HARNESSING THE POTENTIAL OF OPEN DATA FOR VALUATION TRANSPARENCY IN THE DEVELOPING WORLD.

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Abstract

There are many responsibilities on many disciplines in addressing both current and future demands related to the growth of cities in the developing world. As they are to be home to over 90 percent of the world's future children, addressing those demands is urgent.

Valuation is at the base of all economic activity. Consequently, accurate and accountable valuations at a proportionate cost can assist in improving market efficiencies for the populations themselves to address their challenges. A major impediment is that property markets in such cities can be opaque, both accidentally and deliberately, so that the information costs of obtaining the reliable data that accurate and accountable valuations require can be much higher than in more developed markets (in contrast to the values, which could well be much lower).

The use of open data can be a means of finding the cloth to provide the suit, the "suit" being the best market value reading possible in that market. Particularly when reliable government data is insufficient, by a process of triangulation a valuer can provide the best due diligence available in a market, and thereby contribute to a virtuous spiral in that market's evolution.

This paper explores how this might be done.

Introduction

The basic role of valuers worldwide is to form an opinion of what a particular property would sell for at a particular time, as if the sale meets the circumstances of market value as described in the IVSC definition hereunder:

"The estimated amount for which an asset or liability should exchange on the valuation date between a willing buyer and a willing seller in an arm's length transaction, after proper marketing and where the parties had each acted knowledgeably, prudently and without compulsion" (IVSC, 2014).

The question addressed in this paper is, "if any, which open data could and should be accessed in the many and varied property markets worldwide to satisfy that definition of market value"? Open data is defined as data that "anyone is free to access, use, modify, and share it — subject, at most, to measures that preserve provenance and openness".[1]

In turn, that question leads to further ones. For example, what should and should not be open data in order to facilitate the transparent and accountable functioning of property markets, and, thereby, better valuations at lower information costs? "Information costs" are defined as "costs that come from due diligence. That is, information costs include everything an individual or company spends when investigating whether a particular investment or activity is prudent and/or likely to be profitable.[2]

It turns out that these are questions with very serious ramifications on the ground. In the main, the countries with the lowest pro rata information costs are the highest on the UNDP's Human Development Index, and the countries with the highest pro rata information costs are the lowest on the UNDP's Human Development Index.

Here are two tables do show the highest and the lowest ten on the criteria of ease of doing business, registering property, obtaining credit (World Bank Group, 2014) and the countries' ranking by the International Property Rights Index of Physical Property Rights (IPRI 2014), and the United Nations Human Development Index (UNDP, 2014).

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[1] http://opendefinition.org/od/
[2]" http://www.technical-dictionary.org/definition-meaning/information_costs_6071.html

The Ten Easiest Countries to do Business in 2015

Rank	Country	Registering Property	Getting Credit	PPR Rank	UN HDI Rank
1	Singapore	24	17	1	9
2	New Zealand	2	1	4	7
3	Hong Kong SAR, China	96	23	30	15
4	Denmark	8	23	19	10
5	Korea, Rep.	79	36	Unranked	15
6	Norway	5	61	1	1
7	United States *	29	2	10	5
8	United Kingdom	68	17	19	14
9	Finland	38	36	1	24
10	Australia	53	4	17	2

The Ten Hardest Countries to do Business in 2015

Rank	Country	Registering Property	Getting Credit	PPR Rank	UN HDI Rank
180	Haiti	175	171	Unranked	173
181	Angola	164	180	Unranked	149
182	Venezuela, RB	102	104	96	67
183	Afghanistan	183	89	Unranked	174
184	Congo, Dem. Rep.	142	131	Unranked	186
185	Chad	166	131	93	184
186	South Sudan	180	171	Unranked	Unranked
187	Central African Republic	150	131	Unranked	Unranked
188	Libya	189	185	Unranked	55
189	Eritrea	176	185	Unranked	182

Now, correlation doesn't prove causation, and there are serious oversimplifications both in the data and its compilations. Even so, after charting the following correlations, the IPRI was able to conclude that "there is a positive, strong and significant relationship between the strengths of property rights protections and a country's economic performance as measured by GDP per capita" (IPRI, 2014):

FIGURE 3:
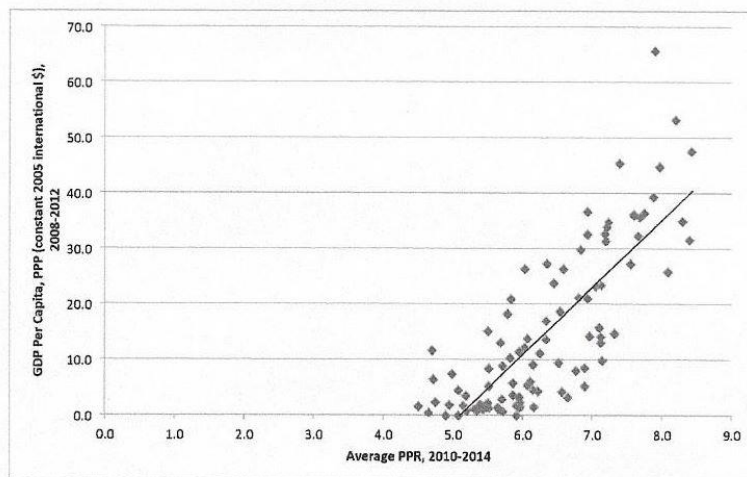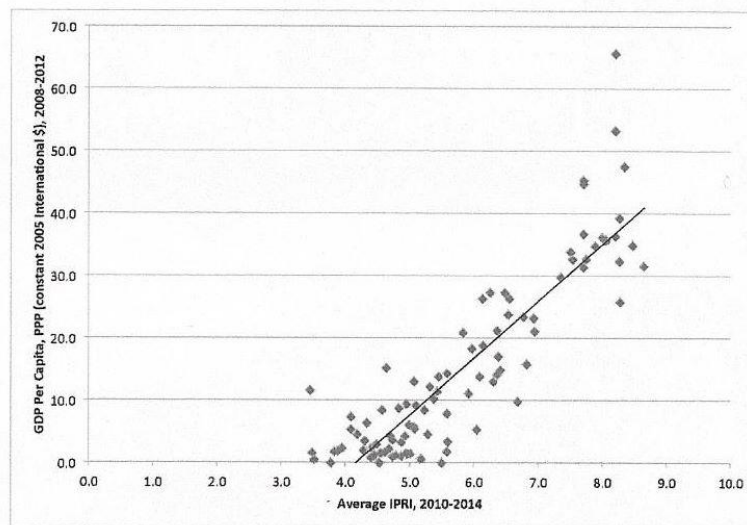Relationship between IPRI and GDP Per Capita

FIGURE 5:
Relationship Between PPR and GDP Per Capita

Figure 1: Source: IPRI (2014).

Moreover, the markets within the largest mass movement in human history, the movement of rural populations into cities, are especially vulnerable to such information costs. These cities

in emerging economies are where over 90 percent of humankind's new lives will begin (Chiquier & Lea, 2009, p. xxxiii.).

So unless something is done, and quickly, more and more new lives will find themselves trapped inside stiflingly opaque and dangerous property markets where the rule of just law - the fundamental requirement for transparent and accountable property markets - is effectively absent, thereby condemning the vast majority of them to less than fulfilling lives. This is a fate that does not come without significant social, economic, environmental and political costs.

This is not news. Up to now, the response has been to have surveyors running about measuring boundaries, and registrars registering these lots to provide security of tenure. Largely, these initiatives have failed, because they have put the cart before the horse.

From a valuer's perspective, you don't have to do that; it's highly desirable, but not central. Security of tenure is also not the main game: for valuers, fungibility of tenure under the circumstances described in the market value definition is the main game.

From that limited but still significant perspective, this should be the main focus: bottom up market reading first, with top down government infrastructure delivery on a co-evolutionary needs basis to follow – not, as hitherto, to lead. Millions have been wasted in aid before putting carts before horses.

Also from a valuer's perspective, security of tenure is only one of many variables to be accounted for by risk allowances in determining the market value. For valuers, that information cost definition is extended to meet the market value definition: what are the information costs of the due diligence required to be a knowledgeable, prudent willing etc. buyer and a knowledgeable, prudent, willing etc. seller? That is, any valuer in a particular market must understand what constitutes due diligence in that market if that valuer is to accept or reject a transaction as evidence of market value.

High government costs in terms of both time and fees are variable in that mix, as are factors such as the availability of finance, and social acceptability of market value transfers and other socio-economic values that feed into market values in the particular domain.

One result of all this is that if business needs to be done, it will be far more difficult to have government involvement if the information and other costs of such involvement exceed its benefits. In particular such information costs have to be proportionate to the property values involved.

People have been making markets since people have been people: they deal with the realities in their environment; they don't wait around until everything is simply hobbly-jobbly (meaning "perfect"). And as valuers are market readers, they can't wait around either to read them. Machines become useful if and when markets scale up, but the markets can be there whether or not surveys and registered tiles are.

One difficulty with holding yourself out as an expert market reader is that of professional indemnity. My co-presenter agrees I provide two instances. Firstly, a colleague told me how he was looking to buy a property on an idyllic beach in Asia. The title had the site's dimensions on it, so he measured the site, and lo, it was so, and so was the lot number. However, he looked a little more closely, and discovered that the site was not the same one at all, but one way back in the mountains. Secondly, in a conversation with another colleague, he related how a beneficiary of a titling scheme was going to sue for damages for anything he paid for which turned out to be different to any of the assumptions at the time of sale. For example, if he paid for a 950sqm site and it turned out to be only 900sqm, he would demand the difference.

Regarding the first instance, fraud is fraud wherever you go, and whenever you do. In opaque markets it is often difficult to prove and the legal system is often not up to the task of prosecution, and justice delayed is justice denied. As the institutional economist Bromley observes (Bromley, 1989) properly functioning real property markets are dependent upon the law catching and penalising crooks every bit as much as a properly functioning sport requires umpires or referees.

Re the second instance, the above definition of market value assumes due diligence by both parties to a sale, including prudence, and a valuer's standard of due diligence has higher expectations. But the law rarely the ass it is made out to be: it does not expect everything to be hobbly-jobbly (meaning "perfect"), and unless it is you will be sued for negligence. However, what comprises negligence is market-specific.

To describe this, the British common law has the legal fiction of the man on the Clapham omnibus. It means the ordinary person on the street.[3] Neither a market participant nor a professional valuer is expected in the law of negligence to have "the courage of Achilles, the wisdom of Ulysses or the strength or Hercules, though Lord Bramwell occasionally attributed

[3] http://www.usingenglish.com/reference/idioms/man+on+the+clapham+omnibus.html

to him the agility of an acrobat and the foresight of a Hebrew Prophet." (Oxford Companion to Law, 1980, as cited in Lovells & Oliver 2012). Let's call such a person an "auhap".

If this so-called "reasonable man" on the Clapham omnibus was in any other country, he would have an equivalent there, varying from someone on a bullet train to someone legging it, but whatever the typical form of transport for those in any other property market he would have an equivalent there. And subject to the law in the particular domain, the idea of blaming the parties or the valuer for systemic underdevelopment is at least as silly as the word "hobbly-jobbly".

So when that person in the second instance went to sue, any lawyer worth his salt would advise him of the standard required for negligence in the particular market, and that any judge of any competence would not expect any party to a transaction to be an auhap.

So, when analysing the circumstances of sale to decide whether or not the sales evidence should be accepted as market value, a valuer should be asking, "who are these parties to the sale, and how did their behaviours correspond to those widely acceptable in the market in which they were acting?"

That is not such an easy question to answer. Even if everyone were an auhap, it still would not be easy because markets range from almost entirely opaque and unaccountable to quite transparent and accountable, but even in the case of the latter sometimes the rugs can be pulled out from under them by collapse in their fundamental assumptions. For example, in that first instance the implicit assumption that 50sqm of land would add a similar rate per square metre is demonstrably false. Rates per square metre are heuristics, not laws.

The trouble is, not everyone has the capacity to grasp that. Only about ten percent of the population is able to isolate variables well enough to see how one's concepts relate to general principles, such as those required to grasp logical fallacies such as the one above (Demetriou, 2015). So what happens with the other 90 percent? Is the valuer to wait around for a transaction between two auhaps and only apply that?

That would be a complete denial of market realities; all sorts of people successfully transact in property markets, not just, or even particularly, auhaps. Some markets are made by your average Joe or Jane, and others by those nearer to auhaps, and to be able to read them a valuer must be at least as much savvy ('smarts") and informed as that market's participants, but far more preferably from within that ten percent able to sort out the conceptual wheat from the chaff.

Such a valuer would then ask, "what constitutes a standard of diligence in this market acceptable to that market's average participants?" That is, not what would an autap do, but what would the local equivalent of the person on the Clapham omnibus do, if and only if that person has the competencies required to participate in that market? It is quite likely, for example, if someone got off the Clapham omnibus and took a trip to another country and bought a property there without competent advice, the purchase would not meet the IVSC definition of market value.

Note that here we are not referring to the second instance. Fraud is fraud wherever you go, and whenever you do. We are talking about smarts and information in the specific market. Which is just as well, as the market is formed by flawed humans beings who, as behavioural economics has established, are usually not at all like the logical machine envisaged by ancient British jurists (Kahneman 2003) or ancient neoliberal economists. All market participants use their values to decide, not mere ratiocination, and everyone uses heuristics in decision-making (Gigerenzer 2013).

Markets are more like vines than Lego sets, and "market value is just one factor among many that motivate owners and is often not at the forefront of their decision-making" (Penalver 2012, p. 840). Whatever machines they may employ to facilitate the market, ultimately markets are between people trying to make their way in their environments.

People out of their depth are more likely to lose in a negotiation, and people with the better smarts and information are more likely to win. The smarts involve:

1. Building appropriate mental models
2. Using one's central representational capacities efficiently
3. Using analogical and deductive reasoning
4. Learning how to learn in the environment
5. Becoming critical and creative thinkers (Demetriou, Spanoudis and Mouyi, 2011, p. 601).

Always keeping in mind that "All decisions are based on models, and all models are wrong." (Sterman 2002 p. 525), but that while all models are wrong, some are useful (Box & Draper 1987, p. 424), the most useful (and scientifically robust) one to explain what we want to in this paper is the Model of Hierarchic Complexity (MHC) (Commons 2007).

There are degrees of capacity for this articulation of cognitive complexity in MHC as follows:

Model of Hierarchic Complexity	
Order or stage	**What they do**
0 – calculatory	Exact computation only, no generalization; human-made programs that manipulate 0 or 1, not 2 or 3
1 – automatic	Engages in one operation at a time. Cellular activities: sensing, effecting
2 – sensory or motor	Discriminates in a rote fashion, stimuli generalization, perceives and views objects or moves; moves limbs, lips, toes, eyes, elbows, head
3 – circular sensory-motor	Schemes (touch, grab, shake objects, circular babble, …), coordinates perceptions and movements, forms open-ended proper classes, phonemes, archiphonemes
4 – sensory-motor	Responds to stimuli in a class successfully and non-stochastically, forms simple concepts, morphemes (coordinates schemes)
5 – nominal	Uses words and names for things (coordinates and relates concepts), single words: exclamations, verbs, nouns, number names, letter names
6 – sentential	Chains words (Coordinates words and names), imitates and acquired sentences and sequences, follows short sequential acts, pronounces numbers in correct order, acquires pronouns subject (I), object (me), possessive adjectives (my) Possessive pronoun (mine), and reflexive (myself)for various persons (I, you, he, she, it, we, y'all, they).
7 – preoperational	Simple deductions; tells stories, counts events and objects up to 5, combines numbers and simple propositions, connects the dots, follows lists of sequential acts, follows lists of sequential acts
8 – primary	Simple logical deduction and empirical rules involving time sequence; simple arithmetic (adds, subtracts, multiplies, divides, counts, proves), does serial tasks on its own
9 – concrete	Full complex arithmetic (long division, short division). 2. Person perspective: takes and coordinates perspective of other and self, follows complex social rules, forms cliques, plan reasonable deals, conceives history and geography
10 – abstract	Builds abstract concepts and variables of conference phenomena (time, place, act, actor, state, type), makes names and quantifies

	propositions, logical quantification, (quantifiers: all, none, some), categorical statements/stereotypes; e.g. "we all die")
11 – formal	Coordinates two abstract variables, calculates the influence of one variable on another one, solves problems with one unknown using algebra, 1-dimensional linear logic (if-then) and empiricism
12 – systematic	Multiple relations between abstract variables, considers relationships in contexts (>building systems)
13 – metasystematic	Compares and coordinates various systems, builds meta-systems out of disparate systems, as well as meta-theories (theories about theories)
14 – paradigmatic	Coordinates, integrates and synthesises metasystems (fields of knowledge), builds paradigms, requires high degree of decentration
15 – cross-paradigmatic	Coordinates and crosses paradigms, builds new fields of knowledge (consisting of two or more paradigms).

(Fein and Weibler 2014, p. 81).

There could be other Stages beyond Stage 15; Ross, Commons, Li, Staine and Barker (2014) have proposed a Stage 16 – meta-cross paradigmatic - characterised by "properties of structure and process (dynamics) described by different paradigms are seen to apply across and operate on those paradigms" (ibid 2014, p. 35), and, way out beyond that perhaps there are our auhaps.

Somewhere along that hierarchy, arguably around stage 9, lie cognitive complexities that are fit for the purposes of satisfying the "smarts" part of having a sale admissible as evidence of market value; what one could expect from the man on the Clapham omnibus. And somewhere above that is the stage, arguably around stage 12, that valuers should have achieved for success in their profession, that Demetriou describes as being able to relate one's concepts to general principles, such as being able to apply evidence of sales insightfully to the property being valued (Demetriou, 2015). As luck would have it, that is similar to the stage required to graduate from a university, so valuers should be drawn from that stage or above, not necessarily but preferably graduates. Also, experience in the market concerned is not only autotelic (valuable in itself) but also increases one's hierarchical complexity through age, as shown below:
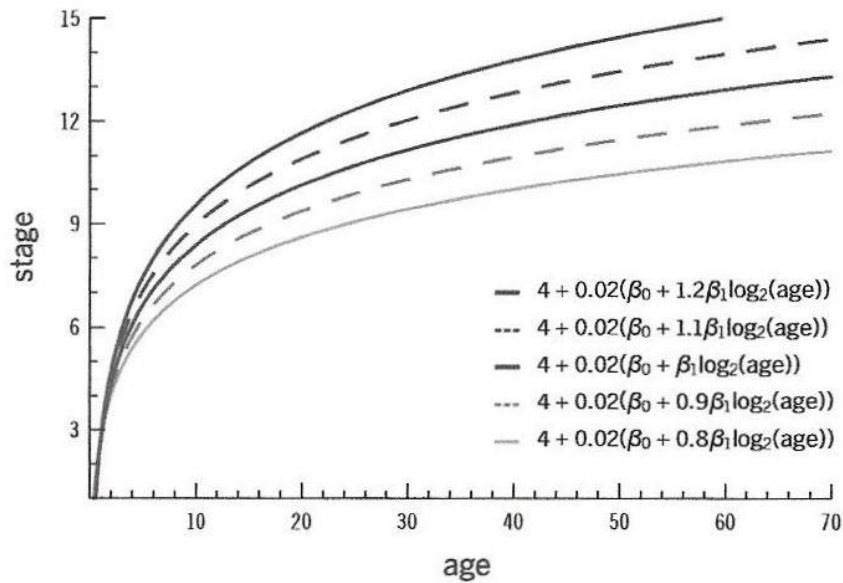
Figure 2: Increases in mental hierarchical complexity ("smarts") with age. Source: Commons, Miller & Giri, 2014).

So much for smarts. Now for information which, when combined with smarts, can lead to understanding and, thereby, satisfaction of the market value definition.

It is important to note, however, that even with auhap levels of understanding you still require a facilitatory environment to close a deal. For anything to happen, both parties have to have the mutually intelligible physical capability (soma), the mind, will and emotional capacities (psyche), the skills, the natural and social environment (Nature), the culture and the tools (produce) to make it happen in conformity with the market value definition:
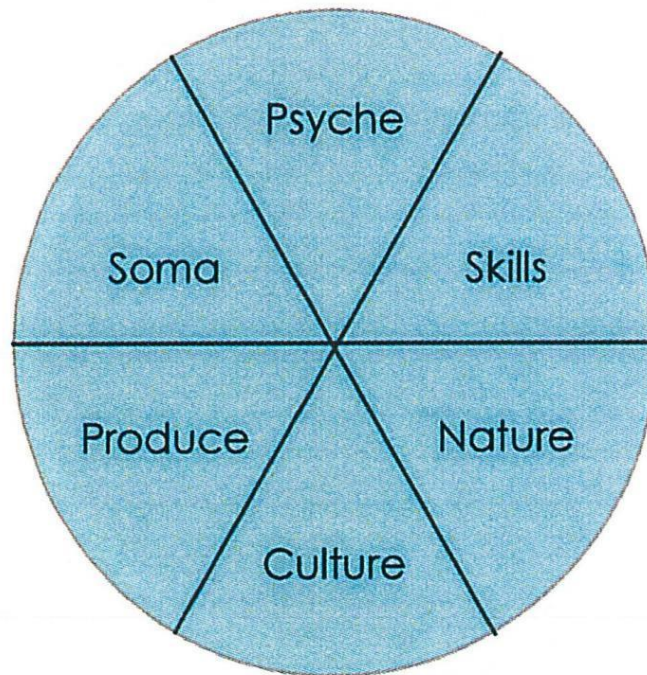
Figure 3: An identity and its umwelt (McDermott, 2014)

Furthermore, regarding produce (in this case, human-made institutions), as Dan Bromley points out "economic institutions constitute the legal architecture of markets and of market processes. All economies are constituted by their legal structures that give content to market processes and existing property regimes" (Bromley, n.d.).

Such institutions often produce open data, and together with their and other closed data in the relevant domains, and open data which is now available on the internet from anywhere, a valuer with the relevant capacities referred to above can provide professional-level transparent valuations as fit for purpose as is practicable in the domain concerned.

Insofar as they are reliable and of little to no information costs, open data could be a major factor in the resolution of difficulties faced by valuers in the developing world. Here, we are using the term "open data" not only in its formal sense of having a licence saying that it is open data and may be used if only if attributed, shared alike and so on. As we are referring to informal markets, we are using it in its informal sense of being widely and freely available. And as the number of internet users is now approaching three billion, likely to enfold the majority of those on Earth with the requisite level on the MHC, much on the internet can be considered open data in this broader sense - especially as it is available to great numbers of the poor. For example, Somalia is the country with the highest mobile phone coverage in Africa.

Take, for example, Google earth. Although allegedly not always reliable in its co-ordinates and other information which is accessible via a free download, in our experience (providing the photo's acuity is sufficient) its ruler function can provide a quite accurate roof area. One of the most fundamental operations of valuation is comparing the property being valued. That always requires physical inspection of the properties, at least from the street, but now that can now be supplemented by aerial inspections via Google earth. To satisfy that market value definition, is that now something that anyone should do when buying or selling a property?

Google isn't stopping there. It bought Skybox in June 2014, and a week later the US Government lifted its restrictions on high resolution satellite photography.

Skybox is a low-orbit satellite firm. By 2016, six such low-orbit satellites might be able to photograph any place on Earth twice a day at high resolution. By 2018 Google Maps intend to have 24 such satellites, being able to video and photograph everywhere and send them to anywhere three times a day.

In October 2014, Google announced that it would provide such maps for free to non-profit organizations. The potential of such open data for coming to grips with the massive challenges of peri-urban growth in the developing world in immense.

This is just one example from one corporation of how open data could assist in shedding light into the world's property markets' darker areas. Google's services don't stop there, though. The normal Google search engine, plus more specialised branches such as Google Scholar and Google Trends: the former is able to provide links to the principles and practice of valuation and other areas of interest, and the latter can provide specific information that could be relevant to the valuation from global, national and sometimes provincial and local scales.

For instance, anyone wanting to know principles and practice of valuation can be informed by open data sites such as those of the International Valuation Standards Council (IVSC, n.d.). Being Australian, I am most familiar with those for New Zealand and Australia, which are articulated on the Australian Property Institute's site, which (API, n.d.), but there are many such resources online, including those of more global reach such as the Appraisal Institute (AI, 2015) and especially the Royal Institute of Chartered Surveyors (RICS, n.d.), both of whom use different terms for what we here call "valuers". However, there are many professional institutes at regional and local scales who could be in better positions to address local realities than global organisations, and which should be sought out by those within their domains. Some of these have international affiliations (for example, see RICS, n.d.), and others do not, But all

provide information about how to become a valuer, appraiser or chartered surveyor or whatever else they are called in their domains.

As far as we are aware, all of these refer to valuations having to be to the highest and best *legal* use. That is meant to contrast with illegal uses, more than with a-legal ones, where laws are inapplicable. Markets exist in informal areas even where the law doesn't, and as long as the valuer provides a speaking valuation – one which makes clear the qualifications and assumptions of the valuation and as precise an articulation as practicable about how the valuation was arrived at from the evidence tabled in the report – valuations can still be conducted, but at that valuer's risk. So we consider that valuations can be conducted in informal areas for unregistered lands, but to attempt that a valuer would be well advised to be at least at stage 12 of the MHC to sufficiently appreciate the issues and the consequences.

The same thing applies to the use of open data in property valuations. Much of it does not possess the rigour required to be trustworthy, but there is still a lot that does, and one must be able to qualitatively assess the differences.

This quality is not common. Markets operate on three things: perception, perception and perception, and the best marketeers are sometimes those best able to massage the truth for their

own benefits. This applies generally, not just to property values. For example, here is a table of the differences in views between the general population and the more scientifically literate:
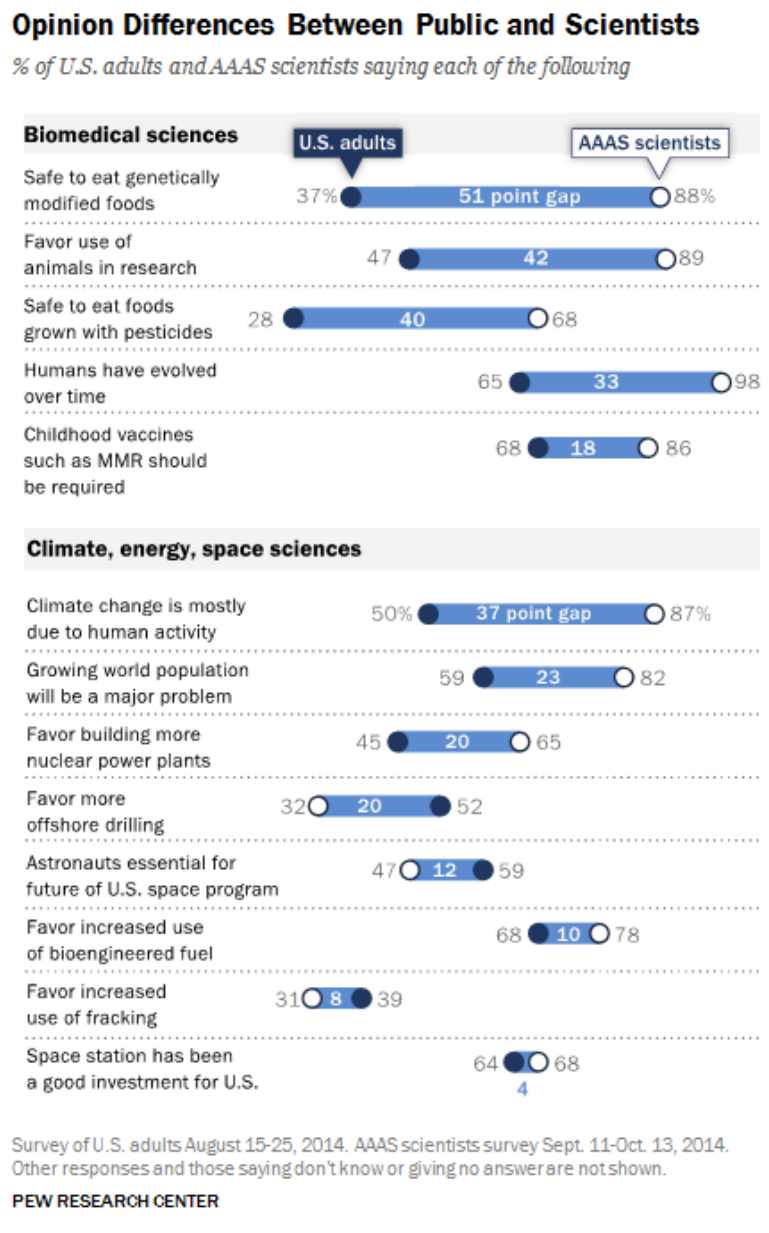

Opinion Differences Between Public and Scientists
% of U.S. adults and AAAS scientists saying each of the following

Biomedical sciences — U.S. adults | AAAS scientists

	U.S. adults	gap	AAAS scientists
Safe to eat genetically modified foods	37%	51 point gap	88%
Favor use of animals in research	47	42	89
Safe to eat foods grown with pesticides	28	40	68
Humans have evolved over time	65	33	98
Childhood vaccines such as MMR should be required	68	18	86

Climate, energy, space sciences

	U.S. adults	gap	AAAS scientists
Climate change is mostly due to human activity	50%	37 point gap	87%
Growing world population will be a major problem	59	23	82
Favor building more nuclear power plants	45	20	65
Favor more offshore drilling	32	20	52
Astronauts essential for future of U.S. space program	47	12	59
Favor increased use of bioengineered fuel	68	10	78
Favor increased use of fracking	31	8	39
Space station has been a good investment for U.S.	64	4	68

Survey of U.S. adults August 15-25, 2014. AAAS scientists survey Sept. 11-Oct. 13, 2014. Other responses and those saying don't know or giving no answer are not shown.

PEW RESEARCH CENTER

Figure 4: PEW (2015)

As a high level orienting generalisation only, the above differences can be considered fairly typical of differences between general adult MHC levels and the stage 12 or higher that is more likely amongst scientists. Given similar differences apply to the market behaviour of auhaps and your average Jane and Joe, it should be clear that valuers, as market readers must follow the old saying, 'when in Rome, do as Romans do, as "when reading a market, read what the markets do," and what follows, "when the market uses open data, use open data".

The IVSC definition of market value can apply anytime and anywhere. The responsibility of valuers in any contexts is to make the relevant market transparent to the client. In the majority of cases, they should be so transparent as to know where they stand in that market, so they can decide whether or not to commit themselves to the largest investments of their lives, and to decades of debt servicing.

It is crucial for valuers to recognise that all markets employ heuristics in their market behaviour (Gigernzer, 2013), and that in some markets open data could be the most reliable information available concerning such heuristics, as well as some of the least reliable. In some domains, the best open data can be even more reliable than government data: I have lost count of how many times people have advised that the values recorded as the value in a deeds or titles registry is there to credibly reduce stamp duties, and is fraudulent.

In all circumstances, a valuer must do what the local equivalent of the man on the Clapham omnibus would be expected to do, and where open data is available it is reasonable to expect scrutiny of that by anyone at stage 9 of the MHC, and subject to the legalities and other circumstances in a particular domain, a source of considering an action for negligence if not accessed by a valuer. Even in domains where government information is more accessible and reliable, a valuer should check both government and non-governement open data, plus whatever closed data is available.

For example, after receiving instruction to value a property, a valuer will determine its legal status, often by means of institutions, as described in Bromley (2009), and prepare other information relevant to the valuation, including accessing the abovementioned facilities supplied by Google.

However, in an increasing number of domains, the valuer will also be able to find out what properties are for sale in the domain, and look for properties similar to then one to be valued. A valuation practice will retain and build upon such open data over time, follow up personally with the parties, and re-check it with official and other records.

This observation can be tested from anywhere on Earth, via Google Maps. For example, going to Pretoria one may find a suburb, and by putting that suburb's name in the search engine one may quickly find properties for sale in the suburb. You can try almost anywhere, and find properties that way. Let's look at some of the bottom ten countries. Port au Prince, Haiti; it works. Luanda, Angola; it works. Caracas, Venezuela; it works; Kabul, Afghanistan; it works … and so on.

"Aha", you may say, "that works for top end of the market properties, but what about properties of the poor? They don't have services like that!"

Are you sure? Because there are now billions of mobile phones on Earth, and they are very popular in areas of limited infrastructure. Furthermore, there are now almost 2 billion smartphones on Earth, a number that is expected to rise to 2.16 billion in 2016, and 2.56 billion in 2018 (eMarketer.com, 2014), and old smartphones is one field where trickle-down might actually work. If you can afford a property, you can afford a smartphone to help you buy or sell one, and they can be very useful, sometimes more fundamentally important, in poorer areas than wealthy ones. For instance, in Africa mobile phones are often used for alternative remittance systems (for example, Lindley & Mosley, 2014).

With new technology, all that open data can be not only captured by the valuer, but also automatically organised, thereby cutting a major proportion of the drudgery from a valuer's work, with the double potential effect of making a valuation cheaper by dramatically lowering information costs and allowing the valuer more time to exercise the skills required to provide a professional level of skills to the particular market. Called a universal Property Data Attribute Warehouse (DAW), it can aggregate of open source data to a single coded system, thereby creating significant transparency between markets, regions and asset classes. In turn, that will provide greater confidence to people in what is one of the world's most significant asset classes.

With such technology, a valuer is able to search single sources of data and with stage 12 or beyond MHC capacities can weigh its accuracy and transparency towards informing a valuation. As its rigour and information content develops, it can also be used by others, such as statisticians, governments, financial and banking institutions, and other real estate professionals.

As such, it could help valuers in their emerging potential role of building bridges between the formal and informal sectors. As Boydell, Baya and Sheehan (2015) powerfully underscore in another paper in this conference, there are contexts where such bridges should not be built at all. However, that leaves plenty where they should be, and to help the 90-odd percent of new lives emerging in the cities of the developing world is one such: THE one such.

Recognition of the fundamental economic, social and environmental importance of real property rights has been established for centuries, as has valuation:

"Valuation is the heart of all economic activity. Everything we do as individuals or as groups of individuals in business or as members of society is influenced by the concept of value. A sound working knowledge of the principles and procedures of valuation is essential in all sorts of decisions". (Ring & Boykin, 1986, p.1).

This recognition is at last percolating down into the lower reaches of cognitive hierarchical complexity; even down to that of some politicians (only joking! Many politicians display very high levels; just not all of them). This higher calibre was recently evidenced by APEC Ministers, representing 44% of global trade and 53% of the world's real GDP, agreeing to work towards the 21 country's region-wide adoption of global standards such as the above IVSC definition of market value:

"Valuations are central to decision-making within the global economy, applying both to capital and property market decisions and to decisions and actions in public and private sector organizations, including regulatory organizations. The public interest, economic growth and development of financial systems are impacted in a multitude of ways by decisions and actions that are dependent on valuations. This critical role of valuation underscores the importance for economies in the region to agree on the adoption of high-quality valuation standards across jurisdictions globally and develop a credible valuation profession" (IVSC, 2014a).

Historically, the following governmental machinery has been adopted to open real property wealth up to market forces and government revenue benefits:

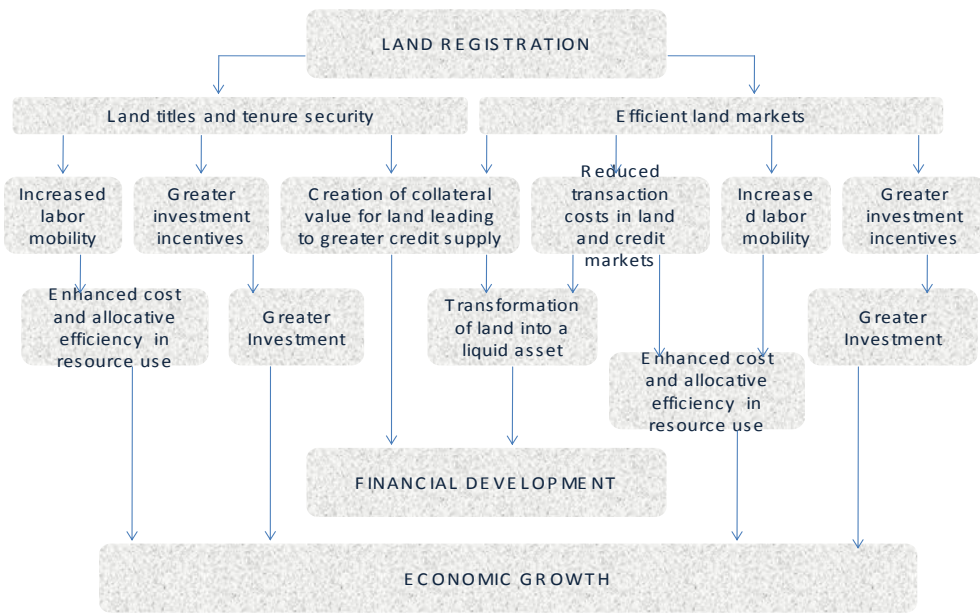**A Conceptual Framework Linking LAMPs to Financial Development and Economic Growth**

Figure 5: Source: siteresources.worldbank.org/INTIE/.../ECA_Land_Paper_v3.4.doc

Figure 6: Source: siteresources.worldbank.org/INTIE/.../ECA_Land_Paper_v3.4.doc
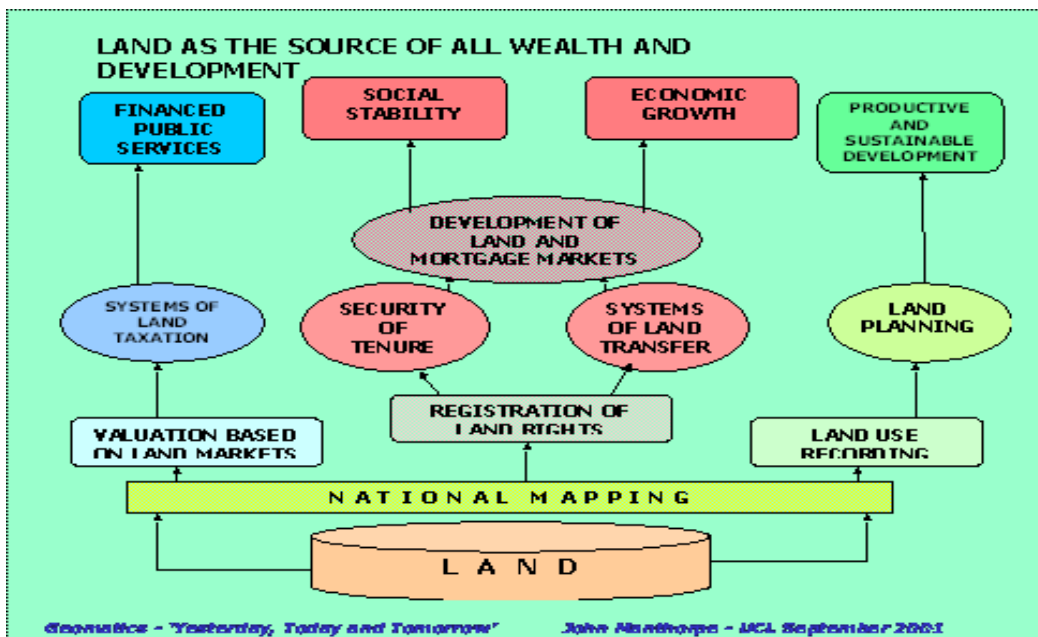
Almost 40 years ago now, Rowton Simpson had pointed out that registration systems, while potentially useful machinery, should not be blown out of perspective. They are only a part of the government's machinery, are not a silver bullet, and a great deal of effort, time and money will be wasted if that is forgotten (Rowton Simpson 1976).

Remember me saying that all models are wrong? Well, these are like all models, wrong insofar as they attempt to address complex and wicked problems with simple to complicated machinery. But like all models to those rating higher on the MHC, they can still be useful – more than just useful: extremely powerful - provided they can be accurately contextualised for what they are: simple to complicated answers to complex and wicked problems, and thereby bound to have unintended consequences. Complicated problems are like sending a rocket to the moon; complex problems are like raising a child: problems can be multiplied when the two are confused (Glouberman & Zimmerman, 2002).

Furthermore, complicated and complex require different approaches, as follows:

Complicated systems	Complex adaptive systems
Role defining – setting job and task descriptions	Relationship building – working with patterns of interaction
Decision making – find the 'best' choice	Sense making – collective interpretation
Tight structuring – use chain of command and prioritise or limit simple actions	Loose coupling – support communities of practice and add more degrees of freedom
Knowing – decide and tell others what to do	Learning – act/learn/plan at the same time
Staying the course – align and maintain focus	Notice emergent directions – building on what works

Table 1: Different Leadership Tasks for Different Systems (Allen 2013)

Those primarily dealing with market machinery need to focus on the left hand column; but those, like valuers, who are concerned with market dynamics need to focus on the right-hand column. Complex adaptive systems are the drivers; machines are the vehicles. We must not put the complicated cart before the complex horse. Simple and complicated can be addressed from MHC's stage 7 and above; complex and wicked are better addressed from stage 11 and above.

Hence valuers must get out into the complex adaptive processes we call people, and investigate circumstances of sales to see how they fit the IVSC definition, *including* the systems of registers if there is a plurality (Boydell, Baya and Sheehan, 2015) or no registrations at all, *including* the form of tenure involved, and thereby discern how the sale can be applied to the property being valued (if at all). In so doing, comparisons of markets with open sources of data may provide points of comparison between markets with similar attributes in terms of geography, population and economic wealth in which many market transactions may not be formally recorded.

Through this process, recorded and developing, both transparency and accountability can be introduced into the markets. Machines such as those above must be fit for the purpose of facilitating that process, not deciding and telling others what to do.

Thereby, valuers can build bridges between the formal and informal sectors in the developing world. If they can do so, they would have played their part in setting a more prosperous stage for the future of all those children, by one small step at a time. And with the use of all this wonderful technology – that is, with complex adaptive valuers as its masters, not its servants – to use open data in their practices, they can play their part in transforming these massive and hitherto opaque and myopic markets into transparent and accountable ones.

Wisely governed, that information could work for the benefit of all their markets' current and future participants: may they all grow up to be auhaps.

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