

Valuers embracing technology and collecting property data 'in the field'

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There are few valuation companies these days that do not provide their staff mobile-electronic means of collecting property valuation data in the field, where as only a decade ago this was not the case. This paper gives a brief picture of how mobile data-collecting technology has changed an industry as it has changed many others who rely on information gathered in the field.

Most industries now see the benefits to collection and storage of information being electronic rather than paper-based and the valuation industry is no different. The change to electronic means has been sparked by both the progress of suitable mobile devices and the commercial pressures to find operating cost and time efficiencies.

A series of questions may be asked:

- What will the impact of ongoing technological changes be on the valuation industry in the long term?
- How does a valuation company or sole practitioner assess the benefits of changing valuation processes performed in the field?
- When may mobile electronic devices eclipse the use of traditional paper-based data-collection methods?

Introduction

The valuation industry has identified two main needs for mobile data-collection technology in the field. The first is to quickly and accurately measure property areas and the second is the need for the rapid collection of field notes.

From early 2000 both tape and trundle wheel measurement techniques gave way to hand-held laser-measuring devices. The measurements used to be written down

on pieces of graph paper and areas were manually calculated using basic geometry, sometimes with the aid of a calculator.

The arrival of *Bluetooth* support (a mechanism allowing the wireless transmission of data to a computer or handheld electronic device) on laser measurers then meant that the data could be captured using support software, and the geometry of the property could be drawn and measured accurately and immediately onsite. This then led to seeking mobile devices with applications able to collect field notes onsite, though to-date, many valuers still carry around printed forms commonly known as "tick and flick" sheets on clipboards for taking notes in the field.

By capturing such information electronically it would be possible to convert these recorded notes into a valuation report, thus reducing time and errors and eliminating the need for transcribing or retyping hand-written notes.

With each new technological wave hardware reduces in size, more support software programs are made available and the overall cost becomes viable. With a mobile device the volume of tasks that can be done by a valuer onsite will increase.

The history and pace of device technology

To understand how quickly mobile technologies are evolving compare the rapid development of the PC (personal computer) with that of today's *mobile* and *smart phone* revolution.

Desktop PCs have their genesis in the 1974 Xerox Alto – which was the first desktop sized computer that featured a graphical user interface and a mouse for pointing and clicking. It cost more than \$30,000 in today's dollars and ran with a clock speed of 5.8 MHz and 128 kilobytes of storage. Today a typical desktop PC can cost less than \$1,000, with a clock speed of 3 GHz and storage of 1 Tb. In Australia it wasn't until 2008 when 68% of the population owned a PC.

Contrast this time scale with that of the commercialisation of the mobile phone. Australia's first mobile phone call was made in 1987 on a device that cost more than \$4,000, it was the size of a brief case and had a battery life of about 20 minutes. From this standing start, it took only 20 years for Australia to pass the 1 mobile phone per capita mark in 2007. Today "basic" mobile phones weigh as little as 100 grams, they easily fit inside your pocket and cost, on average, less than \$100.

Not only are the desktop computer and the mobile phone devices themselves evolving quickly, but the gap between the development of a prototype of a technology and its commercial adoption is dramatically shrinking too.

The rapid evolution of the smart phone is important to notice too, being a product of both the mobile phone and the PC. IBM developed the first 'smart phone' in 1993 called *Simon* being the first phone with an on-board computer featuring e-mail, an address book, a calendar and a note pad. It cost the equivalent of \$1,356



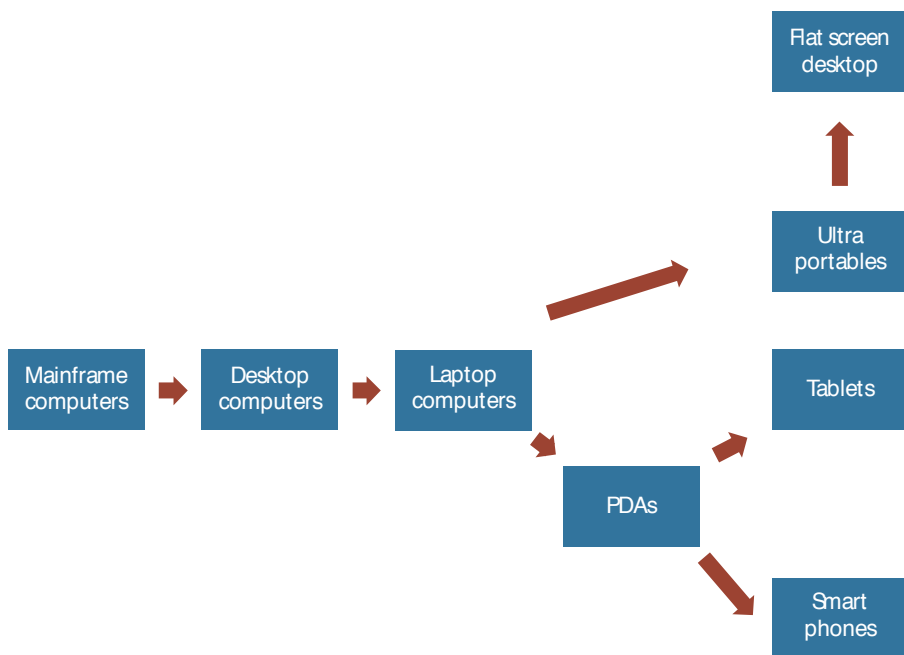


Figure 1 Evolution of device classes

in today's dollars, weighed approximately half a kilo and had a microprocessor running at 16 MHz.

Today 43% of Australians own a 'smart phone' capable of at least browsing the Internet and making use of downloadable software applications (source: Nielsen). A few years ago it would have been hard to accept the social and cultural impact mobile device technology would have made in Australia, and globally. Who hasn't relaxed at a café, ridden on public transport or taken a lunch break surrounded by people texting, twittering, browsing or reading books off smart-phone devices?

To assess the speed of arrival of new platforms and technologies we need to define the *point of general adoption* (PGA). This will be the point at which the maturity of a given class of technology leads to it no longer being considered by late adopters as *risky* or *unusual*. If the point is >40% utilisation by the intended user base, the time to reach PGA for the last three technological revolutions was:

- 20 years for the personal computer
- 10 years for the mobile phone, and
- 5 years for the smart-phone.

As it can be seen the mobile phone took half the time and the smart-phone took a quarter of the time it took for the PC to be adopted.

The adopting pioneers of device technologies are important to the future of its proliferation. The early adopters of the technology however have little actual impact on the valuation profession as a whole; it is only when a technology begins to reach the *point of general adoption* that the impacts are noticed throughout the industry. Wider scale adoption is what impacts on industry standard practices and thus changes the expectations of the industry's clients.

As a comparison for thought, from 1974 to 2008 these were but a few of the improvements made:

- Computing speed per kilo of device weight increased by more than 6,200 times;

- Storage capacity per kilo of device weight increased by 6.25 million times; and
- The cost per unit of computing speed dropped by 7,200 times.

In addition to these simplified metrics, devices have been installed with valuation-relevant programs such as GPS software, cameras, gyroscopes, thermometers, compasses, and internet access to name a few. Each of these developing capabilities have their own improvement curve that can track how much faster, smaller, cheaper and less power hungry they will become over time.

Point of Diminishing Return (PDR) from device improvements

If it is reasonable to forecast that future improvements to device technology will continue at approximately the same pace as seen in the past, then the following conclusions can be made:

- Device weight will drop dramatically – most any desired form factor could be accommodated;
- Device cost will drop substantially – making almost any commercial application economically viable; and
- Device speed and storage will eventually exceed our ability to make meaningful use of increases in computing power or storage space.

In practice, of course, there will be some technical and commercial limiting factors that will prevent the absolute attainment of the above predictions. Nevertheless, we can still conclude that there must be a point in the evolution of mobile devices at which economically meaningful improvements to hardware capability effectively cease. At this point further enhancements and improvements will

have little or no material commercial impact on how fast a valuation can be performed in the field or how quickly a return on investment can be generated from adoption of such devices for field operations.

Some may argue that this point has already been reached since the introduction in late 2010 of low-cost netbooks, tablets and smart phone devices. Certainly any future enhancements to the hardware of these classes of devices are likely to have limited further impact on the commercial viability of using them. The current acceleration of growth in usage of mobile devices in the preparation of valuations is the single largest leading indicator that this Diminishing Return point is fast approaching.

Evolution of Device Form Factor

Another aspect of the mobile revolution directly affecting the valuation industry is the physical size of available devices. The ability to pack a required amount of computing power into a device, with the desired size and weight, will increase the valuer's task capability onsite, and thus influence the rate of device adoption.

Evolution of Device Classes

Early users of tablet or smart phone technology in the field have frequently commented on the slow speeds of their device, that screens are difficult to read in sunlight and glare and that their device may be too heavy, too small or too large, too expensive and sometimes too fragile. These issues have largely been addressed in the latest generation of devices and further improvements are already in development stage destined to be available in Australia in the coming year.

Our ability to miniaturise devices that

Paper Based Approach	Electronic Device in the Field
<ul style="list-style-type: none"> ■ <i>Sketch and measure areas.</i> Area Calculations generally done at an office after the inspection. ■ <i>Tick and Flick Sheet used to record field notes,</i> such as PC items, split up of bedroom and bathroom attributes. Notes subsequently have to be re-typed by the valuer or an administration staff. ■ <i>Print outs of Sales Evidence generated in advance of an inspection – notes taken following drive bys of selected sales.</i> ■ <i>New Sales evidence observed and captured on paper notes,</i> to be manually added to a database and checked for duplicate entries. ■ <i>Last minute instructions received by mobile phone alert;</i> documentation not available, requiring a return to the office. ■ <i>Photographs taken with a separate digital camera,</i> downloaded at the office and then manually associated with a report. 	<ul style="list-style-type: none"> ■ Sketch, Measure and Calculate Areas in real time while on site. ■ Site Notes captured using push button controls with dictation and e-paper as a backup for non-standard situations. ■ Live Sales Evidence available in situ. ■ Documentation (including documents provided after the valuer has left for their inspection) available while on site. Documentation can be verified in real time and used in the assessment process. ■ New Sales evidence captured in real time and made instantly available to all valuers in the company via a central database. ■ Photos added directly from the device's camera into the appropriate job (no download and manual matching step required). ■ Dictated notes can be sent from the field upon completion and transcribed by staff at office while the valuer is on the road, enabling parallel processing of report tasks. ■ Analysis, QA and Replacement Insurance can be calculated. ■ Draft report prepared while in the field. ■ Potentially submit report to the client directly from the field if appropriate. ■ New instructions can be received while in the field – run sheet adjusted accordingly allowing the valuer to capitalise on opportunities to add to their existing run for that day.

Table 1

“pack a punch” has led many valuers to now complain that their smart phone device has actually become too small to use comfortably. The manufacturers of these devices have heard similar feedback across their client base and this has led to the development of a new middle-

sized device broadly referred to as the ‘tablet’ or ‘slate’, such as the *iPad* created by Apple. This device class is now filling a form factor void between the laptop/netbook and smart-phone market, with sizes falling into three categories: small, medium and large.

The smart phone form factor has the advantage of portability and integration of the phone and can be said is a class of device that you don't need to remember to bring with you as it will likely always be in your pocket. The tablet form factor provides a larger screen space for studying documentation and graphical applications while onsite. Whereas the tablet is not as convenient to carry as the smart phone it is easier to use in the field than a laptop computer.

The laptop or convertible tablet with a keyboard can provide a full functioning software environment and is generally used within a car or desk environment. This class of device is often just a little too large to be comfortably used when actually inside a property conducting a site inspection.

Change in activities occurring in the field

The increased power and broader connectivity of mobile devices have increased the range of tasks that can be conducted in the field. Given the advances in hardware capabilities and near ubiquitous network access, the only remaining limiting factor for valuers is the feature set of the software they use when in the field. In theory a valuer, equipped with the appropriate mobile device and programs, could conduct all necessary duties while in the field therefore obviating the need to return to the office altogether.

This change of approach to in-the-field activities will become a key determinant in calculating the economic viability for a company to migrate to an all electronic field-data collection strategy.

Table I shows a common comparison to continuing a paper approach to collecting and distributing valuation data in-the-

field versus changing to electronic data capturing devices.

Change in activities occurring in the office

The applications of improved technology are not limited to the systems used in the field. Indeed it's likely that there will be a number of steps previously conducted in the field that may in the future be conducted from the office; the emergence of *Desktop Valuation* products is the first sign of this. Currently limited in market scope to lower credit risk situations, there is a case growing for using these technologies as part of full inspection valuation products.

The companies that embrace this early will likely gain a clear competitive advantage.

A case in point is the application of aerial mapping and 3D built environment-modelling services available over the Internet. Services such as NearMap (www.nearmap.com) and AAM (www.aamgroup.com) have changed the risk equation of relying on aerial photography to identify, assess and even measure a property prior to an actual on-site inspection. With an average update frequency of 1 month, coverage of the majority of the population, as well as resolutions of up to 1 pixel = 3 cm on the ground, many of the risks currently associated with relying on such

information sources are gradually being reduced.

Such technologies are unlikely to remove the need for a physical inspection in the foreseeable future, but they do offer an opportunity to start the valuation process in a way not previously possible before physical access can be gained. The companies that embrace this early will likely gain a clear competitive advantage.

The ability to remotely analyse sales evidence in this manner has not been lost on the valuation industry either; companies are already validating calculations based on the split of sale price apportioned to land and improvements estimated from remote imaging services.

Thus the transfer of on-site activities into office-based activities done prior to an inspection also alters the total time that a valuer needs to spend on site.

Qualitative considerations in adoption of mobile technology

For most companies considering changes to their in-the-field processes, there are the qualitative factors to be determined such as:

- Resistance of existing valuation staff to change their practices versus the ability to attract and retain technical 'savvy' staff;
- Mandated adoption enforced by leading customers of the company (e.g. recent tenders requesting details on mobile technology employed by the company); and
- Perception and ability to manage risks associated with the use of mobile technology. (e.g. policies surrounding the ownership and recovery of hardware).

The future of mobile technologies in the valuation profession

As illustrated earlier there is past evidence which shows the growth of development and adoption of mobile technologies globally, the same is apparent within the Australian valuation industry. Hence some predictions can be made based on past history and present activities.

- *Universal adoption of mobile devices by the property profession before 2020 is a near 100% certainty* - this is likely to be driven by a combination of future lender panel selection criteria, the fundamental economics of process improvements that can be derived, and the changing demographics of the valuation profession.
- *Substantial and revolutionary new software and hardware improvements* - for example technologies that are currently bulky, complex and expensive will be improved to make the current process of sketching and measuring property areas all but obsolete.
- *Device Form Factor will extend to devices so small and powerful that they will be able to be worn* - assuming the form of a watch, or an earpiece and glasses with built in projectors.

In spite of the impressive technology improvements to come, the changes will have limited overall workflow benefits to the profession. The majority of workflow benefit to be derived from mobile technologies is already available to the profession. Each improvement will constitute only a small percentage of further efficiency to the minimum incompressible time it will take to complete a valuation report. ■

The consequential business impact on the property valuation profession from major technology shifts

Technology	Application	Industry Impact
Web 1.0 <i>Simple databases on the web</i>	The emergence of web sites that could efficiently distribute government and agents advice sales data.	<p>Reduced the time and difficulty associated with collecting and analysing comparable sales data.</p> <p>Levelled the field for many valuation companies that previously could differentiate their services on the basis of their proprietary accumulated sales data.</p>
Web 2.0 <i>Sophisticated multi-party application software delivered over the web.</i>	The start of valuation order aggregation and third party panel managers.	<p>New intermediaries are inserted in between valuation companies and their traditional finance clients.</p> <p>General reduction in fees and changes in the balance of power in the industry.</p> <p>Economies of scale required to operate efficiently on reduced fees leads to rapid consolidation & acquisition of valuation practices into national companies, networks and franchises.</p>
SOAP/XML/Web Services <i>A new method for software to communicate directly with other software without human intervention.</i>	The Finance Industry establishes LIXI. Among other goals, it provides a protocol for exchanging valuation reports and workflow information between all parties.	<p>Leads to the general homogenisation of valuation reports.</p> <p>Reduces the ability of valuation companies to differentiate their product on the basis of report contents and presentation.</p> <p>Lenders valuer selection focus switches to turn around times (through more transparent and consistent SLA reporting that's now possible).</p>
Smart Phones & Tablet Computers <i>Inexpensive Desktop PC power and internet connectivity now fits in a pocket.</i>	Valuation companies develop or purchase software to take the place of paper-based 'tick and flick' sheets.	<p>Valuers can turn around field inspections and report writing faster.</p> <p>Competition to deliver ever-faster turnaround times means more firms adopt some form of mobile technology.</p> <p>Banks take note of the impact of mobile systems on turnaround times for the most efficiently run companies and consequently raise their expectations of all valuation suppliers.</p>