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Digital informalisation: rental housing, platforms, and the management of risk

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ABSTRACT

The eruption of disruptive digital platforms is reshaping geographies of housing under the gaze of corporations and through the webs of algorithms. Engaging with interdisciplinary scholarship on informal housing across the Global North and South, we propose the term 'digital informalisation' to examine how digital platforms are engendering new and opaque ways of governing housing, presenting a theoretical and political blind spot. Focusing on rental housing, our paper unpacks the ways in which new forms of digital management of risk control access and filter populations. In contrast to progressive imaginaries of 'smart' technological mediation, practices of algorithmic redlining, biased tenant profiling and the management of risk in private tenancies and in housing welfare both introduce and extend discriminatory and exclusionary housing practices. The paper aims to contribute to research on informal housing in the Global North by examining digital mediation and its governance as key overlooked components of housing geographies beyond North and South dichotomies.

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Algorithm; Global North; digital platforms; housing informality

Introduction

In the sci-fi novella *Unauthorised Bread* by Cory Doctorow, the protagonist Salima lives in social rented housing in an anonymous metropolis of the Global North. Her tower bloc is entirely corporatized and digitalised: from the entrance to the building and the use of lifts, to all basic appliances, conditioning and tracing her everyday life. This dystopian setting is home to other migrants and refugees like her, for whom rejection of these conditions is not an option. In the novella, they learn how to self-organise, to circumvent discriminatory designs, and hack faulty corporate technologies to do something as revolutionary as baking their own, non-corporate and unauthorised bread (Doctorow, 2019). The novella highlights how digital technology infrastructures increasingly introduce corporate interests into

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dwelling spaces, accompanying and often replacing the state in filtering, monitoring and controlling access and tenants' behaviours. While such a dystopian future of corporate control and conditionality may appear far-fetched, digital technology companies are becoming profoundly central to the transformation of our homes and dwelling practices as this paper discusses.

Under the shadow of highly visible 'smart' urban developments- such as the digitalised high-tech urban fantasy of Toronto's Sidewalk Labs promoted by Google's parent company Alphabet[1]- digital technology companies are fast gaining prominence in a range of residential provision across the world. These range from private rented housing to social housing and other state-provided accommodation (such as refugee shelters). Their strategies include practices that signal a future as dystopian as illustrated in Doctorow's novella. The impact of Covid-19 and the lockdown responses implemented by many governments have been accelerating the introduction of digital technologies in the management of Real Estate. There has been much debate about how to conceptualise and name the digitalisation of housing provision and its management. Some refer to it as PropTech. Scholars such as Fields and Rogers (2021), however, argue for the use of the term 'Platform Real Estate' to capture a broader ecosystem of algorithms and analytics that enable the management of and investment in Real Estate. We stay with this latter terminology. The phenomenon has a profoundly global dimension that reproduces but also expands North and South housing and property geographies. While investment hotspots are predominantly the UK and US, followed by Spain, France, and Germany (Lang, 2019) these changes are by no means limited to Europe and North America, as demonstrated by emerging transnational PropTech summits, networks and global investments circuits in South America and sub-Saharan Africa.[2]

Our goal with this paper is not to enter into the ongoing debates around the conceptualisation or workings of Platform Real Estate. Rather, we hope to draw attention to its effects. Specifically, we are interested in teasing out the emergence of what we call 'digital informalisation' - a concept we offer as a new analytical framework for understanding digitally mediated practices within and beyond housing. In our paper we define and explore this concept through examples of managing risk in rental housing. Our intervention lies at the intersection between informal housing in the Global North and the Platform Real Estate literature. Using the conceptualisations of informality from the Global South, we seek to uncover how the platforms lying in the shadow of formal regulations of the state create forms of digital informality hitherto unstudied within the 'Global North' context. A growing literature discusses how the eruption of 'disruptive' corporate digital platforms in housing and spatial use is introducing new practices and actors that challenge existing boundaries between residential and non-residential, blurring distinctions between planned and unplanned, regulated and unregulated (Guttentag, 2015). The use of algorithms, deemed to be neutral, enables companies to circumvent laws against practicing discrimination towards potential buyers and renters, raising the spectre of unregulated segregation and bias (Allen, 2019). Such increasing ambiguity has implications for housing as the dwelling practices generated through digital mediation may sit uneasily within established housing categories and practices (Doling & Ronald, 2019), and may be in fact generating novel organizational forms,

spatial categorizations, negotiations and subject positions. We examine the disruptive effects they have on housing practices and the regulatory frameworks that govern them, while also highlighting the nebulous operations of such companies. It is our hypothesis that the 'disruptive' effect of such eruption, may be reproducing old housing informalities and engendering new ones. In other words, and in stark contrast to the developmental imaginaries of both 'Global North' technological innovation and smart urbanism, we argue that digital platforms and Platform Real Estate are enabling the expansion of informality within the housing sector.

Our paper engages with these arguments by analysing two dimensions of digitally mediated informalities. We begin by engaging in a brief discussion of geographies of informality and informal housing. We then move to addressing the current literature which has alerted us to the inherent biases within algorithms and how they extend already existing housing discrimination such as redlining. We then analyse examples of tenant screening companies and illustrate the extent to which they are circumventing regulations around privacy and equality to gather data and filter out potential tenants. The filtering enabled by the expansion of risk management algorithms and problematic user behaviour predictors, which we discuss with examples from the UK and the US, in both the private rented sector and public housing access and subsidies. We conclude by speculating on the implications of these current practices on housing futures. While we draw on a limited set of examples, this paper is theoretical and intended to be provocative in nature, drawing on recent interdisciplinary scholarship to open up new avenues for thinking about processes of informalisation in housing under the gaze of corporations and through the webs of algorithms.

Challenging global geographies of informality

A critical analysis of informality requires us to destabilise problematic geographies and developmental categories of 'Global South' and 'Global North'. This is because informality as a concept is largely perceived to operate within the Global South. Scholarship from geography and planning focusing on informality in the Global North has been growing over the past several years and has attempted to open transnational conversations whereby 'third world questions' are asked about 'first world processes' (Roy, 2004). In this critical scholarship, it is not just geographies that are disrupted but also socio-economic analyses of quotidian practices (Roy, 2003; Sheppard et al., 2020; Thieme, 2018). Expanding on this scholarship, and for the purposes of this study we ask: what do we mean when we use the terms Global North and Global South when we engage in these studies? The notion of dividing the world into binaries is problematic on several registers. Firstly, everything outside of North America, Europe, Australia and New Zealand is grouped as being the Global South (Lees et al., 2016; Watson, 2013; Yiftachel, 2006) This pays scant attention to the highly varied geographies in this 'half' of the world and thus transforms the Global South into a naturalised territory, area and region. Secondly, the Global South has largely replaced the earlier concept of the 'Third World' which itself was an invention of Cold War geopolitics. However, where the Third World was a conceptual apparatus that cast new light over the ways in which imperialism, domination, modernity and colonialism evolved in different

contexts (Levander & Mignolo, 2011) the geographical idea of the 'Global South' elides this.

Likewise, the Global North is also seen as a homogenized territory which problematically overlooks the diverse ways in which places and territories sit unevenly within this space. Writing on Southern and Eastern Europe scholars, for example, have argued that its geographies have been seen as distinct from its Northern counterparts. Countries such as Greece, Italy, Spain amongst others have formed the margins of 'Europe' and scholars have argued that Northern Europeans 'orientalise' Southern Europe as places of informality in persistently problematic ways (Leontidou, 2014). Further, one can argue that in fact attempts to inscribe Global North onto a particular territory stems from a racial and class privilege that remains blind to intersectional poverty and inequality that both constructs wealth and development in these countries while occupying its margins. For example, scholars have drawn our attention to how colonization and imperialism are reproduced through gentrification in what (Koptiuch, 1991) calls 'Third Worlding at home'. Here, class and race become important vectors through which urban inequalities are shaped, worlded and encountered. With the rise of inequality and deepening of poverty in many Global North countries such as the US and the UK, further calls have been made to consider places and people in them as living in conditions like in the Global South. In other words, these taken-for-granted geographies that cleave the world into two ignore the multiple Global Norths and Souths that lie within each other's territories (Mohanty, 2003; Trefzer et al., 2014) and the hybrid spaces that emerge at the interstices of these divisions thus challenging them. These issues are important as we unpack the ways in which platforms build on and extend informality in the Global North as ultimately this is tied to existing and persistent forms of discrimination and inequalities.

To return then to the question of informality, a concept problematically associated with the Global South, we ask, how do we study new and emerging forms of informality in the Global North? The expansive literature on urban informality in particular has stressed the multifaceted, nebulous and enduring construct of the idea (McFarlane & Waibel, 2012). Guha-Khasnobis and Ostrom (2006: 3) have argued that informality functions more as a metaphor rather than a clear concept. Where earlier theorizations of informality saw it emerging in situations of state absence or unregulation, and reproducing a binary between formal and informal, more recent scholarship has demonstrated how the state must be understood as a key actor in the production of informality as it uses it to consolidate power and encourage specific forms of development and accumulation. Thus, regulations are subject to change and suspension, and zones of exception created in order to attract mobile global capital (Ong, 2006; Roy, 2009). The question of how regulations emerge, change, benefit some interests, notably corporate or elites, over others reveals the ways in which informality is not in opposition to formality but is co-constitutive. Informality, rather than a given set of practices or spaces, denotes a shifting relationship between the legal, illegal, legitimate, illegitimate, authorized and unauthorized. The role of the state as the arbiter in this fickle and arbitrary process enables the production of considerable power and violence (Roy, 2009). From changing regulations and replacing them with a raft of new policies, legislations and regulators

(Aalbers, 2016), states are central to the varied, uneven and unequal ways in which markets work.

This then also illuminates the long-standing and problematic conflation between informality and poverty. Increasingly however, critical scholarship has opened up other ways of thinking about informality, as not only emerging out of possibilities that are ever-changing, through shifting networks and political moments, uncertainties and crises, but also as something that is equally wielded by the wealthy to suit their interests (Ghertner, 2011; Roy, 2009; Simone, 2004). Thus, informality is not just a response to precarity, but also engenders possibilities that are ripe for exploitation and profit-making. It is this work that we find particularly productive for our analysis. Moving beyond the land debate, we consider digital space as the new frontier. Here, a different kind of acquisition occurs, one in which the ambiguity of rules, the desire for the state to encourage technological innovations and be seen to be welcoming of the latest corporate trends also leads to the suspension of regulations. Here, technology companies that are themselves sites of power and privilege exploit the ambiguity of laws and the veneer of algorithmic neutrality to manage risk and in turn violate the rights of people and places. Thus, those who have been historically underprivileged continue to be under surveillance and manipulated through new vectors of oppression.

We turn our focus to briefly engage the current and emerging literature on informal housing in the Global North which is foundational to our work. Informal housing forms a subset of studies on informality. In the Global North, the scholarly focus on this subject is sparse though growing, despite practices existing for a long time (Durst & Wegmann 2017a). The analytical oversight on informal dwellings is premised on normative ideas of title to property, which translated into neat categories of 'tenure' associated to stability and clearly bounded 'subjects' of similarly bounded, sanctioned contractual relationships. In practice, this is continuously undermined by the constant presence, and indeed proliferation, of non-normative and unsanctioned forms of housing practices. Indeed, scholars are paying increasing attention to the need to engage in conversations across the Global North-South divide, and to draw together seemingly disconnected cities, to explore the ways in which neoliberal capitalism for example is working to generate parallel geographies and social outcomes (Sheppard et al., 2020). This recent scholarship has thus explored a range of housing practices including colonias along the US Mexico border, in-law units and backyard shacks and squatting, property guardianship, informal buildings, subletting and so forth that are both historical and contemporary (Durst & Wegmann, 2017; Ferreri, Dawson & Vasudevan, 2017; Lombard, 2019; Mukhija & Loukaitou-Sideris, 2014; Ward, 2004).

The rise and expansion of often unregulated private letting and subletting is ushering in relatively new unregulated housing practices. The increasing polarisation of formal housing between asset-owning higher income earners and a growing low income cohort trapped into private renting has become characteristic of many 'Global North' contexts. An example of this is the case of Australia's 'hidden homes' (Gurran et al., 2021; Parkinson et al., 2021). Practices of home sharing, subletting and infra-housing exist in the interstices and under the radar of formal, lawful housing. In this context, informal housing is defined as housing that does not adhere to institutional rules or that are being denied protection from prevailing legal frameworks.

This is understood to encompass both dwellings that contravene existing planning, construction or tenancy rules, or 'which offers residents few protections within these rules' (Gurran et al, 2021: 3). As argued by Durst and Wegmann (2017: 283), not only is there a blind spot in terms of acknowledging the wide range of informal housing in the market (in this case, the US), but also in relation to understanding the effectiveness of attempts at regulating them. The question of regulation, however, needs careful attention. Regulation demands as a first step, the making visible and knowable of practices that tenants, landlords and, in places, the state, as discussed above, may prefer to keep in the shadows (Chiodelli, 2019). Recent literature on Mediterranean welfare systems and the production of housing informality has argued for greater attention to specific hybrid institutional arrangements and selective state tolerance (Chiodelli et al., 2021). Support for corporations may even lead to deregulation as exemplified in the deregulation of planning rules around short-term lettings in London. Here the central government legislated in favour of supporting the development of platform economy companies and practices (Ferreri & Sanyal, 2018; Kim et al., 2019), creating as a consequence new grey areas of operation.

The scholarly blind spot on housing informality is also, partly, the result of informality being analytically relegated to pre-modern and anti-modern forms of living. Normative ideals of development and progress, associated with 'Global North' dwelling practices, thus categorise less stable, more fluid or ambiguous practices of dwelling that do not conform to this ideal as exceptional. Normative stable housing has long been encapsulated by owner-occupancy through private home ownership; this, however, has seismically changed over the last two decades in many 'Global North' contexts. In contrast to these normative imaginaries, critical scholarship is concentrating on practices of dwelling in unhomely places (Ferreri & Dawson, 2018; Lancione, 2019), such as buildings that are not formally considered residential – or mainly residential. These emerging practices are pushing scholars to argue for the expansion of housing scholarship to '"not for housing" houses' (Doling & Ronald, 2019), and their relationship to prevailing institutional rules and legal frameworks. However, as this intervention notes, there is a need to expand beyond analyses of space and structure to consider novel forms of governance and issues of access, the management of risk in tenancies and the long-term implications of digital and algorithmic mediation, in both private and public sectors. In doing so, we open up critical ways of thinking about informality in the Global North, particularly the ways in which it structures not only the form of housing but the housing market itself.

Disruptive technologies, persistent discrimination

We begin this discussion of the expansion of informality through deregulation. We engage with ongoing concerns over platforms as 'disruptive technologies' that mask their less-than-utopian practices and effects. The disruption in question refers to important challenges to established economic sectors, practices, their governance and regulations (Guttentag, 2015). As we have noted in relation to the redrawing of boundaries around sanctioned and unsanctioned platform-mediated uses such as Airbnb, planning deregulation by the government can enable the production of semi-formal spaces and practices (Ferreri & Sanyal, 2018). By facilitating use at

short notice and in ways often invisible to official enforcement, and in many cases with the explicit support of national governments and policy-makers, practices of digitally-mediated flexible use have increasingly blurred the boundary between tourism and short-term, temporary uses, and long-term residential uses. This has implications for the study of housing. Platforms such as Airbnb are deeply affecting dynamics of property ownership, rental practices and housing affordability (Cocola-Gant & Gago, 2019; Yrigoy, 2019); processes are in themselves pushing larger populations into more insecure and informal housing arrangements.

The increasing presence of digital platforms and technologies is expanding to both commercial and public housing practices. The digital mediation of these practices is spatially and socially generative of forms of housing and inhabitation that could be categorised as 'informal', as it challenges and shifts relationships between authorized and unauthorized forms of dwelling and inhabitants. By calling these emerging practices 'digital informalisation', we are not arguing that they are either 'informal' in terms of the spatial categorisation of the dwelling, or that they exist without contractual agreements. Instead, as noted earlier, we employ informality as a metaphor (Guha-Khasnobis & Ostrom, 2006) to think about the disruptive effects of Platform Real Estate as well as their opaque operations. While the language of 'disruption' employed by digital platform advocates and scholars alike suggests a break with the past, a completely novel redrawing of existing practices and spaces, it is important to qualify this claim. Innovative technological neutrality, transparency and efficiency may in fact be nothing more than a veneer to hide more insidious practices.

Contrary to imaginaries of impeccable and transparent efficiency, scholars have argued that real-life 'smart urbanism' is increasingly characterised not only by flexibility, but also by *opacity* and *informality* (Söderström & Mermet, 2020). The internal and external workings of many 'smart' digital platforms are both slippery, operating between categories of use, and inscrutable, thanks to the complex architectures of corporate bureaucracies enabled by proprietary software, data collection, licensing and the increasing reliance on algorithms as value-neutral digital data sorting. As noted by critical information studies scholars, beyond its strict technical meaning, the term algorithm is commonly used as a synecdoche for larger technical assemblage or networks of processes, models and decision-making. Gillespie (2016: 22) argues that 'this technical assemblage stands in for, and often obscures, the people involved at every point: people debating the models, cleaning the training data, designing the algorithms, tuning the parameters, deciding on which algorithms to depend on in which context'. Opacity exists in the design as much as in the application of algorithms to understand, govern and predict social processes. With the growth of real-time deep machine learning, there can be profound implications in what Amoore and Raley (2017: 6) have described as 'the politics of algorithmic world-making' It is with these debates in mind that we push for an expanded understanding of informality as a lens to grasp the changes brought about by Platform Real Estate and disruptive digital platforms in housing.

In this disruption, we identify a recapturing of informal and formerly unauthorised practices into the fold of formality through technology. To be captured, practices first need to be made visible and acceptable through technological recoding. Digitally

mediated housing formalise, normalise and extend formerly disconnected, hidden or self-managed housing geographies, such as, for example, offline/classified adverts for flatmates in private homes as well as online advertising through websites and social networks of forms of rental accommodation such as in Australia. As discussed by Gurran et al, 2021, these are often 'hard to define, because they are not covered by a standard residential tenancy lease or contract'(Gurran et al., 2021: 13). In these examples, digital platforms such as Gumtree and Flatmates.com mimic 'the traditional pathways into share accommodation' (Ibid) while in fact existing at the margins of formal, lawful agreements.

The increasing use of online digital platforms to access housing, shape, in largely unregulated and potentially unlawful and discriminatory ways, access to housing. An example noted by literature is the case of inequalities of information in online listing sites such as the US Craigslist (Boeing, 2020). While traditionally information about available housing for rent appeared in local newspaper classifieds, Craigslist has gained near monopoly on the US rental market. Addressing this platform from the demand side, scholars have raised concerns about the impact of the 'digital divide', inflected by cultural differences and social inequalities, on access to housing. Rather than attenuating traditional disparities concerning information about supply, the move to online housing markets risks, on the contrary, reproduces and exacerbates historical patterns of information segregation, steering, and sorting (Boeing, 2020). As online advertisement and digital platforms increasingly rely on personal data capture to generate targeted content, the question of access to information is rendered more opaque. Visibility of information about rental properties can be based on forms of scoring society through the postcode of their former place of residence, reinforcing spatial stigmatisation, or the broader profile of shopping habits and other elements in prospective tenants' 'digital footprints'. As discussed by Allen, this can be seen as a form of 'algorithmic redlining' which builds and reinforces longer histories of discrimination and spatial redlining, and which is 'harmful to the welfare of consumers from minority communities and only serves to reinforce cascading segregation' (Allen, 2019).

Discriminatory 'redlining' can occur, in automated ways, in housing advertisements and marketing through the personalisation of customer experience thanks to the common practice of 'latent trait inferences' - assumptions that algorithms generate by analyzing users' digital footprint (Allen, 2019). In doing so, internet housing marketers and home search engine providers act as gatekeepers and editors of the type of information available and visible to profiled users. While there is little empirical data about the effects of such practices in housing, the potential implications are very harmful:

> When internet home marketing and search engines use these segregating scoring systems to stereotype and make assumptions about consumers, they nudge seekers of color towards houses available in communities and neighborhoods predominantly comprised of minorities, while simultaneously nudging white home seekers toward options in predominantly white and wealthy communities, thereby perpetuating preexisting segregation. (Allen, 2019: 244).

Formal and informal discrimination based on place of residence are not an invention of disruptive technologies; but it is the capillary and technocratic

systematisation of such biases through predictive analytics that is reintroducing and strengthening such processes, driving inequalities and disparities even further. Online housing market and targeted advertisement thus begin to draw the contours of a housing sector made of different parallel worlds governed by automated mediation and discrimination. As digital platforms mediate housing and dwelling practices, the redlining is redrawing the geographies of what is visible and available: a digital recreation of spatial and housing segregation. As discussed by Safransky (2020) in her work on Detroit, algorithms embody a repetitive and standardized form of violence that contributes to the racialization of space and the spatialization of poverty. The veneer of technological neutrality and efficiency not only sanitises and objectifies unspoken, unsanctioned and formerly marginal practices, but it also obfuscates mechanisms of visibility and valuation. Contrary to the claim of platforms to disrupt the housing sector, new and opaque digital housing practices appear instead to reproduce and exacerbate existing forms of discrimination and social and spatial segregation. It is in this sense that we wish to introduce in housing debates an understanding of digital informalisation in rental housing. The process of digitally capturing and recoding rental practices interconnects with other exclusionary and extractive regimes, and it is particularly the case with the mediation of the relationship between landlords and tenants.

Digital mediation of tenancy

Building on the previous section we now turn to explore these advancements of digital informalisation through an analysis of platforms that increasingly 'manage' the rental sector for landlords. Here we examine specific examples of companies that rely on algorithms and ambiguity of regulations around digital governance to engage in ethically questionable and discriminatory practices. In doing so, we show the increasing suspension of housing regulations and its particular effects on rental housing governance within the Global North.

The growth of 'disruptive' technologies and platform economies is closely linked to the exponential rise of the rental sector and asset management organisations in the context of increased 'rentierism' (Sadowski, 2020). At the heart of this growth and expansion into rental housing is mediation, reliant on harvesting and analysis of vast amounts of personal data, in order to reduce the risk incurred by landlords and property owners. Landlords in many 'Global North' countries are increasingly turning to platforms to evaluate and 'manage' their tenancy risk. These companies in turn manage housing by filtering, excluding and making access conditional on behalf of property owners and managers. The filtering and management functions of mediation involve the identification of deserving from undeserving, recognised from unrecognised tenants/citizens.[3] Examples of this processes are online platforms that offer pre-screening of tenants for landlords. In the UK, recent examples include Good2Rent[4] and Canopy[5] which offer online services to build a 'secure reference profile' and a nationally recognised digital rental 'passport': Rental PassportTM.[6] While these are platforms officially endorsed by government departments, others, such as Naborly.com in the US & Canada[7] and Tenant Assured in the UK, offer

'enhanced' tenant screenings for landlords which sits in somewhat more opaque legal territories.

Naborly was founded in Toronto in 2016, after the founder had a bad experience letting out his place whilst on holiday. Concerned with the risk that comes with renting out to unknown individuals, he started a company that conducts extensive background checks on potential tenants for landlords. These go beyond the criminal and traditional credit checks which can themselves be invasive and problematic. Naborly's staff combine credit reports together with intrusive personal information retrieval and social media searches to create a more 'complete' picture of a potential tenant (Lagerquist, 2016). The service uses an algorithm and a team of trained human analysts to crunch variables such as income verification, previous landlord verification, external media and social media analysis (Silverberg, 2016). This has raised questions around privacy and legality. Tenants and landlords have commented in online forums about invasive personal questions, the possibility of knowing sensitive information such as how much a potential tenant owed on their credit card, as well as mechanisms for ranking and 'reviewing' tenants for the benefit of other landlords.

In a controversial move in April 2020, when governments in many countries, including Canada, were introducing moratoria on evictions during the Covid-19 pandemic, Naborly encouraged its clients (landlords) to use the review mechanism to report tenants missing payments and other potential issues of contention. These report would inform a database for retraining their AI systems to more 'accurately understand tenant risk moving forward into this new world' (Hauen, 2020). While the CEO later apologized publicly for not providing 'sufficient context' for the message, many argued that this encouragement amounted to a de facto illegal blacklist (Hauen, 2020). Naborly is not the only platform undertaking such invasive filtering processes against tenants. Several others such as Tenant Assured offered a similar and possibly more disturbing service in the UK. According to an interview undertaken by the *Washington Post*, the company asked potential tenants to give them access to all their social media accounts and searched them for red flags that may make one a 'risky' tenant. On their own website, Tenant Assured listed, amongst various things that they search for, 'high risk language alerts' and 'new to country alert' signalling potential bias against, for example, immigrants and activists. When pressed on the question of privacy, their CEO noted that if you are a normal person, you have nothing to worry about. We note this point about 'normal' specifically because it is vague, yet prescriptive. Tenant Assured as a 'product' offered by Score Assured has now been withdrawn although Score Assured itself continues to exist, and services such as Certyn and Tell.US continue to provide similar services.

While the development of analysis informing predictions is still at early stages, in many countries this is seen as an inevitable and desirable development of digital platforms applied to the rental sector. An example of this is PropTech solution firm Gridizen (UK), founded in 2015. Beyond 'integrated rent payments, maintenance reporting and landlord tenant communication', the company recently promised to offer property managers insights into 'end user behaviours' through 'predictive and prescriptive analytics (Machine learning)' integrated directly into their property management software.[8] The purpose of such screenings and analytics is,

fundamentally, the management of predicted risk: what in other contexts has been defined as algorithmic security (Amoore & Raley, 2017). As noted by scholars in the US, where digital housing platforms and intermediaries are more established (CBRE Research, 2018), companies' 'increasing power over and insight into the lives of tenants, and in which surveillance and monitoring regimes are extended to make access to shelter and housing contingent on factors well beyond the payment of monthly rents' (McElroy et al., 2020). The advancement of capillary data collection about tenants in the name of risk management, clearly has potentially discriminatory and regressive implications. These discriminatory and regressive implications have come to the fore with the wave of evictions and threat of evictions caused by the global economic crisis triggered by the Covid 19 pandemic, '[a]s anxious landlords contend with tenant rent strikes, eviction moratoriums, and remote property management, PropTech companies are also pushing surveillance and data-driven tracking technologies' (McElroy et al., 2020). In the UK, a number of new digital intermediary companies and services have emerged since spring 2020 to address the effects of an estimated 300,000 tenants in rent arrears by May 2020; the payment technologies company Flatfair, for instance, have created the platform 'Resolve' for landlords to request proof of 'financial distress', such as highly personal documents as a redundancy letter, from tenants and negotiate rental repayment plans (Harvey, 2020).[9]

Risky bodies, informalisation and the suspension of equality law

While critiques of Platform Real Estate emphasise the novelty of the tenant-landlord relations that they engender, in terms of filtering, surveillance and control, such intimate insight into the life of tenants and others precariously housed is not *per se* a novelty. Rented housing has invariably, to various extent, been subjected to forms of social control and filtering, as has long been debated in critical housing scholarship (Flint, 2004; Ravetz, 2001). The gathering of often-detailed intimate knowledge of characteristics and behaviours of poorer residents, seen as risky, have long been customary practices in social and housing surveying.[10] To poor residents, lodgers, temporary and seasonal workers, single mothers, and migrants, among others, access to housing has often been conditional on more than just a transactional payment of rent. Housing conditionality based on insights into tenants' lives as we see in the case of PropTech's inroads into the rental market is surprising and novel only if contrasted with a normative housing ideal based on tenants' right to privacy and intimacy. Such an ideal was itself born from organising against the abusive conditions of private rented housing and its intertwining with the surveillance of workers in the context of anti-union organising (Gray, 2018). It is worth remembering that the right to privacy and intimacy has historically been consistently out of reach for those made most vulnerable by intersecting oppressions.

The 'propriety' of tenants has been the subject of a wealth of housing literature, as tenants have historically been monitored, assessed and discriminated based on race, gender and class. The famous distinctions between 'deserving' and 'undeserving' poor in philanthropic housing; in working class housing culture, both emic and etic notions of 'respectability' have historically been linked to values of 'orderly domestic life that depended, amongst other things, on the regular payment of rent' (Ravetz,

2001: 86). In the Global North, accessibility and regulation of public housing for rent were often bound up with 'civilising' discourses around normative standards of acceptable behaviour and personal responsibility, often through the notion of the 'responsible tenant'. As argued by Flint, the classification of tenants has long been a mechanism of social control, which 'sought to secure the conformity of individuals' behaviour to constructed social norms, principally through the mechanisms of tenancy agreements and allocation procedures' (Flint, 2004: 894). Ultimately, such discourses are not only about creating 'proper subjects' and imposing normative ideas of respectability, but by extension, managing risk for both private and public landlords. In the UK, for example, the monitoring of social tenants' behaviours, and the deepening and widening of tenant responsibility, have become over time established key mechanism of governmentality (Flint, 2004) and tenure conditionality (Fitzpatrick & Watts, 2017), in the context of ever more residual welfare provision.

The role of the state is key and, we believe, needs closer scrutiny as the developments in digital mediation are challenging existing regulation and governance, while also redrawing boundaries of the reach of existing, pre-digital understandings of housing and dwelling. These are now seeking expansion into public housing provision. In the US, for example, a proposed change of anti-discrimination legislation by the US Department of Housing and Urban Development to allow for the use of tenant management algorithms has been opposed by organisations in absence of industry-standard tools (Selbst, 2019). In 2020, an investigation by the *Guardian* found that nearly half of local governments in England, Wales and Scotland have used or are using computer algorithms to aid decision making on the allocation of services, including social housing (Marsh & McIntyre, 2020). This shift is occurring in the wider context of a growing use of predictive analytics in welfare provision, so it is not *per se* surprising and rather points at the digital technology confluence between private and public sectors. The way in which such a shift has come about, however, is worth remarking upon.

The UK central government department responsible for welfare is the Department for Work and Pensions (DWP), but the administration of housing benefits is the responsibility of local authorities. In a circular dated 2011, the DWP introduced the possibility for local authorities to adopt so-called 'Risk-Based Verification' (RBV) systems as part of the application processes for Housing Benefits and Council Tax Benefits. RBV subdivides applicants into three categories of risk according to their potential propensity to commit fraud (Department for Work and Pensions, 2011). The circular explained that since RVB was already practiced on aspects of claims in Jobcentre Plus (JCP) and the Pension Disability and Carers Service (PDCS), extending it to the management of housing-related benefits was desirable. This extension, however, was presented as *voluntary* (DWP, 2011, s.14), leaving open the possibility for a highly uneven application across the country. Moreover, the drafting of policies governing the implementation of RVB was left to local governments, and oversight by the authority's Audit and Risk Committee was only advised as 'good practice'. At the same time, local governments were explicitly advised that '[t]he information held in the Policy, which would include the risk categories, should not be made public due to the sensitivity of its contents.' (DWP, 2011, s.14), thus shrouding the operation in secrecy.

There are two key issues with the introduction and implementation of such systems. The first is the great opacity about the categorisation of 'risk' profiles, with 'almost no information available on the data used in RBV assessments […], nor how those data are processed.' (Harris, 2020: e17). While the use of RVB is formally legal, it is clear that the lack of transparency about the mechanisms of assessment place vulnerable residents at a disadvantage. The second, interconnected issue, is the lack of mechanisms to assess its impact on the most vulnerable, which local governments are bound by duty to protect. As 'there are no criteria for monitoring impact in relation to protected characteristics under equality law' (Harris, 2020: e5), the infringement of such rights appears to be wilfully made invisible to and by the state. In this case, a largely automated digital mechanism based on predictive analysis was introduced into housing welfare by the central state, through the back door, opening up a new, grey area of algorithmic decision-making. In the shifting relationship between what is allowed and what is not allowed, the central state created the conditions for local governments to become arbiters of categorisations of housing 'risk', enabling the production of considerable power and violence (Roy, 2009).

Algorithms often obscure the role and responsibilities present in the technical assemblages of processes and models for decision-making (Gillespie, 2016) and in this case, the absence of transparency and oversight further adds to the opacity of the mechanism. In calling the DWP circular an example of *digital informalisation,* we are using informality as a metaphor (Guha-Khasnobis & Ostrom, 2006) to reflect on the disruptive effect of the automated analysis of personal digital data on housing practice. It is more, we aim to show that the state occupies an important role in redrawing the boundaries of authorised filtering practices without necessarily transforming the regulatory frameworks and operations that govern them. In the partial suspension of regulations by the state, technological 'innovations' borrowed from corporate management are introduced in ever greater areas of governance, including housing, testing the boundaries of the rule of law (Harris, 2020). In this case, the politics of algorithmic world-making appear to be profoundly reshaping the role of central and local governments, creating systems where it is acceptable, in order to reduce the 'risk' posed by 'improper' bodies, to suspend or to render impossible to implement those same state regulations designed to ensure equality and protect the most vulnerable inhabitants.

Conclusions

This article has shifted away from the debates around the theorisation of Platform Real Estate. Instead, we introduced the concept of 'digital informalisation' to better understand and study the effects of platforms on everyday activities. In our paper, we illustrate this concept by highlighting the impacts of digital platforms on housing, and particularly on the rental sector. Drawing on the literature on informality from the Global South, we contribute to emerging research on informal housing in the Global North by focusing on the management of risk through digital platforms and their algorithms. We argue that the introduction of digital mediation and predictive analytics in the tenant-landlord relation is a new frontier of value extraction and a key site in which rules are suspended and laws are subject to interpretation and

change. In other words, the expansion of online data analytics-driven processes is ushering in forms of informalisation characterised, in practice, by opaque and discriminatory practices. At the heart of this lies the question of risk management for the landlord, whoever that may be. Algorithms provide a veneer of neutrality for private and state actors to circumvent rules to minimize risk. It is this effect that we name digital informalisation, and the state is central to its operation.

To labour this point further, we note the irony that state institutions historically tasked with the aim of limiting abuse and tenant discrimination are increasingly embracing corporate-controlled algorithmic world-making, ushering in new tenant categorizations, conditionality and governmentality. Automated data processing systems have become a reality for a number of state functions of sieving, filtering and managing populations, in what Virginia Eubanks has called *Automated Inequalities* (Eubanks, 2018). Crucially, whereas in the past the gathering of knowledge belonged to a problematic morally-inflected project of civilisation and tenants' 'betterment', current conditionality through digital mediation is entirely premised on the management of risk to property devaluation and profit maximization. As observed by the European NGO Algorithm Watch, despite its purported innovation in tenant management, housing algorithms are, in practice, another 'attempt to define the "good pauper", much like in previous centuries' (cited in Marsh & McIntyre, 2020). Recalling past examples of tenants' propriety and conditionality means foregrounding rather than dismissing the profound effects of digital informalisation.

The mechanisms for the management and reduction of risk are closely interconnected with historical patterns of social and spatial discrimination and segregation. In stark contrast to the progressive imaginaries of technological mediation as innovative and 'smart', the operation of digital platforms and algorithmic security is anything but a neutral and value-free technocratic solution. In this paper we have presented three lines of inquiry into grey areas and new housing informalities generated by digital mediation. The issues of algorithmic redlining, the mechanisms of tenant profiling and the management of risk in both private tenancies and housing welfare are illustrative of the kinds of problematics we are likely to face as digital platforms in housing play an ever more important role to mediate, distribute and exclude. In our call for a greater understanding of the effects of this expansion, we argue for the need to go beyond preconceived categorisation of 'informal housing' as the geographical un-normative[11]. With the Covid-19 pandemic, the push towards the expansion of digital technology and data harvesting systems is expanding into yet unconquered territories of life. Digital platforms and infrastructures are being rushed in as an inevitable development in property management, often with limited scrutiny of the implications of such mass 'digitalisation'.

To return to our initial questions, how do we study new and emerging forms of informality within this geopolitical context? Here, the evolving critical work from the Global South remains productive as it points to the ways in which informality exists at the heart of the state. While much of the literature on informality has sought to show how it acts as a mechanism of land appropriation to enable certain forms of developmentalism, we have shifted the gaze to emerging digital territories. We have argued that the absence of rules and of regulatory oversight operate to enable platform companies

to capture value and manage risk through discrimination and exclusion. Data extractivism may be theoretically unbounded, but housing is a finite resource, and the intersection of the two raises urgent questions about digitally mediated dwelling practices. The concept of 'digital informalisation' through algorithmic profiling enables to address scholarly blind spots by developing more robust conversations with the Global South, and by asking how these informal systems and spaces are reconfiguring urban inequalities, housing practices and their governance.

Notes

1. https://www.theverge.com/2020/5/7/21250594/alphabet-sidewalk-labs-toronto-quayside-shutting-down
2. Respectively, PropTech Latam/Lavca https://lavca.org/?s=proptech and PropTech Africa https://www.proptechafrica.com.
3. In her discussion of the politics of digital housing transformation, Desiree Fields uses the category of 'property-less subjects' (Porter et al., 2019) to signal the impact of new digital real estate advancement onto marginalise places and communities. See also: "property-led accumulation, undermining the interests of property-less subjects and marginalized places." (Fields, D. https://www.publicbooks.org/uploading-housing-inequality-digitizing-housing-justice/). See also (Fields, 2019)
4. https://good2rent.co.uk/
5. https://www.canopy.rent/
6. https://www.rentalpassport.co.uk/what-is-rentalpassport/, managed by the company "LegalforLandlords – the complete insurance, referencing and legal services partner".
7. https://naborly.com/tenant-screening/
8. Gridizen UK website https://www.gridizen.co.uk/
9. Resolve, Flatfair UK, https://resolve.flatfair.co.uk/
10. Qualitative 19thC surveys such as Charles Booth's *London Poverty Maps* collected income and social characteristics through interviews, police reports and word-of-mouth; such knowledge was key to the early phases of housing reform (Ravetz, 2001).
11. This does not mean to deny the potentially redistributive power of the state and the safeguarding of individual and collective wellbeing by policymaking addressing harmful informality in everyday life and housing.

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