

Examining digital disruption in Australia's housing market

Based on AHURI Final Report No. 304:

Understanding the disruptive technology ecosystem in Australian urban and housing contexts: a roadmap



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What this research is about

This research critically reviews how different emerging digital and disruptive technologies are being incorporated into the housing, housing assistance and planning systems. It examines the technologies' key features; limitations to practical use; risks to housing providers, policy makers and housing markets; and how they might lead to greater efficiencies and new opportunities across the housing sector.

The context of this research

Governments at all levels, along with many in the private and not-for-profit housing sectors are interested in the transformative potential of disruptive technologies. At the same time, there remains significant uncertainty and confusion about what disruptive technologies are; their possible implications for housing provision and assistance; and what their potential benefits, limitations and adverse effects might be.

Key issues for Australia are that while much work has been done in opening up property data assets across governments, significant work is required on data standards, privacy standards and data sharing across government, industry and the not-for-profit sectors.

The key findings

Two competing trends are emerging in relation to Australia's housing and urban planning processes: one involves the centralising of data (often by governments and market

processes), the other seeks to use distributed technologies that enact processes across a network without the need for central intermediaries. Both arise from attempts to solve critical coordination problems, yet may produce vastly different outcomes in relation to privacy, the accessibility of publicly and privately held information, and the subsequent possibilities for innovation.

Some of the technologies described in this research—blockchain, digital planning tools, automation—are at an early stage of development. The promise of some of these emerging technologies is that they have the potential to simplify the processes involved in siting, constructing, tenancing, selling and maintaining of properties in cases where that might not necessarily entail substantial regulatory change. These could include traditional governance functions like data registration and management; automating reference checking; access to property; and property or tenancy payments.

Open data versus data silos

Open data and data sharing frameworks intend to provide public

benefit from large datasets. In companion with data workflow systems, allowing data to be open would mitigate duplication and provide access to those who need the information. Open data is part of the Department of Prime Minister and Cabinet's Open Government National Action Plan 2016–2018. Legal reforms are being rolled out accordingly.

There are reasons why data is siloed (i.e. kept in discrete databases). Various sectors within an organisation—or the same sector across different organisations—may record and code data differently. Data could be the outcome of different funding agreements (e.g. different grants requiring different reporting periods and variables, and the collection and use of specific databases are supported by dedicated business cases). There may also be a lack of standardisation within and between institutions.

In addition, there are often restricted uses on high quality government data (e.g. valuations data, tenant welfare benefit and service needs data, dwelling level energy use), information that could enable research and empower better governance through

privacy covenants on the release and use of data (such as through data supply agreements) or, increasingly so, through commercialisation (such as sale to private companies). The effect of this, for the housing and urban research sector, is to generate data that is partial, at times unreliable, and locked away from those who most need it.

Geographical Information Systems for urban planning

The use of geo-coded information has spread to government, with all state and municipal authorities now reliant on geographic information systems (GIS) to hold, sort and view almost all of their datasets.

QuantumGIS (QGIS) is an open source system allowing for the storage and manipulation of spatial data. Due to being open source in nature, and openly promoting the development of plugin applications and tools by its users, QGIS is the standard for small scale operations that may not be able to afford the licencing of the larger products, though it is beginning to be used by many municipalities and larger organisations.

In Australia, the costs of installing and maintaining many of these platforms are quite prohibitive for government and commercial purposes. As a result, this provides barriers for community groups, start-ups and small to medium enterprises to access and use these systems, unless they are using open source software such as QGIS.

The most comprehensive open data initiative with respect to geospatial data is Open Street Map (OSM). OSM began in 2004 and is a collaborative mapping project with the goal of creating a free and editable map of the world. OSM is licensed under an open database license as developed by the open data commons. It provides fairly comprehensive data for a number of cities and regions across Australia. OSM is useful for many urban applications including street network analysis, yet, it does not currently include as rich a source of urban data as a number of commercial offerings.

Commercial data

In the private sector, the growth of digital transactions, combined with the capability to generate and access data markets based on consumer behaviour, creates market advantages for companies that develop digital capabilities. This has led to an increase in the need for specialist data firms, many of whom have generated privately owned and highly commercialisable datasets. In many cases, these commercial enterprises are able to offer better quality and more complete data than public clearinghouses. There are, however, significant reasons to hold back the sale of government datasets and data stores (which is already occurring with land title registries), as technological change may produce alternatives to privatisation of public assets, including new forms of public-private partnerships, that yield greater long term public benefit.

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Data security

Ensuring a minimum level of adequacy in Australia's data protection regime is crucial for these systems to be adopted without inappropriate privacy interference, and reform may be required.

National and state data protection legislation (e.g. the *Privacy Act 1999* (Cth) and the *Privacy and Data Protection Act 2014* (VIC)) impose rules on the collection, processing and distribution of data when that data is 'personal information'.

It is likely that the majority of data collected and shared by housing and associated services concerning clients would be personal information and governed by data protection law. It is less clear that general data about use of services that did not necessarily include identifying information, or had been de-identified, would be considered personal information. If housing information were de-identified for the sake of participating in an open data system, it is unclear whether de-identification would diminish or even eliminate its value, or whether certain levels of specificity could be included that might still take the material outside the definition of 'personal information'.

Dealing with this problem still requires sensible laws and trusted institutions. At present, Australia's privacy, information and data protection bureaucracies and institutional structures are woefully underfunded and inadequate.

Automation

Another incredibly powerful development, particularly in the areas of law, policy and other disciplines based on data analysis and interpretation, is development of semantic analysis. This automatic method of data extraction is based on machine learning algorithms, which are arguably at the point where they could automate parts of the land use planning process. Capacity now exists for digital planning systems to do initial assessments of planning proposals, particularly for smaller endeavours, which would vastly improve the efficiencies of the planning process. These automated systems do require oversight however, and should never be used without capacity for affected individuals to contest their decisions or legislative interpretations.

Automated decision making systems raise several unique legal and governance concerns. For instance, reputation-based automated systems may pose a threat to social inclusion, as only those who meet various standards will be automatically included in a category. For example, Australian company Trustbond replaces traditional bond systems by providing applicants with a score based on social

media data. If the applicant meets Trustbond's standards as a 'good online citizen', the company will cover the cost of the bond for a fee (providing a surety bond).

Existing decision making systems used by government are typically of limited sophistication. They generally fall into the category of 'expert system', whereby legislation or policy documents are translated into algorithmic decision trees (or flow charts). Their potentially damaging limitations were demonstrated by the Centrelink 'RoboDebt' scandal. Nevertheless, these systems are increasing in scope, sophistication, and use. It is likely that automated systems will be further deployed in various social welfare programs, including systems that establish eligibility and priority for social housing and other housing related services.

Blockchain applications

Developments in blockchain and other automation represent a shift away from centralised data and coordination.

The blockchain protocol—a ledger of transactions that operates and updates simultaneously across a multitude of participating 'nodes' (i.e. computers) using peer-to-peer communication protocol—enables the transfer of value without the need for intermediaries. The distributed nature of the technology enhances data security as it cannot be attacked at a central point. Blockchain transactions are linked, verified and updated using cryptography.

Blockchain can be applied to housing functions such as title registration, co-ownership options (including in reverse mortgages), tenancy management and utilities maintenance, to ensure data integrity. These may reduce the risks and costs of manual entry and expand the capacity of current record-keeping by linking up relevant datasets.

A significant question is the extent to which

blockchain can reduce market friction and regulatory burden to achieve public policy goals. For instance, blockchain might enable complex title arrangements (e.g. smart contracts') for co-ownership to evolve, possibilities that are currently not pursued due to onerous administrative requirements and commercial costs.

Technologies for social housing

All Australian jurisdictions now operate common social housing waitlists for their respective jurisdictions. While it is still voluntary for community housing providers (CHPs) to join, this move towards common waitlisting has nonetheless standardised the assessment procedures, expanded the number of entry points where applications can be made and generally facilitated better tenant–housing matching. This common social housing waitlisting is important as the functions of public and community housing sectors increasingly converge, especially in the context of estate renewals and tenancy transfers, where standardised tenant and property information is easier to transfer from one provider to another.

A real-time property vacancy listing may better facilitate this process, allowing staff at entry points to check for stock availability before directly contacting the CHP with suitable housing, potentially cutting down search time. This may also allow tenancy managers to search for properties available at CHPs they do not already have a working relationship with, expanding the possibility of

matching an applicant to suitable housing.

Technologies and the private rental sector

Emerging technologies may facilitate better tenant–landlord relationships in the private rental sector. The increasing use of standardised application forms can be considerably expanded when paired with blockchain technologies. In that case, there could be a full ledger of the applicant's rental records, their correspondence with the agents and landlords, if they had been in arrears, their bond lodgements, etc. Such clear ledgering can potentially replace the need for references as the applicants' full rental history is available for view. Conversely, however, this may also potentially disadvantage vulnerable individuals in private rentals, particularly if they had trouble keeping up with rental payments due to unstable employment, or if they have special needs (such as grab rails and level access that may require some modification to the dwelling) that some landlords may discriminate against.

Likewise, a full record could also be available of the landlord, showing if they responded to maintenance and repairs promptly, if they raised rents excessively, if they had been taken to VCAT (or other states/territories' equivalent) and whether and how the matters were resolved. The transparency of such ledgers can potentially improve the functioning of the private rental sector by forcing landlords to keep their investment properties to decent standards

Figure 1: Possible implications of disruptive technology for the Australian housing system



Barriers to technology uptake

This research has found there are barriers to technology uptake in certain sectors due to software licensing costs. Policies and procedures that enable open source software are recommended. Open source software does not come with licensing costs and can support startups, not-for-profit organisations and government agencies to have access to a wider array of new and emerging technologies.

Automation may not necessarily always be the preferred client service interface. This is especially the case for clientele with increasing and complex needs, such as social housing tenants and other vulnerable groups, where frontline staff are trained to identify complexities that the clients may or may not disclose, as well as to combat their clients' social isolation. These undisclosed needs may include mental health support needs or maintenance needs not reported by individuals who do not want to be seen as a 'trouble tenant'.

For vulnerable groups, individuals may also have limited capacity or appetite to engage with new technology. Disadvantaged individuals may struggle to access information on

welfare support such as energy rebates because they did not know how, or could not afford home internet, where such information is increasingly made available.

What this research means for policy makers

In an era of 'smart cities', there should be policies to support innovation, pilots and testbeds in exploring the potentials of new disruptive technologies. Given the increasing digitisation of services and products and the wave of digital disruption which is impacting our cities, there is a need for more agile policy setting and review to ensure we mitigate negative impacts early and realise the positive potential of such technologies for the housing sector and society at large. There is potential for vulnerable communities to experience further isolation and disengagement if the emerging technologies are introduced without careful consideration.

The use and protection of personal data is of crucial concern. Protocols would need to be developed to ensure data security—potentially with the assistance of blockchain

technologies—of both social housing applicants and the providers. Currently, state agencies and private entities are limited in terms of how they deal with data through national and state data protection legislation, some of which have yet to catch up with the evolving nature of emerging technologies and the data that they create, access, manipulate etc. Additionally many datasets are kept in organisational silos under cloaks of commercial-in-confidence. While the possibilities for better housing services should be explored, automation and machine learning technologies that rely on government data stores also raise ethical and legal questions, particularly if applied to services for vulnerable groups such as social housing tenants.

Methodology

This research incorporates a review of academic and grey literature on emerging technologies together with workshop discussions involving participants across the housing, technology, government, not-for-profit and academic sectors.

Further information

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