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## Automated Valuation Models: A Practitioner Perspective

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**Abstract:** Following a brief literature review, the various forms of automated valuation models currently in use by valuers in Australia are identified and taxonomised.

The role of automated valuation models is considered within the context of valuation theory and practice including valuation accuracy.

Conclusions are then drawn regarding the potential for future use of automated valuation models by valuers in Australia.

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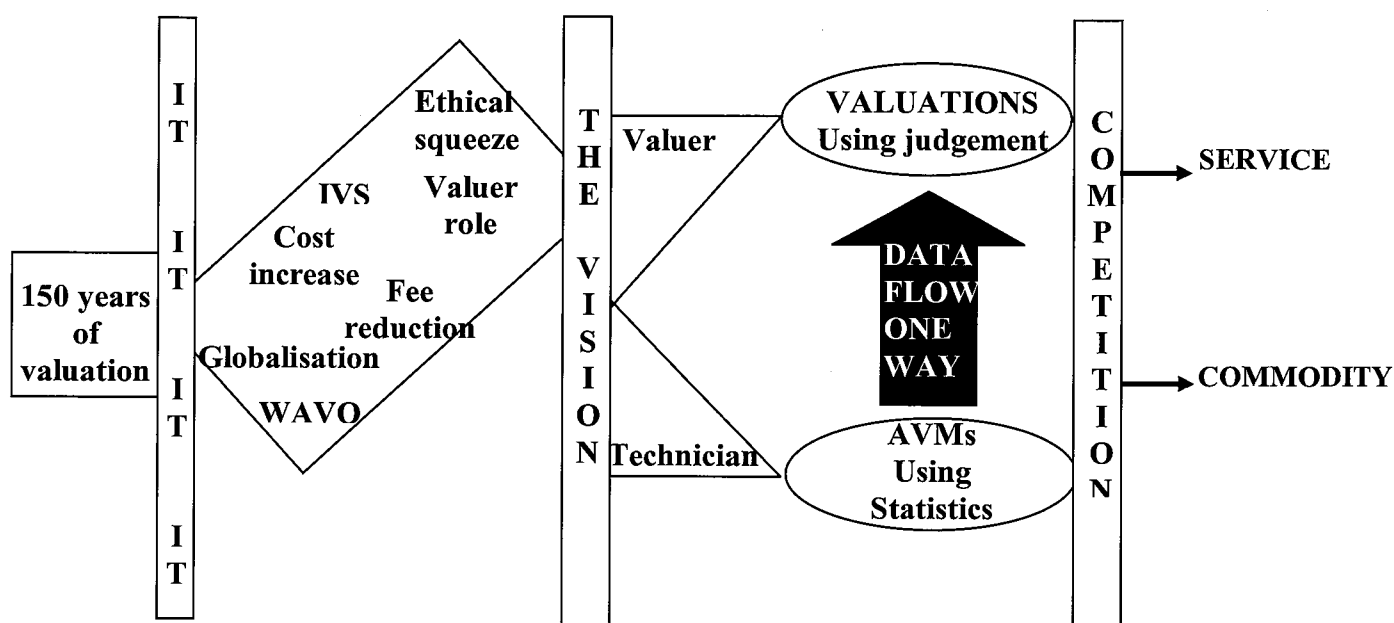
Automated Valuation Models, or AVMs, have been used in Australia for rating purposes since the early 1970's (Fortelny and Reed, 2005) and are widely used in North America for low risk mortgage originations (Gilbertson and Preston, 2004).

Much attention has been focused on AVMs over the recent past as residential mortgage lenders in Australia seek to follow what their overseas counterparts have been doing for many years, recognising:

- advances in technology (Fortelny and Reed, 2005), including GIS (Elliott and Warren, 2005);
- increased data collection (Fortelny and Reed, 2005), including availability of more comprehensive and rigorous market data (Elliott and Warren, 2005) and acknowledging that the collection, organisation and formatting of data is ripe for automation (Gilbertson and Preston, 2004);
- expansion of the internet (Fortelny and Reed, 2005);
- high cost of certified valuations (Fortelny and Reed, 2005);
- increased competition between banks and mortgage brokers driving increased pressure for cheaper and faster valuations to meet shrinking deadlines in residential mortgage lending (Fortelny and Reed, 2005);
- lender frustration (Fortelny and Reed, 2005);

- cost pressure in the high volume sector of the residential market (Elliott and Warren, 2005); and
- development of risk management approaches to the mortgage market (Elliott and Warren, 2005).

Gilbertson and Preston (2004) place the evolution of AVMs in the context of the various forces influencing the valuation profession and proffer the important distinction between valuation as a service and as a commodity (Figure1).



**Forces Influencing the Valuation Profession**

**Figure 1**

**Source: Gilbertson and Preston (2004)**

Elliott and Warren (2005) validly apply Porters 5 Forces framework to the valuation industry and conclude that the trend to use of AVMs is a typical example of substitution, where the market simply substitutes a new and more relevant product for an existing and less relevant product.

For the residential mortgage industry, the combination of substitution with the virtuous circle of cheaper and faster valuations leading to faster loan approvals leading to greater market share is effectively irresistible.

As Motta and Endsley, 2003 note, “the single value opinion at a single point in time is a shrinking market”.

There is, however, considerable confusion evident concerning exactly what an AVM is and how it relates to other approaches to property valuation.

### Literature Review

A variety of definitions and descriptions of an AVM may be found in recent literature including:

“ . . . an AVM is a mathematically generated statistical model that undertakes a pre-set calculation depending on the type of data input” (Fortelny and Reed, 2005)

and

“A user inputs the target address and property characteristics (eg number of bedrooms, age, etc) into the computer model which will then return an estimated value based on the data available to the model.” (Gilbertson and Preston, 2004)

In essence, an AVM may be summarised as being based on some form of software programme that does not require an inspection of the property.

The absence of an inspection appears to have become a major source of concern for practitioners (Fortelny and Reed, 2005). Significantly, Newell (2005) found in 1990 and again in 2002, that 100% of valuers inspect properties and 99% measure or obtain plans of major structures. With the inspection so deeply embedded in the valuation process, it is not surprising that the absence of inspection has become a major source of concern.

Fortelny and Reed (2005) identify two types of AVM, being:

- Indexed AVM – where a property is sold in a given year and subsequently resold in a later year. The focus is, therefore, on the period of time elapsed and the difference in absolute values, though this disregards any changes or upgrades to improvements during the period; and
- Hedonic AVM – where the calculation of the value of a property is a statistically function of certain weighted characteristics.

The advantages and disadvantages of AVMs are extensively addressed in recent literature, including:

#### Advantages of AVMs

- inexpensive, offering substantial cost savings in employee hours, vehicles, office expenses (Fortelny and Reed, 2005);
- speed, with quicker results than conventional approaches (Fortelny and Reed, 2005);
- non-biased results, being as good as the data used but not swayed by sentiment or lender/borrower pressure (Fortelny and Reed, 2005);
- capable of having accuracy determined through a wide range of statistical tests including ratio analysis (Kane et al, 2004);
- reduce risk (Elliott and Warren, 2005);
- increase efficiency (Elliott and Warren, 2005); and
- eliminate human error and bias and physical inspection (Gilbertson and Preston, 2004).

#### Disadvantages of AVMs

- assumption of the existence of a property and its state, with problems if the property has been modified or has defects and potential fraud if the property is non-existent (Fortelny and Reed, 2005);

- reliance on the assumptions within the model with potentially limited supporting evidence, being dependent on the extensive statistical use of averages (Fortelny and Reed, 2005);
- if there is no data, a result is not always possible (Fortelny and Reed, 2005);
- a lack of flexibility with a fixed number resulting and no smoothing (Fortelny and Reed, 2005);
- timeliness of data, such as issues arising from a 3 month delay in the provision of VG data (Fortelny and Reed, 2005);
- concern over reliability due to absence of proven valuation methodology and supporting evidence (Fortelny and Reed, 2005);
- concerns over accuracy (Fortelny and Reed, 2005) with Kane et al (2004) noting accuracy comprises:
  - o validity – is the output what it says it is and is the model set up correctly?;
  - o reliability – the ability of the model to be repeated with the same or similar results using different sets of data; and
  - o precision – the ability of the model to measure market behaviour in a meaningful way;
- only suits certain properties, being suitable for areas that have similar properties and high turnover of stock but unsuitable for multi-million dollar properties or rural properties (Fortelny and Reed, 2005);
- necessary to test the model continually for accuracy/quality control against sales (Fortelny and Reed, 2005);
- prudent to have third party review/verification/audit of processes and outputs (Kane et al, 2004);
- necessary to constantly refresh the model to pick booms and busts (Fortelny and Reed, 2005);
- professional ethos and public interest priority are in growing conflict with creeping commoditisation (Gilbertson and Preston, 2004);
- takes the skill, judgement and experience of the valuer out of the process (Gilbertson and Preston, 2004);
- the inability to spot a “rogue” figure and correct before it influences the value of other properties (Gilbertson and Preston, 2004); and
- the lack of advice to the public (Gilbertson and Preston, 2004).

Significantly, some disadvantages of AVMs may not be disadvantages but reflect limits in the specification of the underlying model:

- rigidity and inflexibility, ignoring other value influencing factors (Fortelny and Reed, 2005);
- considering only some of the buyers considerations and missing elements that may result in a below/above market valuation (Fortelny and Reed, 2005); and
- ignoring the heterogenous nature of property and assuming strong similarities between certain types of real estate “although this (statement) is unfounded as no two properties are identical” (Fortelny and Reed, 2005).

There is, however, considerable confusion evident concerning exactly what an AVM is and how it relates to other approaches to property valuation. Using the definition of Fortelny and Reed (2005), above, an AVM is not:

- a desk top valuation (“For example, a common version of AVM is referred to in the industry as a “desk top valuation”, which is undertaken without an inspection with relatively little data available and can be completed without leaving the office” (Fortelny and Reed, 2005)); or

- a desktop valuation with client telephone contact and pre-determined questions (the CBA model in Fortelny and Reed, 2005); or
- an AVM based not on an automated centralised process but on a bespoke basis by individual valuers (Elliott and Warren, 2005); or
- a kerbside valuation (Newell (2005) found only 13% of respondents in 2002 would carry out a kerbside valuation if requested by third party clients).

### Taxonomy

Using the definition of Fortelny and Reed (2005), above, the principal approaches may be summarised as:

- valuation;
- kerbside / drive by;
- desk top; and
- AVM,

which are taxonomised in Table 1.

Current Descriptor	Process	Inspection	Report
Valuation	On site, in office	Internal	Long
Valuation ?	On site, in office	Internal	Short
Valuation ?	On site, in office	Internal	None
Drive By/Kerbside	By site, in office	External	Long
Drive By/Kerbside	By site, in office	External	Short
Drive By/Kerbside	By site, in office	External	None
Desk Top	In office, open data sources, verbal contact	None	Short
Desk Top	In office, open data sources, verbal contact	None	None
Desk Top	In office, open data sources, no verbal contact	None	Short
Desk Top	In office, open data sources, no verbal contact	None	None
Desk Top	In office, fixed data sources, verbal contact	None	Short
Desk Top	In office, fixed data sources, verbal contact	None	None
Desk Top	In office, fixed data sources, no verbal contact	None	Short
Desk Top	In office, fixed data sources, no verbal contact	None	None
AVM Hedonic	In office, weighted characteristics, valuer input	None	Short
AVM Hedonic	In office, weighted characteristics, valuer input	None	None
AVM Hedonic	In office, weighted characteristics, no valuer input	None	Short
AVM Hedonic	In office, weighted characteristics, no valuer input	None	None
AVM Index	In office, using indices, valuer input	None	Short
AVM Index	In office, using indices, valuer input	None	None
AVM Index	In office, using indices, no valuer input	None	Short
AVM Index	In office, using indices, no valuer input	None	None

### Taxonomy of Principal Approaches

Table 1

Source: Author

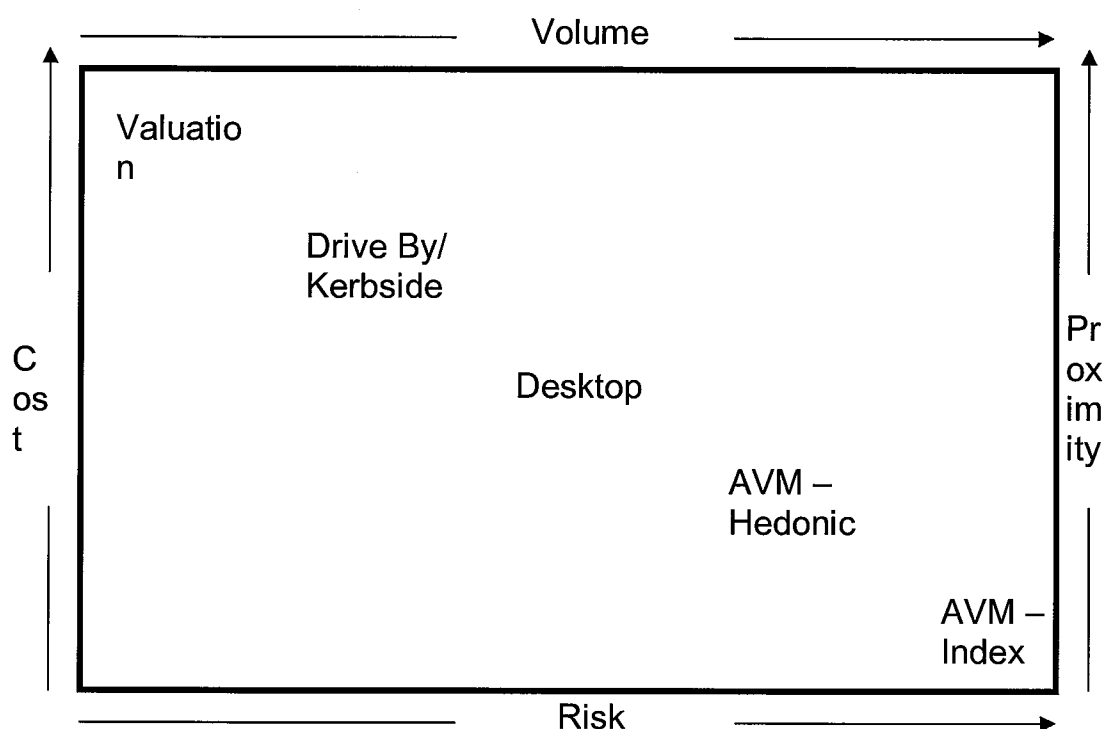
The distinguishing features between the principal approaches may be contended to be the process adopted, existence or otherwise of an inspection and nature of the valuation report.

### Role of AVMs

Interestingly, the conceptual gap between analytical approaches to valuation based on comparable sales and AVMs is relatively narrow.

As Mannell (2005) notes, the use of grids provides an analytical approach to valuation based on comparable sales as does the division of the valuation into land, main buildings and ancillaries. Such an approach is conceptually similar to a three variable valuation model which, if repeated extensively and recorded in a data base, resembles an AVM.

Figure 1 proposes a framework for the principal approaches, taxonomised in Table 1, based on cost, risk, volume and proximity.



**Framework For Principal Approaches**

**Figure 2**

**Source: Author**

The respective elements of the framework may be described as follows;

- cost – being the cost of undertaking the approaches which is greatest for a valuation and least for an AVM;
- risk – being the level of uncertainty inherent in the respective approaches which is least for a valuation (where there is an inspection and rigorous approach) and greatest for an AVM (where there is no inspection and a standard statistical approach);
- volume – with AVMs being considerably more scaleable than valuations; and
- proximity – being the likelihood of the assessment approximating open market value, being potentially greatest for a valuation and least for an AVM. (The term

proximity is used deliberately to distinguish from valuation accuracy, for which there is a specific body of knowledge.)

Essentially, Figure 2 illustrates that there is a trade off between each of cost, risk, volume and proximity. By seeking to reduce cost and accommodate increased volume, risk and proximity may rise. Conversely, risk and proximity may be reduced if cost is higher and volume is lower.

Acknowledging the trade off, the selection of which approach most suits it's business requirements is ultimately a decision for the client.

### **Conclusion**

The potential for the future use of AVMs by valuers in Australia would appear significant. The attractiveness of a lower cost, faster substitute to a sector as dynamic as financial services is simply too great to withstand.

As AVMs become more used, the quality of data improves, the statistics become more sophisticated and so confidence in the method rises leading to greater use and a virtuous circle emerges.

As Elliott and Warren (2005) note:

“With the almost inevitable growth of desk top valuations for residential mortgage lending, if valuers and the firms providing valuation services are to prosper, they need to be part of the solution rather than part of the problem.”

Increased use of AVMs may be expected to lead to increased governance, including either:

- regulation by Government - Fortelny and Reed (2005) note that the US Federal Reserve Board in 1994 increased the specified threshold to US\$250,000 above which a certified valuation is required. Government in Australia may contemplate a similar threshold approach; or
- regulation by professional bodies - Gilbertson and Preston (2004) note that it is up to valuers and their professional bodies to define transparent and consistent standards for AVMs and then to lobby government where necessary to adopt appropriate safeguards.

The opportunities for the valuer in the growing use of AVMs are considerable. Motta and Endsley (2003) note:

“individual properties in stable markets may be valued by an AVM, but it is local valuers who need their fingers on the pulse of the market to warn investors when the supply side is too strong or the demand is starting to weaken”

and Kane et al (2004) note a role for valuers in the audit and review process for outputs of AVMs.

Consistent with the use of AVMs, the management and interpretation of information provides enormous opportunities for valuers:

“The biggest rewards will go not to the individuals who can gather the most information, but to the individuals who can use

information from numerous sources to create value.” (Motta and Endsley, 2003)

and

“successful valuers of the future will not be information gatherers, but information arbiters” (Motta and Endsley, 2003)

and

“the real estate valuer is an independent axis around which property information flows” (Motta and Endsley, 2003)

and

“In the past it was market knowledge that set valuers apart from their competitors, but today it is what they do with that data that differentiates.” (Gilbertson and Preston, 2004)

There is, however, a significant risk for the valuation profession that commoditisation and automation creep up incrementally (Gilbertson and Preston, 2004) though forewarned is forearmed.

There is also a challenge for the valuation profession as to who is best placed to undertake work associated with AVMs:

“The profession will have to consider how to train more technicians equipped to handle more of the routine work and who are better able to compete on price.” (Gilbertson and Preston, 2004)

that may be expected to lead to a vigorous debate within the valuation profession.

Given the confusion that arises from the loose use of the term AVM, it may be beneficial for the valuation profession to determine and aggressively advocate what is a valuation and what is not a valuation but is something less than a valuation. As Gilbertson and Preston (2004) enquire:

“Is it time to redefine valuation?”

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