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RESEARCH ARTICLE

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How information asymmetries exacerbate building defects risks for purchasers of Australian residential multi-owned properties

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ABSTRACT

Increasing urbanization is driving rapid growth in residential multi-owned properties (RMOPs) worldwide. Concerns about the quality of these buildings are also growing in many countries. Yet research into the quality of RMOPs (particularly apartments) remains scant and under-theorized. Addressing this knowledge gap, this paper reports the results of research which employed information asymmetry theory to provide new insights into the prevalence and risks of building defects in the Australian RMOP construction market. Using data about defects in 635 RMOPs built in Sydney between 2008 and 2017 and semi-structured interviews with sixty-six experienced practitioners, the results highlight the severity of the defects crisis. The research identified two types of information asymmetries which exacerbate the risk of buying into a defective building for RMOP customers: *data fragmentation* and *data robustness*. From a policy and practical perspective, this highlights the challenges faced by consumers in undertaking 'due diligence' and the need for reforms that address these information asymmetries.

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Quality; Australia; strata; condominiums; information asymmetries; principal-agent theory

Introduction

The profile of housing in many developed and developing countries is radically changing as the pace of global urbanization increases, leading to growing numbers of people living in residential multi-owned properties (RMOP) – most commonly in the form of apartment complexes (Levin & Arthurson, 2020; Richards et al., 2020). These 'dualistic' forms of ownership are given different names in different countries, including strata (Australia), condominium (USA), propiedad horizontal (Spain) and copropriété (France).

Australia is one of the world's most urbanized countries, with about 2.6 million Australians living in apartments (Foster et al., 2023). Many of these apartments have been built in recent decades; as Rosewall and Shoory (2017) note, the amount of apartments being built each year tripled between 2009 and 2016. Unfortunately, in many countries this process of 'vertical urbanization' has been accompanied by increasing evidence of serious building defects with negative economic, social, and environmental impacts for those living in and around these buildings. These problems have been identified around the world, including in the UK (Hackitt, 2018; Pan & Thomas, 2014), Denmark (Schultz et al., 2015), Hong Kong

(Wong et al., 2009), Malaysia (Wahi et al., 2018), Singapore (Chew & De Silva, 2002), South Korea (Lee et al., 2020; Park & Seo, 2023), Spain (Carretero-Ayuso et al., 2020; Forcada et al., 2016) and Sweden (Zalejska Jonsson & Hungria Gunnelin, 2019).

In Australia, the problem of defects in RMOP has become particularly acute (Shergold & Weir, 2018). For example, Easthope et al.'s (2012) survey of over one thousand RMOP owners in NSW reported that almost three-quarters were aware of defects in their buildings. Johnston and Reid's (2019) analysis of 212 RMOPs across three Australian states found an average of 12–15 defects in each building audited. It was estimated in 2019 that rectifying defects in Australian RMOPs completed during the previous decade would cost \$6.2 billion, and that over 3,400 residential apartment buildings have combustible cladding which puts lives at risk (Equity Economics 2019).

While the above studies point to the extent of the problem in Australia, research into RMOP defects remains scant and under-theorized. To address this gap in knowledge, this paper examines the risks associated with defects in RMOP, drawing upon empirical findings from a research project that collected qualitative interview data

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from experienced practitioners involved in RMOP planning, design, construction, management and defect rectification, alongside quantitative documentary data for a representative sample of 635 strata-titled developments in Sydney, New South Wales (NSW). By mobilizing information asymmetry theory to analyse the results of this research, this paper offers novel insights into the ways in which information asymmetries exacerbate the risks associated with defects for RMOP consumers.

Specifically, two key questions are addressed in this paper:

- (1) What is the prevalence of defects in RMOP developments in Sydney, Australia? (RQ1)
- (2) How do information asymmetries relating to defects in RMOPs exacerbate the risk to consumers? (RQ2)

Information asymmetry occurs when two parties in an exchange relationship have access to different quantities and/or quality of information (Akerlof, 1970). While information asymmetries between actors in the building procurement process have been problematized by a number of construction management researchers (Bakhtawar et al., 2018; Ivić & Cerić, 2023; Lützkendorf & Speer, 2005), and while information asymmetries have also been identified in the RMOP development process (Easthope & Randolph, 2016; Johnston & Leshinsky, 2018), their relationship with RMOP defects has received little attention.

By contributing new conceptual insights into the poorly understood role of information asymmetries in exacerbating the risks associated with RMOP defects, this research broadens the RMOP quality debate beyond the current focus on construction compliance. Furthermore, while this research was undertaken in Sydney, its implications have wider international relevance. As discussed above, defects in RMOP have been identified in many countries, and the risks for consumers are not limited to Sydney or Australia.

Conceptualizing defects in RMOPs using information asymmetry theory

This research defines a building defect as:

A failing or shortcoming in the function, performance, statutory or user requirements of the building, which has existed since construction or been triggered later on by faulty original construction or design.

This definition combines Watt's (2007, p. 96) and Easthope et al.'s (2012, p. 65) definitions, and is useful because it extends the definition of defective work beyond that which fails to fulfill existing statutory

requirements. As Watt (2007) argues, construction that fails after occupation and which does not meet reasonable user requirements may also be considered defective. This approach therefore aligns with our focus on the impact of RMOP on consumers.

In conceptualizing the drivers of RMOP defects from an information asymmetry perspective, this paper builds on the work of Easthope and Randolph (2016), who argue that the RMOP industry operates in a way that uniquely exacerbates the risks of building defects compared to other types of development such as commercial buildings. This is because the dominant RMOP development model makes it easier for developers to avoid taking responsibility for fixing building defects once a development has been sold to buyers (Johnston & Reid, 2019). This is possible for three reasons. First, RMOP developers are typically selling to multiple unrelated buyers, who have little bargaining power or resources to demand regular inspections during construction in the way commercial clients can, and who often struggle to work together to hold developers responsible for defects once sales have settled (Easthope & Randolph, 2016). Second, RMOP developers can avoid responsibility through the practice of 'phoenixing' which involves creating and then bankrupting shell companies around each development to avoid responsibility for subsequent defects problems (Gladstone & Fellner, 2019). The relative unsophistication of the residential market means that buyers may not be aware that a developer has acted in this way in the past. Third, the common 'buy-off-the-plan' development model puts buyers in a weak market position by creating 'asymmetric' information structures by selling homes before they are fully specified and built, with limited insurance if something goes wrong (Hackitt, 2018; Shergold & Weir, 2018; Wilson & Rhodes, 2017).

According to Rosewall and Shoory (2017), quality is further undermined by growing RMOP complexity, coupled with the dominance of relatively small and low-skilled builders in the RMOP construction supply chain compared to the more sophisticated commercial building sector. RMOPs are typically procured through a highly fragmented construction supply chain characterized by communication problems, 'split incentives' and the Design and Construct system, which fast-tracks design and shifts risks to a multitude of small subcontractors who are generally ill-equipped to manage them. This risk-shifting behaviour encourages 'opportunistic' cost-cutting which can also undermine building quality. Compounding these problems, strict loan repayment schedules and volatile markets can put RMOP developers under pressure, creating incentives to rush projects and cut corners to meet payment

deadlines (Britton & Bailey, 2011). The incentive to do so has been exacerbated by the difficulty of customers legally pursuing developers once the building is sold (Britton & Bailey, 2011; McClymont, 2017). Furthermore, concerns have been raised about compromised, under-resourced and fragmented regulatory environments for monitoring the quality of RMOP developments (Hackitt, 2018; Lambert, 2015; Shergold & Weir, 2018). Cumulatively, these factors lead to information asymmetries and disincentivize quality practices throughout the RMOP development process (planning, design, construction, sales and ongoing facilities management).

Conceptually, the problem of information asymmetry is framed within the literature on Principal-Agent Theory (Eisenhardt, 1989). This argues that market transactions are often characterized by an ‘agent’ (for example a RMOP developer) being able to act in a way that affects the ‘principal’ (for example a RMOP purchaser). This applies to any market exchange in the RMOP development process – such as between principal contractors and subcontractors. Principal-Agent Theory indicates that principal-agent problems can arise for two main reasons: the two parties have different interests (‘split incentives’); and/or the two parties have different levels or quality of information (‘information asymmetry’) (Akerlof, 1970). The principal-agent problem is exacerbated when there are multiple principals who cannot coordinate their actions, as is the case with individual apartment customers. This may cause unscrupulous RMOP developers to engage in opportunistic behaviour such as substituting inferior building products and subcontractors, without reducing apartment prices. Known as ‘moral hazard’ in Principal Agent Theory, this behaviour is more likely if principals cannot accurately assess the quality of different products (Ivić & Cerić, 2023). This applies to most RMOP customers, who typically lack the technical expertise to make informed judgements about quality (Crommelin et al., 2021), and are therefore likely to engage in ‘adverse selection’ (Akerlof, 1970) by simply choosing the cheapest product. The increasingly complex nature of RMOP buildings also means that key elements are hidden from everyday view (e.g. fire dampers in the wall cavities, waterproofing on rooftops). This means defective work can be easily concealed in the completed building.

Principal-Agent Theory predicts that if information asymmetries facilitate these behaviours this will lead to a decline in quality across the entire RMOP sector, as customer preference for cheaper lower quality products drives more expensive higher quality products (which are not easily recognized by consumers) out of the

market. The damage caused by this phenomenon is called the ‘agency cost’ and in the context of owners of defective RMOP buildings, can be both financial and psychological (Oswald et al., 2022, 2023). Eventually, information asymmetry theory predicts that market confidence will decline, creating a problem for both good and bad RMOP developers, as falling demand will undermine profitability (see for example Gall, 2019).

Principal-Agent Theory also offers two primary solutions to the problem of information asymmetries: *signalling* and *screening* (Stiglitz, 2000). In the context of RMOP, ‘signalling’ refers to developers using mechanisms such as warranties, brands or quality marks to differentiate their higher quality products (Auronen, 2003). In contrast, ‘screening’ involves principals (RMOP customers) conducting research to determine which developers are most reputable. However, this imposes additional costs on customers, since data about RMOP defects is often not easily available (Johnston & Leshinsky, 2018; Johnston & Reid, 2019).

As illustrated above, the theoretical construct of information asymmetries is a potentially valuable tool to explore the causes and consequences of defects over the lifecycle of a RMOP development. Mobilizing these ideas, the next section describes a three-year research project which used this theory to explore the research questions and gap in knowledge identified above. While information asymmetries are evident throughout the process of developing, selling and rectifying RMOP, we focus in this paper on the ways in which information asymmetries make it very difficult for RMOP consumers to do ‘due diligence’ before buying an apartment. These information asymmetries expose consumers to the risk of buying a defective product which will burden them with significant agency costs.

Method

This research involved a two-stage mixed methods data collection and analysis, using quantitative and qualitative data sources from the RMOP sector in Sydney, Australia.

Stage one

In Stage One, data on the extent and nature of building defects was collected from a representative sample of RMOP buildings in three local government areas (LGAs) in the Sydney metropolitan area (the City of Sydney, Parramatta, Canterbury-Bankstown). This sample comprised 635 strata schemes (i.e. RMOPs) which were randomly selected to represent 50% of all strata-titled properties registered in these three LGAs between 2008 and 2017. This period was chosen because

it represents a phase of significant growth in RMOP development in Sydney. The three LGAs were chosen to represent different price points in the RMOP market: high (City of Sydney), medium (Parramatta) and lower (Canterbury-Bankstown). The list of buildings in the sample was accessed under license from NSW Land Registry Services and the 50% random sample resulted in a representative cross-section of newer RMOP buildings in the three LGAs.

Once the sample was identified, the researchers collected defects data about the selected buildings from a range of documentary sources, as documented in Table 1. This data were collected through requests to industry and government sources, and by searches of publicly available records.

Stage two

In Stage Two, complementary qualitative data were collected using a key informant approach through semi-structured interviews with a representative purposive sample of experienced practitioners involved in RMOP planning, design, construction, management and defect rectification.¹ Interview participants were identified through recommendations by an expert Reference Panel of RMOP industry stakeholders and the researchers' professional networks, as well as occasional snowballing based on relevant suggestions by interviewees. To incorporate diverse perspectives, interviewee expertise was carefully tracked to ensure experts from all relevant sectors were included. Interviews were conducted either face-to-face, by telephone or on-line, and lasted between 45 min and 2 h, involving 2–3 members of the multidisciplinary research team. Informed by theoretical analysis of how information asymmetry theory can explain defects in RMOP, the interviews explored the role that information asymmetries play throughout the RMOP development and sale process. The use of semi-structured interviews provided deeply reflective insights based on respondents' experiences of how information asymmetries exacerbate the risk of buying defective RMOP properties.

Interviews continued until the point of 'theoretical saturation' (Saunders et al., 2018), where no new insights into the research questions were emerging. In total the research team conducted 57 interviews with 66 experts (some interviews involved multiple participants from the same organization – see Table 2).

Analysis

Data analysis involved the development of an analytical framework to systematically compare and analyse

documentary data collected in Stage One, based on the MOP defects literature. This framework comprised: defect types (e.g. cracks/structure, water and fire); location (e.g. doors/windows); system (e.g. mechanical/electrical); damage (e.g. corrosion). For each strata scheme, it was noted whether each type of defect was or was not identified in their building, with further details noted. Defects that spanned more than one category (e.g. fire door defects) were classified under one category (in that case, fire-related defects) to avoid overstating the prevalence of defects in the results.

In Stage Two, all interviews were recorded and professionally transcribed. Using the research questions as a starting-point, researchers conducted open (inductive) and directed (deductive) coding using analytical categories relating to information asymmetry theory (principal-agent problems, split incentives, agency costs, moral hazard, adverse selection, signalling and screening). This generated a list of codes grouped into over-arching themes relating to the research questions. The list of codes was reviewed through the coding process by the full research team to ensure consistency in how they were applied to the interview data.

Following Hennink (2013, p. 133), the results of the qualitative analysis are presented in simultaneous analysis and discussion to allow a grounded reflection. This approach locates the findings adjacent to the relevant discussion, which aids in highlighting the contextual significance of the findings and the contribution to extant research. Given the large volume of data collected, it is not possible to report all the data. Therefore, as in the tradition of qualitative research, selected quotes from interviews which are representative of key issues are presented to support the findings. This is followed by a shorter discussion section which serves to reflect on the key insights from the qualitative analysis and identify new avenues to develop the empirical and theoretical foundations of building defects research.

Results

RQ1: What is the prevalence of defects in RMOP developments in Sydney?

Indicating the scale of the issue, only three interviewees claimed that defects were not a significant or growing problem in the RMOP sector. These statements were typical of many:

How bad is it? It's really bad, let me tell you. It's very rare that I will go to a building built in the last 10 years and not find a problem. – Rectification Specialist 3

Table 1. Defects data collected from buildings in the sample.

Data Source	City of Sydney	Parramatta	Canterbury-Bankstown	Total	% of schemes
Insurance Information					
Provider 1	185	224	226	635	100%
Provider 2	124	168	166	458	72%
Detailed	28	13	56	97	15%
Strata inspection reports (357 total – some duplicates)	115 (174 total – some duplicates)	90 (113 total – some duplicates)	60 (70 total – some duplicates)	265	42%
Development Application data (basic)	86	118	33	237	37%
Development Application Documents (detailed)	78	100	0	178	28%
Annual Fire Statements (152 total – some duplicates)	82 (98 total – some duplicates)	36 (38 total – some duplicates)	16	134	21%
Defects reports (79 total – some duplicates)	41 (52 total – some duplicates)	15 (19 total – some duplicates)	8	64	10%
Cladding register (preliminary)	42	0	0	42	7%
Financing Data	8	8	4	20	3%
Remedial data	7	1	1	9	1%
Council business report (meeting minutes)	3	0	0	3	0.5%
Case Law	0	2 (3 cases total)	0	2	0.3%

I believe that it is far worse than the government or the media either understand or would concede is the case. [The public is] seeing the tip of the iceberg. – Lawyer 2

The quantitative data supports this perception, identifying evidence of at least one defect in 26% of the 635 strata schemes in the dataset (see Figure 1). However, due to the information asymmetries discussed below (RQ2), this figure is likely to understate actual defect prevalence. This is because for many of the schemes in our sample, reliable information was not available. In strata schemes for which more ‘robust’ data was available (314 schemes), there was evidence of at least one defect in 51% of these schemes (and evidence of at

least ten defects in 12%). ‘Robust’ data refers to RMOP developments for which at least one of the following documents was available: a defects inspection report (i.e. a report produced by a remedial expert/consultant after owners have moved in); detailed insurance records; or a strata inspection report (i.e. a report ordered by potential purchasers which is based on an inspection of records kept by the Owners Corporation (OC) of the strata scheme).² Based on the review of available data sources, these three document categories were most likely to provide a comprehensive picture of the prevalence of defects (if any) in a building. For this reason, we consider the ‘conservative estimates’ in Figure 1 are more likely than the ‘minimum estimates’ to accurately reflect the prevalence of defects in the RMOPs in the sample.

Figure 1 also shows that the most prevalent types of defects were: water penetration; cracking and structural problems; and fire safety issues.

These results provide some of the most representative evidence to date internationally about the incidence of defects in RMOP. Given these findings suggest at least half of RMOPs in the sample have defects, it is of great importance that RMOP customers can undertake due diligence into the quality of a building before buying. However, the research findings also demonstrate that this is extremely challenging, as the next section will explore.

RQ2: How do information asymmetries exacerbate the risks associated with RMOP defects for consumers?

Our insights into the role of information asymmetries in shaping the risks associated with RMOPs and defects

Table 2. Interview sample structure.

Sector	No. of interviewees
Rectification specialists (includes contractors, water-proofers, structural and façade repairs specialists, engineers, expert witnesses)	7
Development industry experts	6
Lawyers	5
Academics	6
Subcontractors (includes plumbers, tilers, carpentry, joinery, interiors, foreman)	6
Alternative development model experts (CHPs, student housing etc.)	3
Architects and designers	3
Builders and construction companies	4
Government employees (state and local)	6
Engineers	2
Certifiers	2
Insurers	3
Strata media	2
Property marketing and real estate companies	3
Strata managers	2
Suppliers	2
Strata inspectors	2
Experienced strata owners	2
Total	66

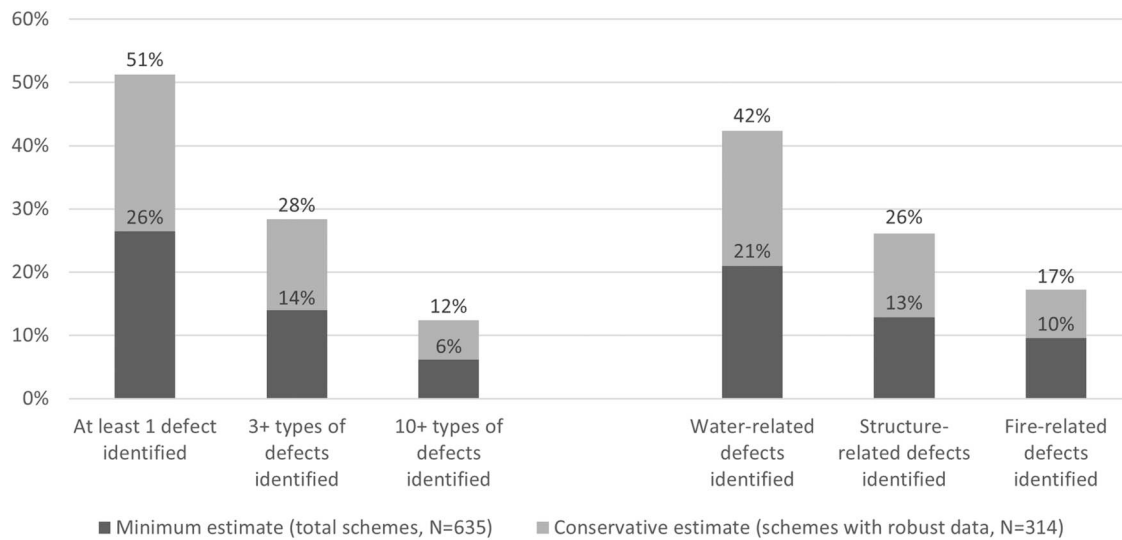


Figure 1. Defects identified in sample, for all schemes and for schemes with more robust data. Source: Authors (Crommelin et al., 2021).

emerge both from the experience of attempting to collate the data required to address RQ1, and from the thematic analysis of the expert interviews. As Ivić and Cerić (2023) note, the risk of information asymmetries arises at multiple points throughout a construction project, and can affect a range of different parties (e.g. developer/builder; contractor/sub-contractor). In this paper we focus on two key types of information asymmetries identified by our interviewees, that contribute to the highly asymmetric relationship between the developer (agent) and the consumer (principal), thus exacerbating the risks to RMOP consumers. We call these two types of information asymmetries *data fragmentation* and *data robustness*.

Data fragmentation

The research identified fragmentation of RMOP defect data sources as a major problem. Although more than 2000 items of defects data were collected during Stage 1, meaningful information on building defects was both scarce and dispersed. Different types of defect data are held variously by local and state government departments; tribunals and courts; private certifiers; building contractors and subcontractors; developers; defect rectification firms; strata managers; OCs; law firms; strata inspectors; construction and strata insurers; and real estate agents. In many cases, accessing data from these sources involved navigating complex relational, confidentiality and legal issues, which sometimes made access difficult or prevented it all together. Identifying whether and which government departments or agencies held various records was often complex and

records were not always easily accessible. Table 1 illustrates this fragmentation and the variable availability of data sources.

This fragmentation of data is a result of past failures by governments to collect comprehensive quality data about the residential construction sector. This creates a major information asymmetry problem for buyers, as there is no centralized depository of reliable and independent information about a building for ‘screening’ purposes. This is also a significant issue for governments themselves, as it means they do not have reliable, comprehensive data on which to base regulatory decisions and direct resources and enforcement.

Interviewees highlighted various ways in which Australian governments have failed to collect adequate information about building quality in RMOPs. For example, many noted that neither developers nor OCs have been obligated to report defects to the government. Interviewees also raised concerns about the under-resourcing of Australian regulators, which prevents governments investigating and reporting complaints (Shergold & Weir, 2018). As one lawyer put it:

It’s Wile E. Coyote ... [The government has] shot off the cliff and suddenly realised they got nothing to hold them up. Because the compliance and regulation of the market is nowhere near what the government can provide, and the government has basically hollowed itself out. – Lawyer 2

Recent reforms in NSW have provided better government resourcing to investigate and report defects and manage defect data (most notably the creation of a dedicated Building Commissioner) and OCs are now being encouraged to report problems (NSW Government

2022). However, these changes do not always mean the public will have access to defects data. A particularly striking example of this information asymmetry arose in relation to the NSW register of buildings identified as having 'high risk' flammable cladding. When a NSW Parliamentary Committee investigating building quality issues sought access to the register, the government agreed only if the register was not made public (NSW Parliament, Legislative Council PAC 2020), citing public health and safety concerns. While these concerns may have been legitimate, this dispute raises the question: what about the health and safety of potential buyers of apartments in these buildings?

As well as these access issues, the Parliamentary Committee raised concerns about data quality and public communications regarding the register, concluding that (NSW Parliament, Legislative Council PAC 2020, p. 40):

The committee has a number of concerns about the cladding database and high-risk register; in particular, whether the high-risk register is an accurate picture of all high-risk buildings out there. There is a lack of detail around the risk assessment used to determine if a building is high-risk and this information may not have been passed on to local councils or building owners ... The confusion among witnesses as to the different registers produced by the NSW Government and where they are held is emblematic of a lack of coordinated action on cladding.

Our findings highlight a similar lack of coordination in data collection, management and communication by government regarding RMOP defect data generally, with consumer access being very limited. It remains to be seen how well recent reform processes will be able to address this issue.

While it might be expected that court records would provide a detailed and reliable source of defects data, our interviewees explained that these records are also limited. As part of the research, we reviewed published defects cases in NSW. This review identified only 63 published defects cases between 1999 and 2020. While these cases provided some useful insights (for example, the median costs awarded were \$500,000, with the largest case costs being \$14.3 million) (see Crommelin et al., 2021 for details), this review also highlighted the issue of information asymmetry. As interviewees explained, these publicly available cases reflect a small minority of buildings with defects, since most defects disputes settle out of court before a decision is reached. As an experienced lawyer in this field explained:

The vast majority of cases settle [...] Very, very few of mine have ever gone to final hearing [...] It's expensive. It is really expensive. – Lawyer 3

This observation also highlights the large 'agency costs' associated with litigating and rectifying defects in RMOP in NSW, which may be a barrier to pursuing a legal claim to judgement. As another interviewee confirmed:

[Strata schemes] take on builders legally and they spend three million dollars in legal fees and for the three million dollars not one defect has been fixed. – Builder/Contractor 1

Given the expense, some interviewees advised RMOP owners against litigating defects under a certain cost. For these reasons, we conclude that the available case law does not provide a comprehensive indication of the prevalence of defects in RMOP. This reinforces an observation made by Carretero-Ayuso et al. (2020) on their review of Spanish litigation records, which also concluded that court records provide an incomplete picture regarding the prevalence of defects.

Given these limitations in government data sources, our research indicates that it is industry that currently holds the most informative defect records, not government. However, the research interviews indicate that even those in the industry struggle to get reliable data. For example, insurers often lacked detailed data that would help them to appropriately assess defect risks. As a strata insurer explained, when they insure an RMOP building:

Well, we don't know who developed or built it. We don't know. These records are lost. ... we have a lot of challenges with data across the industry – Insurer 1

While defect rectification firms hold more detailed data, this industry is very fragmented, with many small companies each using their own data management system. Furthermore, in an example of 'split-incentives', these firms are employed by OCs, and must keep their data confidential. This made gaining access challenging, requiring the research team to sign non-disclosure agreements with each firm. This again highlights the inaccessibility of detailed defects data for RMOP purchasers, who cannot go through a process like this to adequately 'screen' buildings before purchasing.

Data robustness

With governments and industry generally unable to provide consumers with the information required to assess the quality of a building, consumers must turn to other sources. In NSW, there are two main mechanisms for consumers and owners to access building quality information about a RMOP: strata inspection reports and defects reports. A strata inspection report can be

ordered by a potential purchaser of an existing apartment and is produced by a strata inspector reviewing an OC's records and summarizing key information. In theory, purchasing a strata inspection report should mean a RMOP consumer has done their 'due diligence' and is informed about any significant risks in the building. As a consumer-facing document, these reports should be presented in a way that makes it possible for the potential purchaser to understand the risks.

The second form of documentation sometimes available to consumers is a defect report, which is commissioned by an OC and involves a rectification expert inspecting the building and documenting any defects found. Sometimes, a strata inspection report will include a defect report as an attachment, meaning it can be accessed by a potential purchaser. These defects reports can be quite detailed (dozens, if not hundreds, of pages long) and are technical in nature. Whether a defect report is available depends on whether the OC has commissioned one, and if so, whether it is located by the strata inspector when preparing a strata inspection report.

For consumers to be adequately informed, it is important that these two types of reports are accurate and informative. Unfortunately, many interviewees raised concerns regarding the robustness of these reports. These concerns related to the varying skills of the people tasked with creating these reports, the quality of the information the reports draw on, and inconsistencies in how these reports are presented. Together, these concerns highlight the significant information asymmetries facing RMOP customers when they attempt 'due diligence'.

With regards to strata inspection reports, interviewees highlighted the deregulated nature of the industry as a concern. While preparing a comprehensive strata inspection report requires well-honed skills, this deregulation meant many inspectors are practising with limited experience. As one experienced inspector explained:

The cheap, nasty reports – you never [know] if ... it was done properly or if it was just somebody quickly giving you a report of just maybe the last one or two years of what's happened ... It's hard to find people that have the knowledge and the ability to put the reports together – Strata Inspector 1

Similarly, an academic with previous experience of preparing strata inspection reports highlighted the challenges involved in preparing a quality report:

It's hard. You get no help, you just get thrown a computer and you're sitting there going, well, everyone's got a different coding system, everyone's got a different filing system. Wow, it's so easy to miss things. – Academic 2

In particular, inspectors encounter challenges when trying to produce a comprehensive report in cases where the OC's record keeping has been poor. In these circumstances, the inspector must have sufficient experience to be able to recognize what is missing:

They would send us the [flash drive] and [we'd] open it up and it was like 6000 documents which weren't categorised at all ... often like a needle in the haystack finding things. Often you may have to ... send them an email saying, 'look, we're missing the latest defects claim update that was mentioned in the minutes or some court documents that were mentioned or minutes of a meeting.' ... So the biggest problem, I think, is that there really isn't any industry standard for recordkeeping or presenting records. – Strata inspector 1

Other interviewees confirmed that the record-keeping skills of the strata managers³ who manage OC records vary significantly:

It relies on the accuracy and the availability of information at the time the inspector goes and conducts the inspection of the records. If there's a shit strata manager, then bad records, you've got all these gaps in the report. – Real Estate 1

So ... the more I'm seeing from strata managers in ... other buildings, the more I'm really thinking 'oh my God'. Like, if I can't find something and I know what I'm looking for, the average person doing a search isn't going to find things. – Strata Manager 1

Given these issues, it is likely that many strata reports are incomplete, and important information may be omitted. This conclusion is supported by our own review of strata inspection reports. Of the 357 reports reviewed for this research, 12% of reports failed to mention defects at all, while another 8% mentioned defects issues but provided no supporting evidence. Importantly, where a strata inspection report contained little or no information on defects, it was often unclear whether this was because the building had no ongoing defect issues, or because defects had not been adequately reported. Cross-referencing with other data sources suggested the latter was true for at least nine schemes. This suggests that a strata inspection report that does not mention defects cannot necessarily be relied on as evidence that no defects have been identified in the building.

Similar concerns emerged from our interviews regarding the quality of defect reports. In particular, interviewees highlighted how the quality of these reports could vary significantly depending on the consultant's skills, as well as whether destructive testing was undertaken. Some serious defects can be concealed within the building structure, meaning a defects report

based solely on a visual inspection may miss these issues. Interviewees also noted that not all consultants offering defects reports necessarily have expertise in defect rectification, which is a highly specialized area:

If you dig a little bit deeper, the nature of these reports are not a properly diagnostic defects report, they're a cursory inspection that can be undertaken by a whole bunch of potentially unqualified people who are already significantly limited based on their potential relationships with builders, developers and other third party consultants – Strata Manager 2

Even with some of the specialist issues a lot of building consultants won't identify a lot of the defect issues that are there. It's only when you get the different kind of specialists going through that you pick up a whole lot of extra stuff, like fire safety or hydraulics or mechanical ventilation – Lawyer 4

These issues mean a poor defects report may not identify all the defect issues in a building. As one interviewee explained:

Some of the reports, they're quite expensive, some of them are not thorough, they don't go into every apartment, especially if they're tenanted [...] Sometimes I think if it's a very surface type report then it doesn't really go into the proper depth that it needs to. – Strata Manager 1

This means that even when Ocs try to be proactive and deal with defects, they may be working with insufficient information to tackle the problem. Furthermore, as previous research shows (Johnston & Reid, 2019; Lee et al., 2020; Pan & Thomas, 2014), different defect rectification experts take different approaches to determining defect severity, with disagreements common. These variations mean multiple reports may be needed to reach a comprehensive (and generally accepted) position on what the defects are and how they should be addressed. Meanwhile, for RMOP customers, this means that getting access to one defect report may still not be enough to provide a full picture of the defects risks associated with a building.

Ideally, a strata inspection report should translate the technical information contained in a defect report into a format that consumers can understand. In practice this is not necessarily the case, with some strata reports being:

usually very basic, very generic. They're like a four or five page report, maybe with a little bit of information on the balance of funds, whether there [were] any defect issues reported. If there are, they might just annex the defect report or an old quote from five years ago ... the purchaser would really have no way to tie it all together and work out what happened. – Strata inspector 1

In cases like this, the consumer has to try to understand the defects report, which is challenging without technical training. Furthermore, these reports are not always consistently structured, as one defects rectification expert explained:

The [defect inspection companies] that have been in the strata space for quite some time, they're reasonably consistent with each other ... That said, there are some practitioners in the industry that you see their reports and they are terrible ... Yeah, some of the styles and language in some reports ... you go 'wow, that's a bit unfortunate'. – Rectification Specialist 6

This means that similar defects may be categorised differently by different providers. For example, in our review of defect reports we identified a range of a terminology used to categorize defects, including: major/minor defects; a ratings system of 1-3; defects described as either high, medium and low priority; or simply listing all defects without categorization. Other researchers have also identified similar inconsistencies (Johnston & Reid, 2019). These inconsistencies make 'screening' difficult, if not impossible, for everyday RMOP customers who lack the expertise to understand the technical information underpinning these categorizations.

The net result of these information asymmetries is that RMOP consumers have little hope of being able to access adequate information to make an informed decision about whether to buy into an RMOP. There are simply too many points in the process where the required information can be lost, as the diagram in Figure 2 demonstrates.

The overall effect of this poor data environment is that the only data sources available to consumers are often incomplete and/or difficult to understand. The situation is even worse for consumers who purchase 'off the plan' (i.e. before the building is completed), who cannot even access a strata inspection report or a defects report. This leaves buyers vulnerable, especially given that for many, purchasing an apartment may be something they only do once or twice in their life. As Forcada et al. (2013, p. 760) have observed, customers of RMOP 'tend to be technically inexperienced and ... view the technical aspect (treated as quality specifications) as a given covered under the various regulations and standards'. In these circumstances, it seems unreasonable to expect these consumers to successfully navigate the significant information asymmetries identified above. As interviewees put it:

Do we have to expect [customers] to do that level of research and upskilling? I mean it's like saying you have to become a mechanic to buy a car, you need to know exactly how it works and how this is happening

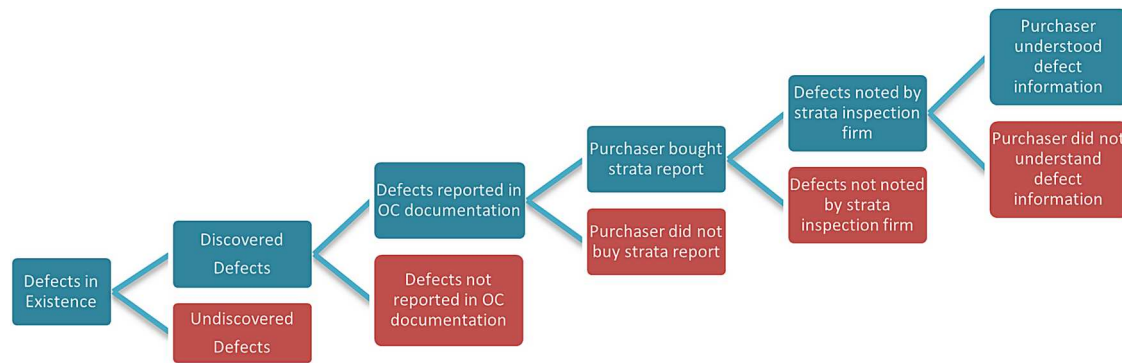


Figure 2. Possible points of defect data loss for RMOP customers. Source: Authors (Crommelin et al., 2021).

and all of that. I mean these are substantial purchases and costs that have been outlaid. I don't think it's fair to burden lot owners with that level of responsibility ... I don't think the consumer, or the owner, should be the person that needs to be across that. – Strata Manager 2

Seriously, if I went to buy a house, I would assume, and the consumer has to assume, that it's been done properly ... I don't know to what extent the consumer can be responsible for actually being able to identify whether defects are going to occur. I don't think they can do it ... to expect them to be able to do that work? And to understand it? I think that's a massive leap ... They're never going to be an engineer or someone who's expert in this space. – Developer Peak Body representative 2

The information asymmetries identified in this research create an environment where it is difficult even for a sophisticated buyer with significant resources to be confident that they are buying into a quality building, even after doing their due diligence. This creates a highly imbalanced market, with consumers at a significant disadvantage. This has a range of negative flow on effects for the RMOP market in general, as the next section will explore.

Discussion

This research was set within the context of a rapid global growth in RMOP development and increasing concerns about the quality of these buildings. The results of this research offer new theoretical and practical insights into the extent of defects in the RMOP sector in Australia and the role that information asymmetries play in creating risks for RMOP consumers.

In relation to RQ1, the findings are concerning, with evidence of defects found in over half of the buildings for which more robust information was obtained. This largely aligns with findings from other Australian research (see Table 3).

While the challenges involved in collecting and categorizing defect data make exact comparisons difficult, each of these studies offer support for the conclusion that our 'conservative estimate' of 51% of RMOP buildings having at least one defect is a reliable representation of the extent of RMOP defects in Sydney.

Furthermore, all four of the Australian studies identified support our finding that water-related defects are among the most common defects in RMOP. This is worrying given water ingress defects have been identified as particularly expensive to fix (Georgiou et al., 1999; Mills et al., 2009; Sandanayake et al., 2022). There is also some support for these findings in the international literature (although comparisons across jurisdictions and development contexts are even more difficult than comparisons with Australian research). Of relevance here are Abdul-Rahman et al.'s (2014) findings that water pipe leakages were the most commonly reported defects in a survey of affordable housing residents in Malaysia. Similarly, in Singapore Chew and De Silva (2002) found water-related defects due to pipe penetration issues in 43% of defects reports examined. However, Pan and Thomas (2014) and Lee et al. (2020) found lower levels of water-related issues in the UK and South Korea, at 8% and 12% respectively. These variations highlight the importance of further research on these issues, given the multitude of factors which shape defect outcomes (including how defects are defined and categorized, how buildings are inspected, and how defects data is collected and made available).

The findings in relation to RQ2 help to fill the gap identified by Ivić and Cerić (2023), who note the limited research involving insights from industry professionals on the role of information asymmetries in the construction industry. The interviews raise significant concerns regarding the extent and impact of information asymmetries in the RMOP market in NSW. This reinforces concerns raised in previous research, which has

Table 3. Key findings from previous Australian research on defects in RMOP.

Study	Context	Prevalence
Easthope et al. (2012) (Australia)	Survey of strata owners in NSW, 1,020 valid responses representing about 990 strata schemes. Self-report, CI \pm 3.1%.	72% of all schemes had one or more defects. Most common were internal water leaks (42%), cracking (42%) and external water penetration (40%). 15% reported missing or defective fire safety measures.
Johnston and Reid (2019) (Australia)	Defect reports for RMOP buildings in NSW (99), Queensland (47) and Victoria (66), for the period 2003–2018 in NSW and 2008–2017 in Queensland/Victoria. Primarily provides data on frequency of defect types and causes.	40% of defects related to building fabric/cladding, 13% to fire protection, 11% to waterproofing, 9% to rainwater disposal and 7% were structural. Water ingress/moisture was the most common cause of defects (29% of defects in the dataset).
NSW Government (2021)	Survey of over 1,400 strata managers and follow-up interviews with two strata managers. Sample involved RMOP buildings over four storeys that had been completed the six years prior to the survey.	39% of buildings had serious defects, with major categories including waterproofing (23% of survey buildings), fire safety systems (14%), structure (9%), enclosure (9%), key services (5%) and cladding (6%). Most defects (51%) 'were identified through independent expert advice which had been commissioned by the owners corporation' (e.g. a post-occupancy defects report).
Foster et al. (2022)	Survey of 1158 participants from 114 different apartment complexes of at least 3 storeys, built between 2006 and 2016 across 3 Australian cities (Sydney, Melbourne, Perth).	'58.5% of participants reported at least one defect in their apartment, and only four of the buildings ... had no reports of defects from residents ... The most commonly reported defect/fault was cracks in internal or external walls (28%), followed by mould or damp (16%) and faulty plumbing (15%)' (at 1156).

Source: Authors, adapted from Crommelin et al. (2021).

identified the difficulty of obtaining data on building defects and its questionable quality (Georgiou, 2010; Johnston & Reid, 2019; Mills et al., 2009; Yung & Yip, 2010). Adding to this literature, the current research identified two key types of information asymmetries which exacerbate the risks associated with defective buildings for RMOP customers, namely: *data fragmentation* and *data robustness*.

The *fragmentation* of defects records makes reliable, aggregated data impossible to obtain, as there is no single source of truth that governments can use to direct regulatory resources, nor that customers can consult to assess the risk of buying into an RMOP. This fragmentation exposes all RMOP buyers to risk as it undermines the capacity of regulators to effectively police the market to mitigate the 'agency costs' (both financial and psychological) that defects rectification imposes on RMOP owners (Oswald et al., 2022, 2023). This fragmentation also prevents high quality developers from 'signalling' their higher quality products to the market and means RMOP customers must rely on paid services from industry to attempt due diligence (i.e. 'screening'). The likely result is that customers will engage in 'adverse selection' by preferring cheaper apartments without knowing they are lower quality, as predicted by Lützkendorf and Speer (2005) and Ivić and Cerić (2023). According to information asymmetry theory, the result will be a market-driven downward spiral of quality.

The findings also indicate that the sources of information currently available to RMOP customers trying to undertake due diligence are problematic, due to their lack of *robustness*. Issues include inconsistencies in the style, coverage and content of strata inspection reports and defect reports, making meaningful

comparisons difficult. This is exacerbated by the limited regulatory oversight of the inspectors and consultants producing these reports. While some reports provide a great deal of useful information for consumers, others provide very little. This lack of robustness across the market also makes it difficult for high quality developers to meaningfully 'signal' their quality, to gain an advantage over lower quality competitors. This in turn creates a lack of incentives for developers and builders to pursue high quality outcomes, if the market rewards for doing so are limited.

Conclusion

Given the highly imbalanced market dynamics these information asymmetries create, we consider the research findings to be evidence of market failure. This in turn leads us to conclude that it is incumbent on governments to level the playing field for RMOP consumers. In the current environment, it is not possible for consumers to do 'due diligence'. Instead, governments must take action to assist consumers to undertake screening in a more straightforward and affordable way. One way to do this would be to introduce greater regulation and standardization of strata inspection reports and defect reports. This could involve the development of standardized templates and minimum requirements for key information. Another way is through the introduction of a developer ranking system, which draws on multiple data sources to rank RMOP developers according to their performance (including past issues with defective work). A tool of this kind is now being developed and piloted in NSW (Equifax 2022). While potentially useful to individual RMOP customers in their

‘screening’ of risky developers, this tool may also provide new confidence to encourage insurers back into the RMOP market, allowing developers to ‘signal’ their superior products to buyers.

From an academic perspective, the new conceptual insights provided by using information asymmetry theory to understand the RMOP defects problem help to broaden the current RMOP quality debate beyond its current narrow compliance-based focus. From a policy perspective, the findings of this research highlight the need for reforms which address the two main types of information asymmetries identified here. Fortunately, the findings offer support for the policy reforms now being undertaken by the NSW government (see NSW Government 2022 for details). Other jurisdictions and countries can potentially learn from these reforms.

The above findings are based on one of the most in-depth data collection and analysis of defects in the Australian RMOP sector yet published. However, the results should be interpreted within the limited context (Sydney, Australia) in which the data was collected. Further research is needed to validate the results in other Australian and international jurisdictions, to see if the information asymmetries faced by customers vary and if so, why. To build on this research, it would be useful to adopt the conceptual framing of the asymmetries identified here – *information fragmentation* and *information robustness* – to facilitate these comparisons. Further refinements to the framework may also emerge as this much needed research advances.

Notes

1. Ethics approval for this research was granted by the UNSW ethics committee, and all research participants provided either written or recorded verbal consent.
2. Owners Corporation is the term used in NSW to describe the legal entity responsible for an RMOP after completion, which is made up of all owners of ‘lots’ (individual properties) in the strata scheme.
3. Strata managers are administrators employed by OCs to manage a strata scheme’s records, so that the individual apartment owners do not have to undertake this work themselves.

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