by the interviews was analysed with the help of SPSS. The analysis involved the identification of thematic areas as well as statistical results.

Secondary data on the property sales and assessment values as depicted in the municipal valuation roll of the CoJ was considered for the assessment of valuation accuracy and uniformity in the assessment of real estate in the CoJ. Due to the reluctance by the municipalities in making available the valuation data the researcher only considered the sample provided by the CoJ. The sample was, therefore, selected based on convenience and availability, and further trimmed down to 88 653 properties. The main criteria used in the selection of the sample properties which had sales fall within the 24 months before the valuation date. The statistical measures including the ASR, PRD, PRB, COD, and Mean Percentage Error (MAPE), were used to assess the sample data in question, for accuracy and uniformity.

The interviews were guided by a questionnaire with a total of eight questions. The administration of the interview questions was at all times preceded by an informal discussion on the interviewee's background and involvement in municipal valuations. The interview guideline served to ensure a higher degree of consistency across all participants. The questions were carefully designed with the aim of establishing the views of the participants on the mass valuation standards. Where it was necessary, further questions were posed to probe the answers further. Each interview session lasted for a minimum of 30 minutes and a maximum of 1 hour 30 minutes, with an average of 60 minutes. Using the snowball sampling approach, 30 participants were invited, but only 13 invitees ultimately participated.

As guided by Tuckett (2004), the analysis of the data from the interviews was subjected to the qualitative principles of analysis. The interview records were transcribed and accordingly subjected to coding, comparison and diagramming. The transcripts were studied with the intention of broadly understanding the information contained therein. As a result, ideas were identified and categorised into themes, which were subsequently used to guide the discussions. The validity of the data was established through employing the qualitative principles of trustworthiness and authenticity.

1.8 RESEARCH DELIMITATIONS

In order to narrow down and keep the study manageable, the following parameters were set.

- In keeping with research aim and objectives, the literature review was focused on the valuation approaches as well as the mass valuation models such as the multiple regression analysis (MRA), Artificial Neural Network (ANN) and Spatial Analysis Models (SAM). It also included the review of the literature around valuation accuracy and mass valuation standard in existence elsewhere in the world.
- In terms of the interviews, the study targeted valuers from all eight metropolitan municipalities in South Africa. For the questionnaire survey, a maximum of 950 valuers with contact details, were targeted, while the CoJ was the focus of the mass valuation statistical study.
- The study only sought to develop a framework for the development of the mass valuation standard. The actual development of the standard was not included in the study due to the need for extensive public participation in the development of a standard.
- The secondary data relating to the assessment of valuation accuracy in South Africa was only conducted on the valuation roll of the CoJ. This was mainly due to the reluctance of the metropolitan authorities to make valuation data available for the study.

1.9 RESEARCH SIGNIFICANCE AND CONTRIBUTION

According to Hofstee (2006) and Mouton (2008), there are two dimensions that distinguish the study as a doctoral study. Firstly, it is the originality of the work at hand, and secondly, it is the ability of the study to contribute to the existing body of knowledge.

The available literature does not suggest that there has ever been a study which seeks particularly to develop a framework which will guide the development of

a South African-specific Standard on Mass Valuation. This presents an opportunity to close a research gap as identified in the literature review that shows a lack of a South African-specific Standard on Mass Valuation. This will contribute the desirable original knowledge to the body of knowledge in the field of mass property valuations in SA. The outcomes of the study will uniquely provide the basis for a properly guided mass valuation practice in the country.

The fact that there are new contributions to various facets of the mass valuation body of knowledge generated by authors such as Pi-ying (2011), Zhou, Ji, Chen and Zhang (2018) and Liu and Wang (2021) cannot be ignored. These contributions, however, do not necessarily address the creation of a mass valuation standard for South Africa. Most of these relate to choosing the right methods and techniques, improving on those methods and techniques, approaches to farm valuations, approaches to commercial valuations, as well as the employment of modern techniques such as artificial intelligence.

1.10 RESEARCH REPORT OUTLINE

The outline of this research report is made up of chapters arranged and explained as follows:

Chapter 1: Introduction. This chapter outlines the background to the study, the research problem statement, research aims, objectives, hypothesis, research design and methods and the outline of the chapter. In essence, this chapter provides the rationale and the motivation behind the study.

Chapter 2: Mass Valuation Approaches and Models. This chapter provides an appraisal of the valuation theories, ranging from single property valuation to mass valuation approaches. It entails a discussion on the evolution of the valuation approaches to date. This appraisal is presented with the end goal of laying a foundation for mass valuation standard.

Chapter 3: Valuation accuracy and Valuation Standards. This chapter involves a review of the literature about valuation accuracy or inaccuracy as others would prefer. It also discusses the evolution of the mass valuation

standard in the world. The chapter focused on the previous studies in countries of the Global South and North relative to the subject matter under consideration.

Chapter 4: Research Design and Methodology. This chapter outlines the structure of the research methodology followed in this study. The methodology is explained in detail, and it is supported by literature from authorities in research methods.

Chapter 5: Valuation accuracy and the Use of Valuation Standards in Mass Valuation in SA. This chapter presents and discusses the findings from the secondary data analysis conducted to establish the degree of valuation (in)accuracy in the Ekurhuleni Metropolitan Municipality, CoJ and City of Tshwane.

Chapter 6: Analysing the Empirical Research Findings. This chapter is an integrated analysis of the findings presented in the two preceding chapters. Concrete and firm proposals on the framework for the development of a standard on mass valuation in SA will also be presented in this chapter.

Chapter 7: Summary, Conclusion and Recommendations. This chapter provides a summary of the previous chapters. To conclude the chapter, the findings and conclusion were drawn. Finally, it also provides recommendations specifically relating to further research to be done in relation to the framework for mass valuation standard for SA.

CHAPTER 2

VALUATION AND MASS VALUATION APPROACHES

"Whenever a theory appears to you as the only possible one, take this as a sign that you have neither understood the theory nor the problem which it was intended to solve."

(Karl Popper)

2.1 CHAPTER INTRODUCTION

Property valuation is an ancient field of study. It has been used for centuries to estimate the value of real estate. It also forms the basis for property taxation. History has recorded several improvements in the property valuation field. These include the discovery of valuation approaches and methods ranging from the traditional to advanced methods. It also includes the use of technology such as the AVM in the valuations. Inevitably, property valuation grew to be relied on when considering imposing property taxes. Property taxation is used in many countries to enhance government revenue. This includes countries like SA, Hong Kong, America, Australia, United Kingdom and Canada, where it also constitutes an important part of the municipal tax revenue (Borst and McCluskey, 2008). The authorities in these countries largely rely on the ad valorem taxation system as the basis for imposing property rates and taxes. The processes of mass valuation must be supportable and transparent, especially to those who are payers of the property rates and taxes determined from the valuations.

According to Grover et al. (2017), the valuation processes are expected to be beyond reproach and to produce more accurate and unquestionable value estimates. Credible valuations upon which rates are based require high quality data in terms of market prices and property characteristics. Ordinarily, a credible valuation depends on time, the cost of valuation and the quality of data. The limitations of mass valuation are the time and cost required for the in-depth

individual property valuations. This renders the attainment of timeous and accurate mass valuation tedious and almost impossible.

According to Chan and Abidoye (2019), the accuracy of the valuation estimates is attributed to the appropriateness and effectiveness of the selected valuation approach. Several authors, including Yacim and Boshoff (2014), Abidoye and Chan (2016b) and Chan and Abidoye (2019) observed that the gradual improvements in the valuation approaches have always been necessitated by the accuracy requirements in the ultimate value estimates. Over time, the valuation approaches would attract some sort of criticism and that would have further galvanised the efforts in improving the valuation approaches as well as the introduction of new valuation approaches (Amri and Tularam, 2012; DeLisle, 2001; Do and Grudnitski, 1992). The valuation approaches have gradually evolved from single property valuations to the valuation of groups of properties (Yacim and Boshoff, 2014). They have also evolved from traditional (orthodox) valuation approaches to advanced (heretic) valuation methods (McCluskey, McCord, Davis, Haran and McIlhatton, 2013).

Relevant to the study are the concerns over the accuracy of valuations. It is evident from the discussion on the studies relative to valuation accuracy, that valuation approaches count as one of the causal factors of the prevalence of inaccuracy in both single property and mass valuation. In line with the focus of the study, the approaches are discussed with the intention of providing a background to valuation approaches, methods and techniques, as well as their impact on valuation accuracy. This concern is more pronounced in mass valuation because of the large volumes of the subject properties and limited valuation time available, which result in a compromise of accuracy and the quality of valuations. The review in this chapter also discusses the improvement in valuation accuracy as the result of the introduction of the ANN and spatial approaches among others (Abidoye and Chan, 2016c; Chan and Abidoye, 2019; Lam and Seneviratne, 2008; McCluskey et al., 2013; Selim, 2009; Yacim and Boshoff, 2020).

Accordingly, this chapter lays a firm foundation for a discussion on the mass valuation approaches and the inherent inaccuracies and inconsistencies. It starts by briefly outlining the valuation theory, followed by the orthodox (traditional) and heretic (advanced) valuation approaches. The chapter also discusses the history and evolution of both single property valuation and mass valuation (appraisal) approaches in terms their application on the residential and commercial properties. The chapter also discusses how the traditional approaches are used with ease in the valuation of a residential property, and their adaptability to mass valuations. However, it also outlines the applicability of the traditional and advanced approaches in the valuation of the commercial properties. Because of heterogeneity in the commercial properties and the complexity of the value determining attributes, the adaptation remains a challenge for the mass valuation of commercial properties. The chapter also identifies the research gaps relevant to the study.

2.2 THE CONCEPTS AND THEORIES OF VALUE AND VALUATION

There is a distinction between the “value” theory and the “valuation” theory. However, both find their origins in the subject of economics (Australian Property Institute, 2015). It is important to introduce this chapter by first discussing value and its theory because understanding valuation theory depends on understanding value theory. The former finds its expression in classical economics and politics (Australian Property Institute, 2015).

Value theory concerns the creation of value in an economic sense. Its proponents argued that value is a subject of a complex relationship between utility, scarcity, desire, and effective purchasing power in an endeavour to influence supply and demand (Blackledge, 2017). The latter, on the other hand, concerns the processes, methods, approaches and techniques of valuation. This relates to how properties are valued by valuers to arrive at an estimate value of the properties under consideration.

Value theory is as old as the contributions by ancient philosophers to economics and politics. According to Lorenz (2006), the concept of value is

described in the works of Xenophon (427-355 B.C.), Plato (427-347 B.C.) and Aristotle (384-324 B.C.). For instance, Xenophon argued that the value of goods depends on the understanding of how to use them. Otherwise, they could also be useless. Aristotle refers to two values: use value, which accrues as the result of its ability to satisfy the human necessities of life and exchange value, which arises from the natural circumstances that some have too much while others have too little(Appraisal Institute, 2001).

Lipsey, Langley and Mahoney (1985) debated the concepts of the exchange value and the market value. In their argument, the former concerns what the value is and will be, while the latter is concerned with what the value should be considering the production and labour costs. The idea of market value is therefore based on the market behaviourism while the latter is merely mechanical. The estimations of what the value will be are best derived from reading the behavioural trends.

The views held by Adam Smith in relation to value formation inform the accepted variety of definitions of market value, especially in the countries whose economic bias is more towards a free-market economy (Blackledge, 2017). This is mainly because in such an economy, the decision by the buyer to finally part with their money in exchange of a property is influenced by market perceptions which underpin the need to possess that property; thus, the demand for the same.

This assertion was further supported by Boshoff (2010) in arguing that the property demand and subsequently the property prices are influenced by affordability, which is indicated by capitalising part of the disposable income. In most countries, including SA, the basis of valuation for property rating purposes is the market value (South Africa, 2004). The market value is an integral part of the free-market economy.

The genesis of property valuation theory can be traced back to the debate between the two erstwhile economic schools of positive economics and normative economics (Lipsey, Langley and Mahoney, 1985). The valuation

theory, in general, is deeply rooted in the work of Alfred Marshal (1842-1925) who is regarded as the pioneer and the founding father of neoclassical economics. It was Marshal's theories of supply and demand that formed the critical basis for the market value concept. He took the discourse on the theory of value to the next level by introducing the methods and techniques of estimating, measuring and forecasting a defined value. Marshall is commonly credited for the origin of the three main traditional valuation methods and approaches: (1) Income capitalisation, (2) Cost Replacement and (3) Sales comparison (Appraisal Institute, 1996: 79).

Adam Smith (1721-1790) argued that value is formulated through the interaction of supply and demand forces. Karl Marx (1818-1883), on the other hand, argued that value is the result of production and cost (Appraisal Institute, 1996: 30-31; Moore, 2009: 24). It can be argued that the neoclassical economists in Britain introduced the art and the science of property valuation in the 1800s. The United States followed suit, commencing with the writings of Irvin Fischer who laid a firm foundation for the Income Capitalisation Approach.

According to Moore (2009: 26), Marshal's value theory was used to lay a firm foundation for the valuation approaches as we know them today. Later in the 1920s, the valuation profession, then referred to as the appraisal profession, was founded. The development of the valuation theory continues to grow even today. In the same vein, the valuation practice in SA is influenced largely by the practices in the United States.

Central to the ability of these countries in influencing SA is their economic systems, which are largely like SA's economic system. It is also a known fact that South Africa's legal system, which is used to regulate the economy and economic relations, derives its existence from the English law (Collins and Ghyoot, 2016). Accordingly, the valuation methods adopted in SA originate from the English and American writers in economics (Appraisal Institute, 1996; Cloete, 2004a).

From the discussion above, it is clear the economic and ideological posture of a country have a direct role to play in the determination of the market value. Without any doubt, this will influence the basis of valuation in relation to the property rates and taxes.

2.3 SINGLE PROPERTY VALUATION

The history of property valuation commences with the valuation of individual properties. It is the cradle of the ideas such as value, value formation and market value in economics that sparked the development of the field of property valuation.

2.3.1 The History of Property Valuation

Although the focus of the study is not to compare economic and philosophical ideologies, it is, however, important to highlight the influences of the same on property values and valuation. This discussion is important as it influences the property market of any country, including SA. Property values are generally influenced by the political posture of a country. In a free-market economy, private property ownership is encouraged. People buy and sell properties to each other in an open market. The properties are, however, subject to the economic fluctuations in supply and demand. As is the case with any goods and services on sale, this influences the determination of selling and purchase prices.

In the case of a socialist posture, private property ownership may be discouraged in favour of communal ownership. This implies that there is no market for buying and selling of properties, as there are no buyers and sellers. The value of properties often relies heavily on the utility of the property to the state. Another reason why the debate on the preferred economic posture of a country is important for property valuations, is the use of the very concept of market valuation. Mostly the valuation of property is based on the market value concept. As the concept suggests, the determination of market value depends on the value judgements of the buyer and seller as participants in the markets.

In turn, the value-forming perceptions of the buyer and seller are dependent on the ideological posture dominant in the society and advanced by the state. As indicated by the Australian Property Institute (2015), property valuers must assume the objective perceptions of the buyer and seller in the market when formulating a value opinion. Any contrary value determination approach devoid of these qualifying attributes for a market value is not a market value. In this context, South Africa's economic posture is regarded a free-market economy. The private property rights are encouraged even in terms of the supreme law of the country, the constitution. The property prices are subject to the market forces of supply and demand and negotiated between the buyer and the seller.

Relevant to the debate, is the fact that it is generally compulsory to use the market value as the basis of valuation. Thus, it is important at this stage to appreciate how market values come into existence; more specifically, how the free-market economy as an ideology, establishes an environment that creates the supply and demand of properties and eventually the value. Any ideological posture opted for by the country is bound to have at least indirect influence on property-value formation; for example, the free-market economy ideology expressed through the state economic policy framework such as Growth Employment and Redistribution (GEAR).

This is a policy that was introduced by the democratic government of SA. Like Thatcherism, GEAR emphasised free-market economics, privatisation, deregulation and a reduction in the role of the state in the economy. Both policies also aimed to reduce inflation and government spending. The GEAR policy framework did not have a direct impact on property value formation in SA, but it did create an environment that was conducive to real estate investment and development. GEAR aimed to promote economic growth and job creation, which helped to increase demand for property, particularly in urban areas. GEAR also included measures to promote private sector investment, which contributed to the growth of the real estate industry in SA; for example, the privatisation of state-owned enterprises and the deregulation of the financial sector created new opportunities for private investment in real estate.

According to the Australian Property Institute (2015), the arguments by the early economic theorists assert that value is not inherent in the commodity, good or service, but depends on the perception of individual or groups participating in the market. Therefore, the centrality of the individuals or the groups is vital to the creation of value of a good, service or commodity. In essence, value is created by: (1) the individual's or group's wish for an item required to satisfy needs and wants as humans (desire); (2) their ability to acquire those items in the market (effective purchasing power); (3) the ability of the items to satisfy those needs and wants (utility); and (4) the present or anticipated under-supply of the items in relation to the demand (scarcity). All these aspects, when considered in the context of supply and demand, create value in the goods, commodities and services.

Classical economists, including, Adam Smith (1721-1790) who, influenced by the works of the physiocrats, argued that the combination of the primary factors of production such as land, labour and capital, creates value. Alfred Marshal was amongst the few neoclassical economists to continue interrogating the theory of value discourse (Australian Property Institute, 2015). He introduced the supply-cost thesis and the demand-price theory antithesis. He argued that the two could not be separated from each other, especially when considering value.

The Australian Property Institute (2015) argued that when conducting property valuation, property valuers must consider the economic principle of anticipation and change. The value of a property should not be based on the historical costs or prices but rather on the benefits to be derived from it in the future. In the same vein, the valuers must also appreciate the change anticipated by the markets, with a potential impact on property value. These may include changes in the economy, body politics, environment and government policy.

Boshoff (2010) argued that property values are influenced by the traditional macro-economic supply and demand, more particularly as this relates to the scarcity of the properties. As Hardford (2007) argued, when industry is exposed to a short supply and high demand of property, the market values will rise. He

illustrates the finding that the disposable income of households which derives from the Gross Domestic Product (GDP) per capita determines the affordability by households. In turn, affordability influences property prices. In essence, Hardford's (2007) findings attest to the assertion that property prices or values are a function of macro-economic behaviour. The macro-economic behavioural choices in themselves are a subject of the government's ideological posture.

Furthermore, Boshoff (2010) argued that the factors that influence the value of real estate include economic factors such as utility, scarcity, desirability, effective purchase power and demand unity. These factors are dependent on the economic dynamism. For these factors to be effective, the economy must allow for some form of bias in favour of the market-based economy. Without an economy that allows for these factors to function effectively, the notion of the market value is virtually non-existent.

Approaches to Valuation of Single Properties

There are mainly three approaches used for the purposes of determining a market value of individual properties in SA and the world, viz., the sales comparison approach, the income approach and the cost approach (Collins and Ghyoot, 2016; Yacim and Boshoff, 2014). The other approaches are merely variations or a combination of the three traditional approaches (Appraisal Institute, 1996; Cloete, 2004b; Joubert and Cloete, 2011). These approaches are further subdivided in terms of methods such as the residual, profit, cost, DCF, income capitalisation and the sales comparison.

In the case of Europe, especially the United Kingdom (UK), more emphasis is placed on the five valuation methods rather than the traditional three valuation approaches, as is the case in SA, Canada and the USA. According to Scarret (2008) and Scarret and Osborn (2014), there are five valuation methods that are used as practices in the UK. However, the residual or the contractors' method, which is often used in the valuation of land and buildings with developmental potential, falls more in the family of mixed approaches. The contractor's method is often used in the instances where there are no market

comparables as in the case of property such as a sports complex, college or museum.

According to Collins and Ghyoot (2016), the Canadians and Americans prefer that valuers use all three approaches in the determination of a property value for the same property. This means they intentionally aim for a reconciliation of the outcomes of the three valuation approaches. They seek to establish a consensus value from all three approaches. The counter argument to the use of all the three methods at once is buttressed on the fear of arriving at three different value estimates. As a result, they are used as alternatives to one another in the order of priority and acceptability, with sales comparison being the first preference (Collins and Ghyoot, 2016).

The literature on valuation, including the work by the Appraisal Institute (2001), Collins and Ghyoot (2016), the Australian Property Institute (2015) and Blackledge (2017), generally refers to concepts of valuation approaches, valuation methods and valuation techniques. Even though these concepts are often used interchangeably, they differ from each other. A valuation approach is generally a strategy or perspective aimed at guiding the valuer on how to tackle a valuation task. A valuation method refers to a systematic way of performing a valuation task, which involves steps or procedures. A valuation technique refers to specific skills used to achieve a valuation task.

2.3.2 The Comparable Sales Approach

According to Collins and Ghyoot (2016), the comparable sales approach assumes that the estimate value of a property can be derived from the selling prices of the comparable properties. The comparable sales are also known by many names, including the market comparison approach or sales comparison, entails the identification of recently sold properties. When there are similar properties available for the comparison exercise, and the valuer is certain about the similarity or the comparability, the comparable properties will be used as the basis to estimate the property value of a property.

The approach is dubbed the simplest of the valuation approaches, as asserted by Blackledge (2017). The approach owes this dubbing to the use of the buying logic of for example, an average buyer of a cellphone in an open market. Whenever a person decides to buy a new cellphone, they will engage in a natural process of shopping, comparing prices with the intention of finding the best quality cellphone within a good price range. This process involves sales comparison, thus relying on the market for price guidance. Ultimately, the decision of the buyer on how much to pay for a cellphone will be influenced by the prices of similar cellphones in the market (IVS Council, 2013).

According to Cloete (2004a), supported in Collins and Ghyoot (2016), and Boshoff (2011), many decided court cases in SA have demonstrated that the Comparable Sales Approach is the most preferred method for determining the market value of properties. This assertion is supported by trends in Europe, Australia and America (Appraisal Institute, 2001; Blackledge, 2017; Scarret, 2008). The approach assumes that there is a market for the subject property. The market value of the subject property, therefore, can be derived from a comparative study of the most recent selling prices of similar properties in and around the neighbourhood of the subject property.

For this approach to be considered, there must be similarities, particularly with reference to the aspects such as the zoning of the subject property and the comparable sales which must agree; the transactions of the comparable sales must have happened within the principle of a willing-buyer willing-seller arrangement; sales must have taken place in an open market and not in out-of-the-ordinary conditions; and the information on the sales must be available and adequate (Cloete, 2004a: 248; Collins and Ghyoot, 2016).

Blackledge (2017) asserted that the three main requirements for properties regarded as comparable include the following: 1) the selected comparable properties must be of a similar type to the subject property; 2) they must be within the similar location with the subject property; and 3) their sale transactions must have occurred within the current market conditions.

Furthermore, after the market analysis stage, i.e., during the valuation process, the valuer must identify and confirm the value-influencing characteristics of the subject property (Blackledge, 2017: 159; Collins and Ghyoot, 2016: 268). This information must be compared with information available on comparable properties. Where necessary, upward or downwards adjustments are carried out on the comparable sales and NOT on the subject property (Appraisal Institute, 2015). These adjustments are performed to match the comparable sales to the subject property in terms of value-influencing characteristics identified and confirmed by the valuer earlier on in the market analysis.

Kummerow (2003) argued that as the result of the heterogeneity of the properties in general valuers are compelled to adjust the comparable sales (*Pcomparable (t-1))* to match the subject property (*Psubject (t))*. In a utopian setting, where all things are equal, the value of comparable sales should be equal to that of the subject property. This theory can be represented mathematically by the following simple linear equation:

Equation 2-1: Subject Property-Comparable Sale (Utopian)

Psubject (t)= Pcomparable (t-1)

Source: (Kummerow, 2003)

However, in considering the heterogeneity of the properties, especially the comparable properties, the valuers must adjust the value of the comparable properties in terms of the differences they present. Accordingly, the equation must be adjusted to the following:

Equation 2-2: Subject Property-Comparable Sale (Reality)

Psubject (t) = Pcomparable (t-1) + Differences

Source: (Kummerow, 2003)

As asserted by Kummerow (2003), these models are a construct of reality. The latter model is used to determine the value estimate of the subject property. Other valuers use the alternative technique called the grid adjuster, which uses

the same principles of adjusting the differences either upward or downwards (Blackledge, 2017). The comparable sales method can be applied to all types of properties depending on the purpose of valuation and the availability of adequate comparable sales (Collins and Ghyoot, 2016).

Unlike in the United States, in SA, the three methods are not used at the same time for the same property. However, recent developments suggest that there is potential for the use of these methods in the same way as in the US (IAAO, 2017). Some academics argue for the use of the Comparable Sales Method together with the discounted cash flow method (Boshoff and de Kock, 2013) and Collins and Ghyoot (2016). Although the fact that the two techniques belong to the same family of income methods, usually the outcome value estimates out of the two methods for the same property differ. Boshoff (2011) also argued that with the adequate infusion and consideration of the market analysis, even the income approaches can produce a market-based value estimate. This is in line with the simultaneous use of the direct and indirect comparative analyses.

2.3.3 The Cost Approach to Valuation

According to the International Valuations Standards Council (IVSC) (2013); corroborated by the RICS (2013), the cost approach is based on the principle that the buyer would not be prepared to pay more for a property than what an equivalent property would cost at purchase or construction. The cost approach is used in the valuation of the properties with unusual character or in areas where a market does not exist (Parsons 2015). It is also preferred for the valuation of property earmarked for development.

A distinction is drawn between the replacement cost as well as the reproduction cost approaches. The former works assume that when estimating the cost of the subject property, the same property is demolished and rebuilt as is, and then depreciated for obsolescence. In the latter approach, it is assumed that an equivalent building, which could cater for the same provisions of the subject property, can be built instead. The new building does not have to be the same

if its utilities are the same as the subject property (American Institute for Real Estate Appraisers, 1983; Blackledge, 2017).

2.3.3.1 Cost replacement method

At times the properties which are mostly targeted for valuations do not have a market in the sense of demand and buyers. Some of these properties would be specialised in nature. Others are in areas where no market could exist, for example, a church, a police station, a mental health clinic, courts of law, power stations, sewer purification plants, water treatment plants, prisons, community halls and public mortuaries. This could warrant the use of the cost replacement method.

The cost replacement method is also used in instances where there seem to be insufficient data required as evidence for comparable sales. Albeit with the existence of the conditions above, the valuer still must ascertain if there is nil or insufficient profit. In the event there is sufficient profit generated from the property, the valuers will choose to use the income method and avoid the cost method (Blackledge, 2017).

Existing specialised properties are somewhat affected by age and are, thus, victims of obsolescence. Depreciation would then be deducted from the estimated cost of building replacement plus the cost of the land. The simplified mathematical representation of the method is:

Equation 2-3: Cost Replacement

Estimated Value (EV) =

Cost of the Building (CB) – Depreciation (D) + Cost of the Land (CL)

Source: (Kummerow, 2003)

The cost replacement method, according to IAAO (2013), entails the estimation of the market value by using the current construction costs. This is, in essence, the estimation of the value of a property either by way of reproducing a building

or replacing it, subtracting depreciation, and adding the value of the land (Appraisal Institute, 2001).

There are basically two stages in the estimation of value using the cost replacement method. Firstly, the estimated cost of the top structure (building) must be determined in keeping with the going construction rates (American Institute for Real Estate Appraisers, 1983). Valuers must always make use of reliable construction costs and assume current construction standards. In SA, for example, valuers rely on the frequently reviewed construction rates compiled by expert researchers such as the Davis Langdon's Africa Region Property and Construction Handbook.

In the case of an old building where comparable sales are not reliably available, the valuer will nominate the use of the cost approach once the income approach is also ruled out. Secondly, as asserted by Appraisal Institute (2001) and supported by Blackledge (2017), once the value of the building is estimated, depreciation is estimated on account of old and externally or functionally obsolete buildings. In estimating the cost of these types of deterioration to be deducted, the valuers will have to rely on some sort of market research.

Take, for instance, a building that was built 20 years ago. Today's building rates will be used in estimating the cost of building and depreciation to the age of the subject property. Depreciation calculated against the building costs is deducted from the sum of the cost of the building and the cost of land. Finally, the value of the land, which together with the building above constitutes the subject property, is estimated. This is determined by reverting to the recent sales in the market. Once again, this is evidence of the authority of the sales comparable approach.

Once the land value is determined, it is added to the determined cost of replacing the building or the depreciated cost in the case of the reproducing of a building. (Blackledge, 2017) Table 2-1 illustrates the high-level calculations involved in the cost method.

Table 2-1: Cost Replacement Approach, Example

Transaction	Amount
New Costs of Improvements	R800 000.00
Depreciation	(R120 000.00)
Depreciated Value of Improvements	R680 000.00
Value of the Land	R300 000.00
Value Indicated by the Cost Approach	R980 000.00

Source: Adapted from Blackledge (2017)

Consistent with the volumes of literature in relation to the reliability and acceptability of the valuation methods, valuers, including South African valuers, regard the cost replacement method as inaccurate and the least acceptable in the family of valuation methods (Collins and Ghyoot, 2016). However, according to the Valuation Office Agency (2010), the cost method has now become acceptable even in the courts – at least for some types of properties such as oil refineries, steel works, academic and public buildings.

One of the major criticisms of the cost approach is that in material times the property markets are never in equilibrium. Therefore, even price is never equal to cost. It is possible for the market value to be more than the cost incurred or for the market value to be less than the cost. In relation to the former when there is a boom in the economy; the market prices will be higher. In the event of a market burst, the market value will be less than the cost. (Kummerow, 2003) In SA, there are strong arguments against this approach.

Collins and Ghyoot (2016), for example, argued against the cost valuation approach, citing, in the main, similar reasons as above relating to the fluctuating prices due to the fluctuating market conditions and inflation. This approach is the least preferred of the three approaches. Even the courts consider this method as the last resort, and only to be used in extremely desperate situations.

2.3.4 The Income Approach

This approach is, according to Cloete (2004b), supposed to be used on properties that generate income from rental or have the potential to do so. For the method, there is some level of market comparison in so far as the income and return rates are extracted from the actual sales and applied on the subject property. This method is also known as the indirect comparison method, investment method, capitalisation method and more. The strength of the income approach is drawn from the financial theory, which dictates that the value of any asset depends on the future benefits of ownership, discounted to the present.

In determining the value of an asset, three variables are unavoidable. This refers to how much cash flows are to be generated, when the cashflows are expected to occur, and the degree of uncertainty in realising these cashflows. In the property markets, this is warranted when the property has the potential to become part of the rental stock. According to Kummerow (2003), as well as Collins and Ghyoot (2016), there are two distinct versions of the income method, namely the direct capitalisation and the discounted cash flow (DCF) method. Both these methods are said to be mathematically the same such that with the proper application of the theory, they should help establish the same value for the same property (Blackledge, 2017).

2.3.4.1 Income capitalisation method

The use of the direct capitalisation approach often arises because of the lack of comparable sales. This could be for a variety of reasons, including the absence of comparable sales with similar characteristics. The approach is slightly modified depending on whether the subject property is a freehold or leasehold. If it is a freehold, a single rate is applied, or a dual rate adjusted for tax is applied. The mathematical expressions for freehold and leasehold respectively used in the calculation of the market value in terms of the Income Capitalisation method is as follows:

Equation 2-4: Capital Value for Freehold

Capital Value = Net Income X Years Purchase Single Rate

Source: Blackledge (2017: 233)

In this case, it must be understood that the assumption is that the landlord still must pay a lease at X amount while he leases the property out and receives (X plus Y) or (X minus Y). In this case, there is profit or loss to be expected in the transaction for the landlord.

Equation 2-5: Capital Value for a Leasehold

Capital Value = Net Profit Rent X Years Purchase Dual Rate, Tax adjusted

Source: Blackledge (2017: 233)

In essence, it can be argued that for this dialect of the income method the valuers will first determine the Net Operating Income (NOI) or Net Profit Rent, and then divide it by the confirmed capitalisation rate. The financial records are quite often used to determine the NOI for the subject property. In the event the financial statements are not available or of much assistance, they can be calculated by deducting the vacancies and operating expenses from the potential gross income. Then the capitalisation rate is used on the NOI to determine the value estimate. It is, however, important to understand the capitalisation rate because it is the factor that infuses the market character in the method. Hence the acceptance of its value estimates as a market value.

In some literature (IAAO, 2013), the capitalisation rates are referred to as the income multipliers. The capitalisation rate is the NOI expressed as a percentage of the gross potential income (Collins and Ghyoot, 2016). It can be calculated from the market data on incomes, expenses, gross income and comparable sales. The two determinants of the capitalisation rate are usually extracted from the market comparable sales. In some instances, there are market research companies providing capitalisation rates for different areas, property types and intervals. In SA, the capitalisation rate could be obtained from good subject authorities such as the Rode's Report, Investment Property

Databank (IPD) or the real estate agents. In this method, the NOI is determined only for the first year and the capitalisation rate is applied accordingly. It is also assumed that the capitalisation rate will remain unchanged for the duration of the investment period.

2.3.4.2 The discount cash flow method

The Discount Cashflow Method (DCF) is one of the two variants of the income method. Interestingly, based on his posture, Blackledge (2017) did not see this method as being part of traditional methods. Even though the principle in the capitalisation method and the DCF method are the same for the DCF variant, the difference is that the cash flow for the entire investment period is projected, discounted back to the present values. These present values are then added into the Net Present Value, which is then used as the market value of the property (Collins and Ghyoot, 2016). This approach is preferred by property investors (Appraisal Institute, 1996; Collins and Ghyoot, 2016). Boshoff (2013) asserted that the DCF approach depends on accurate educated estimation of the future cash flows accruing from the property rights.

The cash flows include the annual rentals for all the years in the investment duration, and the reversionary value (or the selling price of the property at the end of the investment period). In financial mathematics terms, Reilly, Brown and Keith (2003) supported by Brigham and Daves (2004) suggested that the market value of the investment is the net present value (NPV) of the mentioned future cash flows, discounted at the rate or compensation, required by the investor, expressed in terms of the following equation:

Equation 2-6: Net Present value Formula

$$\text{Value} = \sum_{i=0}^{n} \frac{CF_t}{(1+i)^t}$$

Source: Boshoff (2013)

Where, CF_t is the cash flow for each period ***t*** of the investment, ***i*** is the discount rate or the rate of return required by the investor, and ***n*** is the life of the investment.

2.3.4.3 Reconciling the income capitalisation and the DCF methods

According to Blackledge (2017: 233) and Boshoff (2013: 309), if correctly applied the income capitalisation and the DCF methods should bring about pretty much the same value estimates. In fact, Blackledge (2017: 309) argued that DCF can be used as way of confirming the accuracy of the capitalisation method. This claim is illustrated by Collins and Ghyoot (2016). See Table 2-2 as an example of the simultaneous usage of the two methods.

Table 2-2: DCF and Income Capitalisation

Capitalization rate	12%
Escalation rate	6%
NOI Year 1	R50 000,00
Discount rate	18%

Years	0	1	2	3	4	5
Monthly Income		R50 000,00	R53 000,00	R56 180,00	R59 550,80	R63 124, 00
Reversion value					R526 032,07	
NOI/ Profit		R50 000,00	R53 000,00	R56 180,00	R585 582,87	
Cashflow		R42 372,88	R38 063,77	R34 192,88	R302 037,13	
Income Cap Estimated Value	**R416 666,67**					
NPV of Cashflows	**R416 666,67**					

Source: Example from Boshoff (2013)

The DCF process involves firstly, the determination of the gross rental income of the subject property. This is estimated by using the market-related rentals of similar, comparable properties per year. After this the expenses and allowance for vacancies are deducted from the gross income resulting in the effective gross income. Where necessary the additional income is added and results in the NOI. In the case of income capitalisation, the NOI of the first year is divided by the market-related capitalisation rate resulting in the market value. In the case of the DCF approach, the NOI for each year is discounted with an

appropriate rate to the current year. When the cashflows for each period have been determined, they are added to arrive at the NPV (Collins and Ghyoot, 2016: 276).

2.3.4.4 The discount, escalation and capitalisation rates

The secret in the reconciliation of the two methods lies in the determination of the applicable capitalisation rate, the discount rate and the escalation rate. According to Collins and Ghyoot (2016), the relationship between the three can be defined in terms of the following equation:

Equation 2-7: Discount Rate

Discount Rate = Escalation Rate + Capitalisation Rate

Source: Derived from Collins and Ghyoot (2016) and Boshoff (2013)

As discussed in Collins and Ghyoot (2016) and Boshoff (2013), from Equation 2-7 above, the valuer needs only two of the values in the equations to determine the other. The capitalisation rate is determined with the help of the market comparable sales data as discussed above. The escalation rate is usually determined based on the CPI and inflation in the market or provided for in the lease agreement. It is usually slightly higher than the inflation rate and matches the property market growth rate. In the event there is no escalation factored, the discount rate equals the capitalisation rate. It is important to note that the determination of the discount and the capitalisation rates requires the infusion of the 'art' element on the part of the valuer. It is not purely scientific.

It is also possible to determine the discount rate from the market data using the Weighted Average Cost of Capital (WACC) technique. According to Frykman and Tolleryd (2010), the WACC corresponds with the risks inherent in the future cashflows. This suggests that the rate determined in terms of the WACC technique can be used as the discount rate. This technique is seldom used for real estate valuation, but for the valuation of companies. In simple terms, WACC represents the blending of the weighted cost of equity and the cost debt

based on the proportion of the company's equity and debt. The WACC is determined through the following formula:

Equation 2-8: Calculating the *WACC*

WACC = ***Re*** X ***E/V*** + ***Rd*** X (1-Corporate Tax rate) X ***D/V***

Source: Frykman and Tolleryd (2010: 134)

Where ***Re*** is the cost of equity, ***Rd*** is the cost of debt, ***E/V*** is the proportion of equity, and ***D/V*** is the proportion of debt. The ***Re*** and the ***Rd*** can be determined separately using the given formulae. The cost of equity is determined through the formula ***Re*** = Risk free rate of return + (Equity Market Risk Premium – Risk free rate) x Beta. In short:

Equation 2-9: Cost of Equity

$Re = Rf + (Rm - Rf) \times \beta$

Source: Frykman and Tolleryd (2010: 139)

The cost of debt can be derived directly from the most recent cost of borrowings from the bank. For example, if the interest on the borrowing was 7%, that will be the cost of debt required for WACC calculations (Frykman and Tolleryd, 2010). Otherwise, the following formula is used:

Equation 2-10: Cost of Debt

Rd = 1 + corporate tax.

Source: Frykman and Tolleryd (2010: 139)

Valuers prefer to determine the capitalisation rate and the escalation rate and make the discount rate the subject in the equation. It is easier to determine the capitalisation rate than it is the discount rate through the WACC technique. The rate is calculated by dividing the average sales price obtained from the market

into the average NOI obtained from the market. From the above, one can see that once two of the three variables are known the third is easier to determine.

In essence, this means that it is possible to determine the three rates required to calculate the value estimate using both the Income Capitalisation Method and the DCF simultaneously. Therefore, the two methods are reconcilable. As indicated in this section, this approach depends largely on the market data and quality thereof. The challenges raised in relation to the sales comparison approach will also apply to this approach.

2.3.5 The Mixed Approaches

The methods discussed below place reliance on all three traditional approaches discussed above. These methods include the residual method and the profit method.

2.3.5.1 The residual method

Blackledge (2017) asserted that the residual method can be classified on its own, as it uses a mix of all three traditional approaches (sales comparison, income and cost approaches). It is used to determine the value of property which has a potential for development or redevelopment or refurbishment. According to Boshoff (2011), the residual value approach is also known as the development method. This method seeks to estimate the value of vacant land or existing property that may require redevelopment or refurbishment. Kupec and Dlask (2020) explained that the residual approach is referred to as such because it results from the determination of the residual amount resulting from deducting all known or anticipated costs required to complete the development.

It is used to estimate the value of the land that has income-producing capacities including the commercial properties and land to be used for the development of stands to be sold. For example, in the case where the method is applied on the property earmarked for rental stock such as apartments, the potential income of the property is first estimated based on the highest and best use of land. Then the operating expenses are subtracted from the potential income to

derive the NOI. The NOI is then subjected to the capitalisation rate. This will provide the estimated value of the property, from which the cost of development and the required yield (or return on investment) are deducted. The result of this operation is known as the residual value.

According to Blackledge (2017), also in the context of the example at hand, the residual approach is like the income capitalisation method in that both the approaches require the determination of the NOI by deducting the operating expenses from the potential income. In both instances, the NOI is divided by the capitalisation rate of the neighbourhood to derive the value of the property. The difference arises when the development costs and expected yield are deducted from the value of the building to arrive at the residual value.

The estimation of the land value using this method is regarded as the most difficult endeavour to undertake. The valuers will first attempt the use of the comparable sales method. In the event there are few comparable vacant land sales, the valuers will estimate the prices of land in the area using the sales extraction approach. This approach refers to subtraction of the top structure (building) replacement costs of the subject property from the total sale's price. The difference will serve as the market value for the subject property (land). Accordingly, a simplified mathematical equation can be represented as follows:

Equation 2-11: Land Value

Land Value = Development Value -(Development Costs + Profit)

Source: The University of Reading (n.d.)

To determine the development value, the above equation can also be expressed as follows:

Equation 2-12: Development Value

Development Value = Land Value + (Development Cost + Profit)

Source: Derived from the Land Value Equation

From the preceding explanation, it is apparent that the approach can be best used in estimating the amount which the investors are prepared to spend on a property they intend to develop, and the yield required by the developer when investing in the same property. In this regard, the residual value represents the amount of which the developers will be prepared to purchase the land at, after the estimates on the development costs and the acceptable expected developers' profit (net yield) have been deducted from the eventual value of the property after development.

Learning from *Estate Marks v City Council* is apparent from case law in South Africa that the method is not readily accepted and is not regarded as an accurate and reliable forecast. This is primarily because the residual method relies on a number of assumptions of future occurrences, including hope for future income and government approvals on plans and permits. For the well-accepted reason that the validity of the residual approach hinges on the estimated development cost, the expected net income and the expected yield. All these elements can only be guesstimates, thus creating room for doubting the outcomes of the residual valuation method. These fears are echoed by the courts in other countries as indicated by the Appraisal Institute (2001).

The major criticism of the residual valuation method relates to the assumptions made on the potential future income, the operational expenses and the desired profit. This also leads to further criticism of the sensitivity of the method in respect of the inputs that pose a risk of major adjustments to the overall value estimate.

2.3.5.2 The profit method

The profit method, otherwise called the accounts method, which according to Blackledge (2017), is classified under the income approach. According to the IVS Council (2013), the accounts method relates to the valuation of properties that are mainly trade-related and profit-motivated, including but not limited to cinemas, casinos, bars and restaurants. Blackledge (2017) describes these properties as licensed and specialised in nature. The accounts method is used

to estimate the rental value of the property. The rental value is an indication of the capital value, and the method can, therefore, be used to determine the rental value. The rental value can be used to indirectly determine the property value (Colborne and Hall, 1993).

In its conceptual form, the accounts method is based on the thesis that the property value is intrinsically linked to the profits generated by the business in the same property. In this approach, the value of the property is not determined based on the characteristics of the property, but the business activities carried out on the premises. The profit generated from the business activities carried out on the property, indicates the amount of rent the investors are prepared to pay. On the other hand, the rent is the indication of the capital value. Therefore, the higher profit the business makes, the higher the rent they are prepared to pay (Blackledge, 2017).

According to Isaac and O'Leary (2013), to commence with the profits method on a company, it is a requirement to subject the financial statements (accounts) of the business as well the market to careful analysis. This assertion was later confirmed by the Royal Institution of Chartered Surveyors (RICS) (2013), who emphasised that the analysis of the market requires an expert valuer whose speciality is the primary business under consideration. The valuer must have a fair understanding of the behaviour of the buyers or customers of the business to achieve an accurate analysis. The financial accounts of the business under consideration will require that full access to the books of the business be granted to the valuer.

Isaac and O'Leary (2013) explained that the gross income must be calculated taking into consideration all the gross receipts (turnover) vacancy/ occupancy and purchases. Then the expenses/ running costs relating to the running of the business are aggregated and deducted from the gross profit to arrive at the net profit and the capital interest (return on investment (ROI)) as well as the entrepreneur's share. This will result in adjusted net profit, which is then divided into the property rental and the business profit. The rental amount per annum is then capitalised at a prevalent capitalisation rate to derive the capital property

value. Similarly, the business portion is capitalised at its own appropriate capitalisation rate to derive the value of a good will. In addition, the property value, value of goodwill, fixtures and stock may be added together to derive going concern value.

In essence, the formula for determine the property value in terms of the profit method can be expressed in terms of Table 2-3:

Table 2-3: Valuation Steps in the Profits Method

Steps in Sequence	Description	Operation
Gross Profit	Add all income receipts and subtract purchase and vacancies.	+ (addition)
Expenses	Add all the expenses.	- (subtraction)
Net Profit	Deduct the aggregate of all expenses from the gross profit.	- (subtraction)
Adjusted Net Profit	Deduct the ROI and the entrepreneurs' share from the net profit.	- (subtraction)
Property Rent per annum and Business Profit per annum	Divide the adjusted net profit into two.	(divide)
Property value	Capitalise the property rent per annum.	(multiply)
Value of Goodwill	Capitalise the business profit per annum.	(multiply)

As cautioned by Blackledge (2017: 365), the accounts method has its own limitations and is not as dependable as the sales comparison method. Thus, it is recommended that the value derived with the help of the profit's method should not be relied upon in isolation. An attempt should also be made to determine the value estimate using other valuation methods such as the comparable sales. It is also affected by the fact that the accuracy of method is heavily dependent on how well the analysis of the accounts was done. The fact that it is an indirect method of valuation increases the level of doubt on the method. Because it requires detailed analysis, the accounts method is not adaptable to mass valuation. Hence, the profit-based properties are valued individually.

This approach is not regarded as acceptable for the purposes of statutory valuations in SA. In fact, the use of the profit's method is not encouraged by the Appeal Board and the courts in SA, especially in the determination of the market value. The major reason for such a stance is attributed to the need for many assumptions to be used in the process; for instance, the assumption that the investor's appetite for rental is directly proportional to the company's profits. This assumption forms the basis of value formation in the profit method theory. As explained above, the adjusted net profit is divided by two to yield the annual rental amount.

2.3.6 Early Criticism and Alternative to Traditional Approaches

Over time, the traditional approaches were exposed to criticism by various scholars including Smith (1986) and Ratcliff (1972). These criticisms, as expected, were followed by suggestions of enhancing the traditional approaches, infusing new valuation approaches, and the adaptation of existing theories and models from other professions such as the behaviouralism and regression analysis based on the ordinary least square (OLS) estimation. Later, with obvious limitations of the OLS, more improvements were made leading to the evolvement of more sophisticated valuation approaches whose underlying philosophies were explained later.

Smith (1986) was concerned about the theoretical causalities as well as the practical interpretations of the theoretical assertions of valuation which generally led to inaccurate valuations. He raised nine theoretical inconsistencies with a potential to cause inaccurate valuations:

- Inaccuracies arising because of the timing of adjustments. Smith (1986: 3) cautioned against one of the causalities of valuation inconsistency. He argued that often, when adjustments on the comparable sales are applied, the timing and the sequencing of adjustments become problematic. Valuers tend to adjust the prices directly without regard for the impact of the time at which the pricing occurred versus the valuation date.

- Inconsistencies arising as the result of the misapplication of percentage changes. This could arise as the result of the standard norm and practice that whenever adjustments are to be affected, the subject property must be used as the base for the adjustments. As a result, valuers always effect changes as percentage of the subject property (Smith, 1986).
- Inconsistencies which are brought about as the result of the confusion regarding the determination of the date of valuation. There are valuers who would choose the date of inspection as the valuation date while others would choose the date at which the economic assessment and analysis was conducted. It is advised that it is best to use the date on which the report is finally signed off to the client. Valuers are advised to confirm that there were no changes to the physical structure and the economy on that date before signing off (Smith, 1986).

2.3.6.1 Ratcliff's alternative approach

A discussion on the theory of valuation cannot be complete without highlighting the contribution by Ratcliff (1963; 1965; 1972) to the development of the traditional valuation approaches. As one of the major critics of all the three traditional methods, Ratcliff (1963) criticised the approaches as being mis-specified, irrelevant and misdirected, respectively. Ratcliff (1963) asserted that the characterisation of valuation theories in terms of the three categories was a fallacy.

According to DeLisle (2001), Ratcliff also believed that there is only one valuation approach, the sales comparison approach. Smith (1986) asserted that, from the theoretical perspective, inaccuracies and disparities in valuations are caused by the breakdown in logic which is itself underpinned by the inconsistencies in the underlying theories, the misinterpretation of the theories, as well as the applications which are not consistent with the theories, understanding that one cannot simply criticise the existing order without suggesting alternative courses to the existing ones. Ratliff suggested that there were in fact two types of the sales comparison approach which he argued are the market simulation and the statistical inference approaches (Smith, 1986: 1).

The former involves the replication of the decision-making process of both the buyer and the seller, while the latter involves the specification of weights and ratings of by the valuer.

In the first part of the approach, Ratcliff (1963) suggested that valuers would have to simulate the decision-making process as undertaken by the buyers when acquiring a property. He argued that the valuers would have to simulate the buyers' calculus to successfully estimate a property value. This assertion does not fall far from the traditional assumption which forms the crux of the comparable sale approach directing that the valuer always puts himself in the stead of both the willing and informed buyer and seller.

Noteworthy is that Ratcliff (1965) placed more emphasis on the idea of a "flexible" and "open-ended" framework, which encourages the simulation of the buyers' decision-making process. To support his assertion, he argued that the very intention for property valuation is to establish an estimate of the most probable price which a buyer would be prepared to pay to gain possession of that property. This very estimation can best be achieved by a comparison and the adjustment of the recent sales of similar properties that were sold under the ideal market conditions. This belief necessitates that valuers must acquire an in-depth understanding of consumer behaviour as well as the price-setting process in the market.

In the second part of his system, Ratcliff introduced the statistical inference approach, which he purports to be a replacement of the sales comparison with a system of weights and ratings specified by the valuer (Smith, 1986). However, even Ratcliff's approach itself did not escape the criticism by the theoreticians and pragmatists in the valuation field. This follows failure to convincingly answer questions such as how to justify the use of any technique when simulating the market, and how to determine the weights used in the statistical inference system. It is, thus, the assertion of the researcher that owing to the roller-coaster criticisms of the theories of valuation, most valuers have not shifted from the traditional approaches. Instead, one can argue that, over the

years, there has been a concerted effort to address the weaknesses of the approaches.

In brief, Ratcliff, as discussed above, argued that all valuations seek to estimate the most probable selling price and therefore could be attained by applying the scientific method with a greater understanding of the market pricing processes. He further argued that the priority concern to the valuers should be to minimise uncertainties when determining value. However, a limitation was that he did not explain the actual application of the scientific approach any further.

2.3.6.2 DeLisle's alternative approach (behaviouralism)

As early as 1900s, American real estate scholars were debating the strength, the reliability, the validity and accuracy of three valuation methods. This debate sought to establish a unified valuation method; a project that proved not only impossible but also unnecessary. In the end, these experts agreed that all three traditional methods were useful (DeLisle, 2001). The three approaches were rather reconciled through a multistage approach which used each of the three approaches to triangulate the determined value. There were, however, variations and inconsistent treatment in the applications of the approaches. In response to the need to mitigate these inconsistencies, the profession agreed on the use of objectivity as the arbiter in the determination of values. This meant that valuers had to assume the mentality of an average buyer.

In the end, DeLisle (2001) suggested an improvement in the traditional valuation model. In this approach, he recommended the integration of behaviouralism theory into the traditional valuation models. In the example of comparable sales, DeLisle (2001) suggested a three-stage approach to appraisal which entails pre-appraisal, appraisal and post-appraisal. In all these stages, there are numerous intermediary steps. If this process were to be followed religiously, it would remain purely statistical and mathematical. It is for that reason that DeLisle (2001) proposed the infusion of market behaviouralism by effecting adjustments based on what the most probable buyer is looking for.

The research on the applicability of behaviouralism theory to residential valuations was one of the theories targeting the pragmatic valuations issues. According to DeLisle (2001), behavioural theory concerns market behaviour. Richard Hurd introduced this theory which later became the highlight of the early 1900s. This research is one of the major contributions to valuation and particularly mass valuation by DeLisle (2001), as he advocated for a bolder infusion of market behaviouralism in the models of determining the probable selling price.

DeLisle (2001) further cautioned that in considering human behaviouralism theory application to valuation, valuers should not see it as an alternative, but rather as an enhancement to the traditional methods as well as the automated models. This application could be used for the sake of improving the chances of determining reliable and accurate market value estimations. In fact, this was the original intent by Hurd (1903), who started the formal debate about the need to infuse market behaviouralism to valuation instead of mechanically determining property values by simply capitalising the incomes.

2.3.6.3 Kummerow's alternative approach

Kummerow (2003) was in general concerned with the approach employed by real estate schools in teaching valuations. In the end, Kummerow (2003) concluded that the role of valuers consisted of four main tasks:

a) Choosing the best comparable sales;
b) Identifying the price-influencing hedonic characteristics;
c) Estimating the dollar value of the differences between the comparable sales and the subject property; and
d) Reconciling the preceding to arrive at a single price estimate).

Then it was imperative that students should be taught price distributions, price models and prediction error analysis.

Kummerow (2003) also concluded that all valuations irrespective of the opted approach require some reference to the market transactions. This is correct

because even the cost approach refers to the markets for the prices of the materials used in the building process. As a result of these conclusions, Kummerow (2003) proposed a clearer distinction between valuation as a science and valuation as an art, as distinct categories of these approaches. The former is examined based on objective or quantitative methods, while the latter is based on subjective or qualitative methods.

According to Kummerow (2003), valuers must always strike a balance between the two categories in their approaches to valuation. Kummerow's study was more concerned about addressing the techniques in the determination of market price distribution, price models, and analysing the error in the future projections of price estimates, in relation to properties.

2.4 MASS VALUATION APPROACHES

According to the IAAO (2017), mass valuation relates to the valuation of a group of properties simultaneously, using common data, standardised methods and statistical methods. In the context of the study, mass valuation largely refers to assessment of several properties for municipal taxation purposes (Grover, Törhönen, Munro-Faure and Anand, 2017) in line with statutory requirements. Relevant to the study is to note that the definition of mass valuation requires the standardisation of the valuation methods.

There have been a few developments in modelling the valuation approaches which were mainly ignited by the criticism relating to the valuation inaccuracies by the traditional valuation approaches. This sparked a perpetual search for improved and more accurate valuation methods. From a general philosophical point of view, there is an improvement from the three traditional valuation approaches i.e., sales comparison, cost approaches and income approaches.

Then there was the introduction of the hedonic approaches including the MRA, the advanced approaches including the SAM, fuzzy logic approaches and recently, machine learning (ML) algorithms also known as the ANNs, among others. In the same spirit it can be said that from a technological point of view

there has been an improvement from manual valuations to automated valuations models (AVMs) to the introduction of ML tools in valuations.

Mass valuation became a requirement for the ad valorem taxation. The inaccuracies of the single property valuations became more pronounced in the valuation for taxation purposes because of the several number of properties that are involved. The properties were often valued manually, which was a time-consuming and labour-intensive processes. This sparked a perpetual search for improved and more accurate valuation methods. From a general philosophical point of view, there is an improvement from the three traditional valuation approaches i.e., sales comparison, cost approaches and income approaches.

In the case of commercial properties and specialised properties, it seems difficult although not impossible to transition from single property valuations to mass valuation. This difficulty is attributable to the scarcity of comparable sales, as well as the complexity of the relationship between the independent and dependent variables used in models for determining the value for commercial and specialised properties. Often, the authorities prefer to value such properties with the use of the approaches such as cost, DCF, income and profit methods.

Like the valuation of individual properties, mass valuations were also affected by the evolution of the valuation approaches which were driven by the criticisms with emphasis on valuation inaccuracies (Assimakopoulos et al., 2003). Mass valuation was first introduced during the first phase of the evolution of valuation approaches, the traditional approaches phase (More-Esparanza, 2004; Pagourtzi, Assimakopoulos, Hatzichristos and French, 2003; Zurada, Levitan and Guan, 2006). It is at this stage that the use of OLS was initiated for general use.

2.4.1 Defining the Concept of Mass Valuation

Kauko and D'Amato (2008: 2) defined mass valuation as the employment of standardised procedures to systematically estimate the value of a group of properties. According to them, there are various reasons which gave rise to

mass valuation and the need to standardise the mass valuation procedures. For example, economic globalisation compels companies to apply standard valuation standards for properties belonging in the same portfolio. Different standards could lead to inaccurate and inconsistent valuations, making it difficult to produce a set of reliable financials.

McClusky and Anand (1999: 220-221) invoked the definition by Kathmann, who held that mass valuation is “a processes of valuing a range of properties at a given date, in a way that provides objectivity, equity and the possibility of statistical testing”. This definition highlights the important elements of mass valuation. Noteworthy is that the definition confirms the assertion that mass valuation is a valuation process as it relates to various properties, that it is instantaneous and invokes statistical modelling.

The International Association for Assessing Officers (2013) provided a much more inclusive definition which purports that mass valuation is “the process of valuing a group of properties as of a given date, using standard methods, employing common data and allowing for statistical testing”.

These properties may or may not be the same, but they would share some common attributes that would require them to be valued at the same time. Such commonalities may include the same municipal area or belonging to the portfolio of the same owners. From the considered definitions, it arises that whenever mass valuation is employed, there should be a need to value those properties for the same purpose (e.g., taxation) and they should have the same valuation date. Given the practicality of completing the valuation of many properties simultaneously with limited resources (time, valuers and money), standard methods and statistical modelling are essential (Almy and Gloudemans, 2011; Glower, Haurin and Hendershott, 2016).

Imagine how tedious a process it would be if each traditional approach were to be religiously applied on each property individually for a larger population such as those of the South African metros of Johannesburg, Cape Town, eThekwini or Tshwane. Such a project would prove to be impossible to conclude. For it to

be concluded within the same timeline, an impossible greater number of valuers would be required for each municipal area. Even if the entire army of registered valuers in South Africa are deployed to a municipal area at once, they would not be adequate for a timeous completion of a municipal-wide valuation if they were to apply the individual property valuation approaches.

In order to minimise these challenges during the mass appraisal process, it is common practice that models would be developed which would be aimed at assisting in the determination of property values which are not only as accurate as possible but also as timeous (Kontrimas and Verikas, 2011).

2.4.2 The History and Evolution of Mass Valuations

With the evolution of property valuation considered with the need for mass valuation for taxation purposes, the area of mass valuation also emerged. The mass appraisal of residential and commercial properties has a rich history that spans several decades and has undergone significant developments and refinements over time. The history of mass appraisal can be traced back to the mid-20th century when the need for efficient and unbiased property valuations became evident.

One influential study that laid the foundation for mass appraisal techniques is the "Fundamentals of Real Estate Appraisal" published by the Appraisal Institute in 1948 (Appraisal Institute, 1948). This publication emphasized the importance of using a standardized approach to property valuation and introduced the concept of the "cost approach" and "income approach" as key methods for valuing commercial properties.

In the 1960s and 1970s, advancements in computer technology facilitated the development of mass appraisal models. One notable milestone during this period was the publication of the "Computer-Assisted Mass Appraisal Handbook" by the International Association of Assessing Officers (IAAO) in 1976 (IAAO, 1976). This handbook provided guidance on utilizing computer technology for mass appraisal purposes and introduced the concept of

statistical modeling to improve the accuracy and efficiency of property valuations.

During the 1980s and 1990s, researchers and practitioners focused on refining the statistical models used in mass appraisal. The development of the hedonic regression model, which relates property values to their characteristics, played a crucial role in enhancing the accuracy of commercial property valuations. Noteworthy studies during this period include the work of Clapp and Giaccotto (1992) on using hedonic models for valuing commercial properties and the research by Sirmans, Macpherson, and Zietz (1995) on incorporating spatial dependency into mass appraisal models.

In recent years, technological advancements including AI, and the availability of vast amounts of property data have further revolutionized mass appraisal practices. The use of geographic information systems (GIS), machine learning algorithms, and automated valuation models (AVMs) has become increasingly prevalent in commercial property valuation (Bailey et al., 2019). These advancements have enabled assessors and appraisers to handle larger volumes of data and improve the accuracy and efficiency of mass appraisal processes.

Mass appraisal has its roots in the mid-20th century, and it has seen significant developments in various countries including the US, UK, Canada, Australia, Germany, and SA.

The United States played a pioneering role in the advancement of mass appraisal techniques. In the 1940s, the Appraisal Institute published the "Fundamentals of Real Estate Appraisal," which emphasized standardized approaches to property valuation (Appraisal Institute, 1948). The establishment of the International Association of Assessing Officers (IAAO) in the 1930s further contributed to the development and dissemination of mass appraisal practices (IAAO, 1978).

In Canada, mass appraisal practices gained prominence in the mid-20th century. The establishment of the International Property Tax Institute (IPTI) in

the 1980s led to the adoption of standardized mass appraisal methodologies across Canadian provinces (Arnott, 2009). Notable advances include the development of computer-assisted mass appraisal systems and the integration of geographic information systems (GIS) for property data management and analysis.

Australia has been at the forefront of using mass appraisal for property taxation. The introduction of the Valuation of Land Act in 1960 standardized valuation practices across different states. Advances in computer technology and statistical modeling have been integrated into mass appraisal systems, enhancing accuracy and efficiency (Hefferan et al, 2010).

South Africa has a unique context and history regarding mass appraisal due to its diverse property market and the implementation of property tax systems. The history of mass appraisal in South Africa can be traced back to the early 20th century when property taxation was implemented. The valuation of properties for tax purposes became necessary, leading to the establishment of standardized approaches(Franzsen, 2009).

In 2004, South Africa introduced the Municipal Property Rates Act, which mandated municipalities to implement property rates systems. This legislation aimed to improve the efficiency, fairness, and transparency of property taxation. By the directive of the MPRA, the determination of market values through mass valuation plays a crucial role in valuing properties for the purpose of property rates assessment, in South Africa(South Africa, 2004).

South Africa has embraced the use of computer-assisted mass appraisal systems and geographic information systems (GIS) to improve the efficiency and accuracy of property valuations. These tools help manage property data, analyse trends, and facilitate the valuation process. Recently, there are discussions on the use of the ANN models in the mass valuation of property in SA. This debate is hindered by the clarity the courts seek on the activities and processes occurring inside the black box(Yacim and Boshoff, 2018).

Owing to the volumes and homogeneity of the properties in the residential category, there have been significant developments with regards to the mass appraisal methods of the residential property. The mass appraisal methods are largely based on the comparative sales approach. Property characteristics such as location, size, condition, and amenities are considered. The use of AVMs and statistical models has gained traction, particularly for high-volume valuations.

The mass appraisal of residential properties has witnessed several advancements globally. Notable developments include the introduction of hedonic regression models, which relate property values to their characteristics (Clapp & Giaccotto, 1992). Additionally, automated valuation models (AVMs) have gained popularity, utilizing machine learning algorithms and vast property data to estimate property values accurately.

Commercial property mass appraisal has also seen some progress. In addition to the methodologies used in residential property valuation, commercial property appraisal incorporates the income based approaches such as the income capitalisation and the DCF. Mass valuation of commercial properties also involves the use of the profit method, which is used largely where the business on the property has a direct influence on the value of the property such as bars, cinemas and restaurants.

Contrasted to residential property, commercial property mass appraisal on the hand, involves additional considerations, such as rental income, occupancy rates, the profit and the income. Valuers take into account various factors such as property size, location, building quality, and the potential income generated by the property. The use of statistical techniques in this regard can prove to be cumbersome and complex. This is made worse by the heterogeneity of the properties in this category.

2.4.3 The Hedonic Price Models (HPMs) in Valuations

According to Boshoff (2013), the Hedonic Price Models (HPMs) are mainly characteristic of the use of the regression techniques for valuation. It derives

from the Hedonic Pricing Model which is used to determine the price of goods by considering the relationship of the external and internal factors of such goods with the price of the goods. Similarly, the HPMs are used to determine the value of the subject properties (Sopranzetti, 2015). The HPMs use the OLS techniques to assess the price or the value of the subject properties.

According to Boshoff, Yacim and Ahmed (2019), the HPMs based on the OLS were first introduced by court in 1939 in the automobile industry. However, with the passage of time, the need to value a group of properties in an efficient and cost-effective manner became apparent. Following, the work of Lancaster (1966), Rosen (1974) was the first to use this approach to estimate the contributions of each property attribute to the price of a property.

Božić, Milićević, Pejić and Marošan (2013) saw the HPMs as a traditional branch of mathematics and statistics which uses regression formulae/ models to estimate the value of the subject property. The need for mass valuation with consideration for the reduction of inaccuracies as well as the promotion of efficiency in property valuations, also prompted the development of the HPMs. According to Lin and Mohan (2011), the HPM approach is regarded as part of the tradition approaches, but it simply addresses the valuation of group of properties (Božić et al., 2013).

The HPMs or MRA is known as the most-used model for mass valuation. In fact, some researchers refer to as the de facto standard for mass valuation (Jahanshiri, Buyong and Mohd-Shariff, 2011). According to Kauko and D'Amato (2008), to date, the MRA remains the most important theoretical framework for mass valuation. The comparable sales approach largely informs the rationale behind the MRA approach.

In the comparable sales approach, the valuer determines the estimate value for the subject property by adjusting the price difference in comparable sales to match the subject property. The comparable sales approach can be criticised based on the weaknesses that arise out of the dichotomy between theory and practice. For instance, most valuers, particularly old timers, perform

adjustments only “in their heads” and rely on assumptions. This increases the risk of data corruption especially since no workings used in the determination price adjustments are shown.

The strength of the MRA as a mass valuation approach lies in its ability to measure the extent to which each of the property characteristics influences the price or the value of a property. There is vast literature identifying the property characteristics influencing the property values depending on the property types (e.g., residential, commercial, farms, industrial, and public). In the case of residential properties, the characteristics will include the size of the land, the size of the building, living rooms and improvements such as swimming pools.

Jahanshiri et al. (2011) explained that the MRA is a statistical model which relies on analysing the relationship between the dependent variable and the independent variables. In the instance of property valuations, the dependent variable represents the price of the property in question, and the independent variables represent the price-influencing characteristics of the properties under consideration. The relationship between these variables is expressed as the coefficient or the degree of change in each independent variable in relation to the dependent variable.

According to Jahanshiri et al. (2011), the application of the MRA, in technical terms, involves regressing the variables of the sample properties with known prices to establish the relationship known as a coefficient. This is done through known mathematical methods such as the OLS, or the Weighted Least Squares (WLS) or the Maximum Likelihood. The preferred mathematical method in determining the coefficients for MRA is OLS. Once the relationship is established, when the coefficients are known, then the MRA model can be used to predict the unknown prices of the subject properties.

According to Gunes and Yildiz (2015), the fact that the MRA is the most-used mass valuation approach in the world is attributed to the fact that it is understandable, logical and reliable. These characteristics of the MRA ensure

that valuation estimates can be justified. Despite this, the accuracy of the values remains a point of concern.

Kauko and D'Amato (2008) confirmed the assertion that the MRA is the most popular methodology for mass valuation. To this extent, even the hedonic models, which are renowned and the most popular models for price and value formation, are in fact based on the MRA. They argued that this is so because it is regarded as conceptually sound and a very powerful analytical tool relying on both probability theory and calculus.

According to Gnat (2020), the application of the MRA, which is known to be the first and the oldest method to be used in determining value estimates for a group of properties, has evolved over time, adopting new enhancements and assuming variations depending on the specific market conditions and property categories (Božić et al., 2013; Mora-Esparanza, 2004).

Over the years there has been enhancement of the MRA which was mainly aimed at improving the accuracy of the value estimates yielded through the MRA. Notably, more and more valuers have found that the use of the MRA, especially the enhanced versions, produces the most reliable estimates, albeit not better than the advanced methods such as the ANN (Lin and Mohan, 2011).

The concerns about the inherently higher margins of error in relation to the values estimated through the MRA persist. Over time, valuation experts and academia have explored and introduced enhancements to the MRA (Grower, 2016). This was to reduce the margin of error and improve accuracy within time limits and with a higher degree of consistency. The first round of injection to the MRA were improvements and models aimed at improving the spatial dependency of prices as well as spatial heterogeneity, albeit separately. On the other hand, while the MRA methods are evolving for the better, there has been a feeling that new methods, albeit heretic, needed to be tried in the estimation and prediction of price and value. The methods under this category mostly questioned the very analytical underpinnings of the hedonic approach.

With the integration of spatial analysis model, the hedonic models remain largely used by countries such as Hong Kong, the UK, the US, Australia, Malaysia, Singapore, Tasmania, Canada and New Zealand. Most African countries, except SA, still cannot make use of the hedonic models due to the inadequacy of the required property data (Boshoff et al., 2019). However, in SA, the models still ignite volumes of public objections to the valuation rolls Boshoff et al. (2019), found that this is due to the absence of SAM in the currently used hedonic models.

2.4.4 Fuzzy Logic Approach

Fuzzy Logic (FL) is an alternative mathematical approach to computing, first introduced by Zadeh (1965). Contrary to the standard, FL is not based on the usual “true or false”, but rather on degrees of the truth. Further and contrary to the classic Boolean logic, the absolutism logic which asserts that an element can either be true or false, it is about the representation of the similarity of a point or an object shared with each group with a function (membership function) whose values lie between 0 and 1.

In essence the FL challenges the philosophical conviction that everything can be viewed in a binary fashion, as either a “0” or a “1”. The pioneers of FL argue that at times a value could lie anywhere on the continuum, in between the two absolute answers. According to the pioneers, this logic brought computing closer to how the human brain functions. In instances where the value is closer to 1, it means a higher degree of similarity, whereas in cases where the value is closer to 0, it implies a lesser degree of similarity. Because of this, the FL was to alter from an integral part of the expert and the artificial intelligence (AI) systems (Pagourtzi et al., 2003).

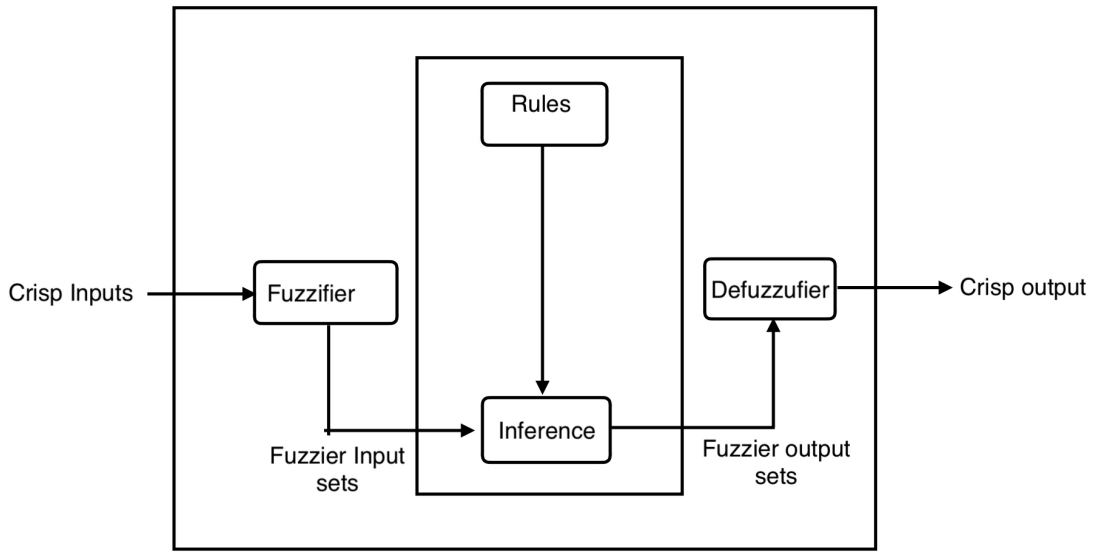


Figure 2-1: Fuzzy System Flow Chart

Source: (Yaşar, Yalpır and Ünel, 2013: n.p.)

Because of the prevalence of imprecise and vague information underpinning the real estate market (Del Giudice, De Paola and Cantisani, 2017), the Fuzzy Logic Approach (FLA) was later introduced for use in real estate valuations by pioneers such as Dilmore (1993) and Bagnoli and Smith (1998). Initially the FLA was used to factor in the distance of the properties from the CBD, and other amenities such as schools, hospitals, shopping centres and recreational facilities. It was also used to factor in the effect of noise on the property values.

According to Lopez et al. (2008), to achieve the best results out of the FLA, one must undertake four phases: (1) the definition of data and the variables; (2) determining membership functions and fuzzification; (3) defining the appropriate fuzzy inference rules into the model, and (4) the computation of the value of the output variables. The following diagram seeks to illustrate the FL system in valuations.

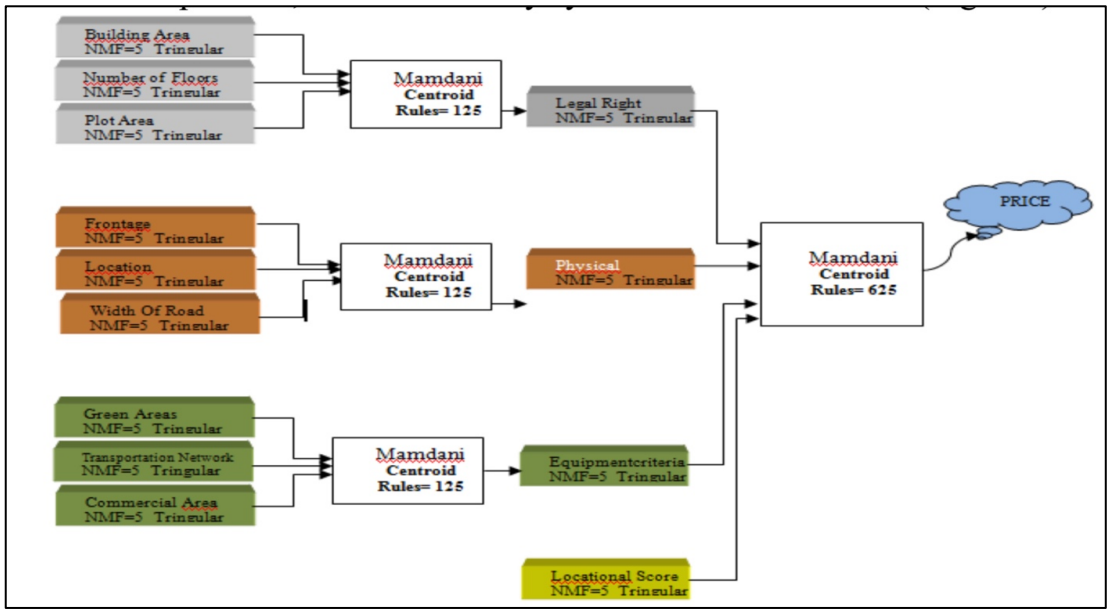


Figure 2-2: Fuzzy Logic System Flow Chart for Real Estate Valuation

Source: (Yaşar et al., 2013: n.p.)

There are numerous studies conducted with the intention of establishing which valuation approaches/models were more reliable under various circumstances. Evaluated against other advanced valuation approaches, the FL was found to be better than the MRA. This performance was mostly attributed to its use of the location attribute. It was also found that the FL yields better results when hybridised with other approaches (Gonzalez and Formoso, 2006).

In some studies, it was found from observing the use of FLA from as early as at the time of introduction to the valuation field that the FLA is more useful when combined with other models in a hybrid of approaches (Król, Lasota, Nalepa, and Trawiński, 2007). In a study by Lokshina, Hammerslag and Insinga (2003), it was found that the FL and ANN performed better that the MRA. However, owing to the limitations pertaining to the determination of the rules, the FL is still not preferred over the ANN and the MRA (Zurada et al., 2011).

2.4.5 Machine Learning/ AI Based Approaches

The ML and AI revolution is felt in many areas of life. One such area is the property valuation for both individual and groups of properties. The introduction

of ML and AI in valuations has thus far proven to be superior with regard to property valuation efficiency, accuracy and consistency.

There are a few property valuation approaches introduced under the umbrella of ML and AI. These include the support vector machines, natural language processing techniques, time series analysis such as the autoregressive integrated moving average. The most popular approaches are the ANN and the decision trees such as the gradient boosted regression tree (GBRT).

2.4.5.1 The ANN

The advent of AI has affected various industries and professional fields. The valuation profession has not been spared this development. The development of the ANN came about because of this definitive development. Pagourtzi et al. (2003) described the ANN models as the mimicking of the biological neural systems (BNS) which enable the functioning of the human brain. The functions of the human brain have always fascinated scientists, and as the result there have been numerous studies on the subject. The ANN was birthed out of the growing understanding of how the human brain functions.

According to Yacim and Boshoff (2014), the human brain functions through the BNS. These are basically nerve cells otherwise known as neurons, which are made up of three basic components: the cell body, then dendrites and the axon. It is understood that the signals are passed from one BNS to the other through the dendrites, through the cell body to the axon. From the observation of the neurons, it was concluded that it is precisely these neurons that enable the human brain to handle complex tasks such as pattern recognition, perception and motor control (Engelbrecht, 2007). According to Mora-Esperanza (2004), the neurons can be illustrated in the following diagram.

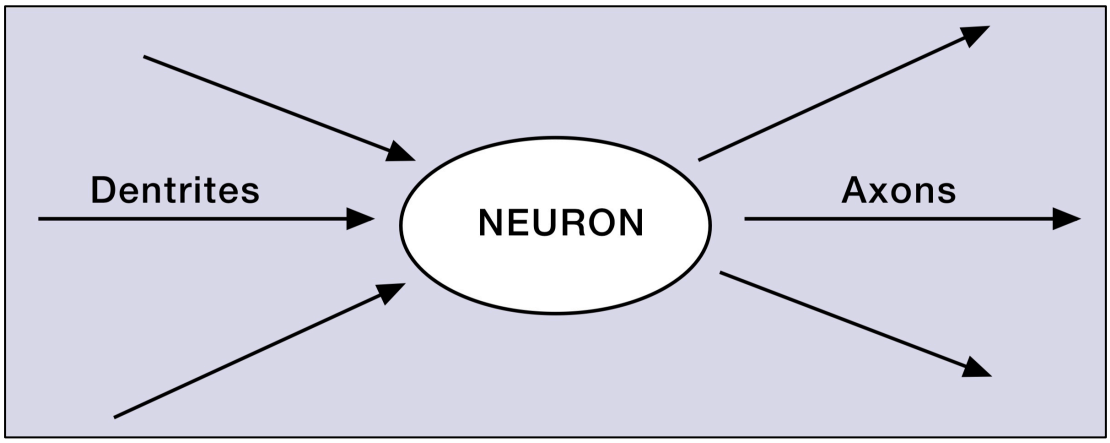


Figure 2-3: Biological Neurons

Source: (Mora-Esparanza, 2004: 256)

This then prompted the development of the Artificial Neurons (AN) which mimic the biological neurons, leading to the ANN. The ANN is composed of the three layers which include the data input layer, the hidden layer, and the output layer (Pagourtzi et al., 2003). The ANN is designed such that, instead of depending on the traditional computer programming, it can learn just like the biological human brain (Yacim and Boshoff, 2018). In any event, the notion of valuation is driven by the attempt to mimic the thought process of an average human being (buyer or seller) when deciding on buying or selling. Therefore, a system such the ANN, which seeks to mimic the human brain in the thought process of buying or selling, could, in theory, improve the estimation of values. The following figure illustrates the structural arrangement of the ANNs.

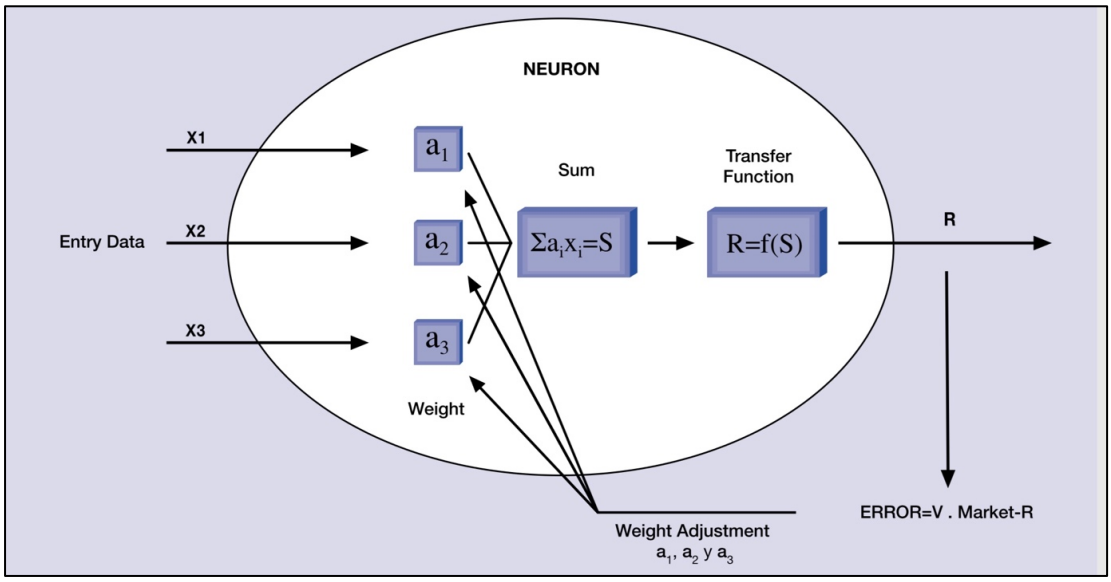


Figure 2-4: Structure of the Artificial Neural Network

Source: (Mora-Esparanza, 2004: 258)

In the application of the ANN, data is inputted in the first layer, the entry layer. Then it proceeds to the second layer, the hidden layer sometimes known as the black box. The hidden layer has two main functions, the weighted summation functions and the transformation functions. Then data proceed to the third later, the exit layer which yields the result, the value estimate.

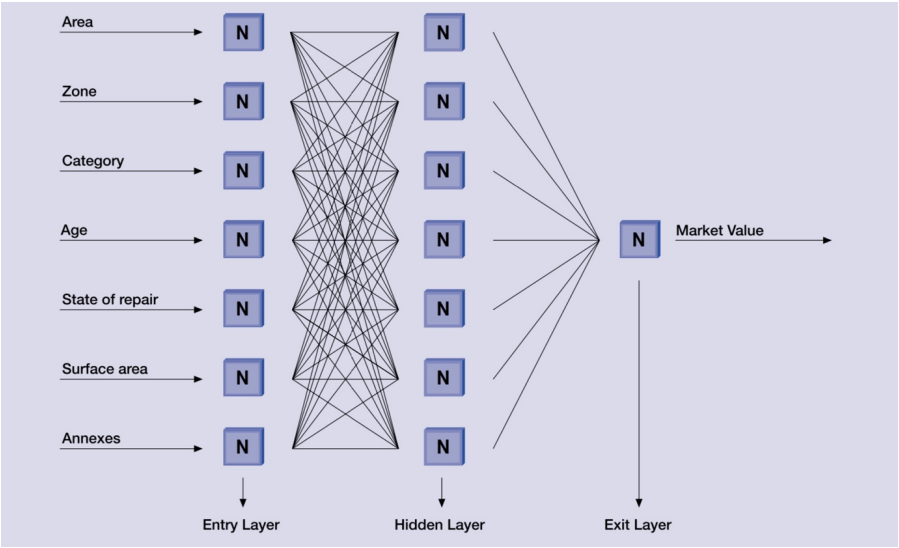


Figure 2-5: Typical ANN for Valuation

Source: (Mora-Esparanza, 2004: 257)

In the first instance, the data inputs in terms of the property attributes are subjected to weighted summations functions, which are typically represented in the following model.

Equation 2-13: Typical ANN Model

$$Y_j = \sum_{j}^{n} X_i W_{ij}$$

Source: (Pagourtzi et al., 2003)

In the above equation, X_i represents the input (property attributes) values and the W_{ij} represents the weights assigned to the input's values for each *j* hidden layer nodes. Once data is weighted and processed through the model above, outputs the transformation variable value Y_j.

According to Yacim and Boshoff (2018), there are numerous transformation models; however, according to Pagourtzi et al. (2003), the preferred model is the regular sigmoid transformation function. This is mainly due to its agility and non-linearity. The function is represented as follows:

Equation 2-14: Regular Sigmoid Transformation Model

$$Y_T = \frac{1}{1 + e^{-y}}$$

Source: (Pagourtzi et al., 2003)

The ANN model must first be exposed to some sort of training on the property attributes data (such as room sizes, the age of the building, number of garages, the ground floor size, total building size) from the sample sales in the market area (Pagourtzi et al., 2003). This allows the ANN to learn the value determination process by generating the weightings of the data on the property attributes that influence the value of the property. To ensure that the model learns the correct principles that will ascertain a greater degree of accuracy in the value estimation, all the outliers identified during the sampling testing are

removed from the sample. Ultimately, the ANN model is used to estimate the values of the subject properties based on the principles learnt at the training stage.

The ANN approaches are developed with the purpose of improving the inefficiencies of the traditional approaches and to improve the accuracy of the value estimates. However, the ANN has its own weaknesses such as the controversy around the inexplicability of what goes on in the black box, especially in the context of countries like SA whose valuation disputes are subject to court decisions. The weaknesses also include the reliance on a large size of sample data to produce better accurate estimate values (Jenkins, 2000; Yacim and Boshoff, 2014). For these reasons, its rollout is deferred.

In addition is the concern that use of the ANN could render the valuation profession redundant, since very little human valuation expertise intervention is required (Chan and Abidoye, 2019; Mooya, 2011; Tay and Ho, 1992). At this stage, the courts are not comfortable with the fact that there is difficulty in logically explaining the value determination processes taking place in the hidden layer (black box). This aspect must be pursued in the courts especially given the scientific evidence showing the improved accuracy levels attained in the ANN approaches. This is contrary to the common requirement that valuers must always be able to provide a logical explanation on how they arrived at certain value estimates. In SA, in addition to this concern, the deferment can also be attributed to the fear that valuers may be replaced and there may be a need to retrain valuers on the new models and techniques.

2.4.5.2 Decision Trees Algorithms

One ML/ AI variant is the decision tree algorithms known as the Gradient Boosted Regression Tree (GBRT). The GBRT is the most popular ML technique that has gained traction in mass valuation, which involves estimating the value of a large number of properties for property tax assessment or other purposes. GBRT is a powerful and flexible approach that can handle complex non-linear relationships, making it well-suited for the challenges of mass

valuation. According to Martinho, Duarte and Neves (2019), Zhang, Lu and Qin (2017) and Zhang et al. (2018), the use of GBRT has gained popularity in mass valuation due to its ability to handle complex non-linear relationships and high predictive accuracy.

One of the key advantages of GBRT is its ability to capture interactions and nonlinearities in data. GBRT builds an ensemble of decision trees in a boosting framework, where each tree is sequentially constructed to correct the errors of the previous trees. This allows GBRT to capture complex patterns in the data, such as interactions between different property characteristics (e.g., location, size, age) that may affect property values. GBRT also has the ability to handle missing data effectively, making it robust in the presence of incomplete or noisy property data (Qin, 2017).

Another strength of GBRT is its high predictive accuracy. GBRT can provide accurate estimates of property values, particularly when trained on large datasets with diverse property characteristics. It can model both the main effects and interactions of multiple variables, resulting in more accurate predictions compared to traditional methods like linear regression or traditional decision trees. GBRT can also handle large datasets efficiently, making it well-suited for mass valuation tasks where large volumes of property data need to be processed (Qin, 2017).

Moreover, GBRT offers interpretability and transparency in the modelling process. GBRT models can provide insights into the importance of different features or variables in predicting property values. Variable importance measures can be calculated to assess the relative contribution of each predictor variable in the model, helping assessors and practitioners understand the drivers of property values and make informed decisions.

However, GBRT also has some limitations. It requires careful tuning of hyperparameters to optimise its performance, and overfitting can be a concern if not properly managed. Interpretability can be reduced in more complex GBRT models with numerous trees and interactions, making it challenging to fully

understand the underlying decision-making process. Additionally, GBRT may require a substantial amount of training data to achieve optimal performance, which may not always be available in all mass valuation settings.

GBRT is a powerful ML technique that has shown promise in mass valuation due to its ability to capture complex non-linear relationships, high predictive accuracy and interpretability. It can be a valuable tool for property assessors and practitioners in estimating property values, particularly when dealing with large datasets and complex valuation tasks. However, careful model tuning and interpretation of results are important considerations to ensure reliable and accurate valuation outcomes.

2.4.6 The Spatial Valuation Approaches

The evolution of spatial valuation approaches can be traced back to the late twentieth century when advancements in technology and data availability provided new opportunities for incorporating spatial considerations in property valuation. The approaches were birthed by the spatial analysis techniques, which involved mapping and overlaying physical, social and economic data to identify spatial patterns and relationships. Early spatial analysis provided a foundation for understanding the spatial dependence and spatial heterogeneity of real estate markets and the need for spatially explicit valuation approaches. However, the lack of sophisticated tools for data management and analysis limited the application of spatial analysis in property valuation (Longley, Goodchild, Maguire & Rhind, 2015)

This was to change with the advent of Geographic Information Systems (GIS) in the 1980s, which revolutionised spatial analysis by providing powerful tools for data management, spatial mapping and spatial analysis. The GIS enabled the integration of various data sources, such as property attributes, land use, zoning, and transportation networks, into a spatially explicit framework for property valuation. The GIS has become a fundamental tool in spatial valuation approaches, allowing for sophisticated spatial data handling and analysis. The GIS has facilitated the development of spatial databases, spatial modelling, and

visualisation techniques, enabling practitioners to better understand the spatial dynamics of real estate markets and make more informed valuation decisions (Longley et al., 2015).

There are a few spatial valuation models including geostatistical approaches, spatial autoregressive models, geographic weighted regression and spatial ML. All these approaches serve to offer valuable tools in the analysis of property values in the context of spatial heterogeneity. The whole theory around the spatial valuation models is premised on the understanding and acknowledgement that property values are influenced by time and space (Anselin, 2003; Fotheringham, Brunsdon and Charlton, 2002; Francke and Verhagen, 2016).

2.4.6.1 Geostatistical approaches

Geostatistical approaches utilise statistical techniques to model and analyse spatially correlated data. These methods account for spatial autocorrelation and provide insights into the spatial patterns of property values. Kriging, a widely used geostatistical method, estimates property values based on neighbouring observations, incorporating spatial dependency (Li, Zhang and Liu, 2018). Geostatistical approaches are effective in spatial interpolation and provide accurate property-value predictions at unsampled locations.

2.4.6.2 Spatial autoregressive models

Spatial autoregressive models explicitly consider spatial interactions and dependencies among neighbouring properties. These models account for the influence of spatially lagged property values on the current property value, capturing spatial spill-over effects. Spatial autoregressive models, such as spatial lag models and spatial error models, provide valuable insights into the spatial dynamics of property values (Anselin, 2003). They are particularly useful in analysing the diffusion of property-value changes across space.

2.4.6.3 Spatial machine learning techniques

Spatial ML techniques, such as spatial clustering, spatial decision trees and spatial random forests, combine traditional ML algorithms with spatial information. These methods leverage spatial patterns and relationships to predict property values. Spatial clustering techniques group similar properties together based on spatial proximity, aiding in identifying spatially coherent valuation clusters (Yu, Shi and Li, 2019). Spatial decision trees and random forests incorporate spatial variables and interactions, allowing for spatially informed predictions.

2.4.6.4 Geographically weighted regression (GWR)

Fotheringham et al. (2002) pioneered the development of GWR as a spatial analysis technique. GWR is a powerful spatial statistical technique that has gained significant attention in the field of mass valuation. With the increasing availability of geospatial data and the recognition of spatial heterogeneity, GWR offers a valuable tool to understand and model spatially varying relationships between property values and their underlying determinants.

The GWR variation is the most popular of the local models. GWR is a localised regression technique that accounts for spatial heterogeneity in property-value relationships. GWR allows for spatially varying coefficients, capturing the influence of local factors on property values. This approach enables the identification of spatially varying relationships between property values and their determinants, providing localised insights (Fotheringham et al., 2002).

GWR is effective in capturing spatial variations and enhancing the accuracy of property valuation models. One key application of GWR in mass valuation is the consideration of spatial autocorrelation, which captures the tendency of similar property values to cluster together. GWR takes into account the local effects that influence property values, such as proximity to amenities, accessibility and neighbourhood characteristics (Huang, Man, Zhang and Shi, 2017). By incorporating these factors, GWR improves the accuracy of property valuation models by accounting for spatial variations.

Unlike traditional regression models, GWR produces a set of spatially varying coefficients for each independent variable. These coefficients provide insights into how the influence of different variables changes across space. For example, Wang, Zhang and Liu (2015) used GWR to examine the impact of accessibility on housing prices and found that the effect of accessibility varied across different regions of a city, highlighting the importance of considering spatial variations.

According to Jahanshiri et al. (2011), the other localised model is the Moving Window Regression (MWR). The fundamental difference between the GWR and the MWR is the weightings assigned to the observations. In the case of the former, the weight is assigned in a gradual manner, ranging from the highest to the lowest, from the regression point outward through the observations. In the case of the MWR, the observations are assigned equal weights (Jahanshiri et al., 2011).

Various researchers including Militino, Ugarte and Garcia-Reinaldos (2004), Cohen and Coughlin (2008), Ismael, Groot and Mulder (2008) and Anselin and Lozano-Gracia (2009) agreed that the application of these models belonging to the SRM family improves the accuracy of the results in the estimation property prices (Abidoye and Chan, 2016b; Chan and Abidoye, 2019; Lam and Seneviratne, 2008; McCluskey et al., 2013; Selim, 2009).

2.5 RESEARCH GAPS

It is apparent that the selection of an appropriate methodology is critical for attaining accuracy in mass valuation. The ML-based approaches, including the ANN, are increasingly becoming approaches of choice. This is because of the impressive accuracy levels achieved in the value estimates when applying such approaches. This has been confirmed in numerous scientific studies. However, it is a fact that most authorities and the courts are discouraged from accepting the valuation outcomes determined with the aid of the ANN due to the non-transparency of the “black box” (IAAO, 2003). Currently the MRA approach and its enhancements are the most-used approaches. Comparative studies have

found the MRA to be in the second place following the ANN in terms of attaining accuracy. The localised mass valuation standard may have to be structured so that it allows for future accommodation of ML-based approaches, including the ANN. Soon, researchers will have to find a way to either break open the black box, and explain the processes inside it or find a convincing argument before the courts to accept and recognise the ANN approaches.

Having discussed all these aspects on the evolution of valuation approaches and models with consideration to the need for standardisation of the valuation practice, the primary concern remains the improvement of valuation accuracy, especially for mass valuation. While the chapter successfully discusses literature and relevant studies on the subject, it also reveals a research gap in relation to the development of mass valuation standard. There are no studies that seek to provide guidance on the development of mass valuation standards that are robust and responsive to the fast-evolving valuation approaches and models. The study will, amongst others, seek to close this gap. The emerging question therefore becomes: *how best to forge a bridge between evolving valuation approaches and models, and mass valuation standard.*

This is in recognition of the realisations that as environments evolve, so should theories upon which valuation approaches and models are based. This ushers in an era of a new theoretical framework, as well as new approaches and models which require standardisation of the mass valuation practices.

2.6 CHAPTER SUMMARY

With the intention of creating fertile ground for a discussion on the mass valuation standards, the study traces the evolution of valuation theories back to the economic theories. This was largely driven by the need to establish the basis of value formation which in turn underpins property valuation as the art and science of estimating property values. Valuation was traced from its genesis in economics. The value of a property is defined as the price it can fetch when sold or bought. Even though there are various kinds of values, the focus of this study is on market value.

Historically, economists have asserted that value is created through the combination of the primary factors of production and the interaction of supply and demand forces (Australian Property Institute, 2015; Boshoff 2010). In the same vein, property valuation refers to the art and science of estimating the price of the properties especially when the sale has not yet occurred. The process of valuation requires a simulation of the buyer or seller value-forming thinking process, which is based on their perceptions. This creates a market, which is an outcome of the country's economic and ideological posture. Market value cannot be created in countries that do not embrace the market value concept and implication, the free-market economy ideology. SA is a free-market economy with a dynamic and robust property market, thus the use of the market value concept in relation to commodities including real estate.

This chapter also discussed the valuation approaches from the valuation of single properties to mass valuation. This discussion cuts across the orthodox (traditional) valuation approaches to the heretic (advanced) valuation approaches. The evolution of property valuation approaches dates to Alfred Marshal (1842-1925). It has evolved from the traditional (orthodox) approaches to the advanced (heretic) approaches. The evolution of the valuation approaches from the traditional methods to the advanced approaches has been driven by the concerns about the valuation inaccuracies and the attempts to improve these (Bagnoli and Smith, 1998; Jiang et al., 2013; Taffese, 2006). The traditional approaches mainly represent generations of the approaches that are based on the three main traditional valuation approaches and ushering in the mass valuation approaches such as the MRA and its improvement modules. It is at the behest of the persisting criticism beyond the MRA that the advanced (heretic) models such as the HPM FL, spatial models and the ANN models are introduced and relentlessly pursued by academia. Most important are the ANN models which arose as a result of the AI revolution.

There is growing evidence that ANN models produce more accurate valuation results (Abidoye and Chan, 2016a). Although the use of the ANN is becoming increasingly attractive, owing to the inability to logically explain what happens

in the black box, especially in the courts, the developing countries including South Africa, still prefer the use of the HPMs (Abidoye and Chan, 2016c; Chan and Abidoye, 2019; Lam and Seneviratne, 2008; McCluskey et al., 2013; Selim, 2009). Indeed, there are other heretic models that are gradually being introduced. These include primarily the spatial valuation models, which are growing in popularity and are a formidable competitor to the HPMs. The choice of the MRA with spatial enhancements, in most countries including SA, is mainly informed by the simplicity with which the interaction and relationships between the dependent and independent variables, including the property characteristics, are logically explained (Abidoye and Chan, 2017; Mooya, 2015; Waziri, 2010).

This chapter discussed the mass valuation approaches and models and revealed that the accuracy of valuations is largely but not exclusively dependent on the selection of the appropriate valuation approaches (Chan and Abidoye, 2019; Jiang, Vujaklija, Rehbaum, Graimann and Farina, 2013).

The next chapter builds on this basis and discusses valuation accuracy, uniformity and standards.

CHAPTER 3

VALUATION ACCURACY, UNIFORMITY AND STANDARDS

"…Second, a literature review seeks to summarise, evaluate, clarify and/ or integrate the contents of the primary reports."

(Harris Cooper)

3.1 CHAPTER INTRODUCTION

For decades, researchers and experts have raised several questions about valuation relative to the accuracy of estimates (Brown, 1986; Brown, 1992; Hager and Lord, 1985; Waldy, 1997). In response to this debate, numerous qualitative and quantitative studies have been conducted in various countries (developed and developing), albeit with limited focus on the valuation of individual properties (Abidoye and Chan, 2017; Ayedun, Oloyede and Durodola, 2012; Adegoke, Olaleye and Oloyede, 2013; Babawale and Omirin, 2012; Matysiak and Wang, 1995; Parker, 1998). In both the qualitative and quantitative studies, most researchers found the existence of valuation inaccuracies, and a few found high levels of accuracy (Parker, 1998). Following the findings that valuation inaccuracies exist, the subsequent question relates to the extent of such inaccuracies and the causal thereof.

Alongside the evolution of valuation approaches, the twin evils of valuation inaccuracy and valuation inconsistency remained a glaring thorn in the eye of the valuers (Smith, 1986; Ayedun et al., 2012). Valuation inaccuracy relates to the degree of variation from the market prices (Ayedun et al., 2012; Crosby, Devaney and Matysiak, 2003; Eziukwu, 2019), while valuation inconsistency is concerned with the variation between value estimates by two or more valuers for the same properties (Ayedun et al., 2012). The valuation concerns associated with the twin evils have always been largely attributed to the lack of testing for valuation accuracy and uniformity, as well as the valuation standards (Dugeri, Gambo and Ajayi, 2012). For this reason, the valuation testing and standards evolved alongside the evolution of the valuation approaches. In the process, international standards for individual properties were introduced and gradually improved.

These developments were inevitably channelled towards the standards for mass valuations. To date, efforts by the international valuation fraternity have culminated in the adoption of the standard for mass appraisal of real estate property (IAAO, 2003). However, there has been a raging debate in every country on whether emphasis should be placed on localising the standards for each country and derive country-specific valuation standards or the countries must simply adopt and enforce the international standards. Throughout this evolution the most significant benefits to the valuation fraternity entail the improvements in valuation efficiency and accuracy (Chan and Abidoye, 2019; Grover et al., 2017).

The purpose of this chapter is to review related studies on valuation accuracy and uniformity and identify gaps that the current study is intended to fill. The chapter also discusses valuation accuracy and uniformity, with the aim of justifying the need for a mass valuation standard for SA. The nature and extent of valuation inaccuracies and inconsistencies experienced in several countries, especially when applying the valuation principles and standards as the basis of market valuation, are reviewed. Literature on valuation accuracy (or inaccuracy) and Inconsistency (or uniformity) is also reviewed. More particularly, in search of the global perspectives on the subject matter, lessons were drawn from other countries including Brazil, China, the US, the UK, Australia and Nigeria. The chapter also provides the theoretical basis for the empirical analysis of the secondary data in pursuance of question, “What is the extent of valuation inaccuracies in SA, relative to the world, especially as it relates to the municipal valuation rolls?”

3.2 UNDERSTANDING VALUATION ACCURACY AND UNIFORMITY

Over the years the concerns over-valuation inaccuracy and inconsistency have become colossal. The concerns grew along the growth of valuation approaches and the profession in general. The impact of these concerns was made manifest on individual property valuations as well as the mass property valuations. But what is valuation accuracy and uniformity? Why are they important in the broader context of valuation and mass valuations?

3.2.1 Valuation Accuracy

The concept of valuation accuracy relates to the proximity of the value (price estimate) and the market price (actual selling/ buying price) (Parker, 1998). To begin with, what is valuation and what is accuracy? For the purposes of this discussion, valuation is a process which entails the prediction of the most likely selling price of a property, and ultimately results in a value (Waldy, 1997). The concept of value, which for the purposes of defining valuation accuracy, is compared to the selling price of a property, refers to the amount recorded as paid for the property under consideration (Baum, Crosby and MacGregor, 1996).

In short, the concept of valuation accuracy begs the question: how close is the estimated value to the actual realised price (Schulz, 2002)? According to the IAAO (2013), when addressing the accuracy of valuations, it is important to do so from two perspectives, level (degree) and uniformity. The level (degree) refers to the level of accuracy in relation to the true value or the sales price. Mathematically, this is expressed as an inverse of the margin of error. For example, if the margin of error is 10%, then the level accuracy will be 90%.

Therefore, it can be reasoned that while valuation accuracy is regarded as a comparison of the two variables, i.e., value and selling price from a positive perspective, valuation inaccuracy is the comparison of the same variables from a negative perspective (Baum and Crosby, 1988). It is, thus, acceptable that valuations may be accepted within certain degrees of inaccuracies otherwise referred to as the margins of error. The Australian courts have determined these to be anything less than 15% in inaccuracy.

The need for the improvement of valuation accuracy as well as valuation uniformity cannot be over emphasised. The studies considered in the literature review illustrate this assertion (Ayedun et al., 2012). According to Ayedun et al. (2012), valuation accuracy and reliability are important to the valuers, their clients and the general valuation stakeholders. This need was observed by several valuation researchers as affecting the valuation stakeholders in developed and developing countries such as Canada, Australia, the UK, the USA and Nigeria.

In the same year, Babawale and Omirin (2012) argued that in fact the accuracy of valuation was a worldwide concern. Despite their focus on the type and source of valuation data, according to Abidoye and Chan (2017), the employment of the advanced valuation models such as the ANN, FL, and spatial analysis method was necessitated by the demand for more accurate valuations and for the users of the valuation reports such as the property investors and financiers. They observed that poor valuation accuracy could lead to loss of profits, loss of jobs and investor bankruptcy.

In South Africa the court challenges against the municipal valuation rolls are primarily based on alleged valuation inaccuracies, which are mostly attributed to perceived and real inconsistent application of the valuation principles and standards. This has, in most instances, as claimed by either of the parties in courts, led to gross inaccuracies of the values in the municipal valuation rolls. It is, however, arguable that these inaccuracies are a manifestation of the valuation inconsistencies in the application of the valuation principles and procedures during the determination of municipal values by the expert valuers (Channing, 2013).

3.2.2 Valuation Uniformity

The concept of valuation uniformity is an antithesis of valuation inconsistency. It seeks to ensure that there is consistency across different valuations of similar properties. It is essential to have consistent approaches, methodologies and standards applied by valuers to avoid wide variations in valuations. Uniformity promotes fairness, transparency and confidence in the real estate market, reducing the potential for disputes and ensuring a level playing field for market participants. (Parker, 1998)

According to Smith and Johnson (2018), uniformity refers to the size of population of the properties, whose value estimate was found to be almost equal to the true values (sales prices). It also refers to the consistency and standardisation of property valuations within a jurisdiction or across different appraisers. It is an important aspect of mass valuation systems as it ensures fairness and equity in property assessments. Uniformity in valuations serves to minimise discrepancies and variations in relation to

physical similarities and location of properties. Poor or lack of uniformity may lead to public distrust in property tax system.

These valuation inconsistencies are in turn attributed to the lack of mass valuation standard, more specifically country-specific mass valuation standard. Alternatively, because there are international standards in place to which developing countries like SA may subscribe, it could also be as the result of inconsistent application of the international standards and valuation principles. Parker (1998) asserted that the concept of valuation inconsistency can be defined as an act of differently applying the valuation principles, procedures and standards, during the determination of values of the same or similar real estate properties.

In the case of mass valuation in general and municipal valuations in particular, the valuation principles, procedures and standards include and relate to aspects prescribed in the legislative framework and the IVS for both individual and mass properties. This may include but is not limited to principles such as prescribing data sources with a higher degree of validity and reliability, conducting property market analysis, the size of the samples used in such a market analysis, choosing valuation approaches, the basis of valuation in relation to the property use, and others.

The judges in the Supreme Court of Appeal case between *Athol Developments (Pty) Ltd and Valuation Appeals Board for the CoJ Valuation Appeals Board and Another SCA* (2014), supported the assertion that valuation inaccuracies, which arise because of inconsistencies, are often the basis for most objections to the valuations rolls. In the South African municipal valuation context, these objections are often raised by rate payers through ratepayers' associations on the same basis. In this case, the basis of valuation was at the centre of the challenge by Athol Developments (Pty) Ltd, a 99-year lease tenant on the subject property.

Clearly, there were inconsistencies which led to a grossly inaccurate initial valuation. It was determined to have a total value of R9 700 000. The municipality challenged the valuer on this outcome and argued that the actual total value should be R460 300 000 million. This was upheld by the municipal valuer and subsequently reflected in the supplementary valuation roll. Upon appeal to the Valuation Appeal

Board by Athol Development, the VAB determined the total value at R308 000 000 million, a view which was ultimately confirmed by the Supreme Court of Appeal. It can reasonably be assumed that in all these instances the values are arrived at by valuers using different valuation approaches and principles.

In the case between *The CoJ Metropolitan Municipality v The Valuation Appeal Board and Connaught Properties (Pty) Ltd* (2013), the consistency in the application of the valuation principles was tested, as the categorisation of two land uses on one building, on two stands was contested. Initially, the municipal valuer categorised the two erven as multiple purposes without mentioning the business and the residential uses. They valued the subject property as though it were predominantly for business purposes. This was contested by Connaught Properties, arguing that while they agreed that the categorisation was multiple use, the dominant land use was residential, and the smaller part was business.

Connaught Properties had no problem with the value as determined, but they insisted that each part of the property should be apportioned with a corresponding value and show 79.4% and 20.6% in favour of residential use and business use respectively. It was also recorded as a known fact that the valuation outcomes are intrinsically linked to the categorisation, and that their treatment in terms of the application of the rates and taxes differs and does matter. In the instance of municipality's point of view, the total value was estimated to be R170 000 for erf 3563 and R3 209 000 for erf 3564. These values were to be subjected to applications of ratios as discussed above. In the end, the courts upheld the proposal by Connaught Properties (Pty) Ltd.

In their quest to understand challenges and find solutions relating to valuation uniformity, Brown and Fraser (2016) proposed the standardisation of valuation methods, the ongoing training of valuers, and employment of quality assurance measures. To ensure valuation uniformity, jurisdictions often implement guidelines, regulations and quality control procedures. These may include the development of valuation manuals, the establishment of review processes, and the use of statistical models to identify outliers and assess accuracy. These measures aim to reduce subjectivity, minimise bias and promote consistency in property valuations.

3.3 ACCURACY AND UNIFORMITY IN INDIVIDUAL VALUATIONS

Most of the studies on valuation accuracy are limited to individual property valuations (Abidoye and Chan, 2017; Ayedun, Oloyede and Durodola, 2012; Adegoke, Olaleye and Oloyede, 2013; Babawale and Omirin, 2012; Matysiak and Wang, 1995; Parker, 1998). Studies on valuation accuracy or inaccuracy formed the basis of valuation discussions as far back as the early 1980s. They were birthed out of the paper by Hager and Lord (1985), which came about as a response by the IPD for the property valuations used in the measurement of performance of property investments. It is important to note that the initial studies, and particularly the quantitative studies, were largely concerned about the valuations of single properties.

Smith (1986) argued that valuation inaccuracies are attributable to two main categories of inconsistencies. In the first instance, he linked the inaccuracies to inconsistencies in the theories of valuation. In this regard, he raised constructive criticism against the traditional theories of valuation. Secondly, he raised the inconsistencies relating to how the theories and principles were applied. Smith's (1986) arguments in terms of the second group of inconsistencies remain relevant to the inconsistencies in the application of the established written or unwritten valuation standards today.

Smith (1986) was also concerned about the confusion and inconsistencies in the theoretical interpretation of the valuation theories, as well as in its practical application. This confusion generally leads to inaccurate valuations. Smith (1986) raised nine theoretical inconsistencies with a potential to cause inaccurate valuations. These included the following:

- Inaccuracies arising because of the timing of adjustments. Smith (1986) cautioned against one of the causalities of valuation inconsistency. He argued that, often when adjustments on the comparable sales are applied, the timing and the sequencing of adjustments become problematic. Valuers would tend to adjust the prices directly without regard to the impact of the time at which the pricing occurred versus the valuation date.

- Inconsistencies arising as the result of the misapplication of percentage changes. Such inconsistencies arise as the result of the practice of simply effecting the percentage increase or decrease, whenever re-valuations of a property are required. In such cases, the subject property is simply used as the basis for the adjustments. As a result, valuers would always effect changes as a percentage of the subject property (Smith, 1986).
- Inconsistencies that are brought about as a result of the confusion regarding the determination of the date of valuation. There would be valuers who would choose the date of inspection as the valuation date while others would choose the date on which the economic assessment and analysis was conducted. It is advised that it is best to use the date on which the report is finally signed off to the client. Valuers are advised to confirm that there are no changes to the physical structure and the economy on that date before signing off (Smith, 1986).

According to Parker (1998), there was never any doubt that there is a necessity to study the subject of valuation inaccuracy, as there is a lot at stake. This is understood to refer to the proximity or difference between the determined or estimated value versus the market value (Waldy, 1997). Researchers generally agree that no property valuation can ever be totally free of inaccuracy (Millington, 1985), or put differently, that achieving perfect accuracy is impossible. Naturally, valuation seeks to estimate the selling price of a property in an imaginary setup, thus inaccuracy will remain an inherent challenge, which can only be minimised rather than eliminated (Herd and Lizieri, 1994).

Parker (1998) investigated the notion of valuation accuracy from a positive perspective. More specifically, he investigated this notion in relation to Australian property markets. In essence, Parker (1998) sought an answer to the question, how accurate are the valuations in Australia? Of course, this study was concerned about a consideration far beyond simple professional negligence as the main causal of poor valuations as discussed by Hager and Lord (1985).

Parker's (1998) study adopted a quantitative study approach, which made use of the numerical data from the market and the valuations conducted. To provide proper grounds for the quantitative study in question, Parker (1998) reviewed the previous

qualitative and quantitative studies on the subject valuation accuracy, which were conducted in various countries.

From a qualitative perspective, it can be established that researchers such as Millington (1985) believed that even though the achievement of perfect valuation accuracy is desirable, it is not possible owing, among other things, to the characteristics of the property as an asset class, the imperfect nature of the property market, the lack of a reliable property sales register, the unique character of buildings, the confidentiality of information on sale prices, as well as the influence of economic aspects such as supply and demand.

Millington (1985) also cautioned that the practice of rounding off numbers during valuation also affects valuation accuracy. This impossibility of attempting to achieve a perfect valuation accuracy somehow gave rise to the use of the concept, valuation inaccuracy rather than valuation accuracy. Consistent with these views, Millington (1985), Baum and Mackmin (1979), and McIntosh and Sykes (1985) asserted that the existence of valuation inaccuracy must be accepted as a fact of life in valuations. However, the jury is still out regarding the acceptability thresholds.

Parker (1998) cautioned that valuation inaccuracy could result in users of the valuation information, loosing confidence in the valuation profession, the property market and the property industry. It is desirable that the valuation inaccuracy, measured as the ratio of the estimated value over the actual market price, often expressed in percentage form, be contained at the lowest levels. The lower the percentage the better the valuation estimates. Parker (1998) asserts that valuation inaccuracy can arise because of inconsistencies in the valuation process.

Parker (1998) also reviewed the quantitative studies that focused on establishing whether valuation inaccuracies existed in the UK and the United States, and if so, the extent thereof. In both cases the findings of the quantitative studies show that valuation inaccuracies do exist in both countries. However, it is noteworthy that the study also revealed that the degrees of valuation inaccuracy in those countries varied vastly from country to country. (Brown, 1991; Cole, Guilkey and Miles, 1986; Drivers Jonas, 1988; Hager and Lord, 1985).

Parker (1998) observed that the earlier quantitative empirical studies about valuation accuracy were conducted on individual properties as opposed to mass valuation (Hager and Lord, 1985; Brown, 1991). However, given the purpose and the use of the test for valuation accuracy, which seeks to ascertain accuracy and acceptability of the valuations, the findings remain relevant to mass valuation.

Parker (1998) provided a review of a study conducted by Hager and Lord (1985) in the UK in which two individual properties were subject to valuation by ten volunteering valuers. This study found the existence of valuation accuracy ranging between 10.6% and 18.5%. The finding of the study was criticised and dismissed by Reid (1985) as misleading and invalid. This was based on the observation that valuers were conducting the valuation pro bono, and therefore not much effort was invested in the project. Reid (1985) also questioned the completeness and reliability of the information provided as the basis of valuation to the participating valuers.

Another study with a larger size of sales was conducted by Brown (1991). This time around 25 sales spanning over five years (1975-1980) that had prior independent market valuations were selected. The study compared the recorded selling price and the prior determined market value. The results showed a higher degree of valuation accuracy. The degree of valuation accuracy fluctuated around 99%.

These findings were confirmed by a later study conducted by Drivers Jonas (1988), which also spanned five years (1982-1988) and involved a larger population size of 1 442 properties with valuation accuracy at 93.4%. The population size was later increased to 2 400 for Drivers Jonas (1990). The findings of the numerous subsequent studies, with improvements in the population size, periods, and statistical analytical techniques maintained a high degree of valuation accuracy (Waldy, 1997).

The data validity and reliability of studies improved with time, increasing population size, independence and quality of information. In essence, the studies found that valuation inaccuracy does exist, although it was very low. It was found that the quality of the information provided to the valuers, the independence of the valuations, as well as the incentives for the valuation work influence the degree of valuation accuracy (Brown, 1991; Drivers Jonas, 1988; Hager and Lord, 1985; Reid, 1985).

Parker (1998) concluded by indicating that valuation accuracy and its acceptability depends on the user in line with the old English adage, 'Beauty lies in the eyes of the beholder'. In the Australian context, from an investor perspective, a valuation accuracy degree of 5% was going to be the ceiling, while for other users, a valuation accuracy degree of 15% was seen to be acceptable. This introduces a new challenge to the valuers, that of debuting new means to ascertain a greater valuation accuracy degree.

In response to the criticism against their initial quantitative studies on valuation accuracy, Matysiak and Wang (1995) improved on the methodology and techniques of their study. They reduced the population size to 317 and increased the time span to eight years. Their findings indicated that it was difficult to achieve a high degree of valuation accuracy as suggested by the previous studies. They also found that the valuers were more likely to succumb to pressure to over-value and under-value in instances of falling markets and rising markets respectively.

Following the global trends, Nigeria, as a developing country, conducted studies on valuation accuracy and inconsistency. One such study was conducted by Ogunba (2004). The study involved 200 valuation firms that conducted valuation in the five state capitals in South-Western Nigeria. The findings of the study suggested the existence of a significant degree of valuation inaccuracy and variations, especially between the valuers. This inevitably was traced to non-uniformity in the determination of valuation input such as data and methods, which were unfortunately pinned on the educational and practice deficiencies of the valuers.

The study was based on the acceptance of the assertion that property valuation accuracy is of paramount importance to the users of the valuation information. Although differing on the treatment of the normative concerns that could help improve property valuation accuracy, researchers still agreed on the paramount importance of valuation accuracy as explained by Hayunga and Pace (2017), McGreal, Adair, McBurney and Patterson (1998), Bourassa, Hoesli and Sun (2006) and Choy, Mak and Ho (2007).

Against the backdrop of the general agreement that valuations inaccuracies do exist in developing countries, including Nigeria and other countries, Ayedun, Oloyede and

Durodola (2011) conducted a study investigating the causes of valuation inaccuracies in Nigeria. They used the survey method and interviews and simple statistical methods to analyse the collected data.

The findings of their study revealed that amongst others, the causes of valuation inaccuracy included a dearth of market data and lack of adequate valuers' experience and training. They made two main recommendations including, that a functional property data bank be established, and that valuers must use the valuation standards set by the statutory and voluntary bodies in Nigeria. The findings and concerns may not hold entirely true for SA in so far as the dearth in property data is concerned, because valuers in SA rely on the data from the Deeds Registry Office for property registrations. The market property data for the entire country is generally regarded as always up-to-date and reliable.

Regarding the training and experience of the valuers, this finding remains to be tested for relevance for South Africa. Anecdotally, it is observed that most of the valuers still hold a National Diploma in valuations as the highest qualification. Very few valuers hold post-graduate research or statistical qualifications. Recently, the requirements for registration with the SACPVP have been stepped up. An honours equivalent degree is now a requirement. Such a degree has to be completed with an institution accredited with SACPVP. These concerns irregardless, the SACPVP through its rules, ensures that necessary and adequate professional experience is attained before a full professional registration is lodged.

The study by Abidoye and Chan (2017) was based on the hypothesis that the reliable and robust data bank provides good quality of property data to be used in valuations, which in turn directly affect the accuracy of valuations. Simply put, property data of poor quality is most likely to result in inaccurate valuations. Abidoye and Chan (2017) argue that in the case of the absence of a robust property data bank, as was the case in some developing countries, the property valuers should use the listing prices data as the basis of reducing property valuation inaccuracies instead of the firms' selling data.

Before assessing the data relating to their study, they asserted amongst others, that the advanced valuation methods such as the ANN, the FL system, and the spatial analysis method are more accurate in estimating values than the traditional methods (Pagourtzi et al., 2003). This does not necessarily resonate with the attitudes of the South African courts, who hold that the traditional comparable sales are more accurate and reliable simply because the logic and rationale can be explained. Furthermore, Abidoye and Chan (2017) asserted that the ANN method performs more accurately than all the advanced valuation methods (Paliwal and Kumar, 2009). The ANN is increasingly becoming preferred mainly because of its ability to learn just like the human brain and improve on the value estimates (Taffese, 2006).

The findings of the study by Abidoye and Chan (2017) confirmed the hypothesis that a reliable and robust data bank ensures to a greater extent the achievement of higher valuation accuracy. The findings suggest that in the absence of a reliable property sales data bank, the online listings prices were preferred to the selling prices obtained from the real estate agents. In the case of SA, the legal framework requires that municipal valuers must rely on the deed's registry as a database for property sales. The reliability of this property sales data bank has been strengthened and affirmed over a protracted period.

The available literature search shows that there is only one study on valuation accuracy in SA, which was conducted as part of the MSc in Property Development and Marketing by Mabuza (2017). This study was focused only on valuations conducted by multiple valuers for the purposes of sales and investment. The study assessed the views of the financial institutions as the users of valuations and the valuers as the suppliers of valuations. The study covered three provinces in SA: Western Cape, KwaZulu Natal and Gauteng. The study sampled a total of 32 826 residential properties, with 20 784 (63.3%), 8 349(25.4%), and 3 694 (11.3%) selected from Gauteng, Western Cape and KwaZulu Natal respectively.

The findings of the study indicate that even though there was a common understanding that valuation inaccuracy was inevitable, there was no agreement on the tolerance level of the degree of inaccuracy (Mabuza, 2017). On the one hand financial institutions, as users of valuations, advocated for the degree of valuation

inaccuracy to be set at between 5% and 10% at most. On the other hand, the study found that the valuers believed that the valuation inaccuracy degree should be set at a maximum of 15%.

This makes sense, especially from the investment point of view. Investors would naturally like to avoid under-or over-valuation, which may in turn distort their investment decisions even if it were by a few hundred thousand rands. In the end, the study recommends that the valuation inaccuracy tolerance be set at a maximum of 5%. One of the glaring limitations of the study in relation to the research is that it did not focus on the valuation inaccuracy in relation to mass valuation or municipal valuations rolls.

Ayedun et al. (2012) focused on the causal factors of valuation inaccuracy and inconsistency in Nigeria. They concurred in accepting that valuation in relation to valuation inaccuracy does exist. The study was conducted through a questionnaire administered to a total of 82 out of 268 valuation or surveying firms. This yielded a total of 120 property valuers operating in the Lagos state. The study found the following to be the factors causing valuation inaccuracy:

- Dearth of market data
- Use of outdated valuation approaches and techniques
- Outdated valuation data
- Lack of valuation regulatory and control framework
- Inadequate [valuer] training
- Failure to hold valuers responsible for negligence
- Imperfection of the property market
- Lack of experience of the valuers
- Undue influence by unscrupulous clients

Furthermore, in relation to valuation inconsistency, the study found the following to be the dominant reasons for valuation inconsistencies.

- Valuer experience
- Valuer education

- Market information available
- Accessibility and use of the valuation standard
- Time spent on a valuation assignment
- Source of market data
- Quality of valuation information to the client

In essence, the study made three findings. These include the finding that most valuers are either not adequately trained or are insufficiently experienced. It was also found that the valuers tend to use outdated valuation methods and techniques. The study also identified the dearth or paucity in market data.

The debates around the accuracy of valuations be it for individual properties or mass properties, has been a subject for discussion amongst the real estate practitioners and valuers for a very long time. Studies to understand this phenomenon and to bring about a solution were conducted by various scholars in Australia, the UK, and Nigeria (Effiong, 2015). In his comparative study between Nigeria and the UK on the extent of valuation inaccuracies, Effiong (2015) revealed that valuation inaccuracy was more prevalent in Nigeria than the UK.

When probing further, he found that there were 13 main reasons for the prevalence of valuation inaccuracy in Nigeria. These included, in order of the ranking, the lack of standards; lack of market data or comparables; lack of a regulatory framework; inappropriate valuation methods; unwarranted client influence; inadequate training of valuers; poor knowledge of the property market; wrong valuation assumptions; lack of experience; and finally lack of consequence management for valuer negligence.

Furthermore, Effiong (2015) acknowledged and accepted that the two distinct yet intrinsically connected concepts of valuation accuracy and variance, have grown to be a serious concern in the valuation fraternity. The former refers to comparability between the sales price and the estimated value, and the latter refers to the comparability between the opinions by two or more valuers on the same property.

In this regard, Effiong (2015) accepted the assertions that the accuracy of the values depends on the market assumptions. He also accepted that no two valuers can estimate the same values (Ajibola, 2010), it was found that most valuers who

participated in the study preferred the valuation error of margins to be anything between 5% and 10% either way. More specifically, 45.7% of the participants preferred 5%, while 31.4% of the participants preferred 10%.

Crosby, Devaney, Key and Matysiak (2003), in their study focusing on the reconciliation of the valuation timing and the sale, concluded that the closer the valuation was to the sales date, the more accurate the valuation. This assertion was confirmed through an empirical study involving the property sales ranging from retail, offices, industrial and all other properties. This study encouraged valuers to adjust their factor of time in relation to the actual sales date to achieve a better degree of accuracy. To this end, a four-month allowance either way is encouraged if accuracy is of essence to the valuers.

In essence, these studies under review generally suggest that the acceptable margin of error for valuation estimates ranges between 5% and 10% (Glover, 1985; Hager and Lord, 1985; Pienaar, 2003). Baum and Crosby (1988) expanded the threshold to a ceiling of 15%. In line with these views, the Australian courts as seen in the cases of *Singer and Friedlander v. John D. Wood & Co* (1977) 243 EG 212 and *Trade Credits Limited v. Baillieu Knight Frank (NSW) Limited (1985) Aust. Torts Reports 80-757* [Court Decision No. 18], decided that the acceptable margin of error be determined at a maximum of 10%, or even 15% under compelling and exceptional circumstances.

3.4 ACCURACY AND UNIFORMITY IN MASS VALUATION

Since the advent of mass valuation, it is expected of mass valuation methods to be consistent relative to uniformity and accuracy of the valuation estimates (Jahanshiri et al., 2011). Kauko and D'Amato (2008), Li, Zhu, and Zhang (2019), Liu and Wang (2021), Geltner, Bressler, de Haan and Miller (2021) and Zillow (2023) agreed that the valuation processes were marred with challenges causing some degree of inaccuracies and inconsistencies. The major concern became that these challenges could erode the confidence of the public in the processes of determining property values and in the valuers themselves.

In determining the market values of properties in mass valuation, appraisers use a combination of different approaches, such as the cost approach (based on the replacement cost of the property), the sales comparison approach (based on the recent sales of similar properties in the same area), and the income approach (based on the expected income generated by the property). These traditional methods are often morphed into the HPMs which are underpinned by the OLS techniques. These are slowly being contested by ML/ AI techniques. The spatial valuation models were later introduced with the aim of enhancing the HPMs and ML/ AI models, to improve valuation accuracy and uniformity.

The evolution of mass valuation models and approaches has focused on eliminating inaccuracies and improving the quality of the valuation process output. In the same vein, the introduction of computer-based models for valuation including the AVMs and CAMA as well as the use of GIS has improved mass valuation accuracy (Hefferan and Boyd, 2010).

At the centre of the valuation inaccuracy concerns lie the twin considerations of time and space. The consideration of time relates largely to the economic dynamics which are a subject of time. The accuracy of property valuations depends largely on the demand and supply forces affecting property prices in the markets. The markets change over time for better or for worse, depending on economic factors influencing the markets.

The space consideration relates to the erstwhile valuation concern of “location, location and location”. One of the property characteristics influencing the value of a subject property for valuation is space, which refers to the spatial location of the properties. There have always been assertions that in order to improve accuracy in valuations, location is a key factor that influences the property values.

It therefore follows that, every locality with the same external factors influencing the value of a property will have its own mass valuation model which will consider the influence of the location and time. In order to ensure the accuracy or put differently, to reduce inaccuracies, it is important for any mass valuation model to consider both time

and space affecting the properties in question. There can never be a one-size-fits-all model for different locations and times.

According to Kauko and D'Amato (2008), time and space play a crucial role in influencing the prices or the values of properties. To this effect, it has been argued over the years that geographic location is important and influential in the discussion of the accuracy, reliability and validity of values produced through the valuation models. In the same vein, it has been argued that the forever changing markets, which are in themselves affected by time, also play an influential role in property-value creation.

Jahanshiri et al. (2011) asserted that while it is expected of new research to address both the concerns of spatial dependency and heterogeneity in the same model, it is also expected that new models must consider time and space effects, otherwise known as spatiotemporal considerations on property values. This will further enhance the degree of accuracy of output property valuations.

3.4.1 Measuring and Testing for Uniformity and Accuracy

The users of the assessment information are always concerned about equity and fairness of the assessments (Smith and Johnson, 2018). This is often highlighted through the use of statistical measurement indicative of valuation accuracy and uniformity. Throughout the evolution of statutory mass valuation for taxation purposes, practitioners have sought to provide confidence in the assessments, through the measurement and testing of accuracy and uniformity. This subsequently called for standards against which the outcomes of such measurements may be tested.

A discussion of the uniformity and accuracy of mass valuation is incomplete without the inclusion of measurement and testing of the same. When discussing mass valuation, the concept of accuracy is inevitably coupled with the concept of uniformity. These are two critical concepts that are relied upon in ascertaining equity in property taxation. Achieving uniformity and accuracy in mass valuation requires a well-defined and transparent valuation methodology, sufficient data, and the use of appropriate statistical analysis techniques to ensure consistency and fairness in the valuation process (Quintos, 2014).

Uniformity refers to the consistency of values assigned to similar properties. In mass valuation, it is essential to ensure that properties with similar characteristics (such as, size, location, and condition) are valued consistently to avoid any potential bias or inequity. Uniformity can be achieved through the use of standard appraisal methods, and employing carefully analysed comparable sales data, across all the properties under review (Quintos, 2014).

Accuracy refers to the degree to which the assessed values of properties match their true market values as expressed in sale prices. Inaccurate valuations can result in over-or under-assessment of properties, leading to unfair taxation or legal challenges. In the context of ad valorem taxation, this is understood to cause inequity between similar properties (horizontal inequity) and different but otherwise similar neighbourhood properties (vertical inequity) (Quintos, 2014).

3.4.2 Horizontal and Vertical Equity in Mass Valuation

According to Kaplow (1989), the concepts of vertical and horizontal equity need to be considered with regard to social welfare and taxation. These concepts are meant to provide guidance in the taxation of individuals by the state. In the case of the former, those with a higher income, carry a greater burden to pay for public services through taxation. In the case of the latter, people of the same income bracket should be treated the same.

According to Quintos (2014), the uniformity and accuracy of mass valuation can be attained in two ways: (1) horizontal equity and (2) vertical equity. On the one hand, horizontal equity refers to fairness with regard to the assessment levels of the properties with similar characteristics. On the other hand, vertical equity refers to fairness with regard to the assessment levels of properties across price levels.

3.4.2.1 Horizontal equity testing

Carter (2016) discussed both the horizontal and vertical equity. He asserted that vertical inequity is found in instances where the assessed value to sales value ratio differs for each property value. Inequity is considered progressive where the assessed

value to sales value ratio is found to be greater or less than 1. Where the ratio is found to be less than 1, vertical inequity is regarded as regressive.

Horizontal inequity refers to the situation where two properties with similar characteristics are assessed differently, resulting in an unfair tax burden on one of the properties (Kaplow, 1989). This inequity can occur in mass valuation due to variations in the appraisal methodology or data quality issues (Allen and Dare, 2002).

Measuring horizontal inequity in mass valuation involves comparing the assessed values of similar properties to identify any discrepancies. Measuring horizontal inequity is an essential step in mass valuation to ensure that similar properties are assessed fairly and equitably. If horizontal inequity is detected, appraisers may need to adjust their valuation methodology or make changes to the data used in the appraisal process to ensure that all property owners are treated fairly. Ultimately, measuring horizontal inequity helps to maintain public trust in the mass valuation process and ensures that taxpayers are paying their fair share of property taxes.

3.4.2.2 Vertical inequity testing

Mass valuation and taxation scholars such as Carter (2016) and Denne (2011) agree that *v*ertical inequity refers to the situation where properties with different values are assessed at different rates, resulting in an unfair tax burden on lower or higher-valued properties. In mass valuation, vertical inequity can occur due to variations in tax rates or exemptions, leading to an uneven distribution of the tax burden.

Testing vertical inequity in mass appraisal involves assessing whether the distribution of assessed property values across different income or wealth groups is consistent with the principle of vertical equity (Carter, 2016). If the distribution of assessed property values is biased in favour of higher-income groups, it can be considered vertically inequitable. Measuring vertical inequity in mass valuation involves comparing the assessment values of properties with the actual sales prices. The tools employed in the measurement and testing of vertical inequity are largely based on comparing the assessment value to the sales price. This is otherwise referred to as ASR.

Allen and Dare (2002) asserted that, vertical equity can be tested through various means. This was confirmed by Carter (2016) who argued that the regression techniques were always used in testing vertical equity. He further indicated that the bi-variate and multi-variate regression models were used by various scholars to test inequity. It worthy to note that the scholars were split in terms of the preference to either use the sales price (SP) or the appraised value (AV) as the depended variable.

The early scholars including Paglin and Fogarty (1972), Almy, Gloudemans and Denne (1978), Bell (1984) and Sunderman, Birch, Cannaday and Hamilton (1990), preferred to designate the SP as the dependent variable. Kochin and Parks (1982) and De Cesare and Ruddock (1998) designated the AV as the dependent variable. Table 3-1 presents a summary of the regression models applied in testing vertical in equity.

Table 3-1: Models for Testing Vertical Equity

Model	Null Hypothesis	Author
$AV=a_0 + a_1 SP$	$a_0 = 0$	Paglin and Fogarty (1972)
$\ln SP=a_0 + a_1 \ln AV$	$a_1 = 1$	Kochin and Parks (1984)
$\ln AV =a_0 + a_1 \ln SP$	$a_1 = 1$	Cheng (1974)
$AV=a_0 + a_1 SP + a_2 SP^2$	$a_0 = a_2 = 0$	Bell (1984)
$AV/SP= a_0 + a_1 SP$	$a_0 = 0$	IAAO (1978)
$\ln SP=a_0 + a_1 \ln AV$ $\ln AV =b_0 + b_1 Z$	$a_1 = 1$	Clapp (1990)
$AV=a_{00} + a_{10} SP + a_{01} LOW + a_{02} + HIGH + a_{11} + LOW\ SP + a_{12} HIGH\ SP$	$a_{00} = a_{01} = a_{02} = 0$	Sunderman et al. (1990)

Source: Carter (2016)

In the equations above, AV represents the assessed value while SP represents the sales price. The a and the b represent the coefficients.

3.4.3 Statistical Tools for Measuring Accuracy and Uniformity

There are various statistical measures that can be used in determining the accuracy and uniformity of valuations. The most popular include the use of the Price Related Differential (PRD) and the Price Related Bias (PRD), the Clapp measure, the IAAO approach, Paglin and Fogarty Approach, the Sunderman approach. However, the ratio

studies by the IAAO remain the most inclusive form of ratio studies used in mass valuations. The IAAO (2017) has developed several techniques to measure accuracy and uniformity in mass valuation. These measures are intended to ascertain whether the assessed values of properties are as close as possible to their true market values, and that similar properties are valued in a consistent and fair manner.

It is important to mention that owing to heterogeneity of the non-residential properties, the use of ratio studies in non-residential properties is often limited. The limited use of ratio studies in the non-domestic arena for property valuation can be attributed to several critical factors, including the Lack of (1) Comparable Data, (2) Limited Transaction Data, (3) Conflicting Valuation Methodologies, (4) Confidentiality and Data Availability, (5) Market Segmentation, (6)Economic and Market Influences, and (7) Property Specificity and Condition (Smith et al., 2018). While ratio analysis can be useful in specific contexts, it requires careful consideration and supplementation with other valuation methods to ensure accurate and reliable property assessments in the non-domestic real estate market (Brown et al., 2018).

Parker, Lockwood and Marano (2011) reiterated the established understanding that accuracy and uniformity has to be attained in order to satisfy the acceptable degree of fairness and equity with regard to the assessment of the properties. In this regard, the testing of assessed property for valuation accuracy and uniformity is inevitable. The development of the assessment testing in mass valuation, has been largely centred around the ASR, the PRD and the PRB. It is therefore imperative to enhance this discussion with a specific focus on these statistical measures. The ASR is explained earlier in this chapter.

3.4.3.1 The Price Related Differential (PRD) and the Price Related Bias (PRB)

Other tools used in sales-ratio analysis to test vertical inequity, are the PRD and PRB. The PRD is the difference between the median ASR of properties that sold and the median ASR of all the assessed properties in a given area. The PRB is the percentage difference between the median ASR and the median sale price of properties in the area. The PRD and PRB are useful tools for identifying potential biases in property assessments, as they can reveal whether assessments are systematically higher or

lower than market values. Assessors can use this information to adjust their valuations and improve the accuracy and fairness of the assessment process.

The price-related differential (PRD)

According to Carter (2016), the mean of the sales ratio of all properties is divided by the weighted mean of the sample, then, the sum of all appraised values must be divided by the sum of all sales prices. Ultimately, the PRD is derived by dividing the former by the latter. In terms of the IAAO standards, the score between 0.98 and 1.03 is acceptable and regarded as insignificant vertical inequity. Anything less than 0.98 is considered to be an indication of progressive inequity, while anything higher than 1.03 indicates regressive vertical inequity.

In a charge led by Gloudemans (1999), the PRD is criticised for the results of its tendency of a downward bias, which is the result of a high mean sales ratio, which, in turn, is the result of the high-value properties skewing the mean ratio (Eckert, Gloudemans and Almy, 1990; Gloudemans, 1999; Gloudemans and Denne, 1978). In an attempt to alleviate the bias, Gloudemans (2011) suggested the shifting of the parameters from 0.98 and 1.03 to 0.95 and 1.05 (or even 1.15) respectively.

The PRD is also criticised for not taking into account the differences in property characteristics, such as size, age, condition or location (Denne, 2011). This means that properties with different characteristics may be grouped together when calculating the median ASR, which can distort the results of the analysis. For example, if the ASR for newer, well-maintained properties is higher than the ASR for older, less well-maintained properties, the PRD may suggest that there is an overall bias in the assessment process, when in fact the difference is due to differences in property characteristics.

Another criticism of the PRD is that it assumes that the sale prices of properties accurately reflect their market values (Denne, 2011). However, sale prices can be influenced by a variety of factors beyond market value, such as financing terms, buyer motivations or property condition. This can make it difficult to draw definitive conclusions about the accuracy of property assessments based solely on sales data.

Additionally, the PRD only measures the difference between the median ASR of properties that sold and the median ASR of all properties in a given area and does not account for other potential sources of bias in the assessment process, such as errors in valuation methods or biases in the selection of comparable properties.

The Price-Related Bias (PRB)

Another key tool used in sales-ratio analysis is the PRB, which measures the difference between the median assessed value and the median sale price of properties in a given area. According to Denne (2011), the PRB first appeared on the radar after its use by the US government in 1957. The PRB marked the beginning of an era ushering in alternatives that sought to improve the PRD.

A positive PRB suggests that the assessed values of properties are higher than the sale prices, indicating a possible over-assessment of properties. This can occur for a variety of reasons, such as outdated or inaccurate property data, errors in valuation methods or systematic biases in the assessment process. An over-assessment can lead to unfairly high property tax bills for property owners, as well as potential legal challenges to the assessment (Denne, 2011).

A negative PRB suggests that the assessed values of properties are lower than the sale prices, indicating a possible under-assessment of properties. This can also occur for a variety of reasons, such as a lack of recent sales data, inconsistencies in valuation methods or other biases in the assessment process. An under-assessment can result in lower property tax bills for property owners but can also lead to a loss of revenue for local governments and potential legal challenges (Denne, 2011).

To address a positive PRB and potential over-assessment, assessors may consider adjusting their valuation methods or updating their property data to better reflect current market conditions. They may also consider analysing the PRB on a more detailed level, such as by property type or geographic area, to identify specific areas of concern.

In order to address a negative PRB and potential under-assessment, assessors may consider conducting additional market research to gather more recent sales data or

adjusting their valuation methods to better account for property characteristics and market trends. Again, analysing the PRB at a more detailed level can help identify specific areas of concern and guide improvements in the assessment process.

The PRB is criticised for reliance on the assumption that sale prices accurately reflect market values. In reality, sale prices may be influenced by a variety of factors beyond market value, such as financing terms, buyer motivations or property condition. This can make it difficult to draw definitive conclusions about the accuracy of property assessments based solely on sales data (Carter, 2016).

Another criticism of the PRB is that it can be difficult to interpret in certain situations. For example, if there are few or no recent sales in a given area, it may be difficult to calculate a meaningful PRB. Similarly, if the properties that have sold in a given area are not representative of the broader population of properties, the PRB may not accurately reflect the accuracy of assessments for the entire area.

Additionally, the PRB only measures the difference between assessed values and sale prices and does not account for other potential sources of bias in the assessment process, such as errors in valuation methods or biases in the selection of comparable properties.

3.4.3.2 The Paglin and Fogarty Approach

According to Gluszak (2015), Paglin and Fogarty (1972) are the pioneers of measuring equity in relation to vertical inequity in property taxation. In their approach, Fogarty and Paglin (1972) boldly assert that for any property, there is a linear relationship between the sales price of a property and its assessed value. Mathematically, the approach is expressed in terms of the formular below.

$$AV=a_0 + a_1SP$$

In this formular, (AV) represents the Assessment Value, (a_0) represents the intercept term, P represents the sales price and (a_1) its coefficient. Ideally the (a_0) value should be 0, as anything below or above represents inequity. If the value is lower than 0, it means higher valued properties are taxed at a higher rate than the lower valued properties, and therefore it is progressive. If it is higher than 0, it means lower valued

properties are taxed at a higher rate than the higher valued properties, thus regressive (Gluszak, 2015).

The Paglin and Fogarty (1972) approach was later criticised for its simplicity and the linearity assumption. According to Gloudemans (2011), the previous approaches including the one advocated by Paglin and Fogarty (1972), which were largely based on the PRD, were marred with several flaws. The PRD was found to be lacking in so far as measuring the severity of the reported bias. Even in the instances where an attempt to measure such severity, it was often not done in a comprehensible manner.

Gloudemans (2011) also points out that the mathematical formulation of the ratio led to an asymmetric range of compliance for the PRD which was 0.98 to 1.03, because the assessment values were divided by the actual prices. The worrisome issue was the observation that the PRD was susceptible to distortion resulting from heteroscedasticity. Thus the limitations pointed out in the work of Paglin and Fogarty (1972) must be forgiven as they are part of the teething stages in what was to be a vigorous development in the testing of equity.

3.4.3.3 The Clapp Measure

The criticism of the approach by Paglin and Fogarty, led to the development of alternatives by authors such as Clapp measure, discussed below. According to Birch and Sunderman (2014), around the same period there were responses to the challenges facing the regression models. The Clapp measure is a statistical measure used in mass valuation to assess the accuracy and equity of property assessments. It was introduced by Clapp and Gault in the 1980s. It followed the use of earlier models that relied on a single equation in estimating district inequity. Responding to the limitations of the earlier regression models, the Clapp measure introduced a two-staged process which relies on two equations. It sought to eliminate the measurement bias observed in the earlier regression models.

The Clapp measure seeks to address the problem of heteroscedasticity. The measure compares the actual sale prices of properties with their assessed values and calculates the ratio of the difference between the sale price and assessed value to the sale price (Denne, 2011). The ratio is calculated as follows:

Ratio = Assessed Value / Market Value

This ratio is then averaged across all properties in a given area to calculate the Clapp measure. If it is found to be closer to zero, it indicates that the assessed values are generally accurate and there is little or no bias in the valuation process. However, if the Clapp measure is significantly higher than zero, it suggests that there may be a systematic bias in the valuation process that is causing the assessed values to consistently over- or under-estimate property values (Sunderman, 2014).

The Clapp measure is often used in conjunction with other measures, such as the COD and the PRB, to assess the overall accuracy and uniformity of property valuations. By using multiple measures, mass appraisers can get a more comprehensive view of the strengths and weaknesses of the valuation process and identify areas where improvements may be needed. Again, it is important to note that the Clapp measure, like any statistical measure, has its limitations and should be interpreted with caution (Denne, 2011). Factors such as changes in market conditions, the availability of comparable sales data, and differences in property characteristics can all influence the accuracy of the measure, and adjustments may need to be made to account for these factors.

3.4.3.4 IAAO statistical measures

The Standard on Ratio Studies (IAAO, 2013b) provided guidance on testing property assessments for uniformity and accuracy. One such test is the ASR study, which compares the assessed value of a property to its actual SP (IAAO, 2013b). The IAAO (2017) recommends that the sales ratio should be between 0.90 and 1.10, which means that the assessed value should be within 10% of the actual SP. The sales-ratio study can be conducted for an entire jurisdiction or for specific classes of properties.

According to Parker *et al.* (2011), the assessment-sales-ratio test evaluates the rate at which the assessed values compare to the actual sale price. There have been numerous studies that sought to confirm the confidence in the ratio analysis tests in terms of its rigour. These include the discussion on the sample size, conditions for including properties in the sample, the determination of confidence intervals, jurisdiction stratification and the appropriateness of tests.

To measure uniformity, the IAAO (2013) uses the COD, which measures the variability of the assessed values for a group of properties. A low COD indicates that the assessed values are relatively consistent, while a high COD indicates that there is significant variation in the assessed values. The IAAO recommends that the COD should be less than 20% for residential properties and less than 30% for commercial properties (IAAO, 2017).

Carter (2016) asserted that the IAAO recommends the use of a combination of measures such as the PRD, the PRB and the Clapp measures. The IAAO also recommends conducting ratio studies, which compare the assessed values of similar properties to identify any differences that may indicate a lack of uniformity. Ratio studies are typically conducted for specific classes of properties, such as residential or commercial properties.

Specific details about the measures are provided in the Standard on Ratio Studies (IAAO, 2013b). The standard provides the set parameters for the COD, the PRD and the PRB. For instance, the standard recommends the acceptability of the PRD to be anything between 0.98 and 1.03, while the PRBs outside the range of -0.10 and +0.10 are regarded as unacceptable (IAAO, 2017).

Overall, the IAAO uses a combination of statistical analysis, field inspections and ongoing data collection and analysis to measure accuracy and uniformity in mass valuation. These methods aim to ensure that the assessed values of properties are as close as possible to their true market values, and that similar properties are valued in a consistent and fair manner.

As an example of applying the IAAO standards, Parker *et al*. (2011) presented a paper based on the study they conducted on the application of spatial dimensions to ratio studies mass appraisal, in the City of Adelaide in Australia. Using the IAAO standards as guidance, Parker *et al*. (2011) evaluated the 2009 annual assessment of the capital values of residential properties in a South Australian City, Adelaide. The city accounted for approximately 360 000 residential properties. The assessment of the study area was conducted in a two-level approach. The first level of the study sought to derive the statistics and gauge the same against the IAAO standards. The second level related to establishing the spatial view of the results in first level.

In the first level, the statistical ratios (ASR, COV, COD, and the PRD) were calculated at three levels: the metropolitan area (study area), the local government area and the suburb. The tolerance levels for the statistical ratios were determined as per guidance by Rossini and Kershaw (2008). The tolerance for the ASR was determined to be anything between 0.9 and 1.10, while the COV and COD were determined to be less than 17 and 13 respectively. According to Parker et al. (2011), the PRD is regarded as regressive if it is above 1 and progressive if it is less than 1.

In line with the Rossini and Kershaw (2008) guidance, the calculations for both the mean and median ASRs were found to be acceptable as they lie between 0.9 and 1.10. This is only with exception of the median AS ratio at the study area level, which was found to be 0.89. The COD was found to be less than 13% at all spatial levels, indicating the acceptability of values. The COV was found to indicate acceptability as it was calculated at less than 17 in all spatial instances. The PRD was found to be larger than 1 in all three spatial levels. In fact, in terms of IAAO standards, the PRD results were found to be well within the acceptable range of 0.98 and 1.03.

In the second level, the study sought to understand from the spatial perspective whether the statistics discussed above, represent equity or the inequity across the districts. The statistics were interpolated spatially in order to detect areas of inaccuracy for improvement. The ASR was interpolated with the aid of Inverse Distance Weighted interpolation across the geographic locations, creating a visual representation of the results. PRD was represented visually by mapping out the regressive, progressive assessments spatially. The assessment groups viz. high-, middle- and low-valued properties were compared against each other to determine the extent of the differences (Parker et al., 2011).

In this regard, the results show that the ASRs were acceptable in all groups. All properties, irrespective of their categorisation, were valued at more or less the same ratio of the respective actual sales. This was achieved with the aid of the Kruskal-Wallis test. The PRD results suggested the non-existence of neither regressivity nor progressivity in all spatial levels. The study found that there were acceptable levels of accuracy (ASR analysis) and uniformity (COV and COD) in the assessment of the properties in the study area.

Most importantly, in the spatial interpolation of the statistics, it was found that the high-valued properties in some parts of the study area could be undervalued in comparison to the low-valued properties in other areas. This provides a better picture in relation to fairness and uniformity of the assessment (Parker et al., 2011).

3.4.3.2 Other statistical measures

There are many other statistical measures that can be used in the quest of assessing valuation accuracy and uniformity. Such measures include the RMSE and MAPE. There are studies that promote the use of these statistical measures separately from those in the IAAO standards. These measures present their own advantages as contrasted to the measures such as the ASR, the COV, the COD, PRB and the PRD (Bogin and Shui, 2020).

According to Bogin and Shui (2020), the RMSE provides the overall measure of model accuracy. The RMSE is a measure of the errors/residuals in the predictions of a model. It can also indicate the measure performance of a models' ability to predict/ forecast (Chai and Draxler, 2014; Hodson, 2012). As guided by Pi-ying (2011), the RMSE is a standard deviation of the residuals. The residuals are used to show how far the sales data points are, from the trendline. The performance of a model implies its ability to make accurate predictions. A lower RMSE suggests that a model yields more accurate valuation estimates. The RMSE is measured through the formula depicted in Equation 4.1.

Equation 4-1: A formula defining the RMSE

$$\text{RMSE} = \sqrt{\frac{\sum_{i-1}^{n}(x_i - y_i)^2}{n}}$$

Where:

x_i = Actual sales price

n = Sample size

y_i = Estimate/ Predicted value

The RMSE is realised by first determining the residuals (differences between the predictions/ estimate values (y_i) and the actual sales prices (x_i)). The residuals are then squared, and the products are added together. The square root of the total of the squared residuals, divided by the total number of residuals (n), is then determined. The answer to this represents the RMSE.

According to De Mytenaere, Golden, Le Grand and Rossi (2016), MAPE is a measure of forecasting accuracy often used when the quantity to be predicted is known to remain way above zero. The MAPE is regarded as a measure of the accuracy of the forecast system/ model, which is expressed as a percentage. It is an absolute percentage of each data point, minus the actual values and divided by the actual value. A lower MAPE suggests low degree of inaccuracy of the model. It is defined in terms of the following formula:

Equation 4-2: A formula defining MAPE

$$\text{MAPE} = \frac{1}{n}\sum_{t=1}^{n}\left|\frac{x_i - y_i}{x_i}\right| \text{X100}$$

Where:

x_i = Actual sales price

n = Sample size

y_i = Estimate/ Predicted value

As illustrated in Equation 4-2, the estimated values (y_i) are first subtracted from the actual sales prices (y_i), dividing it by actual sales price (x_i), multiplied by one hundred (100%). After the percentage errors are determined, the absolute values of the same, are then determined and added together, and divided by the sample size (n).

The Hit Ratio (HR) is another measurement for model performance or its capability to yield accurate predictions. HR is a measure of the extent of success in terms of measuring forecast values that were accurate. It seeks to determine the number of predictions made and found to be either spot on or closer to the actual sales, at a

certain confidence level. The chosen confidence levels for the HR test can be set at 5% or 10% or even 20%.

The higher the HR the better the model. This would imply that the model can predict the valuations more accurately. HR can be defined through the following formula and is expressed in percentages:

Equation 4-3: hit ratio range

Hit Ratio Range=y-y(α)≤ŷ≤ y+y(α)

Where:

y = Selling price of sample

α = Confidence level at 5% and 10%

Equation 4-4: Hit Ratio

$$Hit\ Ratio = \frac{n}{N} X\ 100$$

n= The number of hit ratio

N= Total sample size

3.5 THE PROPERTY VALUATION STANDARDS

The measuring and testing the performance of accuracy and uniformity in valuation on its own, cannot indicate poor performance in horizontal and vertical equity. Neither can it guarantee improvement with regard to accuracy and uniformity. Thus the standards were introduced by various jurisdictions, to close the gap in so far as indicating improvement in performance. Over the years, valuers and valuation bodies such as the IVSC, The European Group Valuers of Fixed Assets (TEGoVA), the United States' Appraisal Standards Board of the Appraisal Foundation, the RICS, introduced generations of valuation guidelines and standards (Anghel, 2012).

3.5.1 The Evolution of Valuation Standards

The evolution of the valuation standards was also necessitated by the fast-globalising world and the inherent corporate interests in cross-national investments (Gilbertson and Preston, 2005; Lambert, 2010; Narayan, Biswas and Sahib, 2017). This means that over and above the concerns on inaccuracy and inconsistency, there standards were also necessitated by interests of the international investors. The valuation standards were proposed as far back as 1874, when a paper was presented to the Social Science Association (Moore, 2009). However, these only materialised later on.

The earliest standards were largely intended for individual property valuation and can be traced to the 1976 “Red Book” of the RICS, which were initially targeted for the use in the UK but has grown to be accepted even outside the UK and incorporates the IVS (Appraisal Institute, 2001; Royal Institute for Chartered Surveyors, 2014). This was followed by the launching European Standards and Guidance in 1984, which was also known as the “Blue Book”. The IVSC was responsible for the introduction the IVS and the evolution thereof (Anghel, 2012).

According to Narayan et al. (2017), with 85 institutional members and 58 member countries, now adopted by many countries including South Africa, the IVSC’s IVS is the most common valuation standard and framework. Some countries opt to use it as is, while others choose to adapt the IVS to the local conditions thus localising the IVS. In the second place is the Red Book of the RICS which has also adopted some provisions of the IVS as an integral part of its framework.

With the advent and the proliferation of mass valuation, especially for the purposes of property rates and taxes, the International Association of Assessing Officers (2013a), introduced the first standard on mass appraisal in 1984. The standards have evolved with time and were subjected to revisions in 2002 and 2012. There are states that have since developed their localised mass valuation standards, including the Canada, Germany and New Zealand.

3.5.2 The Need for Valuation Standards

Valuers are always faced with a possibility of overvaluing properties in falling markets, and undervaluing them in rising markets (Matysiak and Wang, 1995). In a study focusing on property valuation in developing countries, Abidoye and Chan (2018) concluded that the quality of data is important in improving the accuracy of property valuation, and this depends on the reliability of the source of property data such as property sales. They found that centrally collated property sales data proves to help valuers attain more accurate valuations than the data banks managed in silos. Although this was found to be a challenge to most developing countries, SA is an exception. Even though valuers are encouraged to collate and maintain their own databases, the government of SA, particularly the Deeds Registry and the Surveyor General's Office maintain very large and reliable databases regarding the properties, including sales and cadastre data.

At the international level, the need for the valuation standards was ignited and justified by amongst others the varying degree of valuers' subjectivity with regard to the input data used in the determination of the value estimates. To minimise this concern, the valuation community resolved to promote consistency and standards in the determination of property values. This development was also driven largely by the desire to have trust in valuations restored, especially after the collapse of the property market in the UK in the mid-1970s and 1990s (Babawale and Omirin, 2012). In SA, objections to valuations for property rating purposes were and remain on the upsurge. It is for this reason that the property valuation fraternity has had to converge towards developing the standards to regulate the mass valuation projects (IAAO, 2013).

The IVSC was established and continues to exist with the main intention of establishing and enforcing the common valuation standards. Interestingly, one of the convictions of the IVSC is stated as "building trust in valuation". Based on the assertion by the IVSC, it can be argued that these valuation standards are aimed at protecting the public who are the end-users of valuation services from poor service delivery by valuers. This ensures that the quality of services rendered by the property valuers is of a high and acceptable standard and inspires the clients' confidence in the output by the property valuers.

The IVSC decided at a later stage to also introduce the valuation standards for mass appraisals. This was, as it would seem, informed by the fact that member states to the IVSC were in fact imposing property rates and taxes based on the market value concept. As a result of the above, and considering the volumes of the properties usually involved, as well as the limited time made available for completing the mass valuation project, the degree of the valuation inaccuracies remains a concern. Despite developments and improvements relating to the quality of valuations, there are still some concerns around the accuracy levels of the valuations especially the valuations yielding the market values. The fact that the IVS targets mainly the valuation of individual properties as opposed to the valuation of mass properties, as in the case of municipal general valuation, is a limitation.

The property valuation profession in SA is chartered and regulated in terms of the Property Valuation Profession Act (Act 47 of 2000). According to this piece of legislation, all practising valuers are expected to register under the SACPVP (SA, 2000). There is no record of a national standard by a South African organisation, for SA. It reported that the South African Institute for Valuers (SAIV) has adopted the IVS of the IVSC for use as a guide in various property valuation activities, especially single property valuations (SACPVP, 2021).

With regard to mass valuation standards, until end of November 2021, there was no standard pertaining to mass valuations specific to SA (2021). To date, the SACPVP has adopted a standard on municipal valuation for property rating (sMVPR) (SACPVP (2021). It is observed by registered valuers that the sMVPR is only aimed at guiding the implementation of the MPRA. It is focused on the municipal valuations for rating purposes as required in terms of the MPRA (South Africa, 2004). This observation and poor consultative process, forms the basis of the major criticism to the sMVPR. Thus the need to develop a mass valuation standard for South Africa.

3.5.3 Single Property Valuation Standards

There are several standards developed by various jurisdictions targeting single property valuations. These include amongst other, the standards by the TEGoVA, the IVSC and RICS. (Anghel, 2012)

3.6.3.1 The IVSC standards (The Blue Book)

The IVSC is a prominent organisation responsible for the development of the IVS (IVSC, n.d.). These standards have evolved over time and are widely recognised in the valuation profession. The IVS have undergone a collaborative process involving valuation professionals, standard setters, and stakeholders from different countries and jurisdictions (Näyhä & Svento, 2019).

The IVS, commonly referred to as the 'Red Book,' were first published in 1986 as a general guidance document on valuation principles and practices (IVSC, n.d.; Näyhä & Svento, 2019). Since then, the IVS have been revised and updated in subsequent editions to incorporate feedback and advancements in the valuation profession (IVSC, n.d.; Näyhä & Svento, 2019).

According to Näyhä and Svento (2019), the IVS encompass various components that provide a structured framework for conducting valuations across different asset classes. These components include general standards, asset class standards, reporting standards, ethical and professional standards and guidance notes. The general standards outline fundamental principles and concepts underlying the valuation process, emphasising the importance of professional competence, independence, objectivity, and ethical conduct (IVSC, n.d.; Näyhä & Svento, 2019).

Asset class standards within the IVS provide specific guidance on valuation methodologies, approaches and considerations unique to different asset types, such as real estate, business interests, financial instruments, and intangible assets (IVSC, n.d.; Näyhä & Svento, 2019). Reporting standards prescribed by the IVS ensure that valuation results are presented in a clear, transparent and understandable manner, specifying content and format requirements for valuation reports (IVSC, n.d.; Näyhä & Svento, 2019).

The IVS also incorporate ethical and professional standards, addressing conflicts of interest, confidentiality, objectivity, and the responsibilities of valuers in delivering reliable and unbiased valuations (IVSC, n.d.; Näyhä & Svento, 2019). Guidance notes provided within the IVS offer practical insights, interpretations, and examples to assist

valuers in effectively applying the standards in practice (IVSC, n.d.; Näyhä & Svento, 2019).

The IVS have had a significant impact on the valuation profession globally, influencing the development of national valuation standards in many countries (IVSC, n.d.; Näyhä & Svento, 2019). By providing a common framework, the IVS enhance consistency, comparability and transparency in valuations, facilitating informed decision-making and promoting trust among stakeholders (IVSC, n.d.; Näyhä & Svento, 2019).

In conclusion, the IVS developed by the IVSC have evolved over time and encompass various components. These standards provide a structured framework for valuations across different asset classes and promote professionalism, consistency and transparency in the valuation profession. The IVS have influenced the development of national valuation standards and have had a significant impact on the global valuation community, contributing to the professionalisation of the industry and enhancing the credibility of valuation outcomes.

3.6.3.2 The RICS standards (The Red Book)

RICS has a long-standing history dating back to 1868 and has been a pioneer in setting industry standards and promoting best practices in the surveying profession. Recognising the need for robust valuation standards, RICS developed the Red Book, which was first published in 1980. Since then, it has undergone several revisions and updates to reflect changes in market conditions, legislation and emerging valuation practices. The most recent edition of the RICS standard is dated 2020. These standards are used across the globe in countries including Australia, the UAE, the UK, Canada, Hong Kong, Singapore and New Zealand.

RICS valuation standards provide comprehensive guidance on all aspects of property valuation. They cover various types of valuations, including residential, commercial, rural and specialised properties. The standards outline the principles and best practices for conducting valuations, including the valuation process, methods, data analysis and reporting requirements. They also address specific valuation scenarios, such as valuations for financial reporting, investment purposes and mortgage lending. It is closely aligned with the IVS developed by the IVSC.

The RICS (2014) conducted a study on the role of international and local valuation standards in influencing valuation practice across emerging and matured markets. The countries included in the study as samples of the former and the latter markets, were Brazil, China, the US and the UK. This study identified five main focal points of concern in relation to valuation standards: the regulatory environment, education and trading, valuation approaches and practice, market value definition and interpretation, and market data and transparency. These focal areas are isolated and specifically discussed because they are the core of standardisation of the real estate valuation, and the most controversial.

The valuation standards are implemented through the aid of regulatory bodies and framework. In the UK, valuation is subject to self-regulation bodies such as the RICS. In other countries including the US, Brazil and China, valuation standards are statutory matters within the jurisdiction of public statutory bodies (RICS, 2014). This is also the case in South Africa, where valuers are regulated in terms of the Professional Valuers Act under the SACPVP. Contrary to the case in the US and the UK, where the standards are principle-based, the valuation standards in China and Brazil are said to be technically and methodically prescriptive (RICS, 2014). This is attributed to the immaturity of the property markets in the emerging countries, where there is a compelling need to hand hold the valuers for the sake of ensuring uniformity.

With regard to the education and training of valuers, the study found inconsistencies amongst the countries under review. The minimum education requirements to train and practise as a professional valuer differ according to maturity of the market. In the US and the UK, the real estate education and trading culture is well established and is regarded as an art requiring more of valuers' interpretation and knowledge (RICS, 2014). In China and Brazil, the study found that there is no formal education and training in real estate; instead, the real estate sector relies on related professions such as construction, finance, business, architecture, land economics for conducting valuations (RICS, 2014). In comparison, in South Africa, there are professional real estate programmes ranging from a three-year National Diploma/bachelor to a master's degree.

The study also points that professional valuers generally have an opportunity to render services to both the international and local markets (RICS, 2014). The real estate market in developing countries (emerging markets), is driven by international investors who are mostly located in developed countries (matured markets). As such, the international investors demand that whenever valuations are conducted for the purposes of their balance sheets, they be performed using the methods and practices defined in the standards acceptable in their countries (RICS, 2014).

The real estate sector is a market driven sector, placing much reliance on the real estate investors especially international investors. Real estate investors in most countries prefer the use of the concept of market value. Thus, the definition thereof is integral to the valuation standards. The study found that out of the seven local standards found in the subject countries (China, Brazil, the US and the UK), only two were found to offer a definition consistent with the definition found in the IVS. The market value definition in SA is consistent with the definition in the IVS (RICS, 2014)

Lastly, the study revealed that the quantum and quality of data is improving in the emerging markets in that, for example, there is shift from relying on the asking prices to relying on the recorded sales prices (RICS, 2014). There are also organisations whose core business and specialisation is provision of data on real estate sales and investments. Even though SA is also an emerging market, the valuation data is at the level of sales data. Due to SA's connection with the UK investors as well as the free-market economic policies adopted, SA's real estate market and valuation practice are well-advanced; hence, the quality of real estate valuation data.

The main highlights of the study were an attempt to reconcile and align the international standards with local standards. In that regard, the RICS (2014) study suggests that there is a need for standards to address the five focal issues as discussed namely:

- Who should regulate and enforce the standards?
- What level of education and training is required for those who perform valuations?
- Which valuation methods and practices are acceptable?
- How should the concept of market value be defined?

- What data, and data standard should be acceptable?

3.6.3.3 The TEGoVA standards

The TEGoVA is a prominent organisation dedicated to promoting high standards and professionalism within the valuation profession in Europe (TEGoVA, n.d.). TEGoVA has developed a comprehensive set of valuation standards known as the European Valuation Standards (EVS) (TEGoVA, n.d.). These standards serve as a benchmark for property valuations, aiming to ensure consistency, transparency and credibility in the European real estate market.

TEGoVA was established in 1977 to address the need for harmonisation and standardisation of valuation practices across Europe (TEGoVA, n.d.). Recognising the diversity of valuation methodologies and practices in different countries, TEGoVA developed the EVS to provide a common framework for property valuations (TEGoVA, n.d.). The standards were developed through extensive consultation with valuation professionals and aim to promote professionalism, ethical conduct and best practices within the valuation profession.

The EVS encompass a wide range of topics, covering all aspects of property valuation (TEGoVA, 2016.). They provide guidance on valuation methodologies, reporting requirements, quality control, and ethical considerations. The standards emphasise the importance of objectivity, independence, and transparency in the valuation process. They also address specific valuation scenarios, such as valuations for financial reporting, mortgage lending, and investment purposes. The EVS aim to ensure that valuations are conducted with consistency and reliability, regardless of the property type or geographic location.

TEGoVA (n.d.) recognises the importance of aligning with IVSs to ensure global consistency and credibility. The organisation actively collaborates with international bodies such as the IVSC to harmonise the EVS with international standards. This alignment helps to facilitate cross-border transactions, enhance comparability and promote investor confidence in European property markets.

TEGoVA (n.d.) places a strong emphasis on professional competency and education within the valuation profession. The organisation has established the Recognised European Valuer (REV) designation, which signifies a high level of competence and adherence to the EVS. Valuers who obtain the REV designation have demonstrated their expertise in valuation practices and their commitment to upholding professional standards. TEGoVA also provides training programmes, seminars, and conferences to support continuous professional development among valuers, ensuring they stay abreast of evolving industry trends and best practices.

The adoption of TEGoVA valuation standards has had a significant impact on the valuation profession in Europe. The EVS promote consistency, comparability and transparency in property valuations, leading to increased investor confidence and market efficiency. By establishing a common framework, the standards facilitate cross-border transactions, reduce information asymmetry and enhance the credibility of valuations. The EVS also serve as a valuable resource for regulators, financial institutions, and other stakeholders involved in property transactions, providing a recognised and trusted benchmark for assessing the quality and reliability of valuations.

Despite its achievements, TEGoVA faces challenges in ensuring widespread adoption and implementation of the EVS across all European countries. Variations in legal frameworks, cultural differences and language barriers can impede complete harmonisation. TEGoVA continues to address these challenges by fostering dialogue, collaboration and knowledge-sharing among member associations. The organisation also seeks to promote the use of technology and data analytics in valuation practices to enhance efficiency and accuracy.

In relation to the informational issues, beyond a need to create a reliable data bank, Narayan et al. (2017) advocated for the provision of analysed data, which is converted into information ready for the use by the valuers. They argued that valuers must be provided with similar ready to use information. This data, as Narayan et al. concluded, must be made available to all the user institutions at a price. Finally, in relation to the technical issues, they emphasised standardised training for valuers linked with Continued Professional Development (CPD).

In their study on valuation standardisation in Fiji, Narayan et al. (2017) identified three thematic areas which were critical in the engendering of the valuation standards. The focus was on the valuation of individual properties. There were 1) institutional issues, (2) informational issues and (3) technical issues. In relation to the institutional issues, Fiji valuers were left to their own devices. Narayan et al. (2017) decried the lack of measurable performance correctives, choice of methodologies and ethics on the part of valuers.

The IVS has been evolving, with the latest version on record dated 2011. The goals of the IVS are set forth as the development of a globally acceptable valuation standard and the harmonisation of the valuation standard amongst the states. The limitation with these standards was, in the first instance, that it was intended for individual property valuations. It is limited when it must relate to the valuation of a group of properties. It is for this reason that later a standard for mass valuation was developed. The IVS addressed five issues, namely, (1) definitions, (2) framework, (3) general standards, (4) asset standards and (5) valuation application. The IVS focused more on strengthening financial reporting.

The RICS has a long-standing history dating back to 1868 and has been a pioneer in setting industry standards and promoting best practices in the surveying profession. Recognising the need for robust valuation standards, RICS developed the Red Book, which was first published in 1980. Since then, it has undergone several revisions and updates to reflect changes in market conditions, legislation and emerging valuation practices.

A common characteristic in all the above standards is their focus on individual property valuations.

3.5.4 Mass Valuation Standards

The literature search reveals that there is no study on mass valuation standards. However, the landscape on valuation standards has evolved to include the mass valuation of properties, especially the mass valuation for statutory purposes (IAAO, 2013a). The IAAO's Standard on Mass Appraisal of Real Estate is one of the

standards that is used in the valuation of a group of properties simultaneously. It is however, the only international standard on mass valuation.

The mass valuation standard has been evolving over time since 1984; however, to the researcher's knowledge here are no existing studies on mass valuation standard. Closest to such an endeavour is the study by Parker et al. (2011), which is discussed later in this study. The IAAO Standard on Mass Appraisal has evolved over time to incorporate advancements in valuation methodologies, technology, and industry practices (IAAO, 2017). According to Parker (2011), the standard provides guidance on various aspects of the mass appraisal process, including data collection, valuation models, statistical analysis, quality control and reporting.

The IAAO which was initially composed of city valuers' offices in the United States has, over the years, evolved into a world representative body aimed at guiding mass valuation for ad valorem purposes. To date, the IAAO has been at the forefront of writing and publication of the standard on mass appraisal of real property. Literature shows that the first version of the standard was published in 1983. There have been several revisions of the standards since then to meet prevailing trends. However, the last version of the IAAO standards was published in 2017. The main purpose of the standards is to promote uniformity, accuracy, reliability and reasonable valuation cost per land parcel in the mass valuation projects.

Furthermore, Parker (2011) highlighted that the IAAO Standard on Mass Appraisal recognises the role of technology, such as GIS, computer-assisted mass appraisal (CAMA) systems, and data analytics, in conducting efficient and accurate mass appraisals. The standard promotes the effective use of these tools while ensuring data integrity and maintaining professional judgement in the valuation process.

It is evident from the content of the standard that more emphasis is placed on the aspects of this purpose. The standard is further founded on data management and quality assurance. Because of the volumes of properties to be valued, the mass valuation process relies heavily on mathematical/ statistical models, which are often fed into the CAMAs for ease of application. The standard is arranged in a simple and logical manner. In the first instance, it addresses data collection and maintenance.

This is followed by a guide on the valuation models and key valuation considerations, then by model testing, quality assurance and value defence. Finally, it addresses the management of resources in the valuation project (IAAO, 2017).

The debate on valuation standards has evolved to include the mass valuation of properties, especially the mass valuation for statutory purposes (IAAO, 2013a). The IAAO's Standard on Mass Appraisal of Real Estate is one of the standards that is used in the valuation of a group of properties simultaneously. The mass valuation standard has been evolving over time since 1984; however, to the researcher's knowledge here are no existing studies on mass valuation standard. Closest to such an endeavour is the study by Parker et al. (2011), which is discussed later in this study.

IAAO standards continue to evolve. The standards now include the standards on ratio studies (IAAO, 2013b). Though the mass valuation standards by the IAAO are technically sound and acceptable to most professional valuers, there is still a need to contextualise the standards to fit in the national legislative and market environments. The contextual differences in individual countries arguably, might challenge direct usage of the international standards in any country unless it is converted to a country-specific standard framework (IAAO, 2017).

The IAAO Standard on Mass Appraisal has gained international recognition and is subscribed to by numerous countries around the world (IAAO, 2017). According to Parker (2011), countries such as the United States, Canada, Australia, New Zealand, and many European nations have adopted the standard as a guideline for conducting mass appraisals in their respective jurisdictions.

3.5.5 Valuation and Mass Valuation Standard in the South Africa

Contrary to other countries such as the USA and Canada where states (or provinces) are also allowed to carry out the function of assessing real estate, the South African legal framework only authorises the local municipalities and the metros to impose rates on all properties within their jurisdiction. In the same spirit, the authorised municipalities are expected to determine the market values of the properties targeted for the imposition of property rates and taxes (SA, 1996; 1998; 2004).

According to the MPRA (SA 2004), mass valuation for municipal rating purposes is currently the responsibility of the local and the metropolitan municipalities. In discharging this responsibility, the municipalities may choose to appoint professional valuers from the private sector to act as municipal valuers and assistant municipal valuers. The MPRA requires that the market valuation be determined by suitably qualified property valuers using acceptable valuation standards. These market values are to be subsequently used as the basis for the imposition of the municipal property taxation.

In 2014, with the pressure from the government including municipalities and the Department of Cooperative Governance and Traditional Affairs (CoGTA), the SACPVP initiated a process of developing a standard for municipal valuation in line with the MPRA (SACPVP, 2021). There have been numerous versions of these standards, including an attempt to adopt the IAAO's standard on mass appraisal of real property. Two of the major criticisms against the draft standard as tabled by the SACPVP, are that it is limited to the MPRA valuations and it is more of a government standard which excludes the private valuers (SAIV, 2015). It is also a concern whether the draft standard will outrightly and firmly provide a prescriptive requirement or simply a guideline to valuations.

Substantively, the draft standard contains nine chapters, but there are only three chapters that seem to deal with actual valuation issues. This pertains to Chapter 4 –- General Valuation of Rateable Property; Chapter 5 – Valuation Criteria, and Chapter 6 – Valuation Roll respectively. Specifically, Chapter 5 is more substantive on the issues such as data collection (property and market data), site inspection, as well as quality assurance or control). The rest of the chapters seek to ensure compliance with the MPRA. These cover matters like the interpretation of the MPRA, a topic on rating policies, valuation appeals boards, updating the valuation rolls (supplementary valuation rolls) and miscellaneous issues (SACPVP, 2021).

Even though SAIV (2015) seems to suggest that it applauds the details of the draft standard, most of the details do not necessarily serve to improve the quality of valuations in relation to accuracy and confidence by users in the valuers and their output. The draft standard and its stated objective are devoid of an intention to address

either valuation inaccuracies or the confidence in the valuation. This suggests that it is merely an attempt to provide a step-by-step guideline to the implementation of the MPRA. The purpose of this study is to comprehensively provide details necessary to support the development of the draft documents for use in the South African property market.

3.6 RESEARCH GAPS

Agreeably, all studies reviewed point to the existence of the valuation inaccuracy and inconsistency all over the world. The studies by Parker (1998), Millington (1985), Brown (1991), Ayedun et al. (2012), Effiong (2015), Abidoye and Chan (2017) and Mabuza (2017) also discussed the causal factors of such valuation inaccuracies. However, there is very little relating to inaccuracy (or accuracy) and inconsistency (or uniformity) in mass valuation although they shed some light on the causal relationship between inconsistencies in valuation practices and valuation inaccuracies. While only the IAAO (2013; 2017) discussed the subject of mass valuation standard, there is no actual study on mass valuation standards. None of the studies deals with the valuation standards aimed at standardising the valuation practices, especially in relation to mass valuation. This is in confirmation of the gap already identified in this chapter, which relates to the need for a framework for the development of the mass valuation standard.

3.7 CHAPTER SUMMARY

At the centre of this study, lie the concerns around the accuracy and uniformity in the mass valuation of properties within the jurisdictions of municipalities. The determined values are used as the basis for municipal rating. From the various studies reviewed, it is apparent that with regard to valuations in general and mass valuations in particular, valuers across the world acknowledge that the major concern relates to the accuracy and uniformity of valuations. Valuation inaccuracy is generally a result of lack of valuation standards, lack of reliable data on property sales, inconsistencies in the valuation approaches, inadequate valuer training, inadequate valuer experience and poor understanding of the property markets, amongst others.

Because valuation accuracy and uniformity are the reasons for the major concern, it has become inevitable to measure the extent of both accuracy and uniformity. The literature under review, revealed that the debate on the subject of measurement has been aggressively evolving. Part of the popular and accepted practices is to measure equity both horizontally and vertically. More and more statistical measures were introduced for use in the assessment of vertical and horizontal equity. These include the ASR, the PRB, PRD, COD, COD, RMSE, MAPE, HR. These measures are used to give an indication of degree of accuracy and uniformity in mass valuations.

Over time, the assessment methods have largely remained statistical, albeit with variations and improvements. The discussions continue to rage on in the academia with regard to the suitability and effectiveness of the statistical measures employed. The IAAO encourages a focus on a few statistical measures including the ASR, PRB, PRD, COV and COD. Authors such as Clapp, Fogarty, Paglin and Sunderman also proposed their own enhancements to the assessments. In the end, the IAAO approach, remains the most popular approach, mainly because it is integrated in the IAAO's standard for mass appraisals. The minimum parameters of acceptability for the statistical measures are defined in the IAAO standards.

Studies on valuation accuracy for both individual and mass valuations reveal that there are varying degrees of valuation inaccuracy across the globe and across property types. Most studies suggest that the margin of error for the degree of inaccuracy in the valuations versus the sales is generally tolerated at anything between 5% and 10%. This, however, applies to individual property valuations. For mass valuation, the margin of error has been determined to be anything between 15% and 25%. This is further compounded by the acceptance that this level of accuracy is good if at least 90% of the properties under review meet this requirement. This means the valuations of at most 10% of properties under review, can be acceptable if inaccurate by more than 25% in comparison to the sales.

This chapter has set the theoretical basis for the empirical study with regard to mass valuation accuracy, uniformity and standards.

The next chapter discusses the research methodology and methods in preparation for the empirical part of the study.

CHAPTER 4

RESEARCH METHODOLOGY

"Planning to write is not writing. Outlining, researching, talking to people about what you're doing, none of that is writing. Writing is writing."

Doctorow

4.1 CHAPTER INTRODUCTION

According to Neuman (2006), research is a systematic and organised process of investigating a problem with an intention of finding a solution. It is a systematic process of collecting, analysing, and interpreting data or information to come up with scientifically informed solutions (Leedy and Ormrod, 2010). This assertion is also supported by Walshaw (2015) when he describes research as an orderly and a systematic process. Consistent with understanding of research, research methodology is understood to refer to a logical procedure through which the researcher extracts information from data (Fellows and Liu, 2008). Welman, Kruger and Mitchell (2006) described research methodology as a plan according to which researchers obtain data from the participants and generate information from the data. Consequently, this chapter describes the procedures used to achieve the objectives of this research. Accordingly, the chapter is divided into four sections: Section 4.1 provides the introduction; Section 4.2, provides the research philosophy; Section 4.3 covers a discussion on the research approaches; and Section 4.4 deals with the research methods.

Because the aim is to create a framework for the mass valuation standard, the researcher decided to place reliance largely on the experiences and suggestions by the municipal valuation experts, which advocate an interpretivist philosophical posture. To the extent of assessing and verifying valuation inaccuracies in SA, a comparison of the numerical property values contained in the valuation roll and the recent property sales from the deed's office was made. Therefore, this indicates the researcher's adoption of a pragmatic philosophical perspective, which primarily

consists of an interpretivist approach with a smaller component of positivism. The process of arriving at this choice was also guided by the assessment tool developed by Morgan and Smircich (1980). Inherently, this philosophical paradigm firmly suggests a mixed approach. The study adopts a sequential exploratory approach as an underpinning of the mixed approaches with greater emphasis on the qualitative approach (a so-called QUAL → Quan design (Morse, 2003)). The study also uses a mix of both qualitative and quantitative tools in the analysis of data (Babbie, 2020).

4.2 RESEARCH PHILOSOPHY

Every research journey, wittingly or unwittingly, is guided by a set of beliefs relating to the nature of human thought and the connection between human thought and the universe, which is otherwise known as philosophy. Philosophy is a Greek concept which broadly refers to the love for wisdom. Philosophy involves the study of the fundamental nature of knowledge (Cavalier, 1990). It is concerned with the act of thinking as well as how best to align what we think and what we do (Lyles and Easterby-Smith, 2003).

Research philosophy refers to viewpoint as it pertains to academic discipline which involves studying the fundamental nature of knowledge, reality and existence (Cavalier, 1990). Research philosophy is concerned with the concepts of ontology and epistemology which refer to what we know, and how we get to it, respectively. In effect, ontology refers to the findings while epistemology refers to the research approaches (Bryman, 2008).

4.2.1 Ontological and Epistemological Considerations

Ontology, in a philosophical context, refers to a study of what is real or exists. As indicated earlier on, ontology is about what we know. Accordingly, Creswell and Plano Clark (2007) reported that ontology relates to the nature of reality and its characteristics. As asserted by Ryan (2002), reality is to be seen in terms of a continuum, with one end being a concrete structure and objective, and the other end being a projection of human imagination and subjective.

Bryman (2008) asserted that ontology can be considered from either the position of objectivism or constructivism. From the objectivist consideration, social phenomena and their meaning exist independent of social actors. The latter consideration holds that social phenomena and their meanings are continuously achieved by social actors.

This is supported by Fitzgerald and Howcroft (1998), who, even though they referred to the concepts of objectivism and constructivism as realist and relativist respectively, asserted that realists see the external world as tangible structures. The relativists see reality as multiple realities in relation to contextual complexities. The researcher's reality depends on his ontological resolve, and this guides the choices on the research methods (Uma, 2011).

Epistemology is focused on the *how we know what we know* (Grbich, 2007). In other words, this represents our philosophical position on how we acquire the knowledge. In this regard, there are two main categories of epistemology positions – positivist and interpretivist (Bryman, 2008; Grbich, 2007). Creswell (2009) advises that to understand the participants' perspectives, researchers must study and spend time with the participants. There is an alignment between the use of objectivism and constructivism for discussion under the concept of ontology; while positivist and interpretivist are discussed under the epistemological considerations (Creswell, 2009).

The objectivist epistemology requires the testing of existing theories, which in turn requires the positivist epistemology posture. In relation to the constructivist ontological perspective, the aim is to create theories for understanding the participant. Accordingly, the constructivist ontology is compatible with the interpretivist epistemology. Grbich (2007) confirmed this understanding by asserting that contrary to objectivism and positivism, constructivism and interpretivism create objective knowledge through thinking and in joint interaction between the researchers and the participants. Through interpretivism, a multiplicity of meanings is created, leading to a focus on the complexity of views and thus the relevance of the open-ended questions (Scotland, 2012).

4.2.2 Inductive Versus Deductive Research

The researcher's philosophical posture can also be characterised as either inductive or deductive. It thus becomes necessary to distinguish between inductive and deductive research. Inductive research starts from answering a question, collecting, and analysing the empirical data with the intention to develop a theory in the end (Uma, 2011). Deductive research seeks to test a theory. It assumes an existing theory and seeks to prove its validity through the collection and analysis of empirical data. It is also argued that through the former the researcher moves from specific to general principles, while with the latter they move from general to specific principles. In fact, deductive and inductive research process should be seen as integral components of a continuous cycle as illustrated in Figure 4.1.

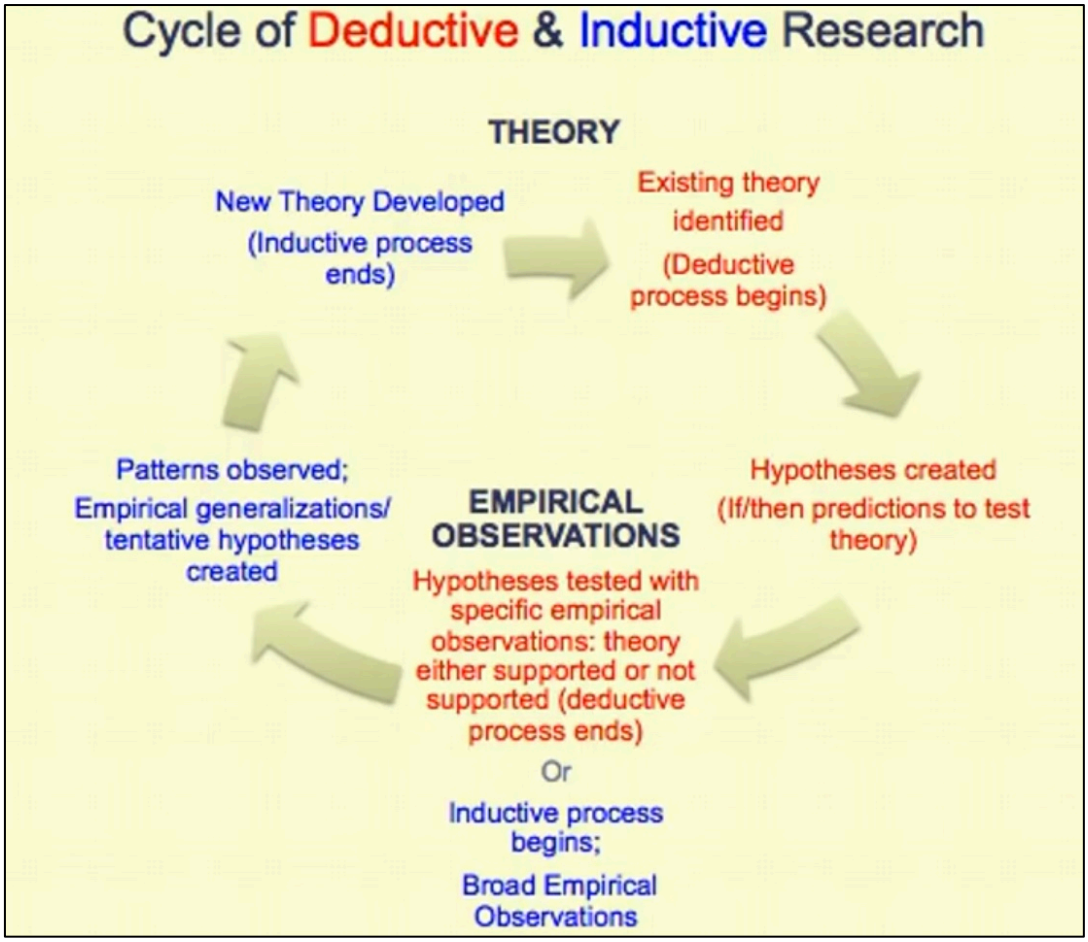


Figure 4-1: Deductive and Inductive Research Cycle

Source: (Lerum, 2014:n.p.)

In keeping with this discussion, this research assumes an inductive approach in that the researcher collected and analysed data through qualitative methods. Interviews were held with the valuation experts to whom open-ended questionnaires were administered. This allowed for the achievement of coherent understanding of the challenges faced by the valuation experts during the compilation of the municipal valuation rolls. Such understanding revealed gaps that require that they be addressed through the creation of mass valuation standard. In the end, a new theory in the form of a framework for the mass valuation standard was developed.

4.2.3 The Philosophy Underlying the Study

According to Morgan and Smircich (1980), researchers naturally have a bias towards a particular philosophical stance. Each researcher must spend some time and figure out what their philosophical bias is. This is important because every research journey is guided by some sort of philosophy, a set of beliefs (Lincoln, Lynham and Guba, 2011). In the current study, the researcher conducted the same assessment, and the results strongly suggested a combination of both objective and subjective ontological posture with a bias on subjectivity. It also suggested a largely interpretative epistemological orientation in the analysis (Creswell and Plano Clark, 2007). These conclusions then give rise to a necessity of a mixture of the constructivist and interpretivist answers, with a sprinkling of positivism in the philosophical grounding preferred by the researcher.

While the study tested the theoretical assumptions in relation to the prevalence of valuation inaccuracy and its causes in the world in general and SA in particular, in the end, the study aimed to create a theory in the form of a framework for the mass valuation standard in SA. In keeping with Morgan and Smircich (1980), Bryman (2008) suggested a combination of both deductive and inductive postures.

The study was conducted with the participation of the municipal valuation experts, with the intention of establishing a rigorous and uniform understanding of the reality presented by the complexity of their views about the standards on mass valuation. This was derived from multiple realities born out of the observations and

perceptions in keeping with Creswell (2014). Open-ended questions were deemed more appropriate when interviewing the participants, as this allowed the researcher to ask questions, listen carefully and probe further where necessary.

The quantitative and qualitative analysis was also used in the treatment of both the primary and secondary data collected. Thus, the research approach selected was a mixed approach design, guided by a mixture of the constructivism, interpretivism, and positivism as philosophical paradigms (Grbich, 2007).

4.3 RESEARCH APPROACHES

The research philosophy or the worldview as otherwise described by Creswell and Plano Clark (2007), is described as a set of beliefs guiding the actions of researchers in as far as making a choice on which research design is concerned. This is informed by the philosophical posture of the researcher, and the research paradigm, described as one of the variants of pragmatism, which are largely dominated by constructivism and interpretivism as opposed to positivism.

In keeping with the mixed research typologies identified by Creswell and Tashakkori (2007), the study adopted the sequential exploratory approach as the mixed approach design. The quantitative component of the study entailing the survey and the assessment of the secondary valuation data was conducted after the qualitative component of the study in the form of interviews conducted with the valuation experts. The interviews were semi-structured.

According to Yin (2009), the research approach refers to the way the researcher goes about in conducting the research in terms of the tools and style of data collections and analysis. According to Welman et al. (2006), there are three main research approaches. These three can be seen as lying along a continuum. This can be imagined in the form of the qualitative approach lying at the one end of the continuum, the mixed method in the middle, and the quantitative approach at the other end (Uma, 2011). The selection of any of these approaches depends on the philosophical posture as well as the suitability of the approach in addressing the research problem (Creswell, 2013).

Some writers on research methodologies argue that distinguishing between qualitative and quantitative and mixed approaches is inconsequential since it is often based on a multiplicity of criteria, thus rendering the exercise equivocal and ambiguous (Layder, 1993). To the contrary, there are several other writers like Yin (2009), Bryman (2008), and Creswell (2013), who asserted that it is possible to distinguish between the approaches on justifiable grounds. These grounds include the inevitable logical alignment between the research philosophy, the ontological and epistemological grounds. The choice of a research approach can be justifiable in terms of choice, whether the enquiry is objective or subjective, deductive or inductive, positivist or interpretivist and objectivist or constructivist.

4.3.1 The Quantitative Approaches

The quantitative approach refers to the study of relationships between two or more variables that are a subject of interest in research which often takes the character of experimental research (Leedy and Ormrod, 2005). This approach is mostly preferred by in the natural sciences, but it has been used by social scientists (Creswell, 2014). Such a study usually involves measurements which are ultimately represented in numbers.

According to Liu (1999), a quantitative study is an investigation of the relationship between facts and how such relationships measure against the set theories. With the qualitative approach, because the researcher seeks to test the existing theories and hypotheses, a deductive posture is adopted (Bryman, 2008).

Amongst others, the major attribute of a quantitative approach is objectivity (Leedy and Ormrod, 2005). This is among the approaches characterised by cause-effect thinking, numerical data and hypotheses. In terms of the research philosophy, this type of a research approach is also referred to as the positivist approach. It is informed by the realist ontological position and the positivist epistemological position.

Critics of the quantitative approach raise concerns in terms of data and how it is often handled in research (Bell and Bryman, 2007). They argued that for the sake of time, researchers need to avoid including the entire population in their study.

They opt for samples, which is not necessarily a true representation of the population. They also argue that there may be data errors arising out of the collection process due to ambiguous questions or understanding by the respondents. Creswell and Tashakkori (2007) confirmed this by stating that, depending on the size of data, data processing may also give rise to errors, especially in the case of large data sets.

Furthermore, Bryman (2008) warned that there may be challenges with the approach due to the failure to distinguish between people and social institutions and the natural world. Researchers also tend to assume a static view of social life void of the realities of the people's lives. The quantitative research instruments often deny the connection between research and everyday life.

4.3.2 The Qualitative Approaches

Flowing from the discussion on the philosophy above, the qualitative approach is informed by the constructivist and interpretivist philosophical posture (Bryman, 2008). Contrary to the quantitative approach, which is purported to be fixated on one viewpoint, the qualitative approach is concerned with the generation of new, cohesive and humanistic understanding from multiple viewpoints, including those of the researcher and the participants (Yin, 2008).

In pursuance of its philosophical intention of creating new theories, qualitative researchers tend to adopt the inductive reasoning posture. This means that they move from a specific area to the general or universal. The data required is generally in the form of words describing the observations or the viewpoints of the participants, as contrasted with measurable numerical data in the quantitative approach (Leedy and Ormrod, 2005).

The tools and techniques used in gathering the required data include in-depth interviews, focus-group discussions, observations and content analysis, while for data analysis the researchers use themes and generalisations to present a coherent and consistent picture (Neuman, 2006). Depending on the research questions and objectives under review, the qualitative approach may be supported

by one or more research strategies of enquiry such as the narrative approach, grounded theory, ethnography, case study and phenomenology (Walshaw, 2015).

- The narrative approach is about exploring and writing about an individual's life. This may include chronologies and biographies. The methods for data collection involve interviews, documents, as well as stories, analysis of historical content and development of themes for data analysis methods.

- The grounded theory approach pertains to investigations into the action, process or interaction, with the ultimate intention of developing a theory based on observations. In this approach, the researcher uses interviews as a data collection method, and coding and categorisation of data as analysis methods.

- The ethnographical approach is used when describing and interpreting the behaviour of cultural, ethnic and social groups. The methods used for data collection are active participation, interviews and observation. The researcher analyses data by way of describing and interpreting the findings, as well as theme development as the analysis methods.

- The case study approach focuses on examining the events relating to a case or multiple cases, with the use of a framework to explain the 'how' of the occurrences. It involves an in-depth study of a case to get an in-depth understanding of the same. For this purpose, the data collection methods used include document review, interviews and artefacts and for the data analysis, detail analysis, theme identification and making assumptions.

- The phenomenological approach refers to exploring and explaining a cohesive understanding of a phenomenon. It includes data collection methods such as interviews and observations. It also includes exploring the experiences of the participants through examining the meaning and context and classifying themes.

As is the case with the quantitative approaches, the qualitative approach has its own criticisms. In the first instance, it is criticised for being a process which requires too much time to interview and probe further the responses. For example, during

the semi or unstructured interviews, one may require further probing into the responses. It is also criticised for being labour-intensive.

The fact that the seekers of information chase after multiple realities means that more people must be involved in the process (Atieno, 2009). The labour intensity also relates to the analysis activities such as coding and categorisation. Finally, the approach requires the researchers to be well vested with the subject of the research for them to have meaningful engagements with the participants during the interviews (Atieno, 2009).

4.3.3 The Mixed Method Approach

Both qualitative and quantitative approaches have limitations which can be resolved by complementing each other (Amalki, 2016). The protracted existence of qualitative and quantitative approaches in social research, as advocated by the purist schools of thought, was based on the false assumption that they are dichotomous (Doyle, Brady and Byrne 2016). The emergent school of thought which was opposed to the views of the purist schools brought about the mixed method research approach as an alternative to the traditional approaches (Doyle et al., 2016).

The third approach is underpinned by the pragmatist philosophy, which is mainly concerned with the consequences rather than the process, the end and not necessarily the means (Creswell, 2014). The qualitative and quantitative research approaches are to be seen as two points on the different ends of the sane continuum (Creswell, 2014). In keeping with the continuum theory, mixed research approaches refer to the midpoint between the qualitative and quantitative approaches. Creswell (2014) predicted that owing to the limitations inherent in both the qualitative and quantitative research, mixed methods are becoming more popular in research.

The mixed approach is defined as the combination of both qualitative and quantitative approaches. Its data collection and analysis methods reflect a mixture of both ends of the continuum (Creswell, Klassen, Plano Clark and Smith, 2011). The mixed research approach is about combining the qualitative and qualitative

quantitative research methods, driven by the assumption of achieving better insights into the problem. But it is not just about the mere combining of the two traditional research approaches; it is about a synergistic relationship characterised by connecting, merging, building and embedding the data together. Creswell (2014) noted that beyond the combination and integration of the quantitative and qualitative methods, the mixed methods Is intended to give research a higher degree of rigour.

The mixed approach involves combing the statistical trends and stories to study human and social problems, resulting in a better understanding of human or social concerns (Creswell, 2014). The mixed approach transcends the debate about which specific method and approach is appropriate. Rather, it lends itself to accurately understanding the problem and finding an appropriate solution (Amalki, 2016). The choice of which approach is appropriate depends on the point of the continuum where the research project lies. It could be that the project largely lies on the quantitative side with a lesser need for the qualitative approach, or vice versa. It could also lie in the middle of the continuum.

Like the other research approaches, a variety of mixed approaches have been identified and evolved overtime. Interestingly, according to Creswell, Tashakkori, Jensen and Shapley (2003), there are basically two groups of mixed approaches. These are the sequential and concurrent mixed approaches, which are further divided into three sub-groups each. The sequential design refers to a situation where the researcher begins by using one of the quantitative approaches, and then proceeds with the other once the results from the first approach are obtained (Creswell et al., 2003). The concurrent group involves the approaches whereby both the quantitative and qualitative approaches are conducted at the same time, and the findings are integrated towards the holistic analysis.

Table 4-1: Types of Mixed Method Designs

Mixed Method Design	**Theoretical Lens**	**Timing**	**Integration**	**Methodological Rational**	**Priority**
Sequential Explanatory Design	Implicit (Post-positivist)	Sequential-Beginning with	Data Analysis Stage ***(Connected)*** and	Complementarity	Quantitative Data

Mixed Method Design	Theoretical Lens	Timing	Integration	Methodological Rational	Priority
		quantitative phase	interpretation Stage ***(Merged)***		
Sequential Exploratory Design	Explicit (Constructivist)	Sequential-Beginning with qualitative phase	Data Analysis Stage ***(Connected)*** and interpretation Stage ***(Merged)***	Development, Complementarity and or Expansion	Qualitative Data
Sequential Transformative Design	Explicit (Advocacy Lens)	Sequential-Beginning with ether quantitative or qualitative	Data Analysis Stage ***(Connected)*** and interpretation Stage ***(Merged)***	Complementarity, Development and or Expansion	Either Quantitative or Qualitative, sometimes both
Concurrent Triangulation Design	Implicit	Concurrent	Data Analysis Stage ***(Connected)*** and interpretation Stage ***(Merged)***	Triangulation	Equal, Both quantitative and qualitative data
Concurrent Nested Design	Implicit or Explicit	Concurrent	Data Analysis Stage ***(Data)*** and interpretation Stage ***(Merged)***	Complementarity, Initiation and or Expansion	Unequal
Concurrent Transformative Design	Explicit (Advocacy Lens)	Concurrent	Data Analysis Stage ***(Separated)*** and interpretation Stage ***(Merged)***	Complementarity, Initiation and or Expansion	Equal and Unequal

Source: Adapted from Creswell et al *(2003)*

In their later works, Creswell and Tashakkori (2007), identified four variations of mixed approaches: (1) triangulation approach; (2) embedded design; (3) explanatory sequential design; and (4) exploratory sequential design. In the order of tabulation, the first approach involves collecting different sets of data for the same research problem with the intention of comparing the findings from both for confirmations and otherwise.

Figure 4-2: Triangulation Approach

Source: (Adapted from Creswell and Tashakkori, 2007)

The second approach, the embedded approach, relates to an instance whereby the quantitative data in used as support to explain the qualitative findings, and vice versa.

Figure 4-3: Embedded Approach

Source: (Adapted from Creswell and Tashakkori, 2007)

The third approach, the explanatory sequential approach, refers to the instance whereby one quantitative approach is used as the basis to inform the data selection process of the qualitative data collection processes.

Figure 4-4: Exploratory Sequential Approach (Quan to Qual)

Source: (Adapted from Creswell and Tashakkori, 2007)

The last approach, the exploratory sequential approach, is regarded as an inverse of the explanatory approach in that the qualitative data is used to inform the quantitative data collection processes. The following diagrams illustrate the four mixed approaches as advanced by Creswell and Tashakkori, (2007).

Figure 4-5: Exploratory Sequential Approach (Qual to Quan)

Source: (Adapted from Creswell and Tashakkori, 2007)

The mixed approach presents an opportunity for the integrated use of both qualitative and quantitative approaches. This is not to suggest that the mixed approach has no limitations and challenges. However, as Amalki (2016) found, it presents researchers with an opportunity to achieve greater length and breadth in the understanding of social research. Amalki also found that a researcher must be sure of their skill set as there are specific skills set required to administer a mixed approach. The second limitation relates to deciding when to use it. This depends purely on what the researcher feels about where the research projects lie on the continuum. Amalki (2016) also found that the mixed approaches may be time-consuming. The mixed approach allows for prolonged debates and informed conversations by the researchers and the participants which at times may delay the research process.

4.3.4 The Adopted Research Approach

In keeping with the discussion above, this study is largely focused on the backgrounds, experiences, views and the opinions of the property valuation experts who are involved in the compilation of the municipal valuation rolls. This focus is with refence to the procedures, methods and techniques in the valuation processes. Such engagement was bound to yield multiple realities on the challenges they face during the compilation of the municipal valuation rolls.

The researcher always strived for the exploration, interpretation and understanding of the multiple realities presented by the participants and to come up with a composite and coherent reality that would allow for the creation of a usable framework (Welman et al., 2006). To a smaller scale, in so far as confirming the existence and the degree of valuation accuracy in SA, the research deals with the quantitative data obtained from the CoJ municipal valuation roll. The data includes the assessed values (A) and the recent actual sale prices (S).

Bryman (2008) asserted that qualitative research approaches allow for a rigorous probing exploration and analysis of the data relating to the research aim and objectives. As such, the development of a framework such as the one for mass valuation standard requires a detail analysis of the data collected and a rigorous

probing of the facts and environment under review. The aim is to recommend a framework that SA can use to guide mass valuation standard especially relevant to the compilation of the municipal valuations rolls.

The mixed method approach made it possible for the researcher to understand both the quantitative and the qualitative data sets. This focused primarily on the behaviours and the attitudes of the participants in explaining their choices and actions during the valuation processes. It was also understood from inception that the study would to a certain extent seek to test for valuation accuracy and uniformity. However, the study was largely intended for the generation of new theoretical information to develop a framework.

The open-ended questions were administered through semi-structured interviews followed by desktop statistical analysis of the municipal valuation and sales data. This research approach was guided by the interpretivist and positivist paradigm and the mixed methods research in general. More particularly, the sequential exploratory mixed design (QUAL → Quan) was applied (Creswell, 2003).

4.4 RESEARCH METHODS

Dawson (2002: 15) asserted that the research methods are techniques and tools which are used to collect and analyse data. Hartas (2010) supported this by asserting that a method is a strategy for data collection and analysis, while methodology is the study about the methods. Depending on whether the research approach is quantitative, quantitative or mixed methods, the research tools could be conducting interviews, making observations or administering questionnaires (Leedy and Ormrod, 2005).

This section identifies secondary and primary data collection methods, in the form of obtaining municipal valuation and recent sales data and conducting interviews with the participants being the valuation experts. The section also describes the sampling methods. Furthermore, the data analysis methods are discussed in detail, especially since both the qualitative and quantitative analytical techniques were employed.

4.4.1 Data Collection Methods

4.4.1.1 Primary data collection

The research used three types of primary data collection methods: interviews and focus-group discussions for the qualitative component and a questionnaire survey for the quantitative component. According to Leedy and Ormrod (2005), an interview remains the most preferred data collection method because it reveals the human meaning to the data collected. The researcher may choose to probe the responses further to establish the participant's motivation, beliefs and perceptions. The focus-group discussion, on the other hand, provides an opportunity for the researcher to validate the findings from other methods such as interviews and statistical data. It can be used as a way of triangulating the findings from other methods.

- Collecting data from the semi-structured interviews

Interviews are a method that can used to collect qualitative data. Its advantage is that the data is collected face-to-face, allowing the researcher access to the body language expressions revealing the unspoken messages (Leedy and Ormrod, 2005). Slack and Rowley (2000) asserted that interviews also provide the researcher access to cognitive information such as beliefs, motivation and perceptions of the experts participating in the study.

Research interviews can be structured, unstructured or semi-structured (Yin, 2008). The distinction between these three types is that the structured interviews have a concrete set of questions and limited probing opportunity. In the case of the unstructured interviews, there are not predetermined and uniform, and the interviewer is allowed to probe freely. The semi-structured interviews can be seen to be a midpoint between the unstructured and the structured and use predetermined questions, but only to initiate and guide a conversation which allows for some degree of flexibility in further probing.

The researcher nominated to specifically make use of the semi-structured interviews, underpinned by open-ended questions. Data was collected from the 13

participating valuation experts from all the metropolitan municipalities in SA. These included Tshwane Metropolitan Municipality, CoJ, Ekurhuleni Metropolitan, eThekwini Metropolitan, City of Cape Town, Nelson Mandela Metropolitan, Mangaung Metropolitan and Buffalo City. Open-ended questions were prepared as a guide for the semi-structured interviews with the intention to understand why gross inaccuracies occur during the municipal valuations. Ultimately, the questions allowed for suggestions on what is needed to be done to address the concerns. The aim of this activity was to solicit the views and perceptions of the valuation experts in the mass valuation process.

It is common knowledge that values in themselves are influenced by perceptions on the price of property (Creswell and Tashakkori, 2007). Interview questions were developed in keeping with the research objectives and were administered to the participants. These interviews lasted an average of 60 minutes, as guided by Leedy and Ormrod (2005). The findings of the interviews were treated as critical in the description of the research gaps and challenges and ultimately the framework (Creswell and Tashakkori, 2007).

- Collecting data through the questionnaire survey

Despite the plausible explanation of how the sample for the questionnaire was determined, the major hurdle was securing the contact details of the targeted valuers. Thus, the researcher relied on referrals and the application of the snow-balling technique to increase the number of participants. A self-completion survey questionnaire was developed with the guidance of the theoretical framework established in Chapters 2 and 3, and further fine-tuned based on the inputs by the participants in the interviews.

This questionnaire was administered to registered valuers who were once or are currently employed as municipal valuers or assistant municipal valuers. The questionnaire was administered online, through the Survey Monkey application. This was shared with the targeted participants through SMS, WhatsApp and email. The completed forms were automatically loaded on Survey Monkey. This tool proved to be appropriate and desirable considering the Covid-19 disruptions.

Section 1 of the questionnaire dealt with the introductory letter to the participant, as well as offering an opportunity to exit the session at any point of the interview. Section 2 dealt with the collection of the demographic data of the participants. The required data included age, gender, qualifications and experience. Section 3 solicited the participants' views on the existence of inaccuracy and the extent of the same.

Section 4 sought to establish the standards currently used by the South African valuers. Section 5 sought to solicit the views of the participants on the substantive content of the mass valuation standard. This section also sought to elicit views on whether to start from the beginning and develop a standard for SA or localise the IAAO Standard on the Valuation of the Mass Real Property. In Section 6, participants were invited to make additional comments relating to the study. The last part of the survey questionnaire accorded the participants an option to place their identity on record, should they so prefer.

- Collecting data from focus-group discussions

Guided by Leedy and Ormrod (2005) and Creswell (2003), the researcher concluded the research by conducting a focus-group discussion which involved the participation of the purposefully selected sample of municipal valuation experts. In this research, the focus-group discussion was identified as source for primary qualitative data, but only for validating the proposed framework. The discussions during the focus groups were based on a presentation on the background to the research, the research findings and the proposed framework. Two focus-group discussions were conducted.

In first focus-group discussion, an electronic recording device was used to record the proceedings in the discussion. The recording was later transcribed by professional transcribers for the researcher. The researcher also made use of a scriber to record the proceedings in writing. These two records, one from the transcription and the other from scriber, were juxtaposed against each other with the intention of ascertaining the accuracy of the record. The second focus-group

discussion was conducted via MS Teams. The recording was administered through the recording function provided for in MS Teams.

4.4.1.3 Secondary data collection

Two methods were used to collect secondary data documents as well as the valuation data for the assessment of valuation accuracy.

- Collection of relevant documentation data

Patton (2002) argued that amongst a variety of data sources aligned to qualitative approach is documentation. The mixed methods approach chosen for this study allows for the integrated use of data sets and analysis (Creswell, 2014). According to Jankowicz (2002), the advantage of using documentation is that it provides for an objective view, published or not published, from outside the research process. The documents may exist in the form of reports, policies, standards, guidelines and memos. It is also important to ensure the robustness of such data by considering documentation from various municipalities. In this case, three metros were included as sources.

Accordingly, the researcher elected to include the documentation on relevant to the compilation of the municipal valuation rolls for the three metros in Gauteng. These collected documents included reports on the analysis of property sales market, the municipal property rates policies and municipal valuation strategies. The documents provided the researcher with insight into the fundamental considerations by the municipal valuers during the valuation process. In essence, the documentation provided the first opportunity in the quest for understanding the gaps and challenges leading to the development of the framework for the valuation standards.

- Collection of property sales and valuation data from the CoJ

The secondary data which contains the property value estimates as reflected the valuation roll, was collected from the valuation department of the City of Johannesburg Metropolitan Municipality. In keeping with the elected purposeful sampling method, for the purposes of the study, only residential properties were

included in the sample. This was primarily because the municipal valuers indicated that they preferred to apply the individual property valuation approaches to properties that are non-residential in general and commercial. For example, the valuers would conduct a separate valuation on a shopping centre and include the value in the valuation roll. The valuation report on the collected data contained six property classes and amounted to 758 998 in total, including 8 488 agricultural properties, 13 112 commercial properties, 1 332 industrial properties, 506 973 residential properties, 215 870 sectional title properties, and 13 223 vacant land plots. As previously stated, the property data was supplied by the CoJ.

With regard to the sales, the researcher identified all the properties that reflected actual sales, which occurred within 24 months preceding the valuation date of the valuation roll, which was 1 July 2017. To this end, a total of 88 653 sales were collected. These included 567 agricultural property sales, 681 commercial property sales, 57 industrial property sales, 39 482 residential property sales, 46 529 sectional title property sales, and 1 337 vacant land sales (see Table 4-2).

4.4.2 Research Population and Sampling

In the sampling for the study and its facets, the researcher was primarily guided by the municipal categories provided for in Chapter 1 of the Municipal Structures Act (Act No 117 of 1998). The specific focus was placed on local and metropolitan municipalities. The sampling designed for each empirical facet of the study varied according to the practicalities charging each facet.

4.4.2.1 Sampling for the semi-structured interviews

Two groups of valuers were the targeted research participants in this study. The first set consisted of the municipal valuers and their assistants. The targeted valuers were those who had been involved in municipal valuations, as municipal valuers and assistant municipal valuers, in any of the eight metros in SA. This choice was based on the fact that metros account for the largest number of households and rateable properties in the country. Thus, it was believed that the views of the valuers involved in the compilation of valuation rolls would be

representative of SA. It was hoped that the combined experience and exposure of the participating valuers, would span across all eight metros.

The participants were identified on a referral basis. The acceptance of the referrals was dependent on the prequalification criteria based on the participants' academic qualifications, professional registration and valuation experience. The participants were invited only if they, (1) held at least a National Diploma in property valuation or higher; (2) they were registered as a professional valuer or professional associate valuer with the SACPVP; (3) they had over 10 years' experience in municipal valuation as either the assistant municipal valuer or the municipal valuer; and (4) they had been involved with the compilation of the valuation rolls in any of the metros.

As guided by Leedy and Ormrod (2010), the typical sample size for the interview should range between 5 and 25 individual participants. As previously reported, a purposive sampling approach augmented by the snow-balling technique was used to incrementally select the participants from the metros, until a satisfactory number was attained. Based on the number of metros aforesaid, who are expected to employ at least four registered valuers, including one municipal valuer and three assistant municipal valuers, the number of valuers interviewed was determined.

Accordingly, the estimated targeted population was therefore 32 participants. However, only 13 valuation experts were ultimately interviewed on mass valuation, the standards and the critical factors affecting the improvement of accuracy and uniformity in mass valuation in SA. This is attributable to the difficulty experienced by the researcher in accessing the registered valuers, as well as the reluctance by most registered professional valuers to participate in the interviews. Nonetheless, the number of participants was deemed to be adequate as per recommendations by Leedy and Ormrod (2010).

4.4.2.2 Sampling for the questionnaire survey

The second set of valuers targeted for completion of the questionnaire survey were all the registered valuers who acted as municipal valuers and assistant valuers in all authorised municipalities. These valuers included the 32 valuers that

participated in the interviews, who were municipal valuers and assistants in metros. The sampling was based on the purposeful targeting of the total of 213 municipalities authorised to impose property rates and taxes, which include eight metros and 205 local municipalities.

In line with the MPRA, it was assumed that each metro employed at least six registered valuers, and each local municipality employed at least two registered valuers. This implies a total research population of 442 potential participants, including the initial 32 valuers in the metro mentioned above, and 410 valuers in local municipalities. For the purposes of the study the targeted population of the questionnaire survey was determined at 442 valuers. However, the fishing net was cast over the pool of 950 registered valuers.

In explaining the determination of the 950 valuers mentioned above, it is essential to first explain the make-up of the valuation profession, especially with regard to municipal valuation in SA. Regardless of the fulltime employed registered valuers, the praxis is that the municipalities often outsource the compilation of the valuation rolls to registered valuers in the private sector. This implies that there are more registered valuers in the private sector with experience in the compilation of the valuation rolls. The MPRA insists on the use of the valuers registered with the SACPVP. As such, they had to be included in the sample. Accordingly, the only practical approach to be used in locating the private registered valuers with experience in the compilation of the valuation rolls was to administer the questionnaire to all the valuers registered with the SACPVP.

It is estimated that there were 2 000 valuers registered with the SACPVP. The SACPVP is the only statutory regulatory body for the valuation profession in South Africa. These include the categories of candidate valuers, professional associate valuers and professional valuers. However, to protect private and personal information, the SACPVP refused to share the contact details of the valuers with the researcher. Because of the difficulty in accessing the complete valuer contact list from the SACPVP, the total number of valuers furnished with the questionnaire was limited to 950 registered valuers.

The contact details for the 950 registered valuers were obtained through the referrals, in keeping with the snow-balling technique. It was also acknowledged that not all the invited valuers were involved in statutory mass valuation. Even the outstanding 1 050 registered valuers were not exclusively made up of municipal valuers. However, as guided by Leedy and Ormrod (2005), if a sample constitutes 20% of the population of the determined research population, this is regarded as adequate to achieve the objective of discussing and confirming the existence, and the extent, of mass valuation inaccuracies in SA, and to lay the foundation for the identification and investigation of critical factors affecting accuracy and uniformity in mass valuation in SA.

Table 4-2: Questionnaire Survey Response Rate

	Frequency	Percentage
Response Rate	134	30-%
Total Population (Narrower definition)	442	100%

As illustrated in Table 4-2, from the lens of the broader definition of the study population, the 134 respondents represent 15% of the 950 questionnaires distributed. The respondents also represent 30% of the total determined research population of 442 potential respondents. The implication of the return rate for the findings relates to whether there are enough to be considered acceptable and whether they can be generalised. Considering the targeted respondents otherwise described in this research as the size of the research population by narrow definition of 442 valuers, the rate of response of 30% is considered adequate for the purposes of the study and valid to serve as the basis for generalisation of the findings, especially considering the supplementary interviews conducted in the research.

For reasons not divulged by the respondents, 14 of the questionnaires were not fully completed, as some respondents skipped some of the questions. As a result, the analysis considered the responses to each question against the total number of respondents who replied to each question. This accounts for variations in the total tallying in the tables used in the analysis. The responded totals also differ from one graph to another, owing to the unanswered questions.

4.4.2.3 Sampling property sales and valuation data in the City of Johannesburg

In keeping with the elected purposeful sampling method, the researcher identified all the sales that occurred within 24 months before the valuation date of the CoJ general valuation (GV) roll (2018), which was 1 July 2017. This sampled data was used in the testing, discussion and confirmation of the existence and the extent of mass valuation inaccuracies in SA.

The identified sales were cleaned by removing the outliers, which could distort the results, then paired with corresponding assessment values. Table 4-3 depicts the data points that were ultimately subjected to statistical analysis.

Table 4-3: Population and Sample Size (CoJ GV 2018)

Property Class	**Assessed Property**	**Identified Sales**
Residential	506 973	39 482
Sectional Title	215 870	46 529
Commercial	13 112	681
Industrial	1 332	57
Agricultural	8 488	567
Vacant Land	13 223	1 337
All Properties	**758 998**	**88 653**

This data also cut across eighteen neighbourhoods of the CoJ. These included Diepsloot, Lanseria, Midrand, Johannesburg (JHB) North, Ivory park, Sandton, Modderfontein, Alexander, Roodepoort, Randburg, JHB Central, Soweto, City Deep, Lenasia, Lenasia South, JHB South, Ennerdale and Orange Farm.

4.4.2.4 Sampling for focus-group participants

The sampling for the focus groups was designed for use only in the validation of the proposed framework. As guided by Babbie (2004), and consistent with the sampling conducted for the semi-structured interviews, an invitation to the focus-group was extended to all the 13 expert valuers who participated in the interviews. These valuers had combined experience of over 50 years in the compilation of the municipal valuation rolls. Their experience cuts across the eight metropolitan municipalities, including CoJ, Ekurhuleni Metropolitan Municipality, the Tshwane

Metropolitan Municipality, eThekwini Metropolitan Municipality, Buffalo City Metropolitan Municipality, City of Cape Town Metropolitan Municipality, Mangaung Metropolitan Municipality. They also had exposure to local municipalities. These experts were also invited to the second workshop aimed at finalising the framework proposals.

4.4.3 Research Data Analyses

Creswell (2014) asserted that the use of mixed methods requires that the researcher be adequately skilled in both quantitative and qualitative research. In fact, Creswell (2014) indicated that one of his students had developed a checklist to help assess the adequacy of the skills level of the researcher who envisages to use the mixed methods. This includes understanding the general research design, quantitative methods, qualitative methods and mixed methods. To this end, the researcher's skills were found to be adequate to use the mixed methods approach, especially in relation to the quest for achieving the set research objectives.

In keeping with the guidelines on the sequential exploratory design, as discussed by Creswell (2003), the analysis of both the qualitative and quantitative data was conducted in an inter-connected manner. The qualitative data was first analysed, and with the findings in mind, there arose a compelling need to confirm the theoretical assumption of the existence and extent of valuation inaccuracies in the valuation roll of the CoJ, which was achieved through the analysis of the quantitative data. The researcher made use of multiple analytical techniques including the data analysis spiral on the qualitative data, the simple statistical analysis on the data from the interviews and the statistical ratio analysis on the quantitative data from the CoJ.

4.4.3.1 Primary data analysis (interviews and focus-group discussions)

Recognising that this was a mixed method design study, the priority data was the qualitative data which was collected through the means of an interview of 13 expert valuers who were involved in the compilation of the municipal valuation roll of the eight metros in SA, and the data collected from the focus-group discussions, which involved the valuations experts with experience in the South African metros.

The analysis of the data from the interviews was integrated with the data from the two focus-group discussions. The analysis of the qualitative data in question was thematic and conducted with the aid of the data analysis spiral as espoused by Leedy and Ormrod (2010), as illustrated in Figure 4-6. This approach was used as the primary guiding method for both data from the interviews and focus-group discussions.

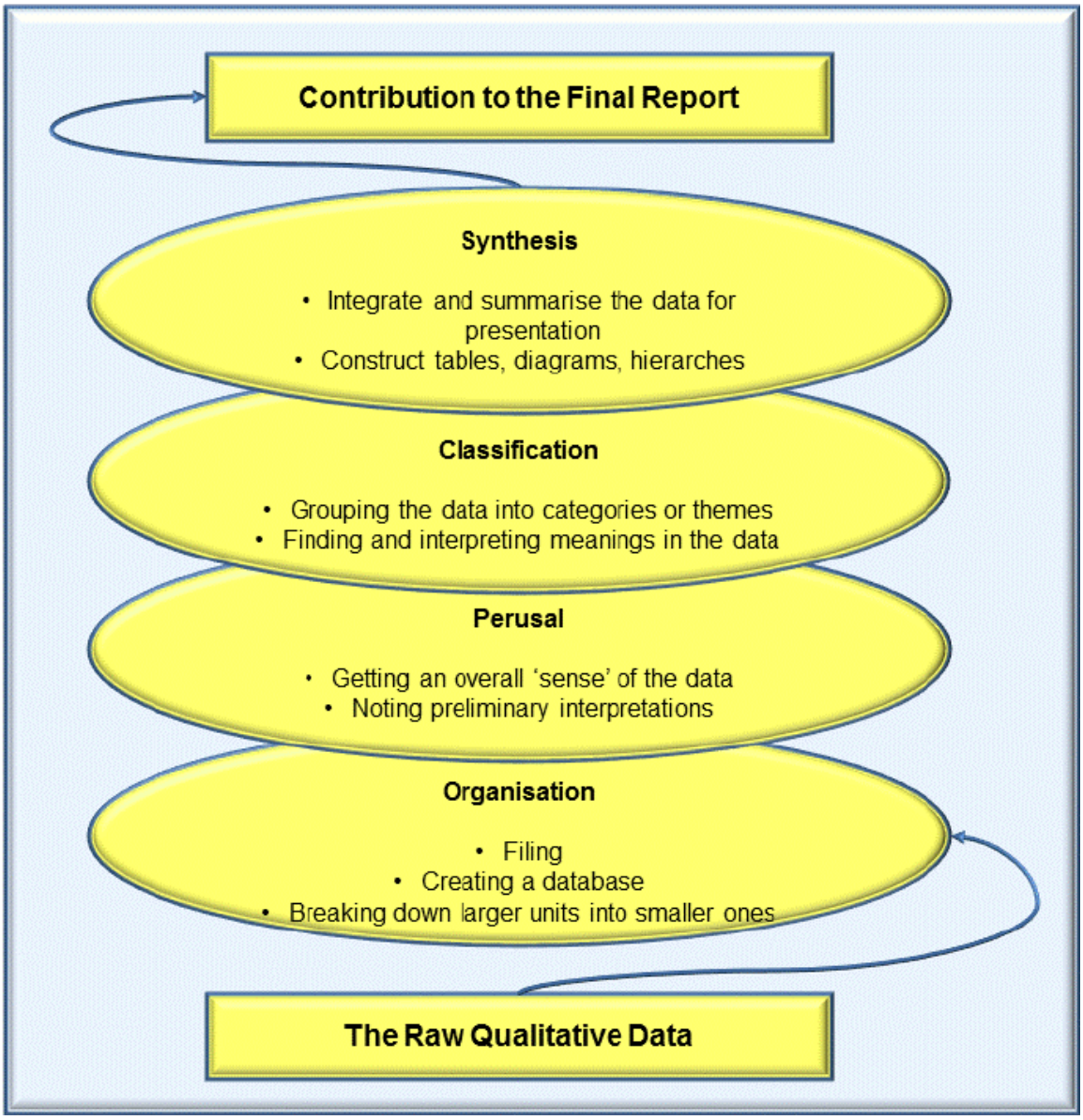


Figure 4-6: The Data Analysis Spiral

Source: (Leedy and Ormrod, 2005:151)

The analysis commenced with assessment of data through identification of statements that relate to the topic, grouping statements into meaningful units, seeking divergent perspectives and construction of a composite. This is as argued by Leedy and Ormrod (2005).

The data was then analysed using the data analysis spiral approach, which involves taking the researcher through the data several times. It is important to note that when interviews were conducted, the questions were on separate cards on which the answers and related information were recorded. The data was collected, all the cards were examined and those with similar information were grouped together into various categories.

In the process of analysis, additional themes and concepts were found and were used to contribute to the enhancement of the final discussion. Then the linkages, variations and nuances in the data within and between categories were identified. All these procedures led to the major goal of integrating the data sets to offer an accurate, detailed and subtle interpretation of the research findings.

4.4.3.2 Secondary data analysis

In relation to the secondary data, which was both qualitative and quantitative in nature, the content analysis as well as the statistical analysis was conducted for the analysis of the collected documentation and the municipal values and property sales, respectively.

- Analysing the documentation

According to Bryman (2021), the analysis of documentation, with the intention of identifying themes to be used further in the research, can be best achieved through the employment of the content analysis technique. This notion is supported by Grbich (2007) who also asserted that documentation analysis is best conducted through the content analysis method described by Simister (1994) as a process of extracting and categorising information from the text. Neuman and Robson (2014) later defined content analysis as a technique used for gathering and analysing the content of the text. These methods enabled the researcher to identify recurring

themes in the documents which are then used to advance formidable scientific view. In the same vein, Grbich (2007) asserted that content analysis allows for in-depth explanation and strengthens the robustness of the findings of the study.

In this research, the use of the content analysis method was preferred as a tool for analysing the information in the collected documents. It was employed as the inter-connected method to the other methods employed in the study as part of the mixed methods approach. As guided by Grbich (2007), the researcher identified seven draft thematic areas from the information contained in the valuation strategy, market reports and the policies. The identified themes include: i) valuation accuracy; ii) the application of valuation standards; ii) the need for mass valuation standard; iv) the components of a mass valuation standard; v) the standards versus implementation guidelines; vi) the valuation approaches and models; and vii) stakeholder consultation. These thematic areas were expected to evolve further as the research advances through the expert interviews.

- Analysis of the property sales and valuation data for the CoJ GV 2018

The data collected from the CoJ 2018 valuation roll and the sales, was subjected to statistical analysis. The first four measures were adopted from the IAAO standard. These included the ASR, the PRD, the PRB and the COD. The last two statistical measures included the RMSE and the MAPE.

In relation to the ASR, the assessed values were computed compared to the SPs. This data was subjected to three step process of analysis.

- *Sales Data Adjustments (Step 1)*

To begin with, the sales data made available was carefully analysed to eliminate invalid sales. This is achieved by adjusting the predated sales to the valuation date. This is otherwise known as “time adjustments”.

With regard to the residential and sectional tittle classes, in the case of residential and sectional tittles, the predated sales were adjusted to the valuation date by dividing the SP by the appropriate adjustment factor. The adjustment factor was determined by dividing the raw factors by most recent raw factor. In determining

the raw factors, a Generalised Additive Model (GAM) with a smoothing spline term was used. The GAM with a smoothing spline term, refers to a statistical technique that extends linear models by allowing non-linear relationships between dependent variables and predictors. It is preferred over the simple monthly averages because, the property market changes under consideration are generally non-linear.

Each monthly adjustment factor is determined by using the following formula:

$$Adjusted\ factor = \frac{Raw\ factor}{Most\ recent\ raw\ factor}$$

Where the raw factor is calculated as follows:

$$Raw\ factor = f(month) + \varepsilon$$

Where, f(month) represents a smoothing spline, and ε represents a random error.

In the case of commercial and other property classes, the above method was deemed not appropriate due to the low volumes of sales registered. Thus, the sales were adjusted to the valuation date with the use of the NPV, whereby the SPs were multiplied with the Consumer Price Index (CPI) factor. This was repeated for each month from the date of sale to the date of valuation. These monthly calculations were determined with the aid of the following formula:

$$Adjusted\ Sales\ Prise = Sales\ Price(1 + R_i)^{1/12th}$$

- *Removal of Outliers (Step 2)*

At this stage, the interquartile range was calculated as the difference between the 75th and 25th percentiles of the values. All the properties whose values extremely exceeded the inner quantile range by at least three times were excluded from any further analysis.

- *Assessment/ Sales-Ratio (ASR) Computation (Step 3)*

Following the adjustment of the sales, the assessment values were divided by the SPs to determine the ASR. This computation was processed separately for each property class.

The PRD was applied to the validation data used in compiling the 2018 valuation roll of the CoJ, in line with the IAAO standard ratio studies. It was calculated by first adding the sales ratios of all sample properties and dividing the sum by the sample size to derive a numerator. Secondly, the denominator was derived by dividing the sum of all the assessed values by the sum of all the SPs.

The PRD is therefore the result of dividing the explained numerator by the denominator. The acceptability parameters for the PRD are defined in the IAAO Standard on Ratio Studies. A score below 0.93 suggests progressivity in vertical equity, while a score above 1.03 suggest regressivity in vertical equity.

Similarly, the PRB was applied to the CoJ valuation data. It is a measure used to determine the bias of the assessed values to the sales price. It is calculated as the ratio of the difference of any sales ratio minus the median sales ratio, divided by the median sales ratio. It is often expressed as a percentage. A lower COD suggests a more uniform assessment. The smaller the PRB value, the better the vertical equity. A high PRB value denotes vertical inequity.

In support of the PRD and the PRB, the COD was used as another measure of uniformity on the valuation data of the CoJ. The COD measures the degree of variance between the assessed value, expressed in percentages of the median variance. This measure is recommended not to exceed 20% for the residential property sample and 30% for the commercial property sample.

The RMSE was applied as a statistical measure of errors or residuals in the valuation estimates. The residuals are used to show how far the sales data points are, from the trendline. The RMSE is calculated by squaring the residuals between the sales price and the assessed value, adding the squared residuals and dividing the outcome by the sample size. Thereafter, a square root of the outcome is

determined. This represents the RMSE score for the sample. The smaller the RMSE the more the implication that the assessments are accurate. The RMSE is calculated by using the formula depicted.

The MAPE was also used. According to De Mytenaere et al. (2016), the MAPE is a statistical measure used in assessing the accuracy of forecasting. It is expressed in a percentage form. Mathematically, the MAPE is achieved by determining the sum of the absolute values of the difference between the actual value and the estimated value, divided by the actual value percentage of each data point. Thus, the higher the MAPE value, the more inaccurate the forecast. The lower the MAPE value, the higher the accuracy level of the forecast. Table 4.4 was used as a guide in interpreting the MAPE results.

Table 4-4: MAPE Result Interpretation Table

MAPE VALUE	INTERPRETATION
< 10	Highly Accurate Forecasting
10 -20	Good Forecasting
20 -50	Reasonable Forecasting
> 50	Inaccurate Forecasting

Source: (Lewis, 1982: n.p.)

4.4.4 Framework Design, Development and Validation

A framework can be defined as a set of rules and beliefs which are used in dealing with clearly distinguished and understood problems and concerns. The nature of the research problem under review requires the development of a framework for the mass valuation standard in SA. This framework is, therefore, a response to the problem and concerns identified in the statement of the research problem, and further clarified through the semi-structured interviews administered to the municipal valuation experts in the CoJ Metro. The aspects of the framework were guided by the findings of the interviews, which sought to establish the causes of inaccuracies in the valuations. These causes were believed to be largely attributed to the valuation inconsistencies by the municipal valuers.

The valuation inconsistencies became the focal point in pinpointing the gaps and concerns to be addressed by the framework. As part of establishing the valuation inconsistencies in question, the researcher critically assessed some of the inconsistencies, as found by the previous studies, in other countries such as Nigeria, Australia and the UK. These inconsistencies were critically assessed for applicability in the South African municipal valuation context. Furthermore, the gaps and concerns identified were juxtaposed against the aspects already provided for in the international mass valuation standard. Flowing from the above, thematic areas were used as the basis for the framework for mass valuation standard in SA. A specific focus was placed on municipal valuation as provided for in the MPRA.

Once the framework was developed, it was subjected to validation through a focus-group discussion. Pidd (2009) suggested that every model or framework requires for validation against real world. The validation of the framework is intended to establish if the framework is a presentation of the real world and to ascertain its compatibility and behaviour in comparison to the real world. The researcher extended an invitation to all the municipal valuers who participated in the study, to attend group discussions, as valuation experts who were familiar with the nuances of the municipal valuation which were meant to assess the relevance and compatibility of the framework to the real world.

The focus-group discussion assumed the format of a workshop. It included a short presentation on the background of the research, the findings, as well as the proposed framework for the mass valuation standard for SA.

4.5 CHAPTER SUMMARY AND CONCLUSION

In a quest to make this research a success, the researcher was guided by the pragmatic philosophical worldview, with a bias towards interpretivism and constructivism from the ontological and epistemological positions respectively. The research was guided by the sequential exploratory design as an underpinning of the mixed design approach, which allows for the combination of qualitative methods with quantitative methods. More specifically, data was collected and

analysed with the aid of the semi-structured interviews were illustrated through a simple statistical analysis.

In relation to the semi-structured interviews, influenced by the small size of the total population of the valuation experts, a combination of a purposeful sampling and snow-balling approaches were preferred. Thirty-two expert valuers involved with the metros, were identified for the interviews, However, only 13 were eventually available for the interviews. Out of the 950 distributed questionnaires, a total of 134 questionnaires were completed and returned. The sample properties that were included in the ratio analysis, were selected with the guidance of properties with assessment values and sales prices that occurred within 24 months before the valuation date. The design and development of the framework for mass valuation in SA was discussed. This also included a discussion on the validation of the framework through a focus-group discussion with the valuation experts.

This chapter outlined the research methodology and methods. The next chapter presents and discusses the analysis of the empirical part of the study.

CHAPTER 5

ANALYSIS AND DISCUSSION

"Your relevance as a data custodian is your ability to analyse and interpret it. If you can't, your replacement is due."

(Wisdom Kwashie Mensah)

5.1 CHAPTER INTRODUCTION

As discussed in Chapter 4 on the research methodology, preliminary interviews were conducted to confirm and enhance the broad research areas identified in the literature review. Because the subject is such a new area in SA, it was expected that the preliminary interviews would provide a sound starting point. It was hoped that the results and the thematic areas would provide the basis for the researcher to develop the questionnaire.

This chapter presents the results of an empirical component of the study. Particularly, the chapter reports on the results of the semi-structured interviews and the questionnaire survey. The themes identified from the literature review were verified, confirmed and redefined through the results of the interviews. The guidelines for the interviews were developed with the aid of the themes identified in the analysis of the literature and document analysis.

The chapter has three sections. The first section relates to the analysis of the primary data from the interviews. The second section deals with the analysis of the data from the survey. The final section deals with the assessment of secondary data on Protea Glen Extension 16. The spiral analysis was employed in the analysis of the data from the interviews. In relation to the questionnaire survey, the study has adopted statistical analysis applied through IBM SPSS version 27.

5.2 INTERVIEW ANALYSIS

5.2.1 Interviewees' Profile

The interviewees were selected based on outstanding academic qualifications, experience and exposure in the field of mass valuation. Table 5-1 provides a summary of the information about the participants.

Table 5-1: Interviewees' Profiles

Professional Status	Academic Qualifications	Experience	Municipalities	Coding
Valuation Experts in Government	ND, BSc	23 years	CoJ, CoT,	PVG001
	ND, BSc	26 years	CoCT, NMB	PVG004
	ND Real Estate, BSc	21 years	BC	PVG002
	MSc Real Estate	20 years	CoJ, CoT, EMM	PVG003
Valuation Expert Private Sector	ND	24 years	BC, NMB	PVPS001
	MSc Real Estate	22 years	CoJ, CoT	PVPS002
	MSc Building	28 years	CoJ	PVPS003
	ND	21 years	CoT, BC	PVPS004
	ND	21 years	NMB, EMM	PVPS005
	ND	23 years	CoJ, CoCT, eThekwini, EMM, BC, NMB	PVPS006
	ND	24 years	EMM, eThekwini, Mangaung, CoJ	PVPS007
Property Rating Expert	ND Real Estate	23 years	All metros	PRE001
	ND Real Estate, BSc	21 years	All metros	PRE002

The experience of the participants ranged between 18 and 24 years. Their academic qualifications of the interviewees ranged from a National Diploma (ND) in real estate/property valuation to post-graduate degrees such a master's degree in property valuations or similar studies.

All the interviewees were registered with at least the SACPVP, which is a statutory body responsible for the valuation profession in South Africa. Only three of the

participants were also affiliated with the statutory bodies operating beyond the borders of SA such as the RICS and American Society of Appraisers (ASA). The interviewees were also affiliated with voluntary professional bodies such as the SAIV and the BPVA. Based on the education, experience and exposure attributed to the interviewees, it can be concluded that their views and opinions can be relied upon in arriving at the research findings.

As discussed in the methodology chapter, the 30 experts were invited to participate in the interviews. Only 13 experts participated in the interviews. Two of the participants specialised in representing ratepayers during objections to the valuation roll. In the study they are coded as PRE. Seven of the participants were practising in the private sector as professional valuers. They are coded as PVPS. Four of the participants were employed in government as valuation experts. Accordingly, they are coded as PVG.

Between the 13 participating valuation experts, it is evident that all had more than 20 years' experience in municipal valuations. They had a combined exposure to all eight metros in SA.

All the interviews were conducted with each expert valuer, separately over the Zoom and Ms Teams platforms. Each interview lasted for an average of 60 minutes. Some interviews lasted as long as three hours. The interviews were guided by the eight open-ended questions stipulated in the interview questionnaire depicted in Appendix C-2.

5.2.2 Analysis of the Results of the Interviews

As suggested by Ritchie and Spencer (1994), the inductive matrix-based method was employed to analyse the data from the interviews. Data was accordingly ordered and synthesised in terms of thematic areas identified from the study. For the sake of confidentiality, the respondents were coded and their respective codes were used in the text. Consistent with the results from document review, the seven thematic areas that were identified were confirmed. They include i) the valuation accuracy; ii) the application of valuation standards; ii) the need for mass valuation standard; iv) the components of a mass valuation standard; v) the standards

versus implementation guidelines; vi) the valuation approaches and models; and vii) stakeholder consultation. These themes are discussed in the following subsections.

5.2.2.1 Valuation accuracy

The interviewees were asked about their views in relation to valuation accuracy in municipal valuation. Most respondents agreed that the level of accuracy in the municipal valuations in SA is questionable. Some argue that the accuracy of valuation in municipal valuation is acceptable only in so far as the statutory reasonability is concerned. This means that Section 52 of the MPRA, which directs that a municipal valuer can adjust the valuation only within 10% upwards or downwards, is largely complied with. The reasonable accuracy of the municipal valuation is therefore acceptable within 10% of the market valuations. Participant PRE001 asserted that all municipal valuations in SA are grossly inaccurate except for those in the City of Cape Town. None of the respondents could provide a firm level of valuation inaccuracy in mass valuation in SA. PVPS006 and PVPS007 were the only participants who indicated that that accuracy is best determined with aid of utilising the IAAO (2017) standards. However, PSPS007 went further indicate that the limitation now relates to the curriculum for qualifications which does not cover much on mass valuation nor on testing for valuation accuracy and uniformity. PVPS007 stated that:

> the biggest problem with assessing the valuation rolls for accuracy in SA, is that the South African valuation schools do not teach much of mass valuation. It is even worse with the required skills in testing for valuation accuracy and uniformity. Even me, I was trained on the job by one of the CAMA experts. Otherwise, with my National Diploma in Real Estate, I wouldn't have become a CAMA analyst.

In general, the respondents disputed the suggestion that the quantum of objections to the valuation rolls was indicative of the degree of valuation accuracy. For instance, PVG001 suggested that:

> the fact that there are less, or no valuation received in a valuation roll, should not suggest that the accuracy of values is very good. Rather it must be noted that most valuers would go to the extent of reducing values way under market value to avoid

> objections, especially in the case of residential properties. This is so because, values always influence the property rating.

Other respondents PVPS001, PVPS004, PVPS005, PVG002 and PVG003 confirmed the assertion by PVG001.The respondents went further to speak about how to achieve valuation accuracy. PVG001 respondent asserted that valuation accuracy depends on the system/application used for mass valuation. The respondent placed a specific emphasis on the strength of algorithms employed as well as the quality of the input data.

The respondent argued that a good system should allow for little or no human intervention in the value calculation process. PVPS003, PVPS004, PVG003 and PVG004 insisted that to achieve good valuation accuracy valuers require complete and quality data. Such quality data is in fact a requisite for accurate analysis of the market data and determination of market valuations. PVPS007 emphasised retraining valuers involved in mass valuation on the standards and testing.

5.2.2.2 Application of mass valuation standard.

The participants were asked if they thought that valuers generally applied any valuation standard when conducting mass/municipal valuations. To this end, the respondents were unanimous in the assertion that there is no documented evidence firmly suggesting that valuers involved in municipal valuations ever made use of any valuation standard. Valuers are generally guided by the South African legal framework which insists on satisfying the market value definition and the requirements of the South Africa courts.

According to PVPS005, at best, municipal valuers would use self-determined standards which they derive from experience. In supporting this assertion, PRE001 asserted that:

> According to my understanding, the IVSC and the RICS do not have mass valuation standard. I also hear from some valuers who may know of the mass valuation standard of the IAAO. But I doubt if they ever use the standard during municipal valuation.

PVPS001 stated that.

> In my experience and knowledge, SA has never had a standard. Even the one published by the SACPVP only came to the fore late 2021. The international standards were only mentioned by other valuers. But we have no proof that they were using those standards in municipal valuations.

These assertions by PRE001 and PVPS001 were confirmed by the rest of the interviewees. All the interviewees agreed that, even though there may be a claim that valuers did rely on a standard, there is no documented evidence confirming that a specific standard was used. Participant PVPS007 argued that:

> in the municipalities where we assist the municipal valuers in carrying out the general valuations, we integrate the IAAO standards. In fact, I was at one stage part of the IAAO committee that revised the international standards. However, the municipal valuers do not read the closeout reports that we submit after completing our projects. This is why they would not know about the standards we used.

In essence, the respondents largely agreed that to best of their knowledge as municipal valuers, there had never been the use of valuation standards, especially the mass valuation standard in municipal valuation in SA. This view is in line with the findings in the literature review which suggested that one of the reasons for valuation inaccuracy is the lack of valuation standards. However, the response by PVPS007 suggested a different answer. This attests to the concern around the valuation curriculum in SA.

5.2.2.3 Need for mass valuation standard

When responding to this question, PVPS001 elaborated on the reason for the existence of the valuation standards. He advanced an opinion to the extent that it must be appreciated that the standards are a culmination of, and a means to preserve certain societal and economic values. PVPS001 asserted that valuation standards are based on the socio-economic values for a particular political agenda, favoured and advanced by the authors of the standard. This gave rise to the belief that given the unique African environment and political outlook, SA should develop its own standard for mass valuation and valuation in general.

PVPS001 responded as follows:

> This is a difficult philosophical question it must consider the nature of standard imposition. It is a known fact that standards are a product of societal value system. Generally, standards are developed somewhere for a particular purpose. Take for instance, the RICS valuation standards. They are developed by the English for its societies including the former colonies'. By so doing, they get to impose their values to the rest of the world. So, I think, on the basis that SA is trying to define its societal values in an African context, it must therefore develop its own standard. However, the fact is that the real estate in SA is defined in western terms. Selling and buying is informed by the western values, it may then be realistic to adapt the IAAO's international standards. Of course, I believe that SA should develop its own valuation standard, informed by its own real estate values.

The assertion by PVPS001 that SA should develop its own mass valuation standard was supported by three other respondents including PVG001, PVG002 and PVPS003, who also submitted that SA must develop its own mass valuation standard because each country has unique market conditions and context. This view is politically charged and suffers a limitation due to the reality that SA is biased towards a free-market economy and is strongly influenced by the western markets. This was also hinted at in the literature review. The real estate value perspectives are based on western life. It is, therefore, almost impossible to ignore the western value system in the South African real estate, and as such in property valuation.

However, respondents PRE00, PVPS006 and PVPS007 mounted an argument that there is no point in reinventing the wheel. According to these respondents, the IAAO has already developed the international standards which are universally acceptable. It may only be necessary that the IAAO's standard be localised taking into cognisance the local legal framework and real estate environment and context. They also noted the work already done by the SACPVP to this end. To cite an example, PRE001 responded as follows:

> It will be foolish to reinvent the wheel. South Africa should take the IAAO's standard and try to adapt it to the SA context. Even the SACPVP did exactly that when developing the newly adopted standard.

PVPS006 argued that:

> As private valuers, we have used the IAAO standards before in metros such as the City of Johannesburg, eThekwini Metro, City of Cape Town, Ekurhuleni Metro and Mangaung. I really think that the IAAO standards are adequate for SA. All that needs to be done, is to upskill the municipal valuers in the use of standards. However, for the sake of acceptability, the standards must be adopted to the South African legal framework.

Consistent with suggestions found in the literature, the findings from the interviews are that SA as a developing country characterised by free-market economy and a real estate market that like the western countries, does need to standardise mass valuation especially as it relates to municipal valuations for rating purposes. In recognition of the fact that the IAAO has already developed a standard on mass valuation, SA should simply take advantage of such development and adapt the IAAO's standard to suit the South African socio-economic environment and the legal context.

5.2.2.4 Components of mass valuation standard

The interviewees were asked what their views were about the components of a standard for mass valuation for SA. An assumption was made that there was consensus that SA needed such a standard to improve on valuation accuracy and confidence in the valuation profession. The responses suggested a variety of valuation aspects to be classified and prioritised as components of a standard for mass valuation in SA. These aspects included data collection, data storage, data maintenance, classification of properties, valuation approaches, modelling, property sales sampling and market analysis.

PVG002 emphasised:

> I am more concerned with the standard, addressing the classification of properties. The current practice is that some municipalities will opt to use zoning as the basis for classification and rate determination, while others would choose to use the current use. It must be remembered that the current use is not always the same as the zoning. A property may be zoned as residential but used as business. So, it is important for the standard to provide guidance on this subject.

At the centre of PVG002's concern lay the uniformity between municipalities especially those closer to one another, such as CoJ and Tshwane Metro. PVPS001 was concerned about the inconsistent use of zoning and current use classifications across municipalities. This affects the neighbourhoods in closer proximity to one another yet in different municipalities. Because of this inconsistency, the values differ vastly.

Interviewee PRE002 stated that:

> For me, model development must be guided by the standard. This is so important that you must know that some valuers cannot even spell CAMA. Data collection, storage and maintenance, is also very crucial especially towards improving valuation accuracy. Therefore, it must be addressed in the standard.

The assertion that the interviewee PRE001 made at the end of the comments, confirms the findings in the literature review which suggested that the quality and management of data has a direct bearing on the accuracy of valuations. The response by PVPS003 was more elaborate and inclusive. While PRE001 critiqued the municipal valuation standards for property rating (sMVPR) for being all encompassing and including even the MPRA issues that have no bearing to the valuation production process, PRE001 was of the firm view that the point of departure should be the content framework of the IAAO's standard. In the words of PRE001:

> It is my thinking that the components of the IAAO standard remain relevant for SA's standard for mass valuation. The sMVPR includes a bit more than what a mass valuation standard should contain, guided by the very reason for its existence. The reason for the existence of a mass valuation standard should be to guide the valuer in the production reliable, accurate and acceptable value estimates. Other issues covered in the sMVPR, such as rating policy valuation appeals board etc. can only serve to make practical the MPRA, and not the main reason for the existence of mass valuation standard.

Considering the contents of the IAAO's standard on mass appraisal of real property, this implies that interviewee PVPS003 was advocating for four main components: (1) collecting and maintaining data; (2) valuation; (3) model testing and quality assurance and value defence; (4) and managerial and space

considerations. PVPS006 confirmed that the IAAO standard covers all the issues relevant to the determination of real estate values.

5.2.2.5 Standard versus implementation and procedural guidelines

The interviewees were also asked to critique or express a view on the recently published sMVPR. Some of the interviewees confessed to not having seen or read the final copy of the sMVPR. Others raised concerns around the fact that the sMVPR is more like an MPRA implementation guideline and certainly not a standard for mass valuation. According to PVG002, the sMVPR missed an opportunity to write a mass valuation standard. Instead, they got lost in the confusion of the MPRA procedure and implementation guidelines. This is despite the fact that they had tried to integrate the contents of the IAAO standard.

In his comments, PV002 noted that:

> I welcome the effort that was put into the compilation of the standard. However, I believe that the authors have confused a standard with procedure manuals. The standard does not address the issues a standard should address. Rather it deals for example, with the appeals board processes. It deals with the issues on the municipal rating policy. All these are not value determining standards.

A few of the interviewees believed the standard was good but not implementable, especially in smaller municipalities because it will prove to be too expensive to implement.

PRE001 commented that:

> In my view, most small municipalities will not be able to implement the standard. It seems too expensive and too demanding. However, my view is that the standard is good.

PVG004 commented as follows:

> I have not seen the standard published by the SACPVP or SAIV. I am concerned that they went ahead and compiled a standard without consulting with us, the valuers in the big municipalities. The metropolitan municipalities such as the City of Johannesburg, City of Cape Town and eThekwini, are responsible for the valuation and rating of properties in the excess of 600 000 properties, worth over R1 trillion

> rands in municipal taxes per annum. Yet, we were not consulted during the development of the standard [sMVPR]. How can they hope to define the standards without asking the clients, being the municipalities, what we think should be included in the standard? They should have involved the municipal valuers.

While there were mixed emotions in reaction to the introduction of the sMVPR in SA, there was nevertheless a consensus that the consultation with the relevant stakeholders was inadequate. According to the interviewees, the team that was responsible for the compilation of the standards did not consult with sufficient valuers during the development of the sMVPR. This is important to the study as it has a bearing on the framework for the development of standard for mass valuation for SA.

5.2.2.6 Valuation approaches and models

The interviewees were asked about their recommended or preferred mass valuation models. All interviewees agreed on the use of the three traditional valuation approaches as the basis of valuation in SA, namely, the sales comparison, the income and the cost approaches. They all agreed that the models are supposed to be based on the traditional valuation approaches. In mass valuation, the independent variables in the value determination formulae are aggregated to be representative of a larger population. While some interviewees did not succinctly state any specific model preference, their comments and characterisation of the type of a model they prefer, befits the MRA and the CAMA. For instance, PVG003 stated that:

> I do not prefer a specific model. But such a model must allow for a robust analysis of property market data. It must also allow for clear reporting. It must be able to read and understand the property-value trends. Less human intervention is needed.

In the same spirit, PVPS005 stated that:

> Honestly, I prefer whatever model. If it can yield results. But whatever you do, never declare openly such a model before the Valuation Appeal Boards or courts. Simply explain the factors influencing values such as the comparable sales. If you attempt to table a model before the courts and valuation appeals boards, you run the risk of endless and unwinnable challenges.

PVG001 was the only interviewee who suggested the use of the ANN models. He went further to suggest that there must be a way of convincing the South African courts of the accuracy of the ANN models. The argument by PVG001 is that the ultimate test should lie in the track record, the model tests conducted, depicting how close to the market value are valuations predicted through the model.

PVG001 said:

> The reality is that we are all using the MRA based models for municipal valuations. There are few who are still using excel-based models in the country. Most of whom simply take advantage of smaller municipalities. The only reason why we are not advancing to the use of the ANN, despite being proven in many parts of the world to be most accurate model, is because of the attitude of the courts towards such models. The courts prefer simple models that can be explained within a parameter of their understanding. What the judges can't understand, they reject. I believe we need a different approach to explaining the valuation approaches in court. Courts must be made to understand that the ultimate test for valuations lies with whether the value estimate is closer to the market valuations or not.

According to PVG004, the use of models in mass valuation in SA differs. Some municipalities use the point/weighted system while others use the MRA. There are also a large number of municipalities that simply escalate the values in the previous roll by a certain percentage. Neither of these approaches can be accepted as credible at the time of objections hearings, especially before the VAB. PVG004 stated:

> I know that in our municipality, we use the multiple regression analysis for the mass valuation. We use statisticians who develop various models for various neighbourhoods and property types. There are generally no valuers who can develop models for valuation because the training of valuers in SA does not provide such a skill. At the very best, there would be a small section on mass valuation. Yet, we were not consulted during the development of the standard [sMVPR]. How can they hope to define the standards without asking the clients, being the municipalities, what we think should be included in the standard? They should have involved the municipalities.

In essence, the interviewees were of the view that their choice of a valuation model should not be limited only to the models underpinned by the traditional approaches. SA must keep up with the global developments in relation to the use of the ANN

as mass valuation model. SA must also hasten to embrace the use of the ANN and other models that may be superior in accuracy. The South African courts must be made to reason the acceptability of models differently without compromising the accuracy of valuations. In the case of the use of the ANN, for instance, the courts must recognise that ultimate test for validity and reliability of model is fixed on the valuation accuracy proven against the market values.

5.2.2.7 Stakeholders consultation

Interviewees were asked to identify the potential stakeholders to be invited for consultation when developing a standard for mass valuation for SA. All interviewees agreed that the process of developing a valuation standard must be subject to adequate public participation in keeping with the principles of democracy.

PVG001 stated that:

> All stakeholders must be invited. This includes all in the profession, municipalities, business owners, property owners, civic organisations, the council and the OVG.

Consultations should also take the form of conversations and dialogue. PVG001 called for extensive consultations with: (1) voluntary associations representing valuers, especially municipal valuers and assistant valuers such as the SAIV and the BPVA; (2) SACPVP as a statutory professional body in South Africa; (3) organisations representing ratepayers and property owners; (4) municipalities; and (5) CoGTA.

PRE002 raised concerns around the way stakeholder consultation was handled in the process of developing the sMVPR. The comments by PRE002 are quoted as follows:

> In relation to the development of the standard now published by the SACPVP, consultations were a one-way communication stream. We were never informed if our views are acceptable or not.

PVG004 was even more concerned with the process leading to the development of the sMVPR. The major concern was that the municipal valuers who are responsible for big property portfolio such as CoJ, City of Cape Town and eThekwini, were not consulted during the development of the sMVPR. PVG004 is quoted as follows:

> The metropolitan municipalities such as the City of Johannesburg, City of Cape Town and eThekwini are responsible for the valuation and rating of properties in the excess of 600 000 properties, worth over R1 trillion rands in municipal taxes per annum. Yet, we were not consulted during the development of the standard [sMVPR]. How can they hope to define the standards without asking the clients, being the municipalities, what we think should be included in the standard? They should have involved the municipal valuers.

The stakeholders identified by the interviewees included the municipalities, the professional bodies, the valuation council, the owners of business properties, owners of residential properties, the voluntary associations of valuers, voluntary associations of property owners, and the members of the public. These stakeholders can be grouped into the following:

- The SACPVP
- SAIV
- Black Professional Valuers Association (BPVA)
- CoGTA
- Ratepayers' Associations

All the interviewees seemed to agree that there must be a consultation process which must be a two-way communication process characterised by dialogue. However, PVPS006 and PVPS007 advanced a strong argument for the exclusion of non-valuers from the process of developing the mass valuation standard. However, consideration with regard to the fact that the standards are a guideline for professional valuers in performing their valuation work, involving non-professionals in the development of the standard, may defeat the very intention of improving the quality of mass valuation.

5.3. ANALYSIS OF THE SURVEY DATA

5.3.1 Participants' Demographic Profile

In the South African context, the demographic profile of the participation of professionals is important owing to the injustices of the past and the current government agenda on transformation of all the facets of economic participation, especially in the real estate sector. The real estate transformation agenda refers to the quantitative and qualitative improvements of participation by women, youth and blacks in general in all the real estate sector's facets including professional real estate services. Property valuation is one of the professional services targeted. Beyond the research intent of this study, this section contributes to the economic transformation discourse by depicting the degree of participation by all the target demographic groups particularly in the mass property valuations aspect of real estate.

Table 5-2 depicts that more than 60% of the registered valuers are concentrated between the 35 to 54. At least 27 (15%) of the registered valuers represent new entrants to the valuation profession while the 23 (18%) in the last two classifications depict fewer valuers continuing with practice beyond retirement age.

Table 5-2: Respondents by Age

	Frequency	Percentage
< 25	0	0%
25 – 34	27	15%
35 – 44	50	38%
45 – 54	33	25%
55 – 64	18	14%
65<	5	4%
Total	133	100%

Table 5-3 shows that there more women valuers among the respondents. Eighty-one (62%) of the registered valuers included candidates and female professional associate valuers.

Table 5-3: Participants by Gender

	Frequency	Percentage
Male	50	38%
Female	81	62%
Total	131	100%

Overall, the statistics depicted in Table 5-2 and

Table 5-3 above, present a hopeful picture. It is a picture which is regarded as desirable in line with the SA's transformation agenda. This means that more youth and more women are becoming valuers even though some of the registered valuers may include candidate valuers. The results of the survey indicate that 30% of the participants are women and 60% are youth. This suggests that the valuation industry is embracing the country's transformation agenda. However, more relevant to the study is that the findings generated from the survey will remain prevalent for some time and are gender-biased.

5.3.2 Professional Profiles of the Participants

Table 5-4 shows that most of the respondents had an exposure to the GV and the supplementary valuation, 123 (93%) and 118 (89%) respectively. Fewer respondents (45; 34%) had exposure to company asset valuation. None of the participants indicated any other type of mass valuation, over and above the listed three types.

Table 5-4: Valuers' Mass valuation Exposure

	Frequency	Percentage
General Valuation	123	93%
Supplementary Valuation	118	89%
Company Asset Valuation	45	34%
Any Other	0	0%

Table 5-5 depicts that 93 (70%) participating valuers had been entrusted with the responsibility of a municipal valuer at least once in their valuation career. In terms of the MPRA, the municipal valuer is required to have 10 years' experience. It can,

thus, be assumed that these valuers had the necessary valuation experience. 108 (82%) of the respondents played a role as Assistant Valuers. In terms of the MPRA, valuers registered as either a candidate valuer, professional associate valuer or professional valuer, may take up the role of an assistant municipal valuer. The results also showed that 88 (67%) of the participants had played a role as data capturers or administrators at some point in the exposure to mass valuation. Only one respondent indicated having had exposure as model builder.

Table 5-5: Valuers' Past and Present Valuation Roles

	Frequency	Percentage
Municipal Valuer	93	70%
Assistant Municipal Valuer	108	82%
Data Capturer/ Administrator	88	67%
Project Manager	49	37%
Any Other	1	1%

The results in Table 5-6 depict that the participants are adequately and appropriately experienced to participate in the study. More than 80% of the participants had more than three years' experience. A total of 44 (33%) of the participants had 3 to 4 years' experience while 69 (52%) of the participants had more than 5 years' experience in valuation. This suggests that the participants understood the valuation problems and challenges.

Table 5-6: Valuers' Experience in Years

	Frequency	Percentage
<1	0	0%
1-2	19	14%
3-4	44	33%
5<	69	52%
Total	132	100%

While most participants, 60 (47%) of the participants, held a National Diploma in property valuation, there were several participants in possession of an honour's degree. This is consistent with the SA's historical past in relation to valuation education and training. The South African valuation education system mostly provides national diplomas. Honours degree and master's degrees are a new

development. Only 4% of the participants held a PhD in real estate or related fields at the time of the survey. Table 5-7 depicts the number of education qualifications held by the participants.

Table 5-7: Participants' Education Levels

	Frequency	Percentage
National Diploma	60	47%
Bachelor's Degree	16	10%
Honours Degree	37	29%
Master's Degree	10	8%
PhD/ Doctoral degree	5	4%
Any Other	1	1%
Total	129	100%

As per Table 5-8, a total of 122 (92%) of the respondents were registered with the statutory body, the SACPVP. The same valuers were also affiliated with voluntary associations such as the BPVA and the SAIV. Ninety-three (70%) of the participants were affiliated with the SAIV while 61 (46%) were affiliated with BPVA. Only 8 (6%) and 1 (1%) of the participants were registered with the international bodies, RICS and ASA respectively. In keeping with Ogunba (2004), the level of education of valuers in SA could be having a negative effect on the level of valuation inaccuracy.

Table 5-8: Participants' Professional Affiliation

	Frequency	**Percentage**
SACPVP	122	92%
BPVA	61	46%
SAIV	93	70%
RICS	8	6%
ASA	1	1%
Any Other	1	1%

Education, exposure and experience of the participants, suggest that the respondents were appropriate for the study because they had adequate mass valuation knowledge and expertise. The table also indicates that the participants are largely members of statutory and voluntary bodies. This means that they are professionally accountable for their decisions and opinions. As cautioned by

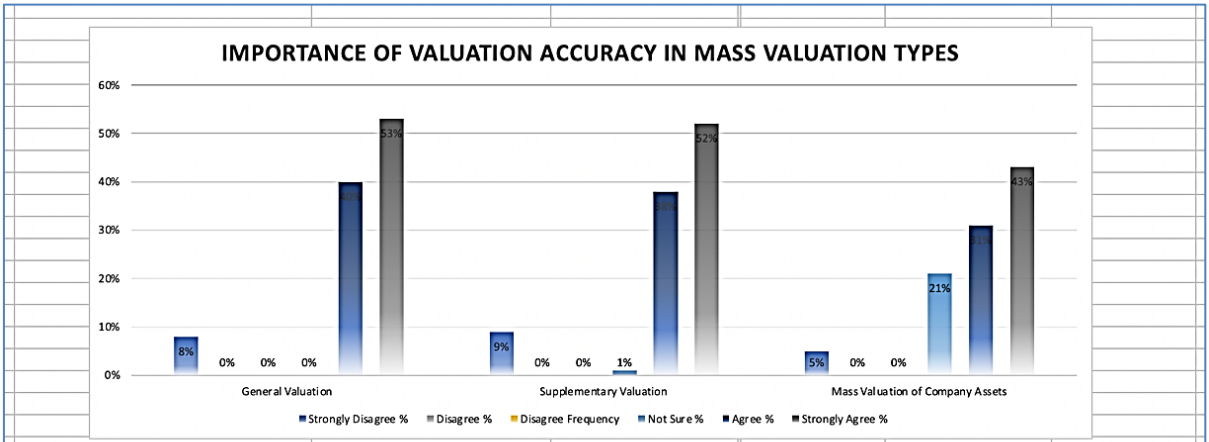
Ogunba (2004), the valuers in SA are registered with a statutory body as professionals. Therefore, this should mean professionalism and less of a negative impact relating to valuation accuracy.

5.3.3 Valuation Accuracy in South Africa

According to most respondents, valuation accuracy is very important for the purposes of mass valuation types including municipal valuation, supplementary valuation and valuation of company real estate. Most respondents believed that the level of valuation inaccuracy is very high in SA, especially with respect to mass valuation. The use of objections to assess the extent of inaccuracy was rejected by most respondents in favour of statistical analysis and independent valuation audits.

5.3.3.1 The importance of valuation accuracy in mass valuation

Figure 5-1 illustrates that a total of 121 (93%) of the 131 respondents were of the view that valuation accuracy is important in the context of municipal valuation rolls (GVs). Similarly, in the case of supplementary valuation rolls, a total of 117 (90%) respondents were convinced that valuation accuracy is important. Ninety-six (74%) respondents believed that valuation accuracy is important for company asset valuations. In short, an average of 86% respondents were of the view that valuation accuracy is very important for mass valuation. A total of 28 (7%) respondents were not sure about the importance of valuation accuracy, while 29 (7%) respondents were not convinced about the importance of valuation accuracy.



Mass Valuation Type	Strongly Disagree %	Disagree %	Not Sure %	Agree %	Strongly Agree %
General Valuation	8%	0%	0%	40%	53%
Supplementary Valuation	9%	0%	1%	38%	52%
Mass Valuation of Company Assets	5%	0%	21%	31%	43%

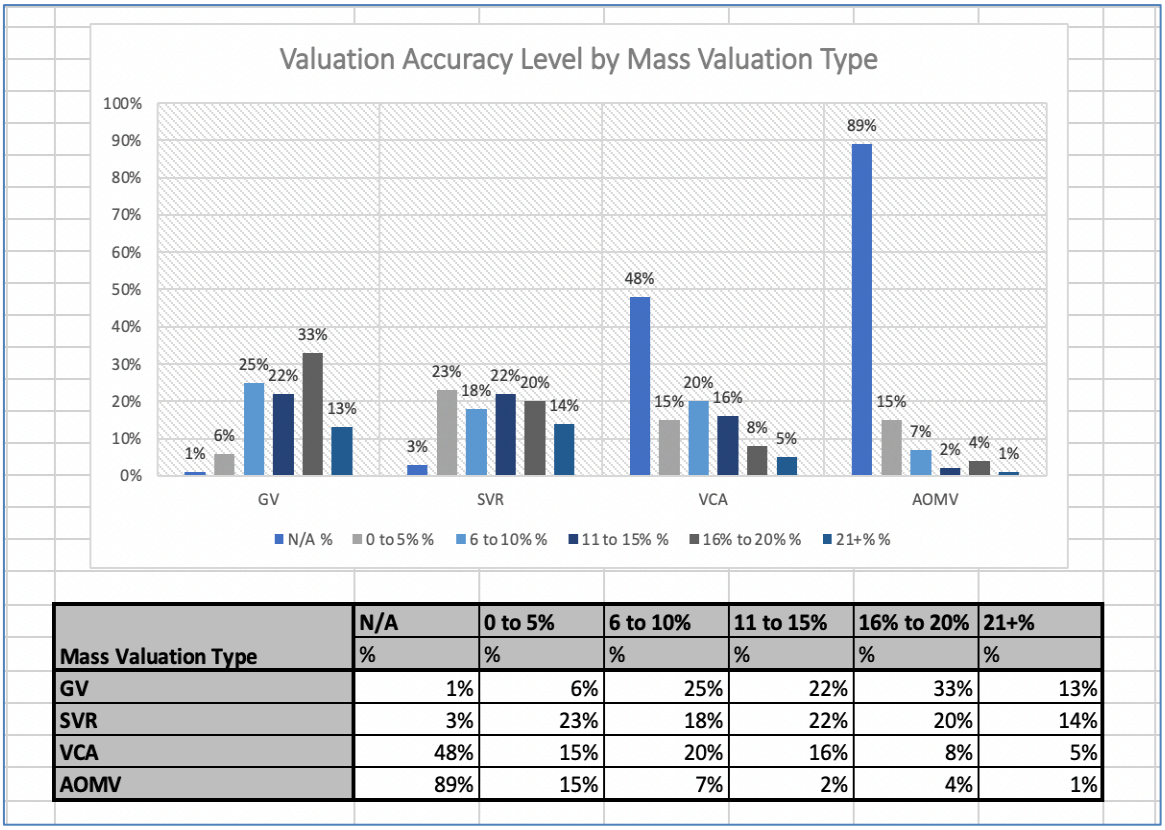
Figure 5-1: Valuation Accuracy in Mass Valuation

5.3.3.2 The extent of valuation inaccuracy in mass valuation in SA

According to the results in Figure 5-2, 90 (68%) of 132 respondents believed that the level of valuation inaccuracy with respect to the GVs can be estimated to be above 11%. These results are consistent with the norm established in the literature review, albeit too high. In relation to supplementary valuations, the critical mass representation of 74 (56%) of 132 respondents, were of the view that the valuation inaccuracy is above 11%. However, 42% of the 132 respondents held the view that valuation inaccuracy lies between 0% and 10%. Even though the scale tilts more to the higher side, the almost even split cannot be ignored. In relation to the mass valuation for company property, a total of 48 (37%) could not comment on the valuation accuracy in relation to the valuation of company real estate, because they were never involved in such mass valuation.

On the other hand, 37 (29%) of 132 respondents believed that valuation inaccuracy is greater than 11%. A total of 45 (35%) of the respondents, were of the view that valuation inaccuracy is between 0% and 10%. In relation to the any other valuation, 71% of the respondents reserved their opinions, while 28 (22%) of the respondents, suggested that valuation inaccuracy is on the lower side between 0 and 10%. Only 8 (7%) of the respondents suggested that valuation inaccuracy is

high (11% and above), even in other mass valuation. Figure 5-2 illustrates these results.



Mass Valuation Type	N/A %	0 to 5% %	6 to 10% %	11 to 15% %	16% to 20% %	21+% %
GV	1%	6%	25%	22%	33%	13%
SVR	3%	23%	18%	22%	20%	14%
VCA	48%	15%	20%	16%	8%	5%
AOMV	89%	15%	7%	2%	4%	1%

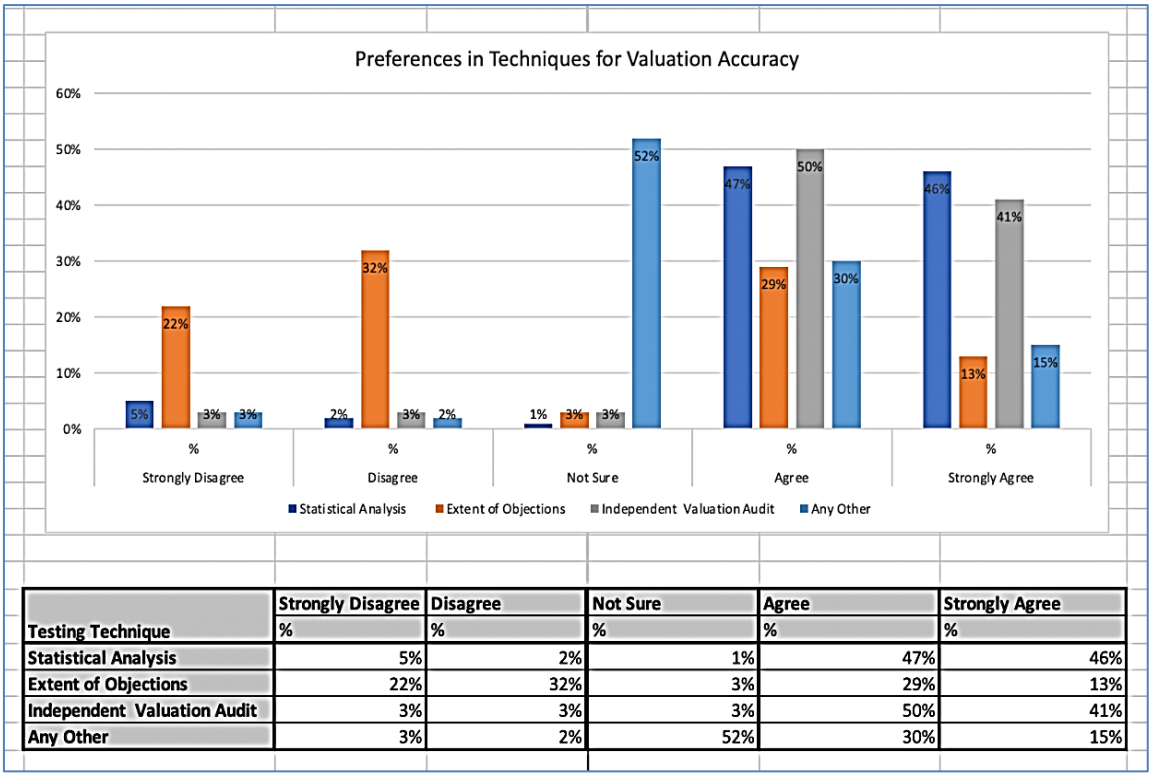
Figure 5-2: Valuation Accuracy by Mass Valuation Type

This means that most of the respondents were of the view that the levels of valuation inaccuracy in relation to the GVs and SVRs are too high. The figure depicts valuation inaccuracy in terms of the mass valuation types.

5.3.3.3 Preferred techniques for the assessment of valuation accuracy

Figure 5-3 depicts the results on the preferred techniques for assessing and testing valuation accuracy in mass valuation projects. Most respondents (95%) prefer the use of the statistical methods, including the MRA. It can be seen from the table and chart below, that 47% and 46% of the respondents agreed and strongly agreed respectively with the use of the statistical methods. This is followed by a total of 91% respondents, who also prefer an independent valuation audit. Some 50% and 41% agreed and strongly agreed respectively, with the use of an independent valuation audit. On the contrary, 54% of the respondents voted against the use of

the prevalence of valuation objections in the assessment of valuation accuracy in mass valuation. The respondents did not suggest any other method.



Testing Technique	Strongly Disagree %	Disagree %	Not Sure %	Agree %	Strongly Agree %
Statistical Analysis	5%	2%	1%	47%	46%
Extent of Objections	22%	32%	3%	29%	13%
Independent Valuation Audit	3%	3%	3%	50%	41%
Any Other	3%	2%	52%	30%	15%

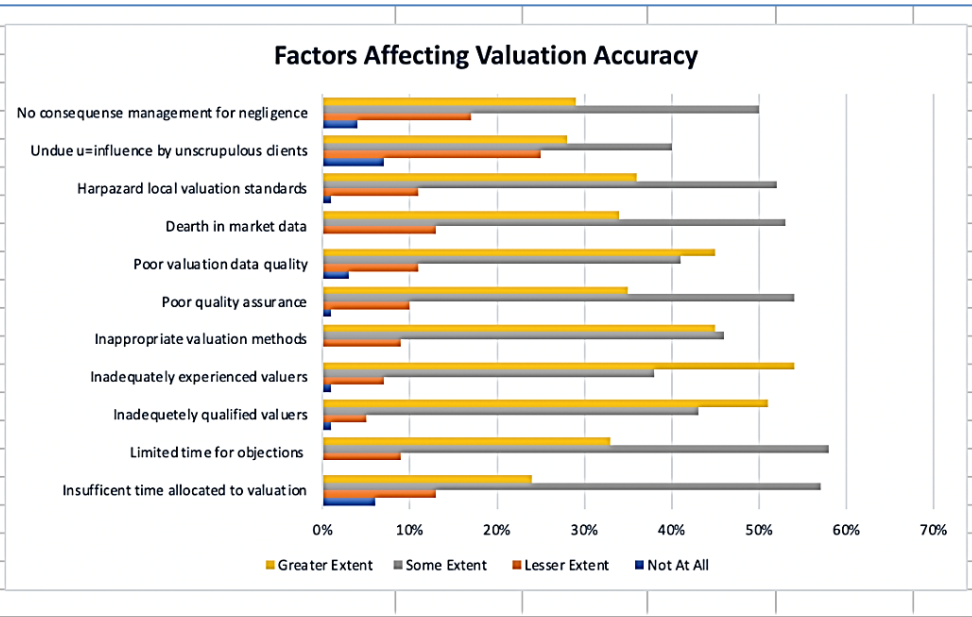
Figure 5-3: Valuation Techniques

These results are consistent with the literature review findings that there are generally increasing concerns about the accuracy of valuations, especially mass valuation and that the rate of valuation inaccuracy is alarmingly high with regard to mass valuation. During the one-on-one interviews, these results were predicted. One of the respondents argued that most respondents to the questionnaire would reject the use of the prevalence of objections because objections may not always be valid.

5.3.3.4 Factors/ challenges leading to mass valuation accuracy

The literature review identified 11 factors which are deemed to influence the accuracy of mass valuation. These factors were tested through the questionnaire survey. According to the results, most respondents were of the view that all the factors identified in the literature review, contributed to valuation accuracy in mass valuation. All the factors scored above 50 (40%) of the respondents who were of

the view that the factors had a meaningful influence on valuation accuracy, especially in mass valuation. Nine of the factors were affirmatively scored by over 100 (80%) of the respondents. Only two of the factors were scored by just under 100 (80%) of respondents, which suggests that there is some doubt with regard to the influence of the two factors i.e., undue influence by unscrupulous clients, and lack of consequence. Overall, the results, confirm the relevance of the factors in relation to the valuation accuracy. Figure 5-4, illustrates the scoring by the respondents.



Factors Affecting Valuation Accuracy	Not At All	Lesser Extent	Some Extent	Greater Extent	Total
Insufficent time allocated to valuation	6%	13%	57%	24%	100%
Limited time for objections	0%	9%	58%	33%	100%
Inadequetely qualified valuers	1%	5%	43%	51%	100%
Inadequately experienced valuers	1%	7%	38%	54%	100%
Inappropriate valuation methods	0%	9%	46%	45%	100%
Poor quality assurance	1%	10%	54%	35%	100%
Poor valuation data quality	3%	11%	41%	45%	100%
Dearth in market data	0%	13%	53%	34%	100%
Harpazard local valuation standards	1%	11%	52%	36%	100%
Undue u=influence by unscrupulous clients	7%	25%	40%	28%	100%
No consequense management for negligence	4%	17%	50%	29%	100%

Figure 5-4: Factors Affecting Valuation Accuracy

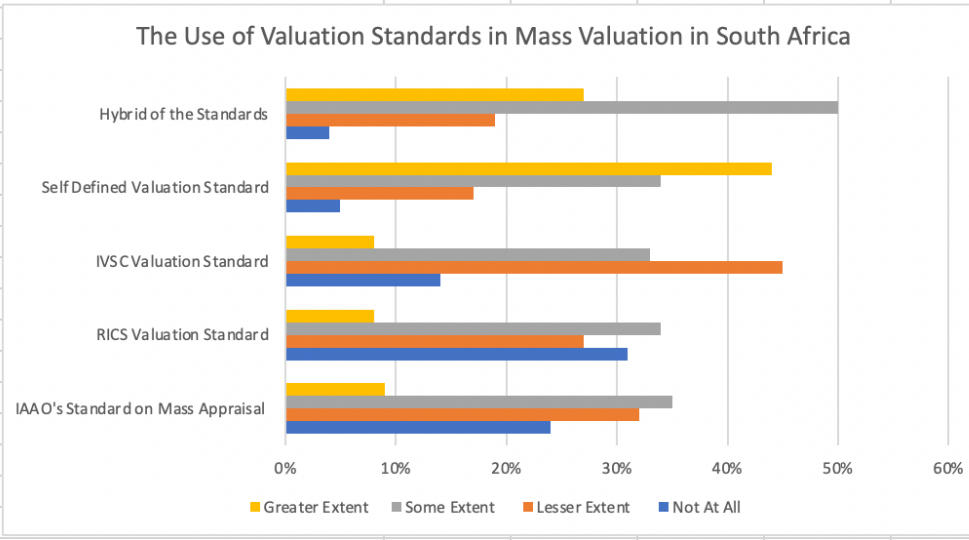
5.3.4 Valuation Standards in South Africa's Mass Valuation

As indicated in the literature review, there are various valuation standards in the market. This includes the standards by international organisations such as the

IAAO, RICS and IVSC. The research sought to establish the standards that were utilised by the valuers in SA, especially during mass valuation.

5.3.4.1 Valuation standards used in mass valuation in SA

The results in Figure 5-5 suggest that most participants indicated that in their roles in the mass valuation projects, they do not use any specific standard. About 87% of the respondents indicated that they either made use of self-defined standards or a hybrid of standards to some extent. On the contrary, the IAAO, RICS and IVSC, the standard only scored respectively 44%, 42% and 41% to the affirmative. Some respondents suggested that they make use of the international standards including the IAAO, IVSC and the RICS at an average of 42% per standard.



Factors Affecting Valuation Accuracy	Not At All	Lesser Exten	Some Extent	Greater Exte	Total
IAAO's Standard on Mass Appraisal	24%	32%	35%	9%	100%
RICS Valuation Standard	31%	27%	34%	8%	100%
IVSC Valuation Standard	14%	45%	33%	8%	100%
Self Defined Valuation Standard	5%	17%	34%	44%	100%
Hybrid of the Standards	4%	19%	50%	27%	100%

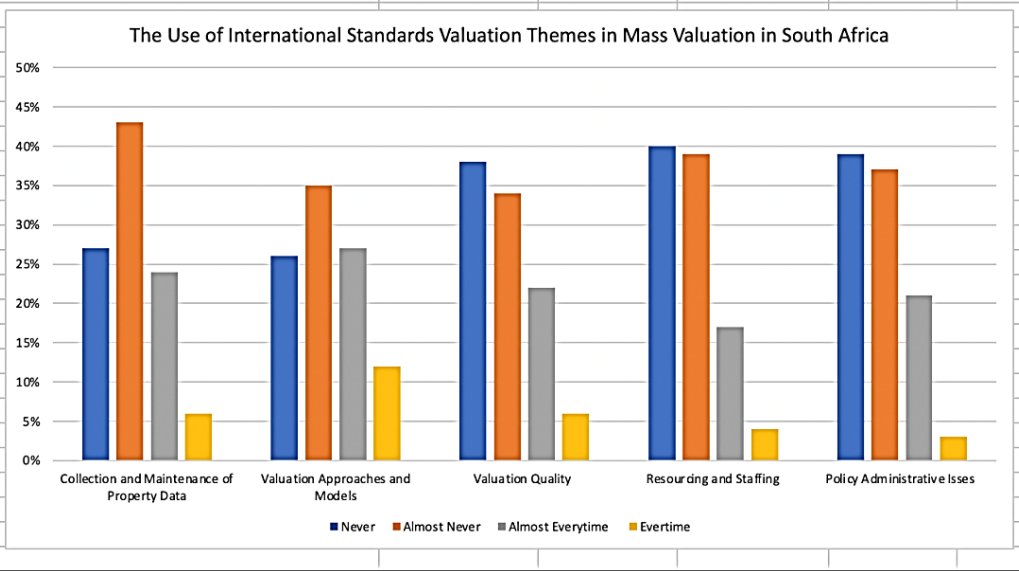
Figure 5-5: The Use of Mass valuation standard in SA

5.3.4.2 Mostly used international valuation standards themes

In terms of Figure 5-6, a few of respondents believed that the themes found in the international mass valuation including, the collection and maintenance of property data, valuation approaches and methods, valuation quality assurance, resourcing

and staffing, and policy administrative issues, are ever used in mass valuation in SA.

On the one hand, an average of 34% respondents believed that the five themes drawn from international standards are never used at all during mass valuation in SA. An average of 37% of the respondents believed the themes are almost never used. On the other hand, an average of 27% of the respondents were of the view that these themes are used almost every time during mass valuation. An average of 6% of the respondents believed that the themes are always used. These have huge implications for the study in that the themes are viewed by many in the industry as embracing all the concerns attributed to valuation inaccuracy and objections in SA.



Factors Affecting Valuation Accuracy	Never	Almost Never	Almost Everytime	Evertime	Total
Collection and Maintenance of Property Data	27%	43%	24%	6%	100%
Valuation Approaches and Models	26%	35%	27%	12%	100%
Valuation Quality	38%	34%	22%	6%	100%
Resourcing and Staffing	40%	39%	17%	4%	100%
Policy Administrative Isses	39%	37%	21%	3%	100%
Any other	0	0	0	0	0

Figure 5-6: Themes for a Mass valuation Standard in SA

Most of the participants believed the themes are not used in the mass valuation in SA. The implication of not using the themes suggests that at least through an international lens, the mass valuation projects in SA do not produce valid and

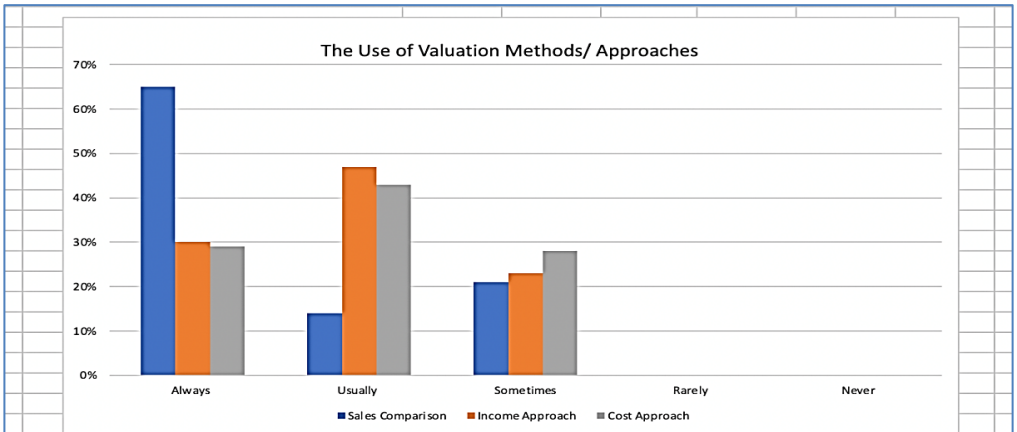
reliable values. It also explains the debate on the accuracy of the municipal valuation rolls as evidenced in the results of the preliminary interviews.

5.3.5 Mass Valuation Approaches

There are a more than three valuation approaches used for valuation. It was, however, found in the literature review, that in the case of SA, only three approaches, including sales comparison, income and cost approaches are considered as traditional valuation approaches. These three approaches are also used as the basis for mass valuation in SA.

5.3.5.1 The use of traditional valuation approaches/ models

The results in Figure 5-7 reveal that 65% of the respondents believed that the sales comparison was always used, while none of the respondents thought it was never used. Respectively, 47% and 43% of the respondents believe that the income and cost approaches are usually used in mass valuation. None of the respondents introduced any other valuation approach. These results confirm the findings in the literature review that South African valuation fraternity still relies on the traditional valuation approaches.



Factors Affecting Valuation Accuracy	Always	Usually	Sometimes	Rarely	Never	Total
Sales Comparison	65%	14%	21%	0%	0%	100%
Income Approach	30%	47%	23%	0%	0%	100%
Cost Approach	29%	43%	28%	0%	0%	100%

Figure 5-7: Valuation Methods and Mass Valuation in SA

The implications for the study relate to framework recommendations on the standard required to guide the use of valuation approaches, especially in the South

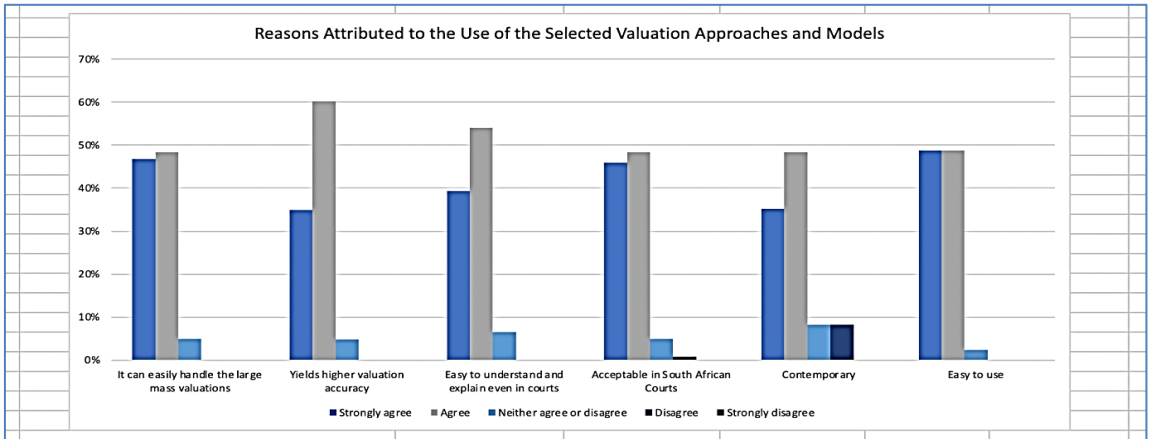
African context. This responds to the question raised in the literature review on whether SA uses the five methods or the three traditional methods.

5.3.5.2 The use of mass valuation models in South Africa

The results show that most respondents, over 92% of the respondents were of the view that the MRA is mostly used in mass valuation in SA. An even greater number of respondents, at 96% believed that CAMA is also mostly used in mass valuation. An almost equal number of respondents held the view that the ANN, Spatial Analysis Model and the FL are never used in SA. This was 70%, 59% and 64% respectively. A very small number of respondents, about 14%, 18% and 16% of the respondents respectively suggested that the ANN, the spatial analysis model and the FL are used in SA. From the interviews, this was proven to be inaccurate especially because of the acceptability of the models in South African courts.

5.3.5.3 Reasons cited for the use of the valuation approaches and the models

The results depicted in Figure 5-8 show that 93% of the respondents confirmed that the reasons for the preference and use of the traditional valuation approaches and mass valuation models, were indeed correct. In fact, the top three reasons, at 98%, 95% and 95%, relate to the ease of use, ease at which large data is handled, and higher degree of accuracy respectively. The fourth reason is because of the acceptance of the approaches and models in the South African courts.



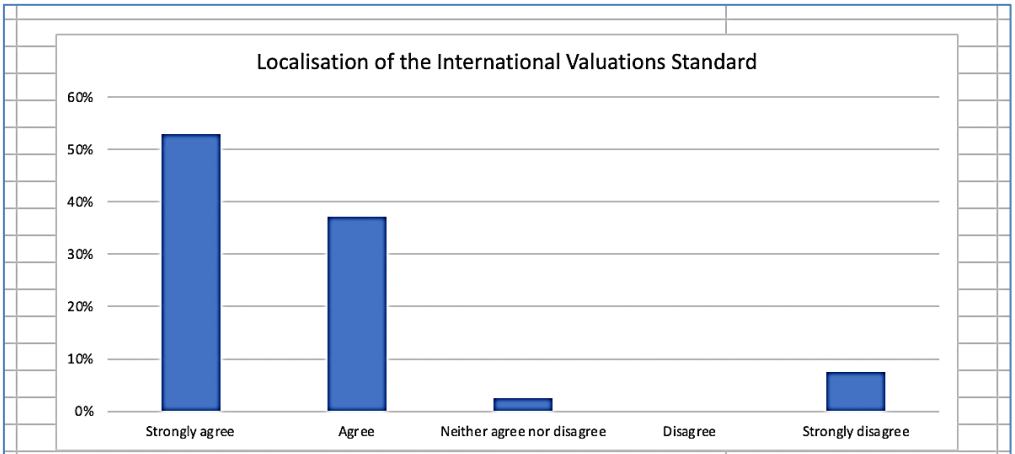
	Strongly agree	Agree	either agree or disagr	Disagree	Strongly disagree
It can easily handle the large mass valuations	47%	48%	5%	0%	0%
Yields higher valuation accuracy	35%	60%	5%	0%	0%
Easy to understand and explain even in courts	39%	54%	7%	0%	0%
Acceptable in South African Courts	46%	48%	5%	1%	0%
Contemporary	35%	48%	8%	8%	0%
Easy to use	49%	49%	2%	0%	0%

Figure 5-8: Reasons for the Use of Valuation Approaches

5.3.6 Framework for Mass Valuation Standard in South Africa

5.3.6.1 The need to localise international standards.

Throughout the study, especially the interviews, a perennial question arose as to whether it was necessary to reinvent the wheel when there was already an existing international standard on mass valuation especially the IAAO's standard on mass appraisal of real property. The results in Figure 5-9 show that over 90% of the respondents were of the view that the international standard should be localised. Only 7.4% of the respondents strongly disagreed with the localisation of the standard.



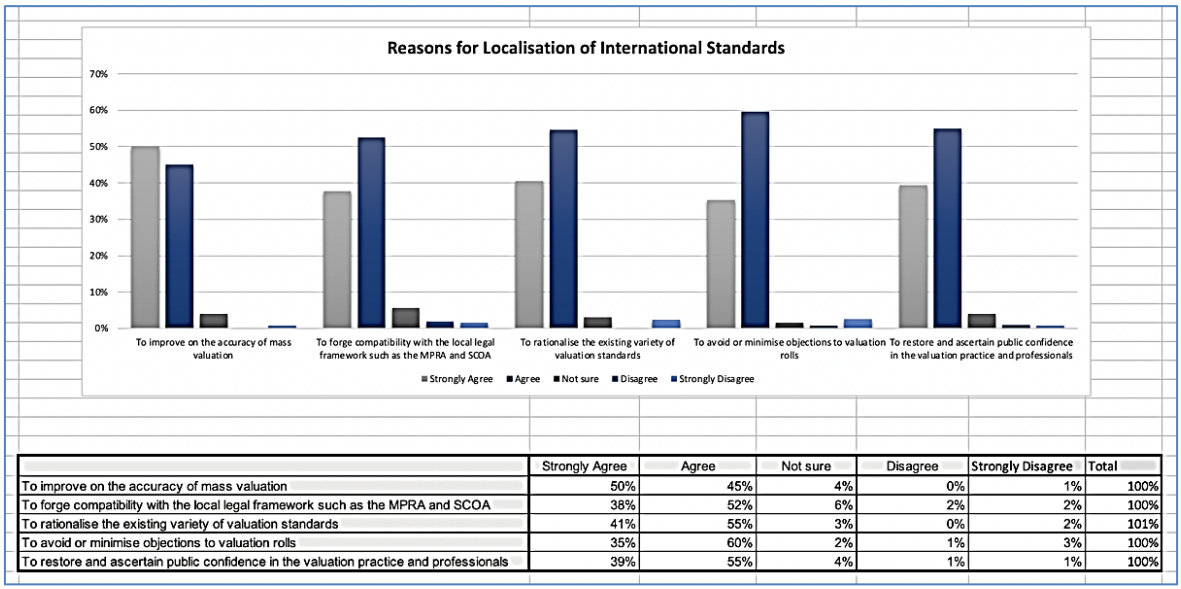
Strongly agree	53%
Agree	37%
Neither agree nor disagree	2%
Disagree	0%
Strongly disagree	7%

Figure 5-9: Localisation of International Valuation Standards

5.3.7.2 The reasons for localisation international standards

Figure 5-9 illustrates the survey results, which suggest that there primarily five reasons as to why must the mass valuation standard must be localised. These reasons include; 1) rationalisation of a variety of valuation standard; 2) the need to improve on valuation accuracy; 3) improving public confidence in valuations and valuers; 4) to foster the compatibility of the international standard with the local

legal framework; and 5) to minimise objections to the valuation rolls. The results of the study suggest the rationalisation of a variety of standards in existence. This is, in fact, the main reason for localisation of international standards. This reason was preferred by 96% of the respondents. This is followed by 95% of the respondents suggesting that localisation is needed to improve valuation accuracy. Almost 94% of the respondents also preferred localisation because of the need to restore confidence in the valuation process as well as the valuers as professionals.

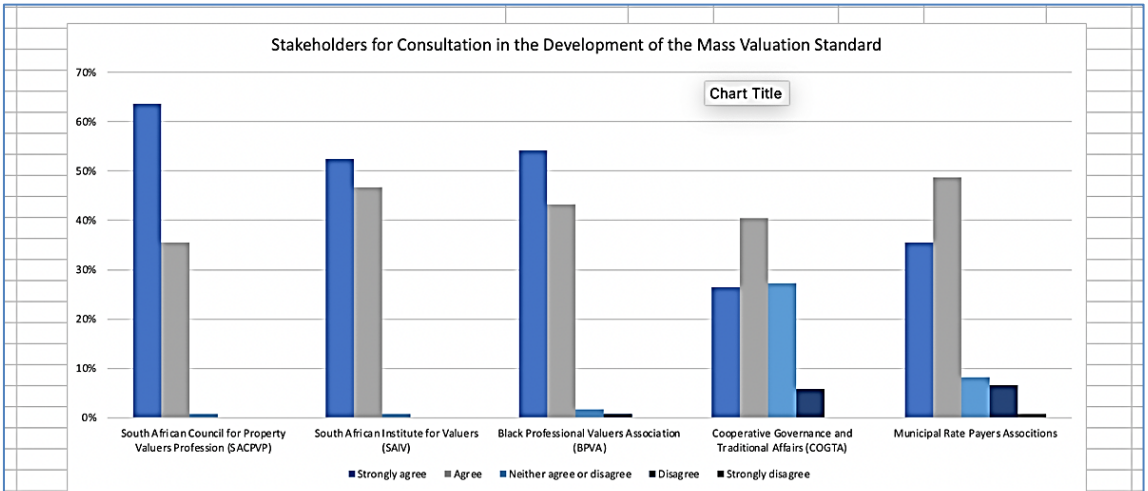


	Strongly Agree	Agree	Not sure	Disagree	Strongly Disagree	Total
To improve on the accuracy of mass valuation	50%	45%	4%	0%	1%	100%
To forge compatibility with the local legal framework such as the MPRA and SCOA	38%	52%	6%	2%	2%	100%
To rationalise the existing variety of valuation standards	41%	55%	3%	0%	2%	101%
To avoid or minimise objections to valuation rolls	35%	60%	2%	1%	3%	100%
To restore and ascertain public confidence in the valuation practice and professionals	39%	55%	4%	1%	1%	100%

Figure 5-10: Reasons for Standards Localisation

5.3.7.3 Stakeholder involvement and consultation

As illustrated in Figure 5-11, about 64% of the respondent agreed that the SACPVP must be involved in the development of the mass valuation standard. This affirmation is followed by 54% of the respondents affirming the BPVA's requirement in the consultation process. A total of 52% of the respondents believed that the SAIV should also be involved in the consultation processes. Although the involvement of CoGTA and ratepayers' associations was the least acknowledged by respondents, over 60% of the respondents still emphasised their involvement.



	Strongly agree	Agree	ither agree or disag	Disagree	Strongly disagree	Total
South African Council for Property Valuers Profession (SACPVP)	64%	36%	1%	0%	0%	100%
South African Institute for Valuers (SAIV)	52%	47%	1%	0%	0%	100%
Black Professional Valuers Association (BPVA)	54%	43%	2%	1%	0%	100%
Cooperative Governance and Traditional Affairs (COGTA)	26%	41%	27%	6%	0%	100%
Municipal Rate Payers Associtions	36%	49%	8%	7%	1%	100%

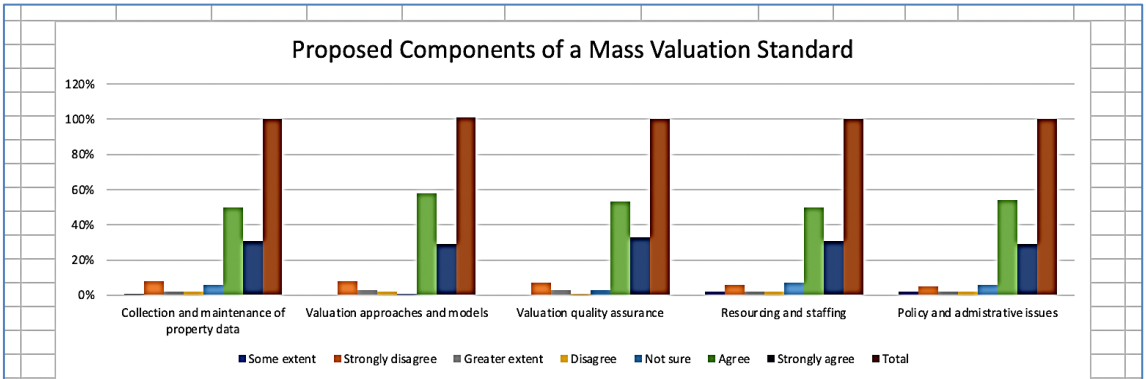
Figure 5-11: Stakeholders in the Development of Mass valuation standard

5.3.7.4 Mass valuation standard thematic areas

The survey also sought to establish an indication of the structure of the mass valuation standard for SA. According to the respondents, the thematic areas of the standard should consist of the following five themes:

- Collection and maintenance of property data,
- Valuation approaches and models,
- Valuation quality assurance,
- Resourcing and staffing, and
- Policy and administrative issues.

Figure 5-12 depicts that 84% of the respondents agreed that the five themes must be included in the mass valuation standard for SA. These thematic areas were identified from the standard on mass appraisal of real property.



	Some extent	Strongly disagree	Greater extent	Disagree	Not sure	Agree	Strongly agree	Total
Collection and maintenance of property data	1%	8%	2%	2%	6%	50%	31%	100%
Valuation approaches and models	0%	8%	3%	2%	1%	58%	29%	101%
Valuation quality assurance	0%	7%	3%	1%	3%	53%	33%	100%
Resourcing and staffing	2%	6%	2%	2%	7%	50%	31%	100%
Policy and admistrative issues	2%	5%	2%	2%	6%	54%	29%	100%

Figure 5-12: Proposed Mass Valuation Standard Components

5.4. THE ACCURACY AND UNIFORMITY TESTS – CoJ VALUATION ROLL

5.4.1 Description of the Study Area

The study area is defined as the all the neighbourhoods within the CoJ. It is flanked by the City of Tshwane to the North, Sedibeng District Municipality to the South, Ekurhuleni (former East Rand) to the East and West Rand to the west. Figure 5-13 is a regional map showing CoJ in relation to other regions in the Gauteng province.

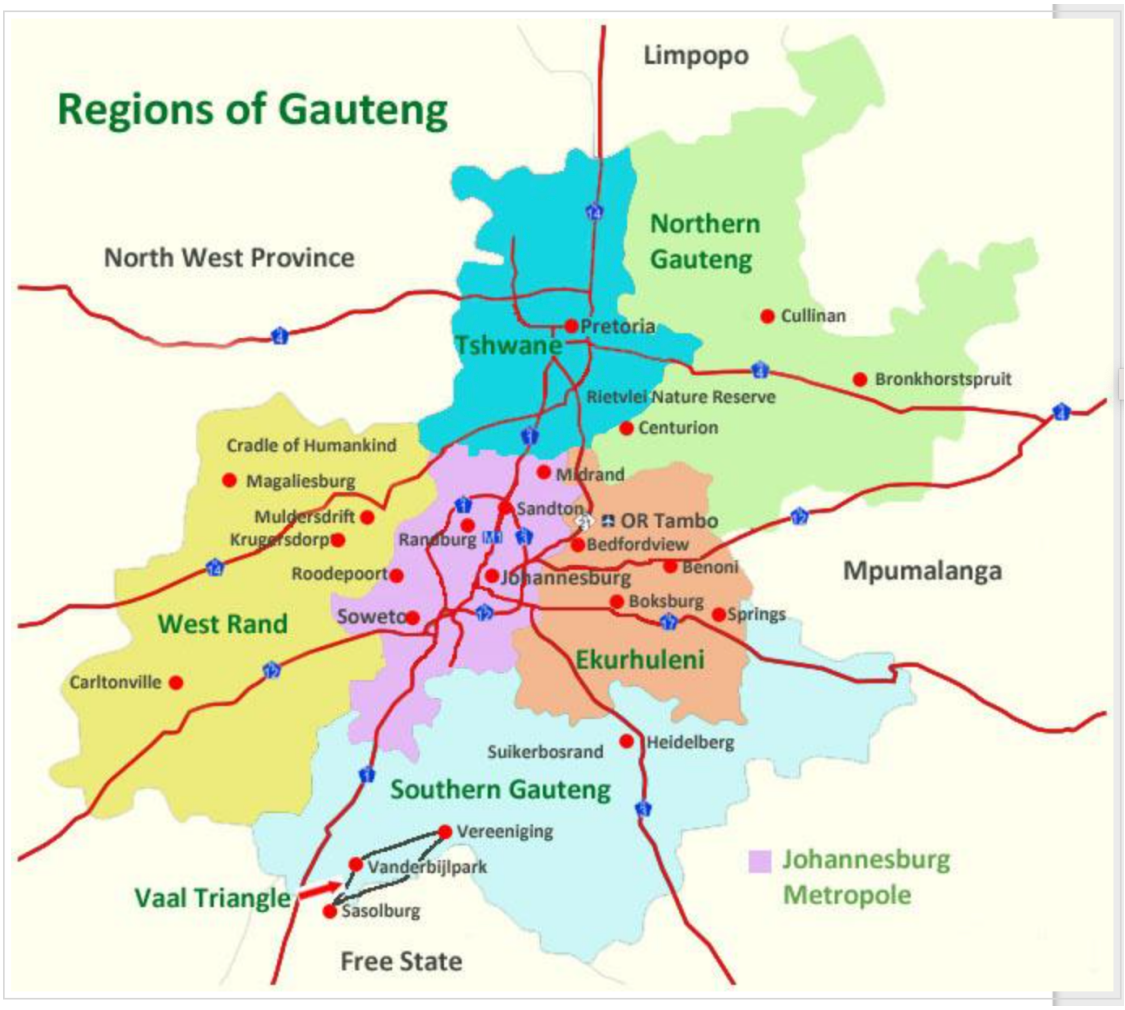


Figure 5-13: Gauteng Regional Map

Source: CoJ (2022)

The study area, CoJ is constituted of 18 neighbourhoods including Soweto, Midrand, Sandton, Roodepoort, Orange Farm, Johannesburg South, Johannesburg North, Johannesburg Central, Ennerdale, Lenasia, Lenasia South, City Deep, Randburg, Alexandria, Modderfontein, Ivory Park, Lanseria and Diepsloot. CoJ is located at the centre of Gauteng. The following map in Figure 5-14 depicts the CoJ in its entirety, divided into 18 neighbourhoods.

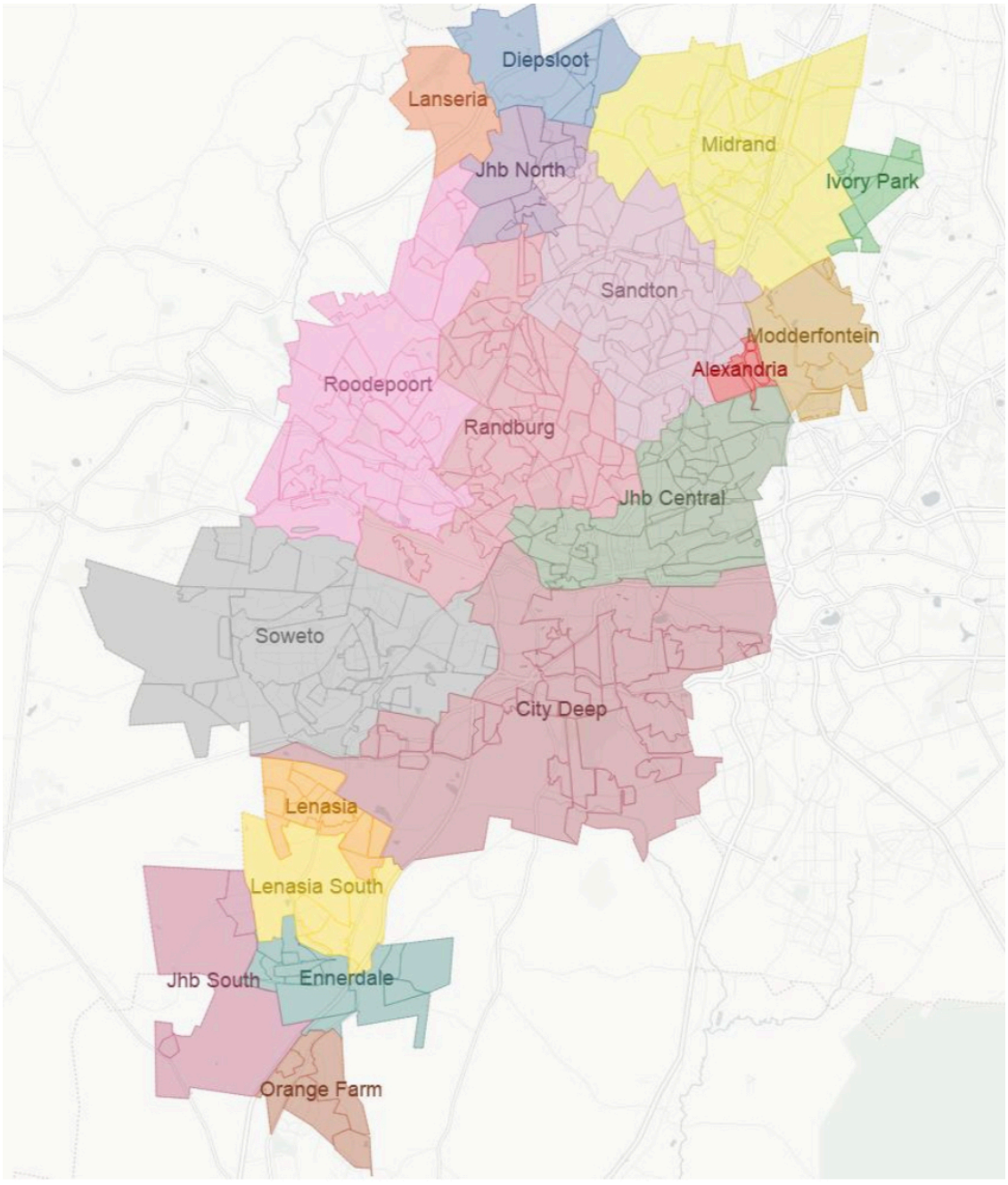


Figure 5-14: City of Johannesburg

Source: CoJ (2022)

The apartheid spatial patterns are well manifested in the property prices in the CoJ. It is important to note this aspect, because it has a direct bearing on the property prices and municipal taxation. In SA, including the CoJ, property prices reflect the income and poverty levels, which are largely expressed along racial lines. For example, prices in Soweto, Orange Farm and Soweto, which are largely black

neighbourhoods, are far lower than the property prices in Sandton, Randburg and Johannesburg North, which are all largely white neighbourhoods.

However, there is a growing trend about high-value properties in the former black townships. If not carefully assessed, the municipality may lose out on taxation. Hence, testing for uniformity becomes critical to ensure that appropriate municipal property taxation is imposed on all property owners.

5.4.2 Summary of Sample Data Statistics

The summary statistics in Table 5-1 depict that the study area accounts for a total 758 998 properties and 88 653 sales. These statistics are further divided according to property classifications, which include residential, agricultural, commercial, industrial, sectional titles and vacant land. The respective assessed properties and sales are depicted in the table.

The table further depicts the averages of sales and assessment value per property at R1 467 000 and R1 427 000 respectively. This is against the backdrop that the total SP and total assessment value, for the entire study area are estimated at R126 479 738 000 and R130 010 841 000 respectively. This suggests a healthy contribution to the balance sheet of the city.

Table 5-9 also illustrates the calculated values for the statistical measures of valuation accuracy and uniformity. The first group depicts the test results for the ASR, PRD, PRB and COD. The last batch provides the values for RMSE and the MAPE. All these statistics are discussed in this section.

Table 5-9: Summary of Statistical Tests for CoJ Sample Data

Statistic	All Properties	Residential	Sectional Titles	Agricultural	Commercial	Industrial	Vacant Res. Land
Sales (sample observed)	88 653	39 482	46 529	567	681	57	1 337
Sales date period	July 2014 to June 2017	July 2014 to June 2017	July 2014 to June 2017	July 2014 to June 2017	July 2014 to June 2017	July 2014 to June 2017	July 2014 to June 2017
Sales date range	36 Months	36 Months	36 Months	36 Months	36 Months	36 Months	36 Months
Total sales price	R126 479 738 000	R70 885 283 000	R46 039 367 000	R1 818 215 000	R4 964 112 000	R587 256 000	R2 185 505 000
Total assessment value	R130 010 841 000	R71 540 700 000	R47 888 061 000	R1 971 707 000	R5 721 712 000	R700 261 000	R2 188 400 000
Average assessment value	R1 427 000	R1 795 000	R989 000	R3 207 000	R7 289 000	R10 303 000	R1 635 000
Average sales price	R1 467 000	R1 812 000	R1 029 000	R3 477 000	R8 402 000	R12 285 000	R1 637 000
ASR(median)	0,97	0.98	0,965	0,967	0,92	0,817	0,969
Price-Related Differential (PRD)	1,022	1,032	1,011	1,042	1,121	1,003	0,995
Price-Related Bias (PRB)	-0,01	-0,024	-0,009	-0,024	-0,035	0,047	0,02
COD	9,60%	1,14%	0,70%	1,90%	3,40%	3,30%	1,40%

5.4.2 The Results

This study used statistical analysis (largely ratio analysis) to assess accuracy and uniformity in relation to the 2018 valuation roll also known as a GV of the CoJ (2018). This entails the determination of ASR, the COD, PRD, RMSE and the MAPE. The use of ratio analysis in this study was faced with limitations in relation to the non-residential properties such as industrial, commercial, and special properties. This is because of the heterogeneous features prevalent in non-residential properties, including the sample sizes, which are smaller for non-residential compared to the residential properties.

5.4.2.1 Assessment-sales ratio (ASR) results

In the case of all the properties, the ASR for the entire study areas is found to be 0.97. The ASR scores for each property classes is scored at 0.98; 0.97; 0.97; 0.92; 0.82; and 0.97 for residential, sectional titles, agricultural, commercial, industrial and vacant residential respectively. The ASR results are depicted in Table 5-9. For all the property classes except for the industrial class, the ASR results are found to be within the IAAO standard parameters of 0.90 and 1.10, implying that the values in the Johannesburg data comply with best practice.

As indicated before, an ASR score lower than 1 indicates overvaluation, whilst a score more than 1 indicates undervaluation. The results indicate a good degree of vertical equity and accuracy, in terms of the standard. Noteworthy, is the residential class scoring– that made it at exactly 0.98, which depicts a more acceptable degree of valuation accuracy from a vertical equity perspective. The residential class is the most dominant class in municipal assessments, including the CoJ's assessment. Thus requiring a careful attention.

5.4.2.2 Price-related differential (PRD)

The PRD for all the properties is found to be 1,022. Disaggregated into property classes, the PRD scores are 1.032; 1.011; 1.042; 1.121; 1.003; and 0.995 for residential, sectional titles, agricultural, commercial, industrial and vacant residential respectively. Assessed against the IAAO standard parameters for the

PRD set between 0.98 and 1.03, the overall results are well within the parameters of acceptability. Similar to the above, there are issues in the residential class that show slight regressivity. The rest of the classes are found to be well within the acceptable parameters. These results, apart from the residential class, indicate vertical equity in the assessment values.

5.4.2.3 Price-related bias (PRB)

For the overall study, the PRB is found to be negative at -0.01. This result is also consistent with the PRB for most neighbourhoods scoring negative values. It is only in the case of industrial and vacant residential land assessments, where the PRB was found to be positive. The observation of the PRB results as depicted in Table 5-9 suggest that for most of the property classes, there was some degree of under-valuation, albeit very small.

5.4.2.4 The Coefficient of Dispersion (COD)

As per Table 5-9, the study found that the COD for the overall study area is 1.4%. Measured against the IAAO standards of a maximum of 20% for residential and 30% for commercial, the residential property class has a COD of 1.14% while the commercial class is found to be 3.4%. This is relatively low compared to the set IAAO standard. For the other classes, are equally very low at no more than 2%. With the COD found to be lower than 20% in all spatial levels, it can be said that the results suggest a very low variations in the assessment values. This statistic suggests a good horizontal equity.

5.4.2.5 Cross neighbourhood evaluation

In this section, the statistical measures including the ASR, PRD, PRB and COD for each neighbourhood are cross compared with the intention to paint a clearer picture. This comparison provides better understanding of their spatial impact, further clarifying the aspect of horizontal equity. All 18 neighbourhoods were subjected to the assessment. The results are summarised in Table 5-10 which depicts the evaluation of the assessment values by neighbourhood.

Table 5-10: IAAO Statistical Measures by Neighbourhood

Neighbourhood	Properties	ASR	PRB	PRD	COD
City Deep	103	0,98	-0,02	1,09	0,18
Diepsloot	9	0,54	0,33	0,63	0,74
Ennerdale	16	0,99	0,07	0,96	0,1
Ivory Park	1	0,99	-	1	0
JHB Central	95	0,94	0,02	1	0,17
JHB North	210	0,98	-0,01	1	0,08
Lenasia	29	0,94	0,13	0,98	0,17
Lenasia South	48	0,98	0,1	1,01	0,18
Midrand	194	0,95	0,04	0,98	0,1
Modderfontein	18	0,94	-0,06	1,01	0,06
Orange Farm	4	1,12	0,02	0,91	0,14
Randburg	89	0,98	0,06	0,97	0,13
Roodepoort	147	0,97	0,04	0,99	0,14
Sandton	336	0,98	0,05	0,99	0,16
Soweto	38	0,99	0,02	1,05	0,24

According to the results depicted in Table 5-10 above; all the neighbourhoods except Diepsloot and Orange Farm, scored well within the set parameters of acceptability in relation to ASR. However, they indicate a small degree of over-valuation. Diepsloot and Orange Farm are on the opposite side of the continuum, with the former depicting extreme over-valuation and the latter depicting under-valuation. In relation to PRD, only City Deep and Soweto indicate regressivity while, Diepsloot and Orange Farm indicate progressivity. The rest of the neighbourhoods are within the set parameters of acceptability.

Regarding the PRB, it is only City deep, JHB North and Modderfontein who scored negative values. The rest of the neighbourhoods were found to be positive. This result confirms the predominance of under-valuation, albeit not excessive. For the COD, all neighbourhoods except for two, scored below 20%. Soweto and Diepsloot scored at 24% and 74% respectively. This suggests that in all other neighbourhoods, except for Soweto and Diepsloot there is positive horizontal equity.

In addition to the IAAO statistical measures, the assessment of the data for RMSE and the MAPE, across property classes, yielded the results presented in Table 5-11.

Table 5-11: Additional Statistical Measures

Neighbourhood	All properties	Residential	Sectional Title	Agricultural	Commercial	Industrial	Vacant Land
RMSE	R40 000	R17 000	R40 000	R270 000	R1 113 000	R1 982 000	R2 000
MAPE (%)	2.727	0.938	3.887	7.765	13.247	16.133	0.122

5.4.2.6 RMSE

The RMSE measurement tells us about the average magnitude of errors between the predicted values and the actual values, taking into account both the size and direction of the errors. It can be observed from Table 5-11, that for the entire study area, the standard deviation of the residuals (prediction errors), otherwise known as the RMSE, was found to be R40 000. The industrial properties are the most undervalued at R1 982 000, followed by the commercial and agriculture properties at R1 113 000 and R 270 000 respectively.

These RMSE results suggest that there is a small degree of inaccuracy in relation to the assessment values. A further reading and analysis of the RMSE results read together with the ASR results which are all below one (1), show that the difference actually represents an under-valuation. Evidently the deviation in the case of commercial properties is too vast, while it is found to be insignificant in the case of vacant land. Even though there is no standard prescribing the acceptable RMSE, the overall impact of such under-valuation as in the results could have a negative impact on municipal revenue.

5.4.2.7 MAPE.

Table 5-11, also depicts the MAPE results in terms of property classes. MAPE measures the average absolute difference between the predicted values and the actual values, relative to the actual values. It indicates the average relative error in terms of percentage. Due to the lack of standards, these results were judged in accordance with the Table 4-4, which was invented by Lewis (1982). Regarding the

MAPE, Table 5-11, it can be observed that the MAPE was found to be in the category of “highly accurate” at 2,73%, for the entire study area.

When disaggregated into neighbourhoods, the MAPE was found to be ranging between good and highly accurate forecasting. In the case of vacant land and residential, it was found to be lowest at 0,1%, 0,9%, respectively. On the other hand, the MAPE was calculated as at good forecasting at 16,1% and 13,2% for Industrial and commercial property respectively. This implies that the value estimates are generally not accurate but reasonable considering the constraints faced by valuers such as time and costs.

The results from the statistical assessment suggest that the CoJ’s 2018 GV, managed to attain a fair degree of accuracy and uniformity. However, there is room for improvement in so far as under-valuation is concerned. albeit insignificant and acceptable in terms of the IAAO standards, there is some degree of inaccuracy and inconsistency in relation to the CoJ’s 2018 valuation roll. The results also indicate that there are more undervalued than the overvalued properties in the sample. The real concern remains the impact of under-valuation on the property rates and taxes (the ultimate rands and cents) due and collectable by the municipality. The reality is that the municipality will forfeit some significant income that could be used in service delivery.

Furthermore, the results infer that the accuracy levels yielded by the model used for mass valuation in CoJ can be improved. This implies a risk of revenue loss for the municipality. It is therefore imperative for the city to carefully consider interventions that can improve valuation accuracy in the future. The city may also have to closely monitor the property sales in areas such as Soweto and Diepsloot.

5.5 RESULTS DISCUSSION AND INTEGRATION

5.5.1 Valuation Inaccuracy and Uniformity in South Africa

Albeit the fact that some of the studies conducted in the past were on the valuation conducted on single property valuations, the results have some bearing to mass valuation. The findings in the literature review revealed that the debate on valuation

inaccuracy has been in existence, at least for the past 20 years, in the developed countries such as the UK, United States, Canada, and Australia (Ogunba, 2004; Brown and Matysiak, 2000).

According to Ogunba (2004), there were numerous studies conducted on valuation accuracy and inconsistency. The findings of these studies suggest that valuation inaccuracy has always been a perennial problem. It existed in valuations in all countries including the developed countries. It was found to be even worse, in the developing countries such as Nigeria and Taiwan. The degree of valuations inaccuracy was generally found to ranging at anything between 10% and 20%. It is preferred that level of valuation inaccuracy be set at 5% to 10%. For the mass valuation, valuation inaccuracy is determined to be at anything between 15% and 25%. It is further recommended that at least 90% of the properties under consideration must meet this requirement.

The empirical studies including the interviews and the survey glean more towards the global picture painted in the literature review. It suggests that SA is not immune from the global challenges relating to valuation accuracy and uniformity. The results from the interviews depict that the interviewees are in fact aware of the existence of valuation inaccuracy as well as uniformity challenges in mass valuation in SA. Although there have never been studies establishing the existence, the extent and causal of mass valuation inaccuracy in SA, the results interviewees, suggest that there is a perception in confirmation of the existence of such a scourge.

This assertion was confirmed by the results from the survey. In enhancing this finding, the survey results suggest that 68% of the respondents believe that believe that the level of valuation inaccuracy can be estimated at least 11% and higher. This is rather too high when juxtaposed against to the international standards. It is also a challenge in dealing with it within the MPRA context because it may require the VAB intervention as it is beyond the 10% for which the municipal valuer is authorised to amend.

The perceptions and suggestions discovered from the interviews and the questionnaire survey were further subjected to a statistical study, seeking to confirm the existence and extent valuation accuracy and uniformity. The statistical study was performed on the secondary data from the CoJ's 2018 GV. The assessment revealed the general scores of 0,97 for the ASR, 1,022 for the PRD, -1,01 for the PRB and 9,60% for the COD. In addition, the scores for the RMSE and the MAPE were found to be R 40 000, 00 and 23.5%, respectively.

Overall, these results suggest that from the lens of the ASR, PRD, PRB and COD, the CoJ assessment values in the GV 2018, are well within the acceptable parameters of the IAAO standards. However, A careful consideration of all these results reveals some degree of valuation inaccuracy albeit small. It also suggests a stronger bias towards under-valuation in relation to the agricultural, industrial and commercial properties. Owing to the limitations of the use of ratio analysis on non-residential properties, the results relating to non-residential properties, are accepted with caution.

5.5.2 Mass Valuation Approaches and Models

As suggested in the literature review the traditional valuation methods including the cost approach, the income approach, and the sales comparison approaches remain relevant in the determination of the market value of the property (Collins and Ghyoot, 2016). This assertion was confirmed by Yacim and Boshoff (2014). Literature review also indicated that owing to the preferences by the courts and the outdated skills set on the part of the valuers, the MRA remains the most acceptable model in the valuation of mass properties. It is difficult to introduce a new valuation model such as the ANN.

The results of the interviews confirmed the use of the traditional approaches in SA, including in the municipal valuation projects. They explain the valuations models should be built on the bases of the traditional valuation approaches. The interviewees' confirms that the MRA is most-used mass valuation model in SA for mass valuation. The results also indicate that there is an appetite to introduce new mass valuation models such as ANN in SA. However, this is hindered by the

position of the courts in relation to the explicability of the data processing operation in the model.

The survey results confirm these assertions, in that all the respondents are convinced that the traditional approaches are still mostly used in valuations in SA, especially in mass valuation. In the same spirit, 92% of the respondents confirm that the MRA is still the mostly used mass valuation model in SA. 96% of the respondents indicated that CAMA is also largely used in SA. They selected reasons justifying the use of the traditional approaches and mass valuation models above. The top three reasons by score are (1) the ease of use, (2) ease in handling data, and (3) best accuracy levels. The respondents also indicated court acceptability,

5.5.3 The Current Use of Mass Valuation Standard in South Africa

The literature review revealed that the reason for valuation inaccuracies is the lack of the valuation standards (Smith, 1986; IAAO, 2013). At the very least it is attributable to the reluctance to use the international standards. According to the findings in the literature review, the use of standards in valuation tended to improve valuation accuracy consistency. This also improves on the confidence the public has on the valuation profession. There was no literature that gave an indication on the extent of the use of valuation standards in SA, especially in mass valuation (Channing, 2013; IAAO, 2017) The South African property markets has similarities to the countries that were reviewed. Thus, the findings discussed in the literature review can be applicable to SA.

The results from the interviews show that the valuation experts strongly believe that while SA never had its own standard in the past, the valuers did not even make use of the IVS. Even in instances where valuers claim to be using the standards, no evidence is provided to this extent. It is the view of the interviewees that the lack or no use of the standard also worsens valuation inaccuracies. This is confirmed by the results from the survey, which attest to the effect that valuers never make use of the valuation standard during mass valuation. This asserting is further confirmed by the results on the use of themes from international mass

valuation standard. About 57% of the respondents attested to the fact that valuers in SA often used their own self-created standards. This is opposed to the fact that about 43,5% respondents on average claimed to have used the international standards from either RICS or IVSC or IAAO. This was disputed by the interviews, in that no evidence is available to this effect. The only result that makes sense is that in fact valuers only relied on their self-made standards.

5.5.4 The Need for Mass Valuation Standard in South Africa

Consistent with the above, it could be concluded that there is a need for developing a mass valuation standard in SA. This was fuelled by the anecdotally observed valuation inaccuracies as conformed in the literature review which suggested that inaccuracies are attributable to the lack of valuation standards. The results from the interviews indicate that the expert valuers are of the agreement that there must be mass valuation in place, specifically for SA. This result is supported by the results from the survey, depicting that, there is a need to localise the international mass valuation standard. About 90% of the respondents asserted that SA should standardise the IVS. This is in direct reference to the IAAO's standard on mass appraisal of real property.

5.5.5 The Proposed Components for Mass Valuation Standard for South Africa

The findings in literature review suggested that in the use of the IAAO's standard on mass appraisal of real property, the mass valuation standard must always seek to influence the production of an estimate valuation closer to the market value. Thus, the components or the contents of the valuation standard must be aimed at contributing towards such a determination. The interviewees raised their concerns on the sMVPR in relation to components of the proposed standard and the results indicate that the participants to the interviews were not satisfied with the components of the sMVPR. Their criticism is mainly that it contains components that have no contribution towards the determination value estimate commensurate to the market value. It also addresses the objections processes. In essence, it is more of an implementation guideline for the MPRA than a valuation standard.

The results from the interviews further suggested that all interviewees agreed on the adaptation of the components contained in the IAAO's standard on mass appraisal of real property which include 1) collecting and maintaining data; 2) valuation; 3) model testing and quality assurance and value defence; 4) and managerial and space considerations. These components were further supported by the results from the survey. The respondents suggested that there were numerous valuations factors affecting valuation accuracy. These factors included insufficient valuation time, limited time for objections, inadequately qualified valuers, inadequately experienced valuers, inappropriate valuation methods/ models, poor quality assurance, dearth in the market data, haphazard/ lack of local valuation standards, undue influence by unscrupulous clients, and no consequence management for negligence. To address these factors, the standard must address the components as indicated here above.

5.5.6 Stakeholder Consultation in the Development of Mass Valuation Standard

With regard to the sMVPR in the context of stakeholder consultations, the participants opined that the development process was not adequately consultative. In fact, some participants went further to suggest that they were not invited to participate in the process. The results of the interviews further suggested that public participation must be improved in relation to the development of the envisaged mass valuation standard for SA. The interview participants stated that the following stakeholders must be consulted: the SAIV, BPVA, the SACPVP, the Office of the Valuer-General (OVG), the ratepayers associations, the municipal valuers and CoGTA. This opinion was supported by respondents to the questionnaire survey

However, during the focus-group discussion, a compelling argument was advanced against the inclusion of stakeholders who are not valuation professionals in the consultations. Primarily, the concern related to the risk that the envisaged mass valuation standard may be suffer the same fate as the sMVPR. The sMVPR include aspects that do not have a direct bearing in the determination of the market values. There was a strong feeling from the interviewees that the stakeholders

should only be valuers and organisations of professional valuers, such as the SACPVP, OVG, SAIV and BPVA.

5.5.6 Subsisting Mass Valuation Practice

The research highlights the general lack of documentation of the valuation strategies and valuation standards utilised by municipal valuers during the compilation of the valuation rolls. This contrasts with the international standard practice relating to mass valuation. According to the researcher, no study has ever highlighted the need for such documentation, thus it has even become even more pressing to do so.

The study also revealed that municipal valuers did not make use of the IAAO mass valuation standard. The participating experts reveal that they only make use of a hybrid of the standards from the IVS, RICS and own experience. However, there are few participants who revealed that actually, because the municipal valuers often made use of use of CAMA systems provided by international companies, the IAAO standards were automatically integrated even for the statutory municipal valuations.

5.6 CHAPTER SUMMARY AND CONCLUSION

This chapter dealt with the analysis of both primary and secondary data. The results from the interviews were presented and analysed. The results from the survey were also presented and analysed. In addition to the two major components, the results of case study assessment were presented in support of the theme on valuation accuracy in SA. All the results were considered in one basket with the aim of presenting a holistic picture on the results. The spiral approach to analysis was used on the data from the interviews and the focus-group discussions.

The interviews and the survey provided in-depth information about the research topic. The results were able to close the gaps that were evident in the literature. The results revealed that the expert interviewees provided valuable and contemporary insight about the research subject. They also revealed that the

survey responses strengthened the foundation for the development of a framework for a mass valuation standard for SA. From the results it can be concluded that there is a need to develop a framework for the development of a mass valuation standard for SA.

Although the interviewees could not specifically indicate the degree of inaccuracy, they suggested that valuation inaccuracies do exist in SA, especially in relation to municipal valuations. According to the interviewees, the levels were ultimately estimated to be 11% and above. The participants believed that there was a very high level of inaccuracy in most valuation rolls in SA. This belief albeit exaggerated, was tested in the CoJ. Albeit to a very lesser extent, inaccuracy was found to exist, especially for some neighbourhoods (and property classes), confirmed through the results of the ASR, PRD, PRB, COD, RMSE and the MAPE, in the case of the CoJ GV 2018.

The results revealed that in as much as they have always heard of IVS, the interviewees honestly had never seen any valuer making use of such a standard in municipal valuations in SA. At best, the valuers were guided by the definition of the market value and the requirements of the courts. In the end, the valuers did not use any specific standard during mass valuation except their own self-made standards. However, in the cases where international valuation systems were used, the international standards were often integrated into the system and processes, despite the lack of understanding on the part of the municipal valuers.

The results also confirmed that to improve valuation accuracy and uniformity in order to influence public confidence in the mass valuation and the valuation profession, there is a need for mass valuation standard. Such standards need to be based on the localisation of the international standards and adjusted to fit the socio-economic and legal context of SA.

Furthermore, the results suggested that the components of the envisaged mass valuation standard for SA should be adapted from the outlook of the IAAO standard. The main components of such a standard should include 1) collecting

and maintaining data; 2) valuation; 3) model testing and quality assurance and value defence; 4) and managerial and space considerations.

The results show that while there is appreciation of the prevalent use of the traditional approaches as underpinnings of mass valuation models, the expressed a need for embracing the use of other models such as ANN, spatial analysis, etc., on the strength of their performance on valuation accuracy. As such, there is a need for the South African courts to be convinced to accept the use of these models based on their valuation accuracy in relation to market values.

In recognition of the democratic nature of SA, the results affirmed that stakeholder consultation is a critical requirement for the development of a valid and acceptable mass valuation standard for SA. Thus, the results from the interviews and the questionnaire survey agreed on the inclusion of the professional valuers from the OVG, SACPVP, SAIV and BPVA in the standard development process. The results also showed that some participants recommended the inclusion of other stakeholders such as the ratepayers associations, CoGTA and municipalities.

SA is busy developing the municipal valuation standards for property rating. This framework can be used as the basis for discussions on the standard in question. Instead of discussing MPRA implementation guidelines, the framework drives the stakeholders to a more valuation-focused discussion. The ongoing discussions could be narrowed to issues that are necessary in the determination of market value, which is the undisputed statutory basis for municipal valuation for property rating purposes.

The next chapter presents the proposed framework for the development of the mass valuation standard for SA based on the analysis in this chapter.

CHAPTER 6

FRAMEWORK FOR THE DEVELOPMENT OF THE MASS VALUATION STANDARD FOR SOUTH AFRICA

"It is the framework which changes with each technology and not just the picture within the frame."

(Marshall McLuhan)

6.1 CHAPTER INTRODUCTION

From the literature review, it became apparent that there is a need to develop a framework that will serve as the basis for the development of a mass valuation standard for SA. At the international level, there are existing valuation standards which range from the valuation of individual properties to mass valuations. However, such standards are not fully compatible with the South African context. The need for the framework is even justified by the gaps which were identified in the analysis of the results of the research surveys. These gaps suggest the need to improve on the valuation accuracy and the reliability during the municipal valuations. This chapter presents in Section 6.2 the design and development of the contemplated framework that is derived from the literature survey and the research survey analysis. It also discusses in Section 6.3 the validation of the framework by the stakeholders in the valuation industry in SA. Finally, in Section 6.4, the chapter discusses the implementation and the implications of the application of the framework.

6.2 THE FRAMEWORK DESIGN AND DEVELOPMENT

It was indicated at the beginning of the study that the aim of the study was to develop a framework that would serve as a supporting structure towards the development of a detailed South African mass valuation standard. As asserted by Fayad, Schmidt and Johnson (1999), a framework is to be seen as a reusable design of all or part of a system which is represented by a set of abstract factors and the way they interact. It is to be seen as an essential supporting structure of a

building, vehicle or object. The Cambridge Dictionary (2018) provides an even more succinct definition, which is a “supporting structure around which something can be built”. The sum of these definitions, in the context of the study at hand, suggests that a framework must be seen as a broad structure upon which a mass valuation standard is to be built, which may be used in the universal development of mass valuation standard. The subjects or the environments upon which the framework is to be applied do not necessarily have to be the same. They may differ especially considering their respective context. In terms of mass municipal valuations, the intention is to use the framework as the basis for the development of a mass valuation standard in SA, which will in turn serve as a guideline in the compilation of municipal valuation rolls. The main components of the framework are discussed in the following sections.

6.2.1 The Purpose of the Framework

The proposed framework serves the purpose of responding to the dictates of the main research question, as well as to the sub-questions posed in relation to the standardisation and mass valuation standard in SA. Furthermore, the framework proposes several interventions targeted at closing the gaps identified in the literature review. Accordingly, the objectives of the proposed framework are:

1. To provide procedural guidelines for the development of the mass valuation standard in SA.
2. To guide the structure and components of the mass valuation standard.
3. To provide high-level guidelines on the valuation approaches and modelling to be used in mass valuation.
4. To provide guidelines for a discussion on the statistical approach and measures to be used in the validation of mass valuation, to test valuation accuracy and uniformity.
5. To provide guidelines for the discussion on the minimum requirements for the collection, analysis and maintenance of property and market data used in the compilation of mass valuation.

Any framework that seeks to address mass valuation or municipal valuation must be focused on or geared towards the issues that contribute towards the determination of market value of a group of properties viz., mass valuation. Even though it may be tempting to include other related aspects such as the municipal rates policy and the role of the Valuation Appeals Board (VAB), the fact of the matter is that the latter issues do not have any direct influence on the determination of market values. They do not in any way guide the expert role of the valuers in the municipal valuation process. For this reason, the framework under discussion is focused primarily on the thematic issues that influence market value determination. The framework will also address the procedural issues that pertain to the development of the mass valuation standard for SA.

6.2.2 Procedural Aspects of the Framework

The results of the empirical study, particularly the oral interviews with the valuation experts, suggest that there is a need to deal with procedural limitations that may be experienced during the development of the mass valuation standard for SA. It is, therefore, necessary to suggest a procedural framework that will guide the development process. As such, the following constitute the components of the proposed procedural framework:

(1) Initiation of the standard development process;

(2) Review of the legislative framework;

(3) Development of the draft standard;

(4) Stakeholder consultation on the draft standard;

(5) First revision of the draft standard;

(6) Invitation of public comments;

(7) Second revision of the draft standard;

(8) Approval of the final draft standard;

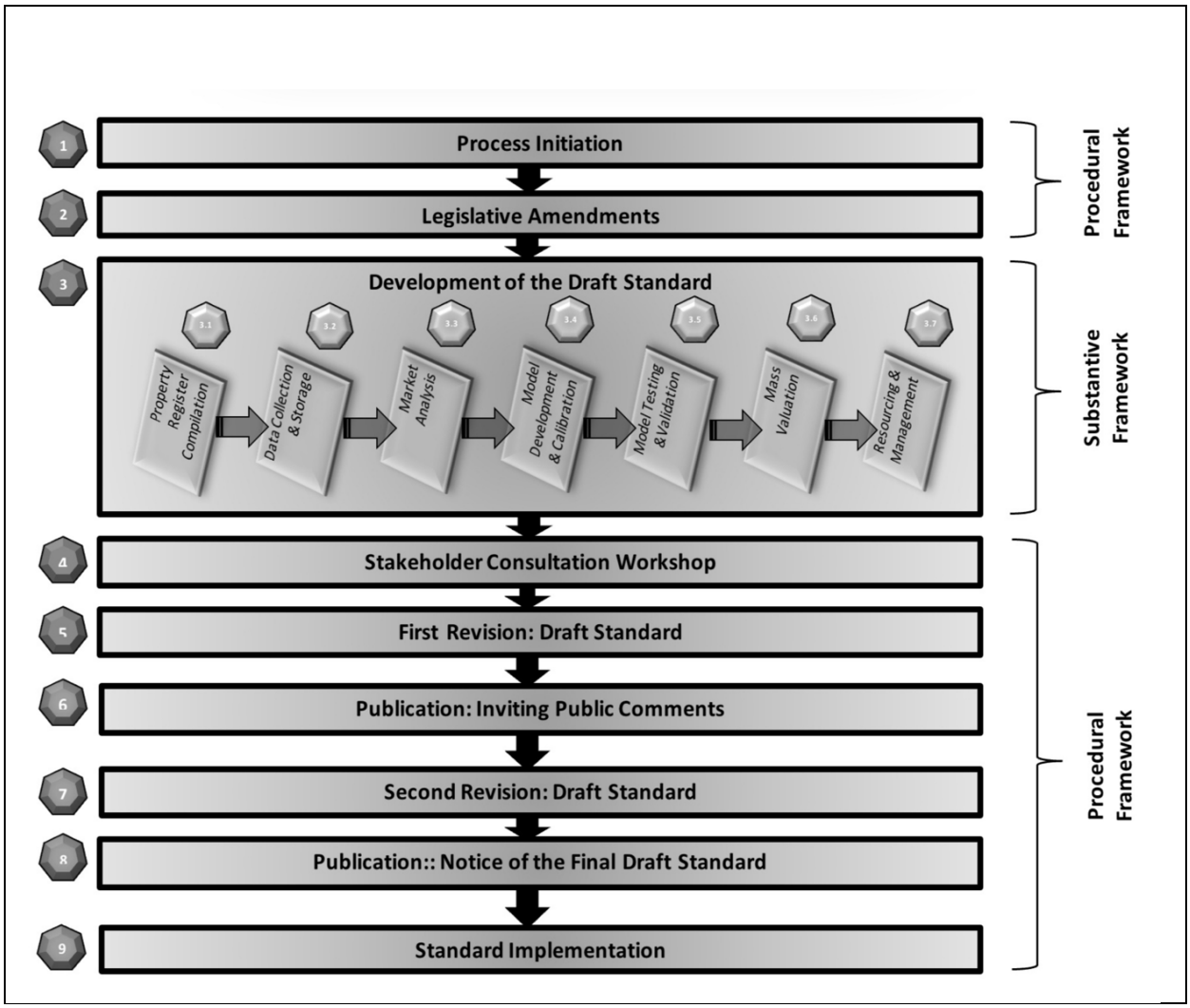
(9) Publication of the final draft standard; and

(10) Implementation of the mass valuation standard for SA.

Lessons drawn from the municipal valuation for property rating purposes provoke a debate around the ownership and lead to asking the question: who should champion the development and perform oversight over the implementation of the mass valuation standard?

Naturally, mass valuations are a subject which can potentially lead to conflict between ratepayers, valuers, municipalities, government and others. For this reason, the development of a standard must ensure adequate consultation with all the stakeholders ordinarily involved and affected in the mass valuation process. As noted earlier, it is also important for the standard to wield some degree of force and effect; otherwise if it were optional, municipal valuers could choose to ignore the standard in doing mass valuations. Figure 6-1 depicts the flow chart of procedural framework for mass valuation standard in SA.

Figure 6-1: Proposed Framework for the Development of a Mass Valuation Standard in SA



Source: Developed by the researcher

6.2.3.1 Initiation of the standard development process

The process for the development or review of a mass valuation standard must be initiated by statutory authority in valuations. It is suggested that this process be initiated by the OVG in consultation with the SACPVP and CoGTA. This suggestion is buttressed against the fact that, while s45 of the MPRA empowers the Minister of CoGTA to exercise the oversight and audit role over the municipal general valuations, the OVG can easily build the capacity to take over the relevant function of the MPRA, The SACPVP has already passed and published a South African Standard: Municipal Valuations for Property Rating.

6.2.3.2 Legislative framework review and amendments

It is imperative that the process of the development of a standard is driven from an authorised government entity. This will ensure the authority of, and confidence in, the standards. There is no legislative directive in relation to the question, by who, by when and how must the mass valuation standard for SA be developed? The closest it can get to the directive is reference is the requirement in terms of s45(1) of the MPRA, that valuation of properties be conducted according to the generally accepted standards. The Minister of Local Government may, in terms of s83(2)(e)(1), delegate some of their responsibilities and authority including that of oversight, audit and validation of municipal valuation rolls to any organ of state including the OVG, albeit the latter falls under the Department of Agriculture, Land Reform and Rural Development (DALRRD). This refers to the minister's authority to assess the uniformity, effectiveness and consistency of the valuation rolls, in terms of s82 of the MPRA.

As it stands, the OVG is only charged with valuation matters relating to land reform. Anything outside this scope must be permitted in line with s9(1)(c), which provides that the OVG may perform other assignment in terms of any law. Based on the nature of the OVG, it is suggested that the OVG be empowered to play an oversight and quality assurance role over mass valuations in general and municipal valuations. This may require the amendment of the mandates contained in the PVA and the MPRA to expressly assign such a role to the OVG. Inherently, this would also require that the OVG be responsible for the development of the mass valuation standard for SA. Part of the responsibilities of the OVG should entail: 1) the development of the mass valuation standard for SA; and 2) conducting validation studies on municipal valuations as required in terms of s82 of the MPRA.

The following amendments are therefore imperative:

- Section 7 of the PVA should be amended to allow for the expansion of the powers of the OVG. This should include the OVG's role in municipal valuations i.e., development of the mass valuation standard, and validation of the municipal valuation rolls.

- The MPRA should be amended to include the requirement for the development of the mass valuation standard, including the outlining of its contents. The amendment of the MPRA must also refer the function of developing the mass valuation standard and the validation of the municipal valuation roll to the OVG.

6.2.3.3 Development of the mass valuation standard

The initiators should appoint a team of mass valuation experts and policy drafters to draft the standard for mass valuation in SA. This team of experts should construct the broad outline of the standard. The outline should constitute only the aspects that will have direct impact on the determination of the market values of the properties. At this stage, they may also include the enabling actions and procedures. Lessons must be drawn from the IAAO's Standard on Mass Appraisals. The team of experts should also populate the framework with the elaborate but broad specifications to the standards.

6.2.3.4 Stakeholder consultation and participation

At this stage, the nature and purpose for the mass valuation standard would have been clarified. It would be easier to identify the stakeholders who are to participate in the development of the mass valuation standard in SA. It is also apparent from the findings that there is a need for stakeholder consultation and participation in the process of developing the mass valuation standard for SA. Thus, the framework should include a reasonable level of stakeholder consultations and public participation during the development of the mass valuation standard for SA. This is because of the presumption that participation by all relevant stakeholders serves to minimise potential conflicts which could arise during the valuation process. Public participation and consultation is also a fundamental practice encouraged in democratic SA.

The commonly agreed stakeholders include the assistant municipal valuers, municipal valuers, SAPVP, SAIV, BPVA, ratepayers associations (Including organisations such as Rates Watch), municipalities and CoGTA. However, the voice of reason and common logic dictates that only valuation professional valuers should be included. These stakeholders are important because of their role in the

municipal valuation process, as well their interest in the determination of the valuation procedures and techniques. The professional stakeholders must be included because of their technical understanding and appreciation of valuation, while the latter three stakeholders are mentioned because of their role in the compilation of the valuation rolls as well as their custodianship of the MPRA Act of 2004 and are more relevant in the designing of the mass valuation procedures.

6.2.3.5 First revision of the draft mass valuation standard

Once the first draft of the proposed mass valuation standard is subjected to review by the stakeholders, the suggested and agreed changes must be integrated into the draft. The product of this stage will be an updated first draft ready to be published for public comments.

6.2.3.6 Invite written public comments on the draft mass valuation standard

The members of the public should be allowed at least 60 days to make comments on the draft mass valuation standard. Their submissions must be recorded and considered in the finalisation of the draft mass valuation standard.

6.2.3.7 Second revision of the draft mass valuation standard

The second revision will seek to integrate the inputs by the public on the draft mass valuation standard. This should culminate in a final standard ready for adoption by the relevant authority viz., the OVG advised by the SACPVP. The OVG should receive and consider for final approval the draft mass valuation standard from the SACPVP, with recommendations.

6.2.3.8 Publication of the final mass valuation standard

A public notice should be issued by the SACPVP making the stakeholder and the public aware of the final draft. The notice should also indicate when the standard comes into full force and effect.

6.2.3.9 Commencement of the implementation the final standard

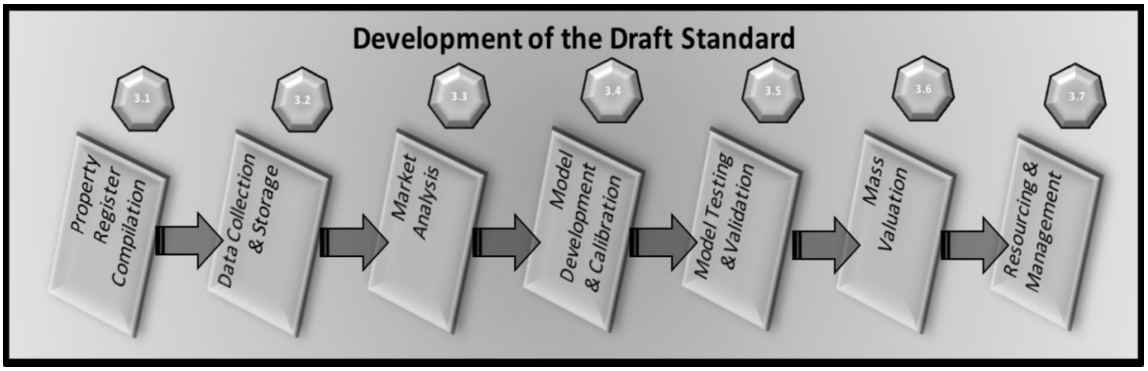
The standard will then come into full force and effect on the date pronounced in the public notice. Once the standard is published, all the municipalities and organisations conducting mass valuations are expected to ensure that the standard is always observed.

6.2.3 Substantive Aspects of the Framework

For the purposes of the substantive framework, a distinction needs to be drawn between a mass valuation standard and a standard on municipal valuation for rating purposes. The former is general and pertains to valuation of any group of properties, while the latter is particular to municipal property rating. The mass valuation standard on the other hand can be used in group property valuations for any purpose including property rating, company asset valuation and more. It is therefore necessary to clearly define the purpose for mass valuation, and the relevant standard definition and prescription. The standard on municipal valuation for property rating purposes seeks to guide municipalities and municipal valuers on conducting valuation property rating purposes. The latter is based on the provisions of the MPRA. The SACPVP has proposed such a standard for South Africa's municipal property rating.

Based on the literature review and the empirical study conducted herewith, these value determining factors can be categorised under four thematic areas: 1) collection and maintenance of property data; 2) valuation models/ methods/approaches; 3) model/method/approach testing; and 4) managerial and administrative aspects. The proposed framework is based on these thematic areas. Figure 6-2 pertains to the substantive issues in the mass valuation standard.

Figure 6-2: Substantive Framework



Source: Developed by the researcher

6.2.4.1 Compilation of property register

In the case of municipal valuation, the MPRA provides for the municipality to compile a property (land parcels and sectional titles) register. In the same spirit, this should be a requirement for any type of mass valuation. This helps with effective planning for the collection of the required data and determination of neighbourhoods for market analysis. In SA, every property including the land parcels and sectional titles belongs under a local or a metropolitan municipal jurisdiction. All land parcels are registered with the office of the Surveyor General and the Deeds Office. This makes it easy for the valuers to compile a property register and maps depicting the land parcels/ properties under consideration.

The mass valuation standard should firstly insist on the compilation of the property register. It should also prescribe the minimum property characteristics to be recorded in the property register. This may include characteristics included in the property description such as farm name, registered division, township name, erf number, portion number and farm number. It must also include the owner's name, zoning of the property and the LPI code. This information is required to form the basis of data collection, market analysis and valuation.

6.2.4.2 Property data collection and maintenance

The envisaged mass valuation standard should provide guidance on the collection of data and the storage thereof.

As it is, it is very difficult to access data utilised by the municipal valuers in the compilation of the municipal valuation rolls. For various reasons including the fact that data is for sale, municipal valuers are generally reluctant to share the data with anyone one else other than their own staff. This makes it difficult for any third party to independently assess the accuracy of the valuation roll to challenge the municipal valuer's opinions. However, property data plays a very significant role in the valuation of properties. This framework proposes that the envisaged mass valuation standard should suggest a common data storage facility into which valuers will bank all the data used in the determination of the market value of the affected properties. In the same vein, the standard should define the quality assurance process and system according to which the data is admitted into the valuation data repository. This will drastically reduce the cost of valuation data and improve on its accuracy and timeous relevance of the valuation data.

6.2.4.3 Market analysis report(s)

To establish the market basis for the mass valuation, conventional wisdom dictates that the valuers must conduct market analysis which may be arranged in terms of property neighbourhoods and property types. For instance, the market analysis for the residential type can be conducted in terms of the neighbourhood areas. In terms of the MPRA, this is also a statutory requirement. Municipal valuers are required to conduct market analysis and compile a report thereof. However, most municipal valuers by instruction of their municipalities opt not to make the market analysis reports available to the public. In fact, most municipal valuers approached by the researcher argued that the market analysis reports were strictly confidential and cannot be shared with anyone even for academic research purposes.

The proposed mass valuation standard must provide guidance on the requirements of the market analysis. This requirement should be made mandatory and public. Amongst others, the standard should address matters such as the acceptable sales sample size, whether expressed as a percentage share, a ratio or a fraction of the subject valuation population. It should provide guidance on the acceptable time parameters for the selection of the sample sales. The market

analysis must also provide the basis for valuation in neighbourhoods where the comparable sales are either outdated or non-existent.

The standard should insist that the market analysis should provide market information for all property types and corresponding valuation methods. To remove doubt, the standard must also provide a guideline on the contents and format of the market studies. Rigorous guidance on the market analysis will contribute to eliminating the use of outdated sales information from the comparable sales used as the basis for market valuation.

6.2.4.4 Developing and calibrating the mass valuation models

As required by law, SA's mass valuation especially for municipal rating purposes, must yield market values. Therefore, it must be based on market valuation principles. The traditional approaches that are used in the valuation of individual properties, including the comparable sales approach, income approaches and the cost approaches, are also preferable for the valuation of mass properties. Because of time and budget constraints, it is impractical to value a sizeable number of properties within a reasonably short period.

Valuers are then required to develop models to guide the valuation of as many properties as possible within the acceptable market valuation considerations, time and cost. The development of such a model is often compelled to be unique to the subject properties and the locality. The mass valuation standard for SA must thus guide the development and calibration of the mass valuation models. It is highly possible for multiple mass valuation models to be used in the same neighbourhood. For instance, the valuation model for commercial properties will not be the same as the model for residential properties. In the same way, the models can vary spatially from one neighbourhood to another.

The outcomes of most studies conducted in various countries across the globe as discussed in the literature review suggest that the ANN models and approaches tend to yield more accurate value estimates. It is for this reason that there is a rapid growth in the preference for the use of the ANN in the world. In SA, contrary to the worldwide growing preference, most valuers prefer to make use of CAMA and

MRA. This preference is mainly informed by the inherent expectation that the valuation may be challenged in the courts, leading to a need to adequately explain the rationale behind the determination of the values in question.

Most scholars agree that the ANN has a limitation which pertains to the mystery relating to the operations inside the black box, leading to a problem in convincing the courts on its rationality and logic. The concerns about the use of the ANN are not based on its inability to produce accurate valuations but simply on the ability to explain the logic and the rationality of the process inside the black box.

The standard should further provide guidance regarding when and how each of the valuation approaches may be used. This requires the valuers to establish the nature of the properties and the availability of data required in the valuation. If there are adequate comparable sales, the sales comparison approach is the preference. Valuers should develop algorithms that allow the use of comparable sales data with ease. In instances where there are improved properties and no recent sales, the cost approach should be used in estimating the market value.

The standard must also address the issues on depreciation schedules, the source of the construction cost schedules required in when applying the cost approach, and whether reliance should be placed on expert periodicals such as Rode and Associates (see s2.3.3.1) or be developed in-house by the valuers. The standards must address the collation of income and expenses needed in the application of the income approach with regard to income-producing properties.

6.2.4.5 Valuation testing and validation

Regardless of whether the valuers opted for a model that falls under the family of MRA or the ANN family or any other model, the model must be tested for its reliability and ability to accurately estimate the property values. The testing must occur at two levels: at the level of the model diagnosis and the level of the sales-ratio analysis. The standard must define the parameters for model diagnosis which should focus on the model's capability to accurately estimate/predict the property values. It should also pay specific attention to the relevance of the variables in influencing the value of properties.

The standard must provide guidance on the tools and the indicators to be used in evaluating the uniformity of the value assessment. These tools are statistical in nature, including the COD which is the average percentage deviation from the median assessment-purchase price ratio, the RMSE and the MAPE. For each of these statistical indices, the standard must explain the meaning of the indicators and provide the acceptable parameters.

6.2.4.6 Valuation resources management

Conducting mass valuations requires a considered management of resources such as human resourcing or staffing which includes data capturers, administrators and valuers. The standard must provide guidance on the human resources and expertise required to successfully and efficiently completes mass valuations. When such guidance is discussed, the standard must also consider the size of the valuation population. The standard must also present options to either conduct mass valuations in-house or to outsource them. The MPRA read together with its guidelines provides such guidance in the case of municipal valuations. With respect to the envisaged authority of the standard, there is a need to elevate the guidelines to the level of standards.

In as far as data computation is concerned, the framework must allow for a discussion on the hardware and software requirements. This can be guided, among other things, by the quantum of properties under review and property classifications. The hardware must be of an enduring quality standard, commensurate with the data under consideration. The standard must also provide guidance on the development of the software or CAMA required for mass valuations. The development of software must define the capabilities of the CAMA to link and integrate with other relevant and related software such as the municipal finance systems, the GIS and statistical tools. The standard must provide guidance on data security and backups.

6.3 FRAMEWORK VALIDATION

The proposed framework was subjected to validation by thirteen (13) industry experts. This section discusses the process that was followed in validating both the substantive and procedural frameworks as proposed.

6.3.1 Validation Aim and Objectives

The aim of the validation exercise was to test the proposed framework for appropriateness and practicality. The following objectives were to be achieved to successfully complete the validation exercise:

- To subject the proposed framework to the scrutiny of the industry experts.
- To enhance and validate the proposed procedural framework through input from the experts.
- To enhance and validate the proposed substantive framework through discussions with experts.

6.3.2 Validation Approach

To understand framework/model validation, it is important to first understand what the model/ framework is. According to Pidd (2009) (s.4.4), a framework is a fictitious representation of the real world. Based on assumptions, an attempt is made to reconstruct the real world in a fictitious environment. Therefore, for a model/ framework to be considered valid, it must be tested and be found to be working as though it would in the real world. In the social sciences, a model/framework becomes valid once it is accepted and approved by the community of the subject experts. In the case of this study, the valuation experts are crucial for the validation of framework.

Framework validation is understood to be a judgement call by experts on the accuracy and the applicability of a model/framework in the real world. As hinted in the assertions by Oberkampf and Trucano (2008:717), validation is “a process of determining the degree to which a model is an accurate representation of the real world from the perspective of the intended use of the model”. According to Miser

(1993), there is no one-size-fits-all validation method. It all depends on the phenomenon being addressed as well as the situation within which the framework is adopted.

In this case, the validity of the proposed framework was subjected to the judgement of the valuation experts who have acted as municipal valuers for South African municipalities in general and metros, in particular. These experts were divided into two groups. They participated in two workshops in which their critique, inputs and suggestions on the proposed framework were solicited. These focus-group discussions were conducted virtually.

In the first workshop, the selected valuation experts subjected the proposed framework to a rigorous process of debate, comments and review. To ascertain the acceptability and approval of the proposed framework, a second focus-group discussion was conducted with different valuation experts. After considering the first round of inputs and comments, the framework was re-tabled before the valuation experts for finalisation.

6.3.3 Validation Process

The focus-group discussions in their nature are meant to facilitate a neutral environment in which the participating experts are encouraged to express their views and opinions and subject the same to group discussion. The experts are also expected to listen to each other's inputs in the spirit of, "influence and be influenced" (Kruger and Casey, 2000; Leedy and Ormrod, 2010; Ritchie and Lewis, 2009).

The focus-group workshop was aimed at validating the framework as whole. A specific focus was placed on both the procedural and substantive framework. To equip the participants with information, they were provided with the background to the research, its aims and objectives, its preliminary findings and the proposed development of the framework. Each workshop was, accordingly, structured in terms of the following three sessions:

Session One (1)

In the first session, the researcher offered a presentation on the research background, research aims, objectives and findings. The researcher also explained the research methodology and the development of the framework. Clarity-seeking questions and comments were invited from all the participants. After clarification, the participants agreed to proceed with the second session.

Session Two (2)

In the second session, the researcher presented the proposed substantive framework. This dealt with the proposed content of the standard (Substantive Framework) and the process of developing the mass valuation standard as well as the stakeholders targeted to participate in the development of the mass valuation standard (Procedural Framework). Following the presentation, the participants were encouraged to suggest corrections and modifications to the substantive framework propositions. This discussion was guided with the aid of the three open-ended questions depicted in Appendix C-2.

Session Three (3)

The third session was concerned with soliciting the opinions of the participants as to whether they thought the framework could be deemed workable or not for SA. It also sought to establish whether the framework could be used in other countries. It entailed a presentation by the researcher on the procedural framework. This session was also subjected to proposals for correction and modification.

6.3.4 Validation Scope and Limitation

The validation exercise was only focused on the proposed framework covering both the substantive and procedural frameworks. The workshop did not attempt to deal with the details of the mass valuation standard as this exercise was reserved for a later process which dealt with the development of the mass valuation standard.

The limitation of the validation process was that none of the participants represented the SACPVP. Because of the initial reluctance by the statutory and voluntary organisations to participate in the study, the expert participants were identified and selected based on their experience and qualifications. All the experts were solicited through referrals with a recommendation to the researcher by other valuation experts.

6.3.5 Experts Participating in the Validation

Validation was conducted with the aid of, and referrals by, the valuation experts that participated in the research interviews and survey. The participants were carefully selected based on their availability and willingness over and above their qualifications and experience. Thirteen expert participants were invited but only seven were available to attend the first focus-group discussion. Six of the selected thirteen valuation experts attended the second focus-group discussion. All the participants were found to have adequate valuation qualifications and experience in municipal valuation, either as part of municipal valuation teams or valuers challenging GVs (s.5.2.1).

6.3.6 Validation Outcomes

The validation of the proposed framework was conducted in two focus-group discussions, which are discussed in the following section.

6.3.6.1 The first focus-group discussions

The first workshop was conducted with nine valuation experts selected from the interview participants. The results of the discussion yielded positive results with regard to the proposed framework. The proposals received positive feedback from the participants.

The discussions were guided through five open-ended questions as shown in Appendix D-2. These questions were derived from the interview participants' responses and observations by the researcher. The summary of the discussion is as follows:

1. What is your reaction to the proposed framework for the development of a mass valuation standard for South Africa, as presented?

   The responses and feedback by the participants revealed that the framework as proposed provides a basis for addressing the normative concerns that lead to valuation inaccuracy in mass valuations in South Africa. The procedural aspects of the framework were applauded by the participants, who expressed their approval with the intensified public consultations. The substantive framework was applauded for its focus on aspects that will help the valuers produce more accurate market-related valuations. There was consensus on this view.

2. Do you think the proposed framework for the development of a standard for South Africa, provides solutions to mass valuation challenges responsible for valuation in accuracy?

   The feeling of the participants was that, even though the details of the standard were not discussed in the framework, the narratives provided adequate guidance on the envisaged process. This will enable the developers of the standard to discuss all the relevant problems and challenges facing the mass valuation industry. It should then be fertile ground for the creation of relevant solutions to such problems and challenges. However, in so far as the poor consultations are concerned, the participants felt that the procedural framework is adequate. It was also the feeling of the group that the framework deals with the important legislative issues and lacunas such as the need for the empowering legislation or clauses in relation to the development of the standard.

3. Is the proposed procedural framework responsive to the concerns relating to public participation limitations as observed from the development of the sMVPR?

   Most participants to the focus-group discussion felt that the proposed framework provides a solution to the problem of limited or lack of public participation in the development of a valuation policy, as it was in the case of

the sMVPR. Greater participation by stakeholders was recommended. However, it was emphasised that the valuation standards are a specialised field and the concern of valuation professionals. This requires that participation be limited to the valuers. The group felt that the involvement of non-valuation professionals would lead to the same challenge of a standard that encroaches on non-valuation matters, as faced by the sMVPR.

4. Does the proposed substantive framework cover all the major aspects necessary to guide the valuers in the determinations of market values in mass valuation?

   The participants were comfortable with the proposals on the substantive contents of the proposed framework. For instance, with regard to the compilation of the property register, they felt that the MPRA provides for this already. According to the participants, the discussions should relate to the standardisation of the property characteristics that should be reflected in the list.

   While the participants agreed that the substantive section of the framework provides for a discussion on all major aspects of mass valuation, they emphasised that there is a need to dedicate time to a more detailed discussion on the mass valuation of non-residential properties such as for commercial properties. Such a discussion should be covered in the substantive framework stages 3.3, 3.4, 3.5 and 3.6. Otherwise, the discussion should also be able to guide determination of market values.

5. Do you think the proposed framework for the development of the mass valuation standard in South Africa is workable and adaptable for developing countries?

   Most of the participants indicated that they were concerned about how the sMVPR was developed. They decried exclusion from the process and were not even made aware of the initiative until first draft was published for comments When asked if it was not adequate that they were granted an opportunity to comment, nonetheless, they responded by alleging that even

the comments were never really considered. It would seem to them as though the late invitation was simply to create an impression that the champions of the compilation of the standard, have fulfilled the requirements for public comments.

The participants agreed that the proposed framework would be workable for South Africa as a democratic country that insists on wide and meaningful consultations. It allows for meaningful participation by professional valuers in the development of the mass valuation standard. With regard to adaptability to other countries, the participants opined that they thought that the framework could be used in assisting other developing countries with similar economies and property markets as South Africa to develop their own local mass valuation standard.

6.3.6.2 The second focus-group discussion

The second focus-group discussion was conducted with seven additional experts. This round included the experts in the employ of the OVG and SACPVP. The comments made by the participants in the first focus-group were integrated into the revised framework. New comments were focused on (1) the composition of the stakeholder to the standard development process; (2) the need to succinctly define the standard on statistical measures for valuation accuracy and uniformity; and (3) the need to enhance the valuation curriculum in SA, to include mass valuation.

Besides commenting on a few new issues, the second focus-group confirmed the results of the first workshop. The second round of discussions was initiated with the presentation of the framework proposals. It was also guided through the three open-ended questions as shown in Appendix D-3. These questions were derived from the review of the proposed framework and were used to follow up on the answers from the first focus-group discussion.

1. The inputs and feed from earlier participants were considered in the finalisation of the proposed framework has. What is your reaction to the second draft?

The participants once again confirmed the opinion that the proposed framework covers, at a high level, all the substantive aspects of typical mass valuation standard. The proposed aspects are responsive to the thematic areas that were confirmed throughout the research. The proposed framework was largely supported for its stakeholder participation approach.

2. Are there any additional issues you feel should be addressed in the final draft, both substantively and procedurally?

   The participants raised compulsory requirements for registered valuers who wish to conduct mass valuation. This matter was discussed extensively; however, it was ultimately felt that it should be the subject of statutory (MPRA) amendments. The participants felt that the specific requirement for municipal valuers must include statistics for mass valuation and specialisation in mass valuation approaches and methods.

   This enhancement will require the improvement in the valuation curriculum in the country. An example was cited from the valuation for land reform curriculum which is a specially designed programme offered by the University of Cape Town (UCT) to interested registered valuers. Otherwise, the participants felt that the proposed framework addresses all the critical aspects for the development of a mass valuation standard for SA.

3. Do you think that the participation in the development of the mass valuation standard should be open to stakeholders beyond professional valuers?

   This topic was tabled as follow-up question based on the comments from the first focus-group discussion. A concern was raised that allowing non-valuation professionals may compromised the critical objective of developing a mass valuation standard. It was argued that this may result in the inclusion of aspects that do not necessarily contribute to the market value determination. This was suspected to have been the case with regard to the sMVPR which is currently used by the SACPVP. The participants thus called for the limiting of participants to professional valuers, voluntary valuer associations and valuation statutory bodies such as the SACPVP and the OVG.

The proposed framework was accepted and approved by the participants, after rigorous discussions. According to Leedy and Ormrod (2010) (s,4.4.2.1), the sample size that was involved in the validation of the proposed framework is adequate for the purposes of drawing conclusions that there is general acceptability and approval of the proposals.

6.3.6.3 Suggested improvements to the framework

The focus-group discussions yielded extensive feedback on the proposed framework. The participants focused their discussions on two aspects of the framework: stakeholder participation during the standard development process and statistical measurements.

The participants made comments on the potential composition of the participants in the standard development process. This discussion was sparked by the concern that in the first draft, it was proposed that non-valuers such as the ratepayers associations and CoGTA be included in the list of consulted. The participants who were registered valuers themselves argued strongly against such inclusion. They believed that the inclusion of non-valuers in the development of the mass valuation standard, could result in an outcome that includes non-value determining aspects, as was the case with the sMVPR. The participants agreed that in order to avoid such a possibility, it would be best to exclude non-valuers. In this way, the standard would remain a professional-valuation-based standard.

With regard to the statistical measurements, the participants were concerned about the trend to under-value properties during statutory valuation. According to the revelations by the participants, the tendency seems deliberate and aimed at avoiding objections to the valuation roll. This tendency also resulted in bad and unorthodox valuation practices such as shortcuts to valuation including market factorisation, a process where values are simply appreciated by a certain basis point from the previous valuation. The participants suggested that the standard should define the minimum requirements for the statistical measurements such as the ASR, PRD, PRB, COD, RMSE and MAPE, in line with the IAAO standard for ratio studies.

The participants were also of the view that municipal valuers lack the pre-requisite skills to administer what they termed true mass valuation. They cautioned that most valuers tend to use market factorisation. Most valuers do not use the standard methods to test the valuation rolls for accuracy and uniformity. Valuers need re-skilling on statistical skills for mass valuation, aimed at testing for valuation accuracy and uniformity. The statistical skills for mass valuation must also be extended to the redefinition of the valuation curriculum for new professional valuers. Therefore, the framework should also enable a discussion on which skills should be made a compulsory requirement for any registered valuer to conduct municipal valuation.

In short, the framework for the development of mass valuation for SA, as proposed by the researcher was positively validated through a rigorous discussion with the experts. Thus, the recommendation is that the proposed framework be used in the development of the mass valuation standard in SA.

6.4 IMPLICATIONS

The framework must be used as a blueprint in the development of the mass valuation standard for SA. Even though its use may not directly and immediately bring about an improvement in the mass valuation concerns such as accuracy and reliability, it lays a firm foundation for the development of a mass validation standard for SA. Although the development of the framework is contextualised for SA's mass valuation processes in general, it can be adapted for use in other developing countries whose real estate standard is at the same level as SA.

The SACPVP recently adopted and published the sMVPR. The sMVPR was, however, met with an outcry and controversy among the valuation fraternity. The proposed framework could be used as the basis for discussions on the development of a mass valuation standard free of such controversy. Instead of simply replacing the MPRA implementation guidelines, the proposed framework seeks to drive the stakeholders to a more valuation-focused discussion. The ongoing discussions could be narrowed to the issues that are necessary in the

determination of market value, the undisputed statutory basis for municipal valuation for property rating purposes.

6.5 CHAPTER SUMMARY AND CONCLUSION

The use of the proposed framework may not instantly bring about an improvement in the mass valuation concerns such as accuracy and reliability. However, it lays a firm guiding foundation for the development of valuation standards in SA. Even though the development of the framework is contextualised to SA's mass valuation processes in general and municipal valuation in particular, it can be adapted for use in other developing countries whose real estate standard is at the same level as South Africa.

While it is a common understanding that like all standards on valuations, the mass valuation standard for SA must assume a guiding rather than prescriptive status, meaning that the valuers must want to follow the standard purely because it represents the best practice and not because they will be punished for not following the standard, it is imperative for the standard to be enforceable, especially in the case of municipal valuation and the use in the financial statements. The standard must be used by state regulatory and oversight entities as a yardstick to gauge the accuracy of the valuations by professional valuers.

The legislative and regulatory framework, including the PVA, MPRA, and other valuation laws must clearly address the issue of the mandatory use of the mass valuation standard for SA. It thus becomes imperative for the participating stakeholders to discuss and propose legal and policy framework amendments that will define the authority of the standard when developing the mass valuation standard for SA. The proposed framework creates a conducive foundation for such discussions.

The next chapter will present the conclusion and recommendations of the study.

CHAPTER 7

CONCLUSION AND RECOMMENDATIONS

"Reality is not exhausted by knowledge. Inaccessible to research are the ultimate facts. All scientific conclusions are based on axioms, all reasoning depends ultimately upon faith. Faith is virgin thinking, preceding all transcendent knowledge. To believe is to abide at the extremities of spirit."

(Abraham Herchel)

7.1 CHAPTER INTRODUCTION

This study was conceptualised in Chapter 1, where the research aim was stated as the investigation of the applicability of valuation approaches, models and standards, with the aim of proposing a framework on the development of the standard on mass valuation in South Africa. Chapter 2 delved into the philosophical outlook governing the research, the selection of appropriate research approaches and techniques. Chapter 3 dealt with literature on valuation accuracy and uniformity and standards. Chapter 4 addressed the research methodology which outlined the strategy and tactics of the empirical research, which consisted of four main phases.

The first component was interviews with select experts on their perceptions on mass valuation, valuation accuracy and mass valuation standard in SA. The second component was the administration of the survey questionnaire to all the municipal valuers including assistant municipal valuers. The fourth component was the focus-group discussion which was aimed at validating the proposed framework. The third one was the assessment of the secondary data representing a sample of municipal valuation in Gauteng's CoJ. The last component was the focus-group discussion aimed at validating the revised proposed framework.

Chapter 5 presented the results and analysis of the primary and secondary data, expert interviews and of the questionnaire survey. Chapter 6 entailed the

proposed framework for the development of the mass valuation standard for SA.

This chapter presents the conclusions and recommendations of the study. It addresses the achievement of the objectives, the study's contribution to knowledge, the practical application of the findings, the study limitations and finally, the recommendations for future studies.

7.2 RESPONSE TO THE RESEARCH QUESTION AND OBJECTIVES

The research question was constructed as: *how best can South Africa develop the mass valuation standard that can enable the improvement of valuation accuracy, especially in municipal valuations in South Africa?* The study has been able to answer this question primarily through the achievement of the research objectives. In brief, the response to this question lies with the proposed framework for the development of a mass valuation standard discussed in Chapter 6.

The research objectives were outlined in Chapter 1. The objectives represent a breakdown of the broader research aim. Table 7-1 depicts the methods used to achieve the objectives and the actual chapters that contained a detailed discussion on each research objective.

Table 7-1: Research Objectives' Achievement Metrics

RESEARCH OBJECTIVE	METHOD	CHAPTER
To investigate and discuss the generally accepted valuation approaches and models for mass valuation in the world.	Literature Review	Chapter 3
To investigate and discuss the existence, the extent and the causes of valuation inaccuracy in the world, as well as the existence of valuation standards.	Literature Review and Document Review	Chapter 4
To test, discuss and confirm the existence, and the extent, of mass valuation inaccuracies in SA.	Questionnaire Survey and the Secondary Data Analysis	Chapter 5
To identify and investigate the critical factors affecting the improvement of accuracy and uniformity in mass valuation in SA.	Questionnaire Survey and Interviews	Chapter 5
To develop and validate a framework for a mass valuation standard aimed at improving valuation accuracies in SA's municipal valuation.	Analysis of the literature review, the interviews, questionnaire survey	Chapter 6

The first objective was state as *"To investigate and discuss the generally accepted valuation approaches and models for mass valuation in the world."* This objective aimed at tracing the evolution of valuation theory, approaches, and models central to mass valuation and the effect these may have on the accuracy or inaccuracy of value estimation. The idea of market value was traced back to neoclassical economics. It became apparent that owing to the perceptions of individuals participating in the market, the concept of market value can only exist in a free-market economy such as SA (Australian Property Institute, 2015). At the centre of it all is what Alfred Marshal referred to as a synthesis of supply-cost (thesis) and demand-price theory (antithesis); simply put, supply and demand (Boshoff, 2010; Hardford, 2007).

The concept of market value can be traced back to Greek philosophers who addressed the debate on the use value and the exchange value. Alfred Marshal (1842-1925) introduced a discourse on the determination of value as espoused in the theory of value, hence the introduction of valuation techniques as it relates to goods. It was also revealed that the traditional valuation approaches viz., sales comparison approach, cost replacement approach, income approach, can be directly traced back to the work of Marshal (Lipsey, Langley and Mahoney, 1985) (s.2.3). Over time, there has been an evolution in the valuation methods from traditional (orthodox) to advanced (heretic). This culminated in an era of advanced valuation and mass valuation such as the hedonic models, MRA, FL and ANN.

In SA, the three valuation approaches are the most utilised approaches to valuations (Yacim and Boshoff, 2014) (s.2.1). Most studies suggest that the ANN is becoming the preferred valuation model. It is the best performing model in terms of attaining valuation accuracy. Owing to the inexplicability of what happens in the black box, the jury is still out with regard to convincing the courts to accept the ANN as the appropriate model. The accuracy of valuations has a strong dependency on the appropriateness of the valuation approaches and models selected. The mass valuation standard should strive to accommodate not only the hedonic models and the MRA but must also include the ANN for

future's sake. This will help anticipate the acceptance of the ANN models in the future (Chan and Abidoye, 2019; Jiang et al., 2013) (s.2.1; s.2.7).

The second objective was *"To investigate and establish the existence, the extent and the causes of valuation inaccuracy in the world, as well as the existence of valuation standards".* This objective was aimed at establishing from the literature three aspects on the existence, the extent and the causes of valuation inaccuracy. The literature review confirmed that there is generally a problem of inaccuracy in valuation, both in the cases of single or mass valuation. This is problem that is common in many countries. In fact, researchers have always engaged themselves in a discourse about valuation inaccuracies for some time (Hager and Lord, 1985; Brown, 1986; Brown, 1992; Waldy, 1997). The existence of valuation inaccuracy was confirmed through several studies conducted in both developed and developing countries, by amongst others Matysiak and Wang (1995), Parker (1998), Ogunba (2004), Ayedun et al. (2012), Babawale and Omirin (2012), Adegoke et al. (2013) and Abidoye and Chan (2017).

The extent of this problem is common in both developing and developed countries. It was found that it is more prevalent in developing countries owing to the existence of a properly established property market and property data repositories. According to Ogunba (2004), there was a highest degree of inaccuracy in South-West Nigeria. The study by Ayedun, Oleyede and Durodola (2011) confirmed the existence of valuation inaccuracy. While there are countries that have conducted some studies in valuation inaccuracy, there is one study conducted in SA by Mabuza (2017), who established that inaccuracy exists at alarming levels in SA (Glover, 1985; Hager and Lord, 1985; Pienaar, 2003).

The causes of valuation inaccuracies range from the fact that valuation remains the art and science of guesstimates where the valuers must make assumptions, including assuming the role of imaginary buyer and seller. Researchers established that, among other things, the inaccuracies in the mass valuation are primarily due to a lack of or inadequacy of mass valuation standard (Dugeri, Gambo and Ajayi, 2012). This is underpinned by a lack of reliable property sales

data, inconsistencies in valuation approaches, inadequate valuer training, inadequate valuer experience, poor understanding of the property markets and a dearth of the market data.

The third objective was *"To test and confirm the existence and the extent of valuation inaccuracies in mass valuation in South Africa".* To the extent of achieving the objective stated above, there was a need to establish if there were indeed valuation inaccuracies experienced in municipal valuation in SA. This was achieved by the assessment of the municipal valuation data against the data on the actual market sales. The achievement of this objective was affected by the research limitation relating to the reluctance by the municipalities to make municipal valuation data available to the researcher. Municipal valuers blatantly refused to assist with the data. The valuer from Ekurhuleni informed the researcher that this was a national position taken at a forum coordinated by CoGTA.

However, after several attempts and intervention through the executive mayor's political office at the CoJ, only the CoJ made valuation data regarding their 2018 valuation roll available. The city is in Gauteng in South Africa. The total assessed properties in the CoJ's 2018 valuation roll were 758 998 in total. For study purposes, the population was determined at 88 653 properties that were cleared for use in the statistical analysis. Various statistical measures were used to test for accuracy and uniformity of the assessments. These include the ASR, the PRD, the PRB, the COD, MAPE and the RMSE, which were used to compare the purchased price and the property valuers' estimates.

The objective of the study was achieved, as through the administration of the statistical tests on the CoJ GV 2018. it was found that the ASR is 0.9; PRD is 1.022; PRB is -1.01; the COD is 9.60%; and the MAPE yielded 2.73%. In accordance with the IAAO standards, these results suggested an acceptable degree of accuracy and uniformity. All these statistical measures suggest the assessment was reasonable with relatively fair level of accuracy and uniformity in municipal value estimates. The RMSE was found to be R40 000, which suggests that the assessment in the CoJ yielded the accurate valuations. In general, although the measures were found to be within the acceptability

parameters, the results indicate that there were more undervalued than the overvalued properties in the sample.

In relation to the fourth objective, which *was "To identify and investigate the critical factors affecting the improvement of accuracy in mass valuation in South Africa",* the study sought to establish the factors that have a bearing on the improvement of valuation accuracy and need to be addressed in the proposed framework and standard on mass valuation in SA. Guided by the findings and the theoretical framework established during literature review, the researcher conducted an empirical study characterised by use of a questionnaire survey, semi-structured interviews and focus-group discussions. The factors in question were identified in the literature review and were confirmed in the interviews and the questionnaire survey.

Within the literature review, it was found that the existence of valuation inaccuracy in mass valuation is the result of a lack of valuation standards, lack of reliable data on property sales, inconsistencies in the valuation approaches, inadequate training of valuers, inadequate valuer experience and poor understanding of the property markets, amongst others (Abidoye and Chan, 2017; Adegoke, 2013; Ayedun et al., 2012; Babawale and Omirin, 2012; Matysiak and Wang, 1995; Parker, 1998). The factors that contribute to valuation inaccuracy, can be summarised as follows:

- Dearth of market data
- Use of outdated valuation approaches and techniques
- Outdated valuation data
- Lack of valuation regulatory and control framework
- Inadequate [valuer] training
- Failure to hold valuers responsible for negligence
- Imperfection of the property market
- Lack of experience of the valuers
- Undue influence by unscrupulous clients

These factors were interrogated for relevance to the South African context. This then culminated in the identification of the factors critical for improving valuation

accuracy, which were then included in the questionnaire. The following are the factors that were investigated:

- Limited time allocated to valuation
- Limited time allocated to objections
- Inadequately qualified valuers
- Inadequately experienced valuers
- Inappropriate valuation methods and models
- Poor quality assurance
- Poor valuation data quality
- Dearth in market data
- Haphazard valuation standards
- Undue influence by unscrupulous clients and
- Lack of consequence management for ineptness and negligence.

The fourth objective was therefore achieved in that the factors affecting the improvement of valuation accuracy in mass valuation were identified and subjected to confirmation as intended. The ultimate achievement of the objective is documented in Chapter 5.

The fifth and the last objective was stated as *"To develop and validate a framework for the development of a standard on mass valuation with the aim of improving valuation accuracy in South Africa."* Primarily, this objective was aimed at proposing a framework for the development of a mass valuation standard. This was achieved through the proposal presented in Chapter 6.

Driven by the understanding that valuation accuracy and credibility is the focus, the proposed framework has two main components including the procedural framework and the substantive framework. The former component deals with the steps that are to be followed when a standard of this nature is to be developed. It is based on the gaps identified in the legal framework, as well as the observations of the recent experience during the development of the sMVPR in SA. Part of the proposal entails the amendment and alignment of the existing legislation such as the MPRA as well as the PVA to empower the

development of a valuation standard. Public participation is placed at the centre of the process, appreciating that SA is a democratic society.

The latter component addresses the contents of the standard with the aim of rendering it responsive to the objective of improving valuation accuracy, thus raising the level of public confidence on the valuation rolls and valuers. The content includes aspects such as the compilation of the property register, data collection and storage, market analysis, model development and calibration, model testing and validation, mass valuation, as well as resourcing and management. These topical subjects were derived from the review of the international standards as well as the sMVPR.

The appropriateness and workability of the proposed framework was ascertained through the validation process, which was based on testing its acceptability with the relevant stakeholders. The validation of the framework was therefore realised through a focus-group discussion, which was attended by nine experts and key stakeholders identified through their involvement in mass valuation projects and environment in SA. The objective was further achieved through the proposed framework which was endorsed by the participants in the focus-group.

The proposed framework was presented to the group who were invited to submit their comments. The focus-group agreed that the proposed framework is appropriate and will have direct and positive effect on the improvement of accuracy in mass valuation. The participants also concurred that the intensification of public participation in the process of standards development and review will increase the level of confidence in the mass valuation processes and the valuers in general, because the stakeholder will have a better understanding of the standard guiding the valuers during mass valuation.

The focus-group noted the development to the extent that the SACPVP has already published the sMVPR, which also seeks to address some of the aspects of the standard in part. However, it was noted that sMVPR addresses the property rating process in general and does not include mass valuation. It was further noted that there was no empowering legislation enabling the

development of a valuation standard. These observations prompted a need for recommendations for implementation. The focus-group suggested some actions towards implementation. These include the legislative amendments, the assignment of authority to either the SACPVP or the OVG, and possible delegation of the municipal valuation audit function by the Minister, to the OVG.

7.3 CONTRIBUTION TO KNOWLEDGE

The contribution to the body of knowledge made by this research can be seen from both theoretical and practical perspectives. In terms of theory, the contribution enhances the theories relating to valuation in general and mass valuation, while in terms of practice, the contribution relates to the effect on pragmatic and contemporary aspects of mass valuation and the valuation industry.

7.3.1 Theoretical Contributions

The study makes the following contributions, from a theoretical perspective:

I. The literature review revealed a growing trend in the studies and findings on valuation accuracy. While most of these studies found that there are valuation inaccuracies in both the developing and developed world, very few of those studies contributed to valuation accuracy as it relates to mass or municipal valuation. The current study extends the debate on valuation accuracy and uniformity to include and focus on subject of mass valuation, especially statutory municipal valuation.
II. The study contributes towards a contemporary debate relating to the development of a mass valuation standard for SA and other developing countries.
III. This study presents the perspectives of subsisting mass valuation practice in SA, which is based on the opinions of the valuation industry experts. It reveals a number of undocumented practices such as the use of a hybrid of standards from the IVS, RICS and own experience.
IV. It suggests that the mass valuation standard should be constituted mainly of the aspects that are directly aimed at improving valuation accuracy and uniformity. These should include the property register, data collection and

storage, market analysis, model development and calibration, model testing and validation, mass valuation, as well as resourcing and management.

V. The study presents a validated procedure for the development of a mass valuation standard for SA, which may also be used in other developing countries. The proposed framework was validated through a focus-group discussion and contains the procedures and the substantive aspects that are aimed at improving mass valuation accuracy.

7.3.2 Practical Contributions

From a practical perspective, the study makes the following contribution:

I. The study used the statistical measures including, the ASR, the PRD, the PRB, the COD, to assess a municipal valuation roll for accuracy and uniformity. In addition to these statistical measures, the MAPE and the RMSE, were also used. According to the researcher, this has not been done before in SA. Only valuations, objections and appeals were used as a yardstick for quality valuations.

II. The study also highlights the fact that municipal valuers do not make the market analysis reports available to members of the public for scrutiny not even when requested formally. This increases suspicion and diminished confidence in the municipal valuation rolls. It also discourages the ratepayers from lodging valuation disputes even when they are adversely affected.

III. The framework makes a direct and practical suggestion with regard to the amendment of the legal framework to accommodate the development and review of the mass valuation standard. The procedural component serves as a guideline to the both the development and review process. This content can therefore be used as the basis for a process plan relating to the development of the mass valuation standard.

IV. Furthermore, the practical contribution by the study relates to the elaborate and substantive nature of the second component of the framework, the content framework. This component can be used as guidance in the formulation/development of the municipal valuation strategy. The valuers

can address the components of the standard in their strategy, as this will boost public confidence in the valuation rolls and the valuers.

7.4 STUDY LIMITATIONS

The study was met by several limitations including:

I. Owing to the reluctance by the municipality to participate in the research, either by giving researchers access to the municipal valuers or providing secondary data for assessment, even when it was stated that it is for academic purposes, only the data made available by the CoJ were used to form a view about valuation accuracy and uniformity in SA.
II. The major limitation to the study relates to the reluctance by the SAIV and the SACPVP to assist the researcher in reaching the registered or affiliated valuers. As a result, information about municipal valuers and assistant municipal valuers was obtained through referrals, leading to delays in concluding the study.
III. Even though there are 213 (8 metros and 205 local municipalities) municipalities in SA that impose property rates, the empirical part of the study, especially the assessment of the secondary data pertains to valuation accuracy and uniformity, the research targeted only the eight (8) metropolitan municipalities of SA due to inaccessibility of municipal valuers. Only one metropolitan municipality, the CoJ, ultimately made the valuation data available for the study.
IV. The interviews and the focus-group discussions were limited to only 13 and 9 participants respectively. The participants in both the forums were found by way of personal referrals amongst the valuation experts. This number decreased further to seven new participants in the second focus-group workshop.

7.5 GENERAL CONCLUSIONS

Resulting from the primary concern on valuation inaccuracy, valuation standards were introduced for individual property valuations. Over time, property rating, otherwise known as ad valorem tax, was introduced. For this purpose, properties had to be valued en masse, timeously and accurately. As

a free-market economy, therefore, a need for a mass valuation standard to guide the valuation of several rateable properties became apparent.

South Africa also went through such an evolution. This also crystalised the need for a South African-specific mass valuation standard. This need predates the democratic breakthrough. It coexisted alongside the municipal valuation for the purposes of imposing property rates, even under the apartheid regime. The introduction of the international mass valuation standard by the IAAO, preceded by a myriad of valuation standards by different organisations such as the RICS, IVC and the IAAO, lends credence to such a need. This need for the development of the mass valuation standard was further fuelled by the evolution in valuation approaches and models.

The primary concern in the study has always been about inconsistent application of the valuation approaches, models and principles which has often led to valuation inaccuracies. The valuation approaches have evolved from traditional three valuation approaches to the expansion of three to five traditional approaches, and to the AVMs and the mass valuation model.

Most countries including Canada and SA are still struggling to introduce new approaches or methods that use innovation as such as meta-heuristics and learning algorithms. These include the spatial models as well as the ANN, which uses trial and error and training algorithms in improving the model's precision in predictions or estimations. Albeit being the most accurate model, the ANN is yet to be accepted for use in mass valuation for statutory purposes in most countries including SA.

The inconsistencies and controversies in choosing the valuation approaches and practices, as well as other factors, exacerbated the problem of valuation inaccuracy and uniformity challenges, especially relating to mass valuation. The anecdotal evidence derived from the statistical study on the CoJ GV 2018, shows that the problem of inaccuracy is also prevalent in SA. This is evident from the municipal valuation data evaluated.

Appreciating that the need for a mass valuation standard has existed since the emergence of mass valuation for ad valorem property taxation, what then

follows is the development of such a standard. It is also important to note that there are valuation standards existing at the international level, albeit for individual property valuations. More relevant to the study is the IAAO's standard on mass appraisal of real property. The results revealed that it is not necessary to reinvent the wheel and seek to develop a mass valuation standard for SA from scratch. The localisation of the IAAO's standard is, therefore, recommended. Such localisation is required to ensure the adaptation of the standard to the South African environment and context.

The study proposes and recommends a framework for the development of a South African mass valuation standard. The proposal is not in any way aimed at providing the detailed contents of the standard rather; it is a framework for the development of the actual mass valuation standard for SA. The emphasis of the proposal is on (1) the development process and (2) high-level guidance on the content to be included in the standard.

The procedural framework is informed by the results which revealed that the standard (sMVPR) which was recently developed by the SACPVP for use in South Africa, and which is criticised since it is not focused on mass valuation but on the implementation of the MPRA. It is seen as addressing non-valuation issues such as the rating policy as well as the appeal process, which is more of a dispute resolution process than a valuation issue.

The process of its development is also questionable as valuation experts decry inadequate or even lack of consultation. The results show a need for strengthening the consultation process for the development of a mass valuation standard for SA. The substantive section of the proposed framework provided guidance for the discussion of substantive issues of the standard. The issues are adapted from the IAAO's standard on mass appraisal and confirmed as relevant for SA, through the empirical enquiry. The substantive issues are a response to the concerns on the factors that cause valuation inaccuracy.

Finally, the results of the study also revealed that there is a need to persuade the courts to accept the use of the ANN because of its ability to produce the

most accurate valuation estimates. This is even though the ANN suffers rejection dues to its lack of transparency in the interpretation of the coefficients.

7.6 PRACTICAL IMPLICATIONS AND APPLICATIONS OF THE STUDY

The primary beneficiaries of this research who may find the proposed framework useful include the valuation fraternity (professional valuers), the OVG, SACPVP and CoGTA.

The recommended framework relates to the development of a mass valuation standard for SA. It will help with the simplification of the development of the mass valuation standard. It also seeks to focus on the development of the standard on the issues that seek to ensure and improve valuation accuracy in mass valuation projects. It also provides guidance on a process based on public participation principles.

Valuation accuracy and uniformity is crucial in the quest of giving assurance to the people affected by the valuation information, such as the property ratepayers. In order to ascertain the attainment of good accuracy and uniformity in statistical measures, such as ASR, PRD, PRB, COV, COD, RMSE and MAPE are used. While the IAAO standards on ratio studies set the guiding standards for these statistical measures, there is a need for the localisation of the standards to respond to the South African environment. With the spatial heterogeneity that results from apartheid spatial planning linked to income levels, the tendency of the standards to address both the vertical and horizontal equity, is plausible.

The study also has implications for the legislative framework in that it also recommends the amendment of legislation to provide for an empowering clause to the extent of who should develop and implement the mass valuation standard. This is against the background that the MPRA, as it stands, only prescribes that municipal valuers must make use of the valuation standards but does not provide guidance on who should develop and oversee the implementation of the standards.

7.7 RECOMMENDATIONS FOR FUTURE STUDIES

The following recommendations for future studies are made:

I. The study established that, at this stage, the South African courts do not accept the ANN approaches to determine the assessment values, especially for statutory valuations due to the inexplicability of the processes in the black box. A study on the possibility of courts accepting the use of ANN as a model that determines the market values with better accuracy through the opening of the black box is recommended.
II. While there are a few studies focusing on valuation accuracy or inaccuracy in SA, there are none that deal with valuation accuracy or inaccuracy in relation to mass or municipal valuations. The findings of the study indicate that the expert valuers who participated in the survey generally believe that valuation inaccuracies are very high and prevalent in mass valuation especially municipal valuations. A study that seeks to confirm and establish valuation inaccuracies during mass valuation in South African municipalities could be undertaken.
III. Additionally, studies on spatial hedonic price modelling are highly recommended for mass valuation in the South African property market.

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APPENDICES

APPENDIX A-1: LETTER TO CITY MANAGERS

UNIVERSITEIT VAN PRETORIA
UNIVERSITY OF PRETORIA
YUNIBESITHI YA PRETORIA

Department of Construction Economics Tel: 012-420 4972 Fax: 012-420 3598

The City Manager
LLLLLLLLLLL
TTTTTTT

03 October 2019

Dear Sir

RE: REQUEST FOR VALUATION DATA AND MUNICIPAL VALUERS TO PARTICIPATE IN THE RESEARCH INTERVIEWS

Our conversation over the cell phone, refers.

I am a PhD candidate in Real Estate, at the Department of Construction Economics in the University of Pretoria. I am currently undertaking a research on *"Towards the Uniform Mass Valuation Standards in South Africa"*. The purpose of the research is to identify the areas that require standardisation in conducting municipal valuation in terms of the Municipal Property Rates Act, in South Africa. This will result in the mass valuation standard framework that will help minimise valuation inaccuracies and increase public confidence in the municipal valuation rolls.

It is on this basis that I hereby humbly request that your office, provide me with the electronic copy of the valuation data that used in the most recently approved municipal valuation. This may include 1) the actual general valuation roll, 2) the property sales for the 6 months period before or after the relevant valuation date. This data may be supplied in an excel or excel

compatible format. This data may also be limited to the residential properties in the middle and upper income suburbs.

Furthermore, this research requires that I conduct one on one interviews with experts in municipal valuation. These interviews may either be face to face or telephonic or any other preferred methods. To this end we request that you refer us to the municipal valuers, deputy municipal valuers and or assistant municipal valuers, in order for us to extend an invite for participation, to all of them individually.

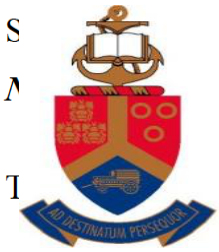
I wish to state upfront, that should approve my requests, the data relating to the most recent completed valuation roll, as well as the data collected from the interviews with the valuer will be treated with the highest degree of confidentiality, and only for academic purposes stated above. I also undertake to share the findings of this study with all the participants. Should you wish to impose further conditions pertaining to this, please indicate.

Should you have any questions or queries, please do not hesitate to contact Mr Steven Ngubeni at email address: ngubenis@vodamail.co.za or cell: 0726060964.

Thank you in advance for your favourable consideration of this request.

_____

Steven P. Ngubeni
PhD Real Estate (Candidate)



UNIVERSITEIT VAN PRETORIA
UNIVERSITY OF PRETORIA
YUNIBESITHI YA PRETORIA

Department of Construction Economics Tel: 012-420 4972 Fax: 012-420 3598

Municipal Valuer/ Assistant Municipal Valuer
City of))))))))))))

Steven P Ngubeni
PhD Real Estate (Candidate)

03 October 2019

Dear Sir/ Madam

RE: REQUESTING YOU TO PARTICIPATE IN THE RESEARCH INTERVIEWS

I am a PhD candidate in Real Estate, at the Department of Construction Economics in the University of Pretoria. I am currently undertaking a research on *"Towards the Uniform Mass Valuation Standards in South Africa"*. The purpose of the research is to identify the areas that require standardisation in conducting municipal valuation in terms of the Municipal Property Rates Act, in South Africa. This will result in the mass valuation standard framework that will help minimise valuation inaccuracies and increase public confidence in the municipal valuation rolls.

The research requires that conduct interview with experts in municipal valuation, preferably, telephonically or face to face. In recognition of your expertise a statutory and experience in municipal valuations, you have been recognised as someone who can give full insight and provide first-hand information for this research. As such, we kindly request your participation in this research, which will last a maximum of 30 minutes in the form of the one-on-one interviews.

Should you grant my requests, the data collected from the interviews with the valuer will be treated with the highest degree of confidentiality, and only for academic purposes stated above. I also undertake to share the findings of this study with yourself and the other participants. Should you wish to impose further conditions pertaining to this, please indicate.

APPENDIX A-2: LETTER TO MUNICIPAL VALUERS

APPENDIX B: SURVEY QUESTIONNAIRE

PART 1: ABOUT THE PARTICIPANT

For statistical purposes only, please provide the following background information.

1.1 Please confirm if you are you registered as a valuer, with experience in municipal valuation, and willing to participate in this survey?

Response	X
Yes	
No	

Please Note: If your answer is no to the above, you may exit the survey.

1.2 Which age group do you belong to? (Mark with "X")

Age Category/ Group	X
Less than 25 years	
25 to 34 Years	
35 to 44 Years	
45 to 54 Years	
55 to 64 Years	
65+	

1.3 Which gender do you belong to?

Gender Group	X
Male	
Female	

1.4 Which of the following types of mass valuations were you ever involved in? (Mark with "X")

Type of Valuation	X
General Valuation Roll	
Supplementary Valuation Roll	
Company Asset Valuation	
Any Other	
Specify:	

1.5 Which of the following roles did you hold during the mass valuation projects selected above? (Mark with "X")

Role	X
Municipal Valuer	
Assistant Municipal Valuer	
Data Capturer	
Project Manager	
Any other role	
Specify:	

1.6 Under which category amongst the categories below does your general valuation experience fall? (Mark with "X")

Years of Experience	X
No Experience	
1-2 years	
3-4 years	
5 years +	

1.7 How many times were you involved in each of the following mass valuations? (Mark with "X")

Type of Valuation	None	1-3	4-6	7-9	10+
General Valuation Roll					
Supplementary Valuation Roll					
Company Asset Valuation					
Any Other					
Specify:					

1.8 What is your highest formal qualification in property valuations or any of the relevant fields? (Mark with "X")

Qualification	X
National Diploma	
Bachelor's Degree	
Honour's Degree	
Master's Degree	
PhD	
Any other	
Specify	

1.9 Which professional bodies are you affiliated with?

Qualification	X
SACPVP	
SAIV	
BPVA	
RICS	
ASA	
Any other	
Specify	

PART 2: RESEARCH QUESTIONS

Municipal Valuation Accuracy/ Inaccuracy

2.1 Do you agree that valuation accuracy is important in the following mass valuations, and to what extent?

Valuation Type	Strongly disagree	Disagree	Not Sure	Agree	Strongly Agree
Municipal Valuation Roll (GVR)					
Supplementary Valuation Roll (SVR)					
Any other mass valuation					
Specify:					

Any other comment:

_____

_____

2.2 Considering your experience in mass valuation, what would you say is the average level of valuation inaccuracy in the following mass valuations?

Valuation Type	N/A	0-5%	6-10%	11-15%	16-20%	21%
Municipal Valuation Roll (GVR)						
Supplementary Valuation Roll (SVR)						
Any other mass valuation						
Specify:						

Any other comment:

_____

_____

2.3 On a scale of 1 to 5, please indicate to the degree to which you would prefer the use of the following approaches in assessing the level of valuation accuracy in municipal valuations.

Assessment Approach	Strongly disagree	Disagree	Not Sure	Agree	Strongly Agree
Statistical Analysis (Regression analysis)					
The extent of objections					
Independent audit					
Any other approach					
Specify:					

Any other comment:

_____

_____

Factors/ Challenges Leading to Valuation Inaccuracies.

2.5 On a scale of 1 (minor) to 5 (major), please indicate the extent to which the following factors/ challenges contribute to valuation inaccuracy during municipal valuations.

Valuation Challenges	Not At All	Lesser Extent	Some Extent	Greater Extent
Limited objection time allocation				
Inappropriate valuation approaches				
Inadequately qualified valuers				
Poor assurance/ quality control				
Inadequately experienced valuers				
Poor valuation data quality				
Poor valuation data maintenance				
Lack of country- specific valuation standards				
Poor understanding of property markets				
Dearth of market data				
Undue influence by unscrupulous clients				
Insufficient time spent on valuation				
No consequences for valuer negligence				
Other factors				
Specify:				

Any other comment:

_____

_____

The State and the Use of Mass Valuation Standards in SA.

2.6 Considering your experience in mass valuations. Which of the following standards are used, and to what extent?

Existing Mass Valuation Standards	Not At All	Lesser Extent	Some Extent	Greater Extent
Standard on Mass Valuation (IAAO)				
Valuation Standards (RICS)				
International Valuation Standards (IVSC)				
Self-defined valuation standards				
Hybrid of the standards above (International)				
Any other valuation standards				
Specify:				

Any other comment:

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2.7 To what extent do you think the valuers make use of the following thematic areas of the existing international mass valuation standards?

Components/ Themes of the Existing Mass Valuation Standards	Never	Almost Never	Almost Every Time	Every Time

Collection and maintenance of property data				
Valuation Approaches and Models				
Valuation Quality Assurance				
Resourcing and Staffing				
Policy and Administrative Issues				
Any other component/ theme				
Specify:				

Any other comment:

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Mass Valuation Approaches and Models

2.8 How often are the following valuation methods used in mass valuations?

Mass Valuation Approaches	Never	Almost Never	Almost Every Time	Every Time
Sales Comparison Approach				
Income Approach				
Cost Approach				
Any other approach				
Specify:				

Any other comment:

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_____

2.9 How often are the following mass valuation models employed in mass valuations, in SA?

Mass Valuation Models	Always	Usually	Sometimes	Rarely	Never
Computer Aided Mass Appraisal (CAMA)					
Artificial Neural Networks (ANN)					
Multiple Regression Analysis (MRA)					
Spatial Analysis Models					
Fuzzy Logic					
Any other approach					
Specify:					

Any other comment:

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2.10 To what extent did the following reasons contribute to the choice on valuation approaches and models above?

Reasons for choosing the valuation approaches/ models	Strongly Agree	Agree	Neither Agree/ Disagree	Agree	Strongly Agree
It can handle large mass valuations					
Yields higher valuation accuracy levels					
Easy to understand and explain					
Acceptable to the courts					
Contemporary method					
Easy to use					
Any other approach					
Specify:					

Any other comment:

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_____

Framework for Mass Valuation Standards

2.11 To what extent, do you think the international mass valuation standards should be localised?

Localise the Standard on Mass Appraisal for Real Properties (IAAO's)	No	Yes
Strongly Agree		
Agree		
Nether Agree/ Disagree		
Disagree		
Strongly disagree		

Any other comment:

_____

_____

2.12 Do you agree, and to what extent, that the following are the motivation reasons to localise the international standards?

Framework for Mass Valuation Standards	Strongly Agree	Agree	Neither Agree/ Disagree	Agree	Strongly Agree
To improve on the accuracy of mass valuation					
To forge compatibility with the local legal framework					
To rationalise the existing variety of standards					
To avoid or minimise objections to the valuation rolls					
To restore public confidence in professional valuers					
Other factors					
Specify					

Any other comment:

2.13 By indicating with any number from 1(lesser extent) to 5 Greater extent), to what extent should each of the following stakeholders be involved when developing the mass valuation standard?

Framework for Mass Valuation Standards	Strongly Agree	Agree	Neither Agree/ Disagree	Agree	Strongly Agree
SACPVP					
CoGTA					
Municipal Ratepayers' Associations					
SAIV					
BPVC					
Any other stakeholders					

Any other comment:

2.14 Do you agree that the following themes be included in the proposed Standard on Mass Valuation for South Africa, and to what extent?

Framework for Mass Valuation Standards	Strongly Disagree	Disagree	Not Sure	Agree	Strongly Agree
Collection and maintenance of property data					
Valuation Approaches and Models					
Valuation Quality Assurance					
Resourcing and Staffing					
Policy and Administrative Issues					
Any other stakeholders					
Specify					

Any other comment:

General Comments

2.15 Do you have any general comments relating to improving the standard for mass valuations in South Africa?

In conclusion, you are invited to furnish us with contact details, should you be comfortable to do so. These details are intended for use queries relating to this academic study.

Name : Phone :

Address : Fax :

Mobile : email-mail :

APPENDIX C-1: INTERVIEW SCHEDULE

Name	Date	Platform/ Venue
PVG001	2020/03/17 at 10H00	Ms Teams
PVG002	2020/03/22 at 14H00	Zoom
PVG003	2020/03/24 at 10H00	Zoom
PVG004	2020/03/25 at 11H00	Ms Teams
PVPS001	2020/04/02 at 12H00	Ms Teams
PVPS002	2020/04/02 at 14H00	Ms Teams
PVPS003	2020/04/04 at 09H00	Ms Teams
PVPS004	2020/05/07 at 10H00	Zoom
PVPS005	2020/05/08 at 11H00	Zoom
PVPS006	2023/03/07 at 12H00	Teams
PVPS007	2023/03/07 at 15H00	Teams
PRE001	2020/06/09 at 10H00	Zoom
PRE002	2020/06/12 at 11H00	Ms Teams

APPENDIX C-2: ONE- ON- ONE INTERVIEW QUESTIONS

1. What are your views regarding valuation accuracy especially in relation to municipal valuations?
2. The municipal valuations are generally in accurate. Sometimes, they are only 50% of the market values. Our concern, however, is not on the valuations lower than the market value, rather on those values higher than the market value.
3. Do you think, municipal valuers do apply any valuation standard when conducting municipal valuations?
4. Should South Africa simply adopt and implement the international standards, or should it localise and adapt the international standard, or should it develop her own standard from the ground up?
5. If we all agree that there is a need to formalise the standard for South Africa, what should constitute the main components of the mass valuation standard, and why?
6. Based on your observations, what are your views regarding the proposed sMVPR as was circulated for comments, and finally adopted by the SACPVP?
7. Who do you think should be consulted when the standards are developed for mass valuation in South Africa and why?
8. Which mass valuation model could be the best fit for South Africa, given the aggressive technological developments affecting valuations, including the use and the growing compulsion to use the MRA OLS, ANN?

APPENDIX D-1: FOCUS-GROUP DISCUSSIONS

AGENDA

#	Item Description	Item Leader
1.	Welcome and Introductions	Steven Ngubeni (PhD candidate)
2.	Research Background	Steven Ngubeni (PhD candidate)
3.	Proposed Framework for Mass Valuation Development	Steven Ngubeni (PhD candidate)
4.	Question Guided Discussion	Steven Ngubeni (PhD candidate)
5.	Conclusion and Closure-	Steven Ngubeni (PhD candidate)

APPENDIX D-2: FOCUS GROUP DISCUSSION ONE - GUIDE QUESTIONS

1. What is your reaction to the proposed framework for the development of a mass valuation standard for South Africa, as presented?
2. Do you think the proposed framework for the development of a standard for South Africa, provides solutions to mass valuation challenges responsible for valuation in accuracy?
3. Is the proposed procedural framework responsive to the concerns relating to public participation limitations as observed from the development of the sMVPR?
4. Does the proposed substantive framework cover all the major aspects necessary to guide the valuers in the determinations of market values in mass valuations?
5. Do you think the proposed framework for the development of the mass valuation standard in South Africa, is workable and adaptable for developing countries?

APPENDIX D-3: FOCUS-GROUP DISCUSSION TWO - GUIDE QUESTIONS

1. The proposed framework has been updated as per initial feedback and inputs as presented. What is your reaction to the second draft?

2. Are there any additional issues you feel should be addressed in the final draft, both substantively and procedurally?

3. Do you think that the participation in the development of the mass valuation standard, should be open to stakeholders beyond professional valuers?