



Influencing urban development through government demonstration projects



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ABSTRACT

Government-backed high-density infill residential developments are used as a planning policy tool for engaging the building industry and promoting sustainable urban development. There is limited research into the influence such buildings have on the building industry and urban development outcomes. This paper presents analysis from interviews with 14 leading building-industry stakeholders about a demonstration mixed-use building developed by the Victorian state government in Melbourne, Australia. The development included innovative elements addressing environmental sustainability, governance, mixed tenure, mixed use and modular construction. The analysis found that stakeholders were acutely aware of the development, with some innovative elements – such as the modular construction – being monitored by stakeholders informally; other elements – such as environmental sustainability – were of nominal interest. Translation of informal learnings to stakeholder's own companies was lagging. While it is evident that the development has played a role in influencing the building industry to some extent, more effort is required to communicate practical outcomes and learnings in a formal way if sustainable urban development is to be facilitated through the demonstration development planning approach.

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1. Introduction

More than half of the world's population now live in urban areas, a percentage that is predicted to increase rapidly in the coming decades (UN, 2014). In Australia, major cities are home to almost 80% of the population (DIT, 2013). By 2041 an additional 3.1 million homes will be required in these cities as the population increases and the average number of occupants per dwelling decreases (McDonald & Temple, 2013). Where and how to locate these additional homes is of increasing concern for various public-, private- and community-sector interests, not only in Australia but globally, particularly in the context of climate change. In order to drive sustainable urban development, governments are increasingly taking a proactive approach by directly funding innovative demonstration developments in an effort to guide the building industry and consumers, and to test planning approaches. There is limited evaluation of these demonstration buildings on the influence they have on the wider building industry and urban development, so transferring learnings to policy and planning outcomes or the building industry has been difficult (Femenias, 2004; NHSC, 2013).

This paper begins to address this research gap by providing perspectives from building-industry stakeholders about a Victorian state

government funded and developed demonstration higher-density housing project known as the Nicholson in Melbourne, Australia. While there is some research evaluating innovative, higher-density housing demonstration developments (Femenias, 2004), this is typically focused on one or two innovations (e.g. environmental sustainability) and limited to the users of the building and/or design, economic and technical elements, rather than the influence of these elements and outcomes have on wider building-industry stakeholders from an urban policy and planning perspective (Heiskanen, Nissilä, & Lovio, 2015; Hu, Geertman, & Hooimeijer, 2014a; Ridley et al., 2013). This paper therefore addresses the question:

How does a government-developed demonstration project perform as a model for future urban development and influence the wider building industry?

The paper firstly presents an overview of the literature around sustainable urban developments and innovative demonstration buildings, followed by a description of a case study and methods used. The analysis and discussion are then provided around the five key elements from the case study.

2. Shifting to sustainable affordable higher-density housing

Over recent years there has been a shift towards higher-density housing in major cities, both in Australia and internationally (NHSC, 2013). This is in recognition from policy makers and planners that cities

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must restrict low-density urban expansion, for reasons including the loss of agricultural land and the high cost of providing infrastructure in these areas. Concern is also emerging that while greenfield development sites can contribute to housing affordability, they are limited in their ability to provide housing and associated amenities for an affordable, environmentally sustainable and socially equitable future (Atkinson, Wulff, Reynolds, & Spinney, 2011; De Sousa, 2002; Giannakodakis, 2013). Higher-density housing infill within existing city boundaries, and particularly areas close to key hubs of activity and public transport, is now seen as a more effective housing solution for many urban areas (City of Melbourne, 2010). While there are identified benefits from higher-density housing, without considered development design that takes into account constraints of the existing built environment, environmental sustainability, the integration into the local community and tenure outcomes, there can also be significant variable-term frame problems, both for occupants and the local community (CABE, 2001; Farris, 2001; Kearns, Whitley, Mason, & Bond, 2011; Macmillan, 2006). In Australia numerous plans, policies and initiatives at federal, state and local government level have been developed to regulate and guide built-environment stakeholders to address these challenges (e.g. City of Melbourne, 2013).

Increasing densification is occurring against a backdrop of improving environmental performance across the built environment (Garnaut, 2008). Over the past two decades countries such as the UK, USA and Australia have introduced a range of measures, such as a minimum building performance requirements, financial incentives/rebates and requirements for renewable energy or 'smart' technologies, aimed at improving the environmental sustainability of the built environment (Moore, 2012). While these approaches have been recognised as having some success in achieving their desired outcomes, current built-environment standards in Australia, and many other countries, still fall short of requirements to limit climate change impacts.

The role of governments in relation to the development of the built environment is typically the setting of minimum performance regulations and the development of strategic land-use planning regulations. In Australia, minimum performance requirements of residential dwellings are set by the federal government (Moore, 2012), however state and local governments have the ability to require improved performance or other design/occupation outcomes through planning requirements, which can be tailored for different regions. For example the approval of a residential development site at one location might be contingent on the inclusion of a certain amount of retail space, while this may not be a requirement for proposed developments in another area. There is evidence that identifies that the building industry is unlikely to voluntarily achieve improved environmental performance or design/amenity outcomes, as they believe that consumers will not pay for what is perceived as a limited benefit (Crabtree & Hes, 2009). There is also evidence that the building industry is unwilling to take risks to trial more innovative designs and solutions (Femenias, 2004). In this context, demonstration projects allow for the advancement of innovations in the built environment. This was reflected upon by a former Victorian state planning minister, who states in the 2014 metropolitan planning strategy *Plan Melbourne* that the government's land development authority (Places Victoria) 'will continue to play a vital role in developing key government land holdings, as well as other sites, where appropriate' (DTPLI, 2014, p. III). More broadly, Places Victoria, and the Victorian government, are confronted with the prospect of facilitating the accommodation of an additional 1.6 million dwellings and 3.4 million people by 2051 within increasing spatial, affordability and sustainability constraints (DTPLI, 2014).

Around the world, there are an increasing number of innovative higher-density housing developments that have attempted to address affordability, environmental sustainability, housing quality and social improvements as a way of promoting and advancing holistic sustainable urban development outcomes. While not always getting the outcomes right, these exemplar buildings are moving the planning, policy and research discussion forward. See Table 1 for leading exemplar residential

buildings. State or local governments played a critical role in some of these developments. For example the local authority sold the land on which BedZED was built for below market value in order to make the project viable (Peabody, 2009). A similar situation occurred for zHome in Washington, where the City of Issaquah brokered a deal to transfer the land to the developer at no cost, dependent on certain environmental sustainability and design requirements (Living Building Challenge, 2015). In addition, K2 apartments in Melbourne were developed by the Department of Human Services, a Victorian state government department (DesignInc, 2015). The other projects listed in Table 1 (with the exception of Printworks) were private-sector-led developments.

Research into such innovative developments is typically focused on evaluating direct lessons learnt, occupant satisfaction levels and technical performance or elements (Berry, Whaley, Davidson, & Saman, 2014; Heiskanen et al., 2015; Ridley et al., 2013; Zero Carbon Hub, 2014). There is limited research, both in Australia and internationally, that looks into the influence these demonstration developments have on the wider building industry as an urban planning tool (Femenias, 2004). The following section outlines a case study and evaluation that begins to address this research gap.

3. Case study — the Nicholson development

The Nicholson development is a graduated three to nine-storey residential apartment and retail complex 7 km from Melbourne's CBD. The developer was Places Victoria (the Victorian government property development agency). The AUD\$56 million project was envisaged as a commercially-replicable demonstration project of an innovative mixed tenure, mixed use apartment development offering high density affordable living in a well-connected location (Places Victoria, 2015). The site was a former tram depot owned by the Victorian state government. Initial (2011) purchase prices for the apartments ranged from AUD\$230,000 to AUD\$510,000 with an average of AUD\$367,000. This was substantially below the Real Estate Institute of Victoria's estimated 2011 apartment medium value of AUD\$474,500 in Melbourne. The Nicholson won the 2011 Urban Development Institute of Australia Judges' Award and was a finalist in the Property Council of Australia's Innovation and Excellence awards (Places Victoria, 2015). Places Victoria hoped that the development would influence the wider building industry to engage with some or all of the innovative elements in the building.

The Nicholson contains over 1900 m² of ground-floor commercial/retail space and 199 one- and two-bedroom apartments comprising:

- i. 110 privately owned apartments with 60% of purchasers owner-occupiers, of which 82% were first home buyers.
- ii. 58 apartments purchased by HomeGround Services (a registered affordable-housing provider) under the Australian federal government's Nation Building Social Housing Initiative, to be rented by low-income tenants at a maximum of 30% of tenants' income or less than 74.9% of market rent.
- iii. 31 apartments provided as affordable rental dwellings under the National Rental Affordability Scheme (NRAS). Low to moderate income earners occupy these dwellings at a 20% discount to market rent.

In addition to being a model of affordability with the inclusion of mixed-use and mixed-tenure, the Nicholson is distinguished by innovative environmental sustainability, governance and modular construction characteristics (Places Victoria, 2015). While individually, none of these elements are particularly novel, combined they represented significant innovation in the Melbourne housing market at that time.

- i. *Environmental sustainability*: The Nicholson was designed to a 6-star Nationwide House Energy Rating Scheme thermal energy rating (heating and cooling load of 114 MJ/m²·annum), which at the time was above the 5-star minimum requirement, and features roof-mounted solar panels to deliver solar-boosted hot water for

Table 1

Global examples of exemplar residential buildings (Asia Business Council, 2007; DesignInc, 2015; Living Building Challenge, 2015; Peabody, 2009; Southwark Council, 2016; Yudelson & Meyer, 2013; Zero Carbon Hub, 2014).

Name and location	Dwellings	Const. (year)	Features	Previous land use and ownership
BedZED, Sutton, London, UK	82 units with ground floor work space	2002	Designed to be carbon neutral, protecting the environment and supporting a more sustainable lifestyle, including mixed tenure housing. The project was made viable when the local authority sold land to the developer at below market value dependent on the sustainability outcomes.	Built on reclaimed land previously owned by the London Borough of Sutton.
K2 Apartments, Windsor, Melbourne, Australia	96 units with onsite ground floor parking	2007	Developed to set a new benchmark in ecologically sustainable, an 8-storey medium-density public housing facility in Melbourne, Australia, developed by a Victorian state government department. The four connected buildings are oriented to allow for maximum northern sun exposure with public and private courtyard spaces.	Previous land use not known. Owned by the Victorian state government.
Printworks, Southwark, London, UK	94 flats with ground floor offices	2010	A 9-storey residential block using modern methods of construction in a highly restricted urban location. Features include prefabricated bathroom pods, multi-utility heating networks and grey-water recycling. Developed in partnership with the UK Government's Homes and Community Agency under the London Wide Initiative.	Former industrial site, private ownership.
TaiGe Serviced Apartments, Shenzhen, China	230 units with commercial component	2004	The first LEED certified commercial development in China. This demonstration project included many green building features including water and energy saving, water recycling and improved indoor environment. The project was listed by the Guangdong government as a Green Residential Building demonstration project.	Not known.
The Commons, Brunswick, Melbourne, Australia	24 units with ground floor commercial space	2013	Inner-city, vertical eco-village with no car spaces. Public transport and shops are in close vicinity. The extensive green roof features raised vegetable boxes and hardy native plants that filter stormwater run-off from the building and act as an insulating blanket on the apartments below.	Previously developed site, previous ownership not known.
Twelve West, Portland, Oregon, USA	273 units with 5 levels of commercial space	2009	A 23-storey sustainable mixed-use development with ground floor retail space, four floors of office space and 18 floors of residential apartments. It is noted for its integration of roof top wind turbines.	Previously developed site, private ownership.
zHome, Issaquah, Washington, USA	10 townhouse over 3 levels	2012	A project designed to achieve zero net energy, as well as a number of other environmental benchmarks. It includes heat and natural cooling recovery ventilation, energy feedback monitors and deep day lighting design features. The City of Issaquah played a critical role in brokering a deal where the land was transferred to the developer at no cost, dependent on the sustainability outcomes.	Open space in new development area, City of Issaquah.

residents. It has gas heating/appliances, recycled and treated rain-water water systems, and is in close proximity to bike paths, train stations, trams and bus routes.

- ii. *Governance*: The onsite place-management model involves one entity managing all owners' and corporation property matters and tenancy management services for affordable rental and social housing dwellings. The onsite place manager also provides property management services for private investor owners. Typically these elements would be handled by separate off-site managers.
- iii. *Modular construction*: The Nicholson was the largest development in Victoria to utilise modular construction; with more than 340 individual modules built in a Melbourne factory. Because of this, the Nicholson was built 50% faster than traditional construction approaches.

Marketed during a time of stalled property sales in Melbourne, the above features resulted in faster than expected private sales and significantly higher than average owner occupation rates (Higgins & Moore, 2015; Places Victoria, 2015). As a result, the Nicholson project indicates the potential for such developments to be successfully adopted more broadly throughout the building industry and as an approach to strategically influence the building industry. The question is, has it?

4. Methods

To address the research question, semi-structured interviews were conducted with 14 key Melbourne building-industry stakeholders including bankers, developers, housing researchers, investors, property managers and valuers. Table 2 provides the characteristics of the stakeholders interviewed. A range of stakeholders were included in the research to ensure a broad spectrum of interests and experiences was captured. Previous research in Australia has identified the difficulty and challenges of engaging building-industry stakeholders for detailed

Table 2
Characteristics of key stakeholders interviewed.

Code for analysis	Position	Type of organisation
Stakeholder 1	Director/Owner	Private developer/advisor – medium-density infill
Stakeholder 2	Managing Director	Private developer – high/medium-density infill
Stakeholder 3	Senior Development Manager	Private developer – high/medium-density infill
Stakeholder 4	General Manager, Residential, Victoria	Listed developer – high/medium-density infill and land developments
Stakeholder 5	General Manager, Apartment Developments	Listed developer – high/medium-density infill
Stakeholder 6	Fund Manager	Superannuation fund developer – high/medium-density infill and land developments
Stakeholder 7	Director – Property Risk	National bank – all areas of property development
Stakeholder 8	Director – Independent Borrowers Advocate	Independent finance broker – all areas of property and development
Stakeholder 9	Manager – Government Valuations	Public valuer – all areas of property and development
Stakeholder 10	Director – Residential Valuations	Private valuer – all areas of residential property and development
Stakeholder 11	General Manager – Operations	Not-for-profit property manager – Community Housing Association – high/medium-density housing
Stakeholder 12	Senior Property Manager	Private property manager – high/medium/low-density housing
Stakeholder 13	Manager – Strategic Consulting	Real estate consultant – global multi-disciplinary property organisation, all areas of property and development
Stakeholder 14	Head of Research	Real estate researcher – local multi-disciplinary property organisation

research (Crabtree & Hes, 2009). Therefore, interview participants were identified using the authors' own networks as well as a desktop review of leading building-industry stakeholders who were active in the high/medium-density residential infill in the Melbourne region. The personal contacts provided access to senior managers which would not have been available otherwise. Many of the stakeholders operated nationally, giving the research a more holistic perspective. The proposed list of stakeholders was reviewed by colleagues of the authors to ensure that a representative sample had been selected. The stakeholders who were interviewed were all external to the stakeholders who had worked on the design and construction of the project, as the principle objective was to assess the diffusion of ideas throughout the development industry at large.

The interviews were undertaken across May and June 2014 at the interviewee's place of work and lasted approximately 60 min. The interviews were audio recorded and transcribed, then thematically coded. Interview questions related to each stakeholder's organisation, property market conditions and trends since the construction of the Nicholson in 2011, covering cost, design, environmental sustainability features, mixed tenure, mixed use, modular construction and onsite building management. Stakeholders were initially asked questions in a broader context for the Melbourne development industry, and then more specifically of the implications from, and for, the Nicholson. The interview format allowed questions to be tailored to different stakeholder groups, and provided a better opportunity for detailed exploration of themes than other methods of data collection, for example conducting a survey, which is more limited in this regard (Yin, 2010).

One limitation of the research is the focus on only one building. Despite this, it provided an opportunity for providing quick policy feedback from the wider building industry in Melbourne as to the influence of a Victorian state government-backed demonstration development. The benefit of detailed studies on limited numbers of buildings has been identified elsewhere in the literature (Ridley, Bere, Clarke, Schwartz, & Farr, 2014).

5. Results and discussion

This section presents the analysis and discussion from the interviews across the five key elements in the Nicholson: environmental sustainability, governance, mixed tenure, mixed use and modular construction. The analysis and discussion also covers wider industry influences where these were identified by stakeholders.

5.1. Environmental sustainability

Improving the environmental sustainability of developments above minimum building codes was broadly recognised by stakeholders as the right thing to do from the perspective of reducing environmental impacts. However, stakeholders felt that improving the environmental performance above minimum standards had to be done within existing and constrained financial structures. The perception was that improved environmental sustainability impacted on upfront affordability for both the building industry and consumers, and that the general purchasing market did not currently value such outcomes.

According to the stakeholders, environmental sustainability requirements were placed behind price, location, number (and size) of rooms and local amenities in the decision-making process. This has also been found in other Melbourne and international apartment research (Moore, Martel, & Horne, 2014). For the apartment market, the ongoing challenge regarding environmental sustainability is the perceived additional upfront cost and limited understanding about the through-life benefits for owners and occupants. Several stakeholders were adamant that consumers were more concerned with price as a number one priority. If a development fit within a consumer's budget and had higher environmental sustainability outcomes then that was seen as a bonus, but not a requirement.

"Are they going to pay more for a 6 star energy rating? I wouldn't."
 [(Stakeholder 14)]

There were different opinions about engagement by consumers and consumers' attitudes towards environmental sustainability. Some stakeholders stated that they had never had a potential purchaser come up to them and ask questions about environmental sustainability. Other stakeholders highlighted the fact that consumers are becoming increasingly savvy and understand exactly what they are purchasing with their money. They felt that a recent change had occurred and consumers were now translating rising living costs (e.g. utilities) to design and purchasing outcomes from their apartment. The complexity of the purchasing public with regard to knowledge about sustainability and other benefits of good design has been found elsewhere (CABE, 2001; Carmona, 2013; Macmillan, 2006).

Developers indicated that they would offer improved environmental sustainability outcomes if the market demanded it, as they try to match their product as closely to buying preferences as possible. The stakeholders also thought that owner-occupiers were also more likely to value environmental sustainability features over investors who were more concerned with maximising return on investment.

"Most customers, no matter what generation, if you give them a choice between improved finish or a more sustainable product ... they will generally go with improved finish."

[(Stakeholder 5)]

While some of the stakeholders spoke of providing a product for a market, there is significant discussion in the wider literature about market failures and environmentally sustainable housing (CABE, 2001; Hu, Geertman, & Hooimeijer, 2014b; Moore et al., 2014; Nevin & Watson, 1998). Market failures are evident even from these interviews, where it was generally perceived that consumers are not valuing improved sustainability. Allowing the market to determine value relies on consumers having sufficient information about the true upfront and through-life costs and benefits about improved environmental sustainability outcomes. Some stakeholders felt that there was a lack of education and understanding about the through-life implications of design choices for consumers. However this was not a universal view with other stakeholders stating that they were developing what consumers wanted.

The impact of the environmental sustainability elements is difficult to gauge, as the minimum building requirements have changed since the construction of the Nicholson and what was once innovative, is now regulated through minimum building standards. In this regard the Nicholson demonstrated that higher standards were possible, and that developments could include elements such as solar and rain water recycling. The building also highlights the challenges of increasing sustainability, with the water treatment plant still not operational due to issues around water testing and costs that have not yet been resolved (although this did not appear to be known amongst the stakeholders). It was clear from the interviews that it will take more than one-off demonstration buildings to improved environmental sustainability in new apartment developments.

5.2. Governance

The stakeholders were unaware of the onsite management approach implemented at the Nicholson. Onsite management is not yet a widely adopted development approach in Australia. There was some consensus amongst the stakeholders that this was because it was market dependent. A large percentage of apartment purchasers (i.e. investors) do not currently value onsite place management and do not understand how it could improve their bottom line (return-on-investment), therefore it is not something that is desired. The stakeholders did recognise that the owner-occupier market did value onsite management.

Stakeholders also felt that onsite management was more valued at the higher end of the market, where owners expect more inclusions and a higher level of care.

“So your generic investor/renter, that's not going to be an attraction for them, whereas if it is predominantly owner-occupier [they appreciate that]. We are starting to see that more, where there is a concierge desk onsite where they have someone there 24/7.”

[(Stakeholder 7)]

Some of the developers have recently started to engage more with management as an opportunity to have a one-stop-shop for owners. While more geared towards management of rental apartments, this demonstrates that stakeholders are looking to find ways to add value to their products. One developer believed that going down the path of providing management (albeit off-site) was about branding for them; an additional hook to get consumers to purchase their product. In this context the engagement with management by developers was still in its infancy compared to organisations servicing public sector housing as their core job.

5.3. Mixed tenure

The provision of mixed-tenure housing in Australia is not a new concept and efforts to foster mixed tenure housing have been occurring since the 1950s (Arthurson, 2008), although mixed tenure has not been as actively promoted in recent years. The Nicholson represents a return to such development in Victoria. Of all the demonstration elements in the Nicholson, the inclusion of mixed tenure provided the most divisive discussion point amongst the stakeholders, which is not surprising considering the contestation in the wider literature (Arthurson, 2010; Bond, Sautkina, & Kearns, 2011; Joseph & Chaskin, 2010; Sautkina, Bond, & Kearns, 2012). While many stakeholders believed that mixed tenure was a good thing in principle, some stated that it was not something they would want to encourage or live in themselves. Many of the stakeholders were aware that the Nicholson contained mixed tenure accommodation. In fact it was quite a talking point amongst the wider property industry and many of the stakeholders felt that Places Victoria demonstrated significant leadership and bravery in developing a mixed-tenure residential development. In this context the Nicholson was seen as an exemplar development that the building industry could learn from, and stakeholders were monitoring outcomes in an informal way. They did, however, recognise the substantial public sector commitment to delivering this; support which may not be available to other developments.

Most of the stakeholders felt that public or affordable housing has stigma attached to it. The perception was that such housing attracts a lower quality of occupant and this can impact on liveability and, ultimately, on property values.

“The ideal scenario is you want no form of community or social housing in the building ... there is a smell associated with it ... if I had a choice between one that had it and didn't — I would be choosing the one that didn't have it.”

[(Stakeholder 14)]

This stigma was not really based on any real evidence but is more a longer-term cultural issue in Australia. As highlighted in the literature, there is limited evidence that demonstrates the actuality of perceived stigmas (Arthurson, 2010; Ruming, 2013). The Nicholson property manager said that they had no evidence from across their multiple residential sites, both in Melbourne and Adelaide, that there was any real stigma attached to mixed-tenure accommodation. In fact they believe that because the Nicholson was mixed tenure they had a high level of interest for both public and private occupants to live there.

Evidence from the initial sale of the Nicholson apartments would indicate that the inclusion of mixed-tenure accommodation had less impact on value than first thought. The community housing was purchased off the plan with the agreement that prices would be adjusted once the private market had purchased apartments. Once the private market had purchased sufficient number of the Nicholson apartments, the community housing had its price adjusted upward by AUD\$20,000 per apartment by the Victorian Valuer-General, reflecting that the private owners valued the apartments more than initially predicted.

There was also a split in opinions between those who thought salt and pepper (affordable apartments integrated alongside private apartments, also referred to as pepper-potting) was the best way to have mixed-tenure housing, while others felt that siloed tenure options were better, with separate public and private buildings side by side. The siloed approach was not so much to keep tenants from mixing, but to control building costs and assist with keeping the cost of living lower for affordable-housing tenants. There is limited evidence that demonstrates significant social benefits from mixing tenure within a development (Arthurson, 2010; Bond et al., 2011; Joseph & Chaskin, 2010).

“What Places Victoria did with the salt and pepper was very courageous. As a developer we wouldn't do it as a matter of course because we think that is leading with their chin. We are curious to the research into the development.”

[(Stakeholder 4)]

While the provision of affordable housing was seen as a required housing type from the stakeholders, there was a clear sense that there is still a significant way to go if mixed-tenure accommodation is to be accepted both in the building industry and by the general public. Most of the issues centre around the perception/stigma of affordable housing, and improved education could help to address this. The Nicholson was recognised as being innovative by demonstrating a salt and pepper mixed-tenure accommodation and the industry is keeping an informal eye on it to see how it works out over the longer term. At this stage they have not engaged more in mixed-tenure housing, although they are now more aware of such housing.

5.4. Mixed use

Mixed-use apartment developments (a mix of residential and retail/commercial premises) were viewed with caution from the stakeholders, particularly the developers. Such developments have become standard in Melbourne's housing in recent years, driven by local councils wanting to activate street frontages and ensure local amenity for residents. Generally mixed use was seen as a beneficial and even desired inclusion, if delivered with due consideration; although the feeling was there are too many cafés going into developments across Melbourne, which may not be financially viable in the longer term and could result in future planning issues. The Nicholson property manager stated that mixed use is important not only for the convenience, which the shops can provide, but the local employment opportunities and community forming they can provide.

“There are probably not many developments [that] don't offer this now. Purchasers want it and they will seek out options [that] have this, creating that village lifestyle where they can pop down and grab a coffee or something to eat.”

[(Stakeholder 7)]

The key issues identified by the stakeholders against including retail with residential were noise (from the shops themselves but also from increased traffic), trucks entering/exiting the area to deliver goods/take away rubbish, and increased pedestrian numbers. One stakeholder said that knowing what they do about the negatives of mixed-use developments, they would not buy into one.

The stakeholders, while having various views of mixed use, did not look to the Nicholson as a case study of how to achieve this – in fact they mentioned other recent developments around Melbourne as examples of both good and bad mixed-use developments. This may be due to the fact that retail spaces at the Nicholson have remained unoccupied (in early 2015) since residents moved into the development in late 2011 (except for one independent supermarket). The empty retail space was identified by some of the stakeholders as having the potential to impact on sales/rents of apartments. It would be beneficial, then, for the owners of the retail space to consider lowering their rent prices, or allowing some pop-up shops to utilise the space in order to generate an active street frontage, which in turn may help to attract longer-term tenants. From a developer's perspective it is important to get some commitment to the retail spaces before completion of construction. Perhaps because retail is more challenging than residential spaces in the development, developers are starting to question the value of it in apartment developments, even with the recognised community benefits.

5.5. Modular construction

The majority of the stakeholders interviewed were aware of modular construction methods and knew that the Nicholson was a modular construction development. There was mixed reaction to modular construction amongst the stakeholders. Some felt that it was an attractive proposition for developers and consumers, while others felt the opposite.

"The industry is very aware of this development and this product This is a market-leading product, I think no one could disagree that this is quite a good looking development and has demonstrated that modular construction is no longer a novelty, but it is a realistic option."

[(Stakeholder 5)]

These mixed views were related primarily to the cost of construction. Some stakeholders believed that modular construction costs more than traditional construction, and that it was not yet economically viable for the wider building industry. Other stakeholders thought that the construction costs were now roughly in line with traditional building approaches, particularly when time efficiencies were factored in both for developers and consumers.

The main challenge around modular construction for the building industry in 2011 was around how to get banks to finance this type of construction. They were making progress payments for a product that was offsite – whereas they would traditionally pay for stages they could see onsite. While the Nicholson development helped banks to understand the process of modular construction and develop alternative funding processes, this still remains a significant hurdle preventing modular construction becoming more mainstream.

"We did consider it for project we completed in South Melbourne but on a cost-benefit analysis it wasn't going to improve the outcome for us. We were swayed in the end by the banks, who hadn't quite got their heads around it. We are told the banks are more comfortable with this now."

[(Stakeholder 6)]

Overall though, considering that the Nicholson was an early Australian example of large-scale modular construction, many of the stakeholders thought it had influenced the wider building industry. It was a well-known example in the building industry and had provided a platform for further innovation in modular construction and the financing mechanisms to support it. Developers in particular seemed to be moving closer to accepting modular construction approaches, with many having looked at the costs and trialled the inclusion of modular elements such as bathrooms within new developments.

5.6. A model for urban development?

The interviews identified that the Nicholson was well known amongst the wider building industry as an innovative building, and is considered to be replicable for some innovation elements; an outcome that addressed part of the aim of the government developer. The majority of stakeholders were aware of the demonstrative elements included in the building and had mixed views on the impact the development had on their businesses. The most significant influence on the wider building industry has been from the mixed tenure element and the use of modular construction. Critically, the development has allowed these elements to move from concepts to a tangible case study that provided real world feedback and market testing for stakeholders without them having to take the financial and reputational risk themselves. There was evidence that as a direct result of the Nicholson development, stakeholders were now engaging with modular construction and investigating it as a more feasible construction option, both in terms of the results of the onsite construction achieved, but also from changes to financing structures by banks of such developments. The mixed tenure demonstration had also led to greater consideration of incorporating such tenure type into other developments, although there were still some challenges around accepting this, particularly by developers who still felt that there was a negative stigma attached to such housing.

The environmental sustainability, mixed use and onsite governance elements were not well known from the Nicholson development, and remain an ongoing challenge for the building industry to engage with. These elements are still viewed as market specific in that they are not included unless stakeholders believe that there is a market that wishes to pay for such features. In a contested affordable higher-density housing market, such as Melbourne (Higgins & Moore, 2015), there is a hesitance to include features which are perceived to drive up purchase price. However, such elements contribute to better design outcomes, not only for the immediate development and occupants, but also the wider community. The Nicholson demonstrates how challenging it can be to capture these benefits, as the retail spaces remained predominantly empty in the short term. Furthermore, the development demonstrates the importance of timing, with the innovative environmental sustainability performance becoming the regulated minimum performance before the construction of the development had been complete.

Overall, the financial involvement of the Victorian Government in delivering an innovative development to help guide the broader building industry has had some qualified success and highlights the important role that state (or local) governments can play in guiding the building industry in Australia and internationally towards a more sustainable urban future. The analysis suggests that key stakeholders are on the precipice of embracing some of the innovative elements in the Nicholson; an outcome which may not have been possible if not for the Victorian government involvement. The outcomes could be enhanced if the government improved dissemination of learnings from this development to the wider building industry. What was noticeable from the interviews was the extent to which interviewees made reference to informally keeping an eye on the development, thus implying a lack of formal or structured methods through which information was being disseminated. This information should be disseminated through peak industry bodies and at building industry events to maximise coverage. A detailed case study on the costs, benefits and challenges of undertaking a modular construction development would be useful to this end. These lessons are applicable to cities around the world who are trying to achieve improved sustainability and liveability within building industries who are reluctant, or slow, to embrace innovation if there are risks involved. Reducing risks has been shown to engage the building industry, as demonstrated with the BedZED and zHome examples, where the local authorities organised for low (or zero) cost land transfer to ensure project viability (Living Building Challenge, 2015; Peabody, 2009).

6. Conclusion

It is evident by this research, and by the wider property industry awards it has won, that the Nicholson has played a role in influencing certain elements in the building industry in Melbourne, and that the aim of the Victorian government (through Places Victoria as the developer) in developing this building as an approach for wider urban development change has been partially successful. However, it is also clear from this case study that a demonstration project is not a panacea to fix all challenges within the building industry. For example, the innovative elements that were most engaged with by developers were ones that they believed could help improve their financial outcomes. In addition, the environmental innovation (which was more of an incremental improvement rather than a radical change) became the standard practice before the completion of the development due to changes to minimum building performance regulations by the Federal government, which greatly reduced the influence the dwelling had on the wider industry in regard to environmental sustainability. This highlights the importance of and challenges around timing for demonstration projects.

To improve learning outcomes and influence the building industry from government demonstration projects, such as the Nicholson, more effort is required to communicate the outcomes and engage the wider building industry in a more formal and coordinated way (e.g. through peak industry bodies) to learn from case studies and in particular, draw links to how they could incorporate these innovative features into their own developments. The stakeholders had relied on word-of-mouth informal discussions with colleagues and outcomes of industry awards to learn about the project; an ad-hoc approach at best. Furthermore, if governments are committed to demonstration projects as a sustainable urban development approach, then the challenge is not just to improve information dissemination, but to remain committed to ongoing research into existing, newly constructed and proposed developments. Future research is required to build upon this paper, evaluate a wider range of demonstration projects and include other stakeholders, such as local authority planning officers, in order to improve understandings of how demonstration projects might better shape planning and urban development outcomes.

There is scope for future government innovative developments to have increased influence by ensuring that outcomes and learnings from such developments are shared with the wider building industry; which this paper is in part addressing. While focused on Melbourne, the findings provide a valuable understanding for future sustainable urban development projects, not only in Australia but internationally where many cities are facing similar development and urban planning challenges.

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