Fractionalised land interests: More questions than answers

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Articles

Fractionalised land interests: More questions than answers

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The South Australian Government recently announced the launch of a new system of fractionalised land title, to be rolled out as a trial in two of Adelaide's new residential towers. The system involves dividing the estate in each lot into 20 equal interests, using both blockchain technology and the Torrens register to record and trade them. This article outlines a possible design that would support such a proposal to analyse how a fractionalised land title challenges traditional categories of property, including the possibility of bifurcating land title into both real and personal property. It explores the likely range of rights and responsibilities and the tensions arising as a consequence, to conclude that there are a number of unresolved questions inherent in an otherwise elegant idea.

I Introduction

In September 2019, the South Australian Government announced the launch of a new system of property investment to be rolled out in two of Adelaide's new residential towers.[1] The system is said to involve 'fractionalising' the property into 'bricklets' and establishing a market for these bricklets via blockchain technology. According to the ministerial press release, bricklet owners will have their interest recorded on the blockchain for 'credibility and trust in the audit trail'. The interest will also be automatically added to the Torrens register. The Minister explained the proposal as 'directly holding the fragment of the property deed rather than investing in a trust, financial product, or other intermediary platform'.[2] In other reports, however, the proposal was described as a 'boost to the bourgeoning fintech ecosystem in South Australia'[3] suggesting that the bricklet as a financial product, rather than a system of real property title registration.[4]

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1 David Ridgway, 'SA-Based Innovation to Revolutionise Property Investment Bricklet by Bricklet' (Media Release, 23 September 2019) <www.premier.sa.gov.au/news/media-releases/news/sa-based-innovation-to-revolutionise-property-investment-bricklet-by-bricklet>.

2 Ibid.

3 'SA-Based Innovation to Revolutionise Property Investment Bricklet by Bricklet', *Mirage News* (online, 23 September 2019) <www.miragenews.com/sa-based-innovation-to-revolutionise-property-investment-bricklet-by-bricklet/>.

4 The prospect of the proposal forming a financial product falling within the *Corporations Act 2001* (Cth) is beyond the scope of this article.

While details on the bricklet scheme are scant, the possibility of land titles administered using blockchain technologies is not new.[5] Examples across the world, however, present a variety of use cases — from jurisdictions with low public trust in government regulation of land titles,[6] to others that do not have the benefit of a Torrens system.[7] While there are clearly identified benefits in such technology such as low transaction cost, high transparency, and high security, the Torrens system in all Australian jurisdictions, notably with the advent of e-conveyancing, offers these benefits already.

Reduced levels of property ownership as a core component of household wealth in Australia is, however, considered to be a problem, along with the challenge of promoting investment in building new housing stock to cater for a growing population that may not experience home ownership.[8] Blockchain technologies are considered to offer potential solutions to these problems — affording the possibility of creating multiple tradeable small interests in real property held by unrelated parties. It does this through managing the secure transmission of the interests and regulating the relationships between multiple owners of the one lot.

The proposed dual system does not purport to replace existing Torrens land registration system of real property interests. Instead, it intends using the existing registration system to record ownership rights in the property, while creating a parallel system of recording and trading these interests via blockchain. This proposed mechanism is different from Griggs' earlier examination of the implications of blockchain being used as 'a publicly available blockchain that would not be controlled by any central agency but would instead contain a record of all transactions made for the sale of real property within the registry,' and pertains solely to the way in which these properties, controlled by the owner of the bricklet platform,[9] are divided and administered. Griggs et al envisaged the application of blockchain to the national land registration system itself,[10] and concluded that the use of blockchain would make no conceivable difference in preventing fraud — a

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5   See generally Rod Thomas and Charlie Huang, 'Blockchain, the Borg Collective and Digitalisation of Land Registries' (2017) 81(1) *Conveyancer and Property Lawyer* 14; Elizabeth Mary Petsinis, 'A Land Transfer Registration Revolution? Exploring the Opportunities and Limitations for Implementing the Blockchain in Electronic Land Transfer Transactions in Australia' (2018) 27(1) *Australian Property Law Journal* 65; Nicolás Nogueroles Peiró and Eduardo J Martinez García, 'Blockchain and Land Registration Systems' (2017) 6(3) *European Property Law Journal* 296 <https://doi.org/10.1515/eplj-2017-0017>.

6   See generally Nir Kshetri, 'Will Blockchain Emerge as a Tool to Break the Poverty Chain in the Global South?' (2017) 38(8) *Third World Quarterly* 1710 <https://doi.org/10.1080/01436597.2017.1298438>.

7   See generally Raquel Benbunan-Fich and Arturo Castellanos, 'Digitization of Land Records: From Paper to Blockchain' (Conference Paper, Thirty Ninth International Conference on Information Systems, 2018).

8   See generally Renata Ribeiro Ferreira. 'Stepping Stones to an Exclusionary Model of Home Ownership in Australia' [2016] (77) *Journal of Australian Political Economy* 79; Gavin A Wood et al, 'Life on the Edge: A Perspective on Precarious Home Ownership in Australia and the UK' (2017) 17(2) *International Journal of Housing Policy* 201 <https://doi.org/10.1080/14616718.2015.1115225>.

9   See *Lakeba* <https://lakeba.com/>.

10 Lynden Griggs et al, 'Blockchains, Trust and Land Administration: The Return of Historical Provenance' (2017) 6(3) *Property Law Review* 179.

major feature of the Torrens system. They also find that blockchain technology is limited in application in relation to derivative interests in land, such as easements, mortgages and fee simple.[11] In addition, the authors noted that security related issues in blockchains could complicate joint ownership within a blockchain context.[12]

These observations are also relevant in this context; however, the difference between the proposed bricklet system and the system envisaged by Griggs et al is that the Griggs' discussion centres around using blockchain as a means of titles registration, whereas the proposed system purports to keep the current land registration system intact, and in addition, provides for ownership rights of the bricklets to be recorded on a blockchain and to be traded via that mechanism. This leads to quite different considerations in analysing the proposal.

Despite the announcement of the bricklet proposal as 'fractionalisation', this article considers two possible frameworks for such a system: tokenisation and fractionalisation of property. After explaining how each system works, we consider the implications of both tokenisation and fractionalisation for the nature of what is owned, notably how such interests are likely to interact with the foundation concepts of real property. Part III considers the relationship between fractionalised blockchain interests and the estate in land, and Part IV analyses the implications of the unity of possession enjoyed by co-owners in common with each other, for the management of the parties' interests.

II Tokenisation and fractionalisation of interests in land

Despite the lack of detail about the bricklet proposal, it is possible to analyse its underlying concept through comprehending the functioning of blockchain technology as a means of creating and managing assets. In this part we outline the operation of blockchain and distributed ledger technology, providing a background to its development, its key characteristics relevant to real property dealings, and its mode of operation in managing real property. In particular, we contrast two possible methods of real property dealings — fractionalisation and tokenisation — as a means of clarifying the challenges inherent in a proposal such as the bricklet scheme.

A The development of blockchain technology

Blockchain and distributed ledger technology may be most well-known for their role in cryptocurrencies, such as Bitcoin,[13] but the potential applications of blockchain technology extend beyond the generation of cryptocurrencies[14]

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11 Ibid 179.

12 Ibid 180.

13 The origins of blockchain are found in the white paper published by Satoshi Nakamoto in 2008 on Bitcoin: Satoshi Nakamoto, 'Bitcoin: A Peer-to-Peer Electronic Cash System' (Paper, Bitcoin, 2008) <https://bitcoin.org/bitcoin.pdf>.

14 Eg, the Ethereum blockchain was designed to 'serve as a platform for individuals to develop applications that are not limited to cryptocurrencies': Muharem Kianieff, *Blockchain*

and include the creation of payment systems and smart contracts.[15] It can also function as a secure database and a real property register,[16] and in a variety of use cases including real estate administration.[17] In fact, the future of real estate in the blockchain era has been described as 'one where purchases and investments become much more liquid, much more available, and far more easily documented and managed'.[18]

A blockchain can be described as a transaction database that is shared by all the nodes participating in that system, and that exists and operates without a central authority.[19] It can 'perform any type of function that requires a detailed registry that is time-stamped and secure'.[20] A blockchain creates a distributed public ledger, and provides an algorithmic record of all transactions on the blockchain.[21] In particular, blockchain technology provides 'a peer-to-peer network using proof-of-work to record a public history of transactions that quickly becomes computationally impractical for an attacker to change if honest nodes control a majority of CPU power'.[22] Although the development of digital assets functioning as currency and money first drew public attention to the radical technology, and the advantages and possibilities of it needing no backing and no centralised issuer, such as a central bank,[23] the possibilities of blockchain for real property were already highlighted in 1998. Nick Szabo conceptualised the possibility of secure property titles with owner authority.[24] Szabo envisaged that

> [n]ew advances in replicated database technology will give us the ability to securely maintain and transfer ownership for a wide variety of kinds of property, including not only land but chattels, securities, names, and addresses. This technology will give us public records which can 'survive a nuclear war', along the lines of the original design goal of the Internet. While thugs can still take physical property by

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Technology and the Law: Opportunities and Risks (Informa Law, 2019) 38. See also ibid 38 n 17.

15 A smart contract is a computer protocol that facilitates, verifies, or enforces the negotiation or performance of a *contract* through digital means. *Of note, through their design* smart contracts permit the performance of credible transactions between strangers without third-party intermediaries.

16 See Paul Vigna and Michael J Casey, *The Age of Cryptocurrency: How Bitcoin and the Blockchain Are Challenging the Global Economic Order* (Picador, 2016) 217. See also Kianieff (n 14) 24.

17 These include token securitisation, land registries and cadastrals, token-enabled marketplaces, standardised property data, tokenisation of real estate, sales process optimisation, real estate management and property identification, listings and data: Bastiaan Don et al, 'Real Estate Use Cases for Blockchain Technology', *Enterprise Ethereum Alliance* (Web Page, 1 March 2019) <https://entethalliance.org/wp-content/uploads/2019/05/EEA-Real-Estate-SIG-Use-Cases-May-2019.pdf/>.

18 Ibid vol 1, 3.

19 Louise Parsons, 'Bitcoin: Consumer Protection and Regulatory Challenges' (2016) 27(3) *Journal of Banking and Finance Law and Practice* 184.

20 Kianieff (n 14) 17.

21 Parsons (n 19); Griggs et al (n 10).

22 Nakamoto (n 13) 8.

23 Ethereum, *A Next-Generation Smart Contract and Decentralized Application Platform* (White Paper, 17 June 2019) <https://github.com/ethereum/wiki/wiki/White-Paper>.

24 Ibid 23. See also Nick Szabo, 'Secure Property Titles with Owner Authority' (Paper, Satoshi Nakamoto Institute, 1998) <https://nakamotoinstitute.org/secure-property-titles/>.

force, the continued existence of correct ownership records will remain a thorn in the side of usurping claimants.[25]

Szabo envisaged a database that

> can securely maintain titles of ownership, and securely transfer them upon the request of current owners. ... The purpose of the replicated database is simply to securely agree on who owns what. The entire database is public.[26]

One of the unique characteristics of blockchain technology is that it presents a system that 'for the first time allows for scarce, rivalrous property'.[27]

The different nodes in the system verify each transaction on the blockchain through solving a complex mathematical problem, and also keep an identical record of all transactions on the blockchain. The distributed public ledger that is created in this way records and verifies transactions.[28] The data on the blockchain network are processed and stored across multiple sites, on multiple computers, referred to as nodes.[29]

The information of each preceding transaction is permanently recorded on the blockchain through a hashing function. In essence, the entire transaction history of an asset is permanently recorded on the blockchain through 'hashing'.[30] This means that security tokens in particular, when generated on a blockchain, hold much promise for secure applications.[31] A blockchain is 'an online registry that can record transactions between individuals',[32] and the benefits of 'linked blocks' are integral to its usefulness:

> By recording and combining transactions into a decentralized, secure ledger, a blockchain network creates a 'chain' of chronological data that no one party has control of or can change and such that each block and individual transaction can be verified via cryptography. The transaction records are further protected by the

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25 Szabo (n 24).

26 Ibid.

27 Misha Tsukerman, 'The Block Is Hot: A Survey of the State of Bitcoin Regulation and Suggestions for the Future' (2015) 30(4) *Berkeley Technology Law Journal* 1127, 1129 (citations omitted).

28 Mark Kalderon, Ferdisha Snagg and Claire Harrop, 'Distributed Ledgers: A Future in Financial Services?' (2016) 31(5) *Journal of International Banking Law and Regulation* 243.

29 Adrien Alberini and Vincent Pfammatter, 'Blockchain and Data Protection' in Daniel Kraus, Thierry Obrist and Olivier Hari, *Blockchains, Smart Contracts, Decentralised Autonomous Organisations and the Law* (Edward Elgar, 2019) 272, 275.

30 'Hash functions are small computer programs that transform any kind of data in numbers of fixed lengths, regardless of the size of the input data. Hash functions only accept one piece of data at any given time as input and create a hash value based on bits and bytes that make up the data': Daniel Drescher, *Blockchain Basics: A Non-Technical Introduction in 25 Steps* (Apress, 2017) 72. 'Hashing is a very simple operation that associates any digital information to a number. The algorithm is devised to generate an almost unique number with a fixed number of digits associated with the input in a deterministic way': Tomaso Aste, Paolo Tasca and T Di Matteo, 'Blockchain Technologies: Foreseeable Impact on Industry and Society' (2017) 50(9) *Computer* 18, 25.

31 See Don et al (n 17) 3: Tokens can identify ownership, allow a mechanism for transactional processing, and serve as a property identifier.

32 Kianieff (n 14) 8.

replication of the data across nodes allowing for multiple and verifiable sources of truth.[33]

In the context of Bitcoin, the unique characteristic of the blockchain, that is, the inclusion of all previous transaction information in each new transaction, was depicted as follows in the original white paper:[34]
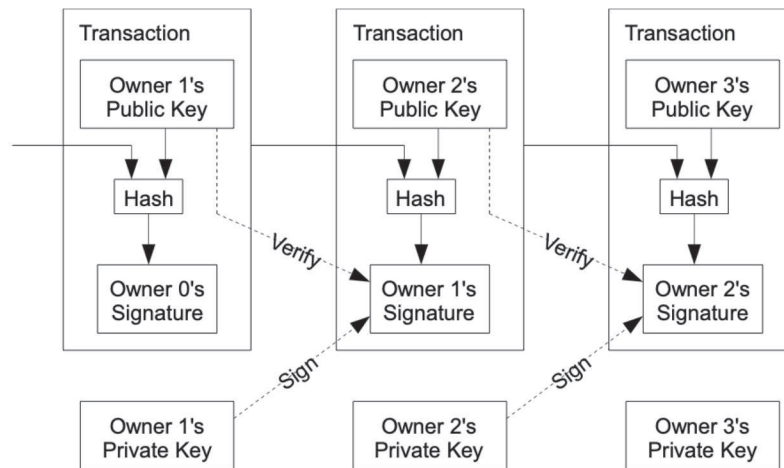
B Key characteristics of blockchain technology

While there are many technical features inherent in such a complex technology, relevantly for real property transactions and in particular an analysis of the bricklet proposal, we identify four key characteristics of blockchain technology: trust mechanisms; cryptographic signatures; distributed ledger through nodes; and transparency.

1 Trust mechanisms: Cryptographic proof

One of the main advantages of a blockchain application is that it introduces a system of trust, thereby facilitating transactions between strangers without the need for trusted third parties or intermediaries.[35] This was one of the key libertarian objectives of bitcoin as a digital cryptocurrency that could be generated privately and transferred peer-to-peer without the intervention of public authorities.[36] Instead of relying on a trusted third party to verify and record transactions, the ledger of transactions would be 'held in multiple locations simultaneously and be made publicly available'.[37] Transactions are verified by the majority of nodes on the blockchain reaching consensus on

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33 Don et al (n 17) 4.
34 See Nakamoto (n 13) 2.
35 See Kianieff (n 14) 6.
36 Ibid; Nakamoto (n 13).
37 Kianieff (n 14) 7.

proof of work.[38] For real property, this provides opportunity for otherwise unrelated parties — who need not trust each other — to transact with confidence.

2 Cryptographic signatures

The data on a blockchain is immutable.[39] The original entries on a blockchain database cannot be changed or tampered with,[40] as a result of the way in which the blockchain works. Blockchain transactions are secured through the use of asymmetric cryptography (public and private keys to encrypt and decrypt messages) which is integral to the inherent security of transactions on a blockchain.

As noted in the original South Australian media release about bricklets, the security of blockchain technology is considered a key selling point for a new system. The question of validating identity is recognised as crucial in land transactions generally, in paper-based Torrens transactions and e-conveyancing alike.[41]

3 Distributed ledger and nodes

Replication and synchronisation of information on a blockchain through the use of a consensus algorithm on a distributed ledger and storage as identical copies in each of the ledgers held by multiple nodes, means that the data cannot be destroyed or altered.[42]

As with Torrens, the veracity of the register is paramount. Originally duplicate certificates of title assured this via a centralised government run ledger (the register). The advent of automated titles systems relied on an electronic register — still centralised — supported by backups and best-practice digital security. Blockchain's distributed ledger speaks to the concerns inherent in land titles systems, albeit through a decentralised system.

4 Transparent, private and permissioned networks

Each transaction on the blockchain can be tracked as it is identified by a code[43] thus providing a transparent means of proving rights, including ownership rights, attendant on recorded transactions.[44] Although the bitcoin and Ethereum blockchains, for example, are public and have been deliberately open and accessible with a view to the development of different applications using the blockchain for specific uses, a private permissioned network can be created. In a permissioned network the parties are typically known to each

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38 See Drescher (n 30) 156.

39 Kianieff (n 14) 8.

40 Ibid.

41 See, eg, *Land Title Act 1994* (Qld) s 162, that requires witnesses to an instrument to verify the identity of the person signing it; and *Electronic Conveyancing National Law* (Qld) s 23(2) which sets out the rules for participating in the e-conveyancing network, including the setting of standards for verification of client identification.

42 Alberini and Pfammatter (n 29) 275.

43 Daniel Kraus and Charlotte Boulay, 'Blockchains: Aspects of Intellectual Property Law' in Daniel Kraus, Thierry Obrist and Olivier Hari, *Blockchains, Smart Contracts, Decentralised Autonomous Organisations and the Law* (Edward Elgar, 2019) 240, 244.

44 Ibid 265.

other or have specifically been granted access to the network.[45] Because of the nature of the interests involved in the bricklet proposal, this would likely be the manner in which such a scheme would operate.

Again, transparency is inherent in the Torrens system. While old system title relied on a chain of title evidenced by all deeds in the chain, Torrens comprised a centralised register of all transactions that are visible on each title, and traceable back to Crown grant. Similarly, each 'block' on the blockchain corresponds to a dealing and as with the Torrens register, is identifiable via code.

Blockchain applications offer unique benefits for both land governance and land data governance.[46] In a peer-to-peer network of node computers, users would be able to lodge their transactions into the network and each transaction and the user's status would be validated by the node computers using algorithms.[47] Once a transaction has been validated, it will be added to the blockchain[48] replicating a 'chain of title' as in old system land dealings. Without suggesting that the title would be derivative, each transaction in the chain would be verifiable.

While this broadly describes the operation of a blockchain land registry, there are further considerations involved in fractionalising interests in land.

C Fractionalised property using blockchain

Bennett, Pickering and Sargent summarise what they describe as 'fractionalised property investment' in Australia in 2019 as follows:

> The concept seeks to break conventionally registered land parcels into conceptual shares — potentially numbering in the hundreds or thousands. Investors then buy and sell those shares in a managed marketplace. The shareholders receive a portion of the regular rent payment in the event that the property is leased and are entitled to a share of the sale value if the property is sold.[49]

Bennett, Pickering and Sargent conclude that the concept sits 'at the intersection of the land sector and fintech, and that 'fractional property shares merely represent another financial derivative underpinned by the formal land sector'.[50] Examples include BrickX, DomaCom and CoVESTA.[51] In the BrickX example, the properties are owned by BrickX and investors invest a relatively small amount using a digital wallet.

Although schemes such a BrickX are described as *fractionalised* property ownership, the terminology, when compared to the proposed Bricklet system,

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45 See Kianieff (n 14) 37.
46 See Rohan Mark Bennett, M Pickering and J Sargent, 'Transformations, Transitions, or Tall Tales? A Global Review of the Uptake and Impact of NoSQL, Blockchain, and Big Data Analytics on the Land Administration Sector' (2019) 83 *Land Use Policy* 435, 435. See also Harish Natarajan, Solvej Krause and Helen Gradstein, 'Distributed Ledger Technology (DLT) and Blockchain' (FinTech Note No 1, World Bank Group, 2017) 22 <http://documents. worldbank.org/curated/en/177911513714062215/pdf/122140-WP-PUBLIC-Distributed-Ledger-Technology-and-Blockchain-Fintech-Notes.pdf>.
47 Bennett, Pickering and Sargent (n 46) 440.
48 Ibid.
49 Ibid 441.
50 Ibid.
51 Ibid.

creates some confusion. 'Fractionalisation' has been used to refer to a division of rights in real estate to smaller units. Graglia and Mellon describe 'fractional ownership' as 'multiple parties sharing the rights and responsibilities of owning a real asset (that is, a house, a condominium, or a commercial building).[52] It can include fractional occupancy (such as time share scheme).

By contrast, albeit from a more technical perspective, systems such as BrickX sell digital assets, that is, tokens, and not real property at all. For purposes of this article we describe this system of creating a financial right tied to real property as 'tokenisation'. Fractionalisation, on the other hand, we reserve to describe the transfer of title on a blockchain where the shared interest of the owner of a 'fraction' is in fact registered on the government's land title registry — as envisaged by the Bricklet scheme. This categorisation is generally aligned with the very useful *Framework for Blockchain-Registry Adoption* created by Graglia and Mellon.[53] At a low level, blockchain is used as a method to record property ownership, thereby providing greater security.[54] At a more integrated level, blockchain technology will allow fractional rights to be managed via a blockchain, and ultimately that peer-to-peer transactions will be possible and rights transacted without intermediaries.[55]

We expand on this distinction as follows:

1 Tokenisation

The term 'token' describes a digital asset that is created to be used on an existing blockchain, often through a decentralised application. In a tokenised system, the underlying real estate asset is purchased and owned by a single owner, eg, a corporation such as BrickX Financial Services Ltd, which runs the BrickX scheme. In the product disclosure statement it is clear that the service is a financial service.[56] Such a scheme involves an online platform through which members can 'invest indirectly in properties in various locations across Australia to earn rental income'.[57] It states further that '[t]he BrickX Platform also enables members to buy and sell beneficial interests (Bricks) in one or more BrickX trusts which hold properties with the potential to benefit from capital returns on BrickX Trust property assets.'[58]

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52 J Michael Graglia and Christopher Mellon, 'Blockchain and Property in 2018: At the End of the Beginning' (Conference Paper, Annual World Bank Conference on Land and Poverty, 19–23 March 2018) 21.

53 Ibid 16.

54 Ibid. See levels 1 and 4 on Graglia and Mellon's scale. The hashing process is particularly beneficial in this respect. Graglia and Mellon cite Dubai and Georgia as examples of public land registries running a central database on a permissioned blockchain.

55 Ibid.

56 See BrickX Financial Services Ltd, *Product Disclosure Statement for the BrickX Platform (ARSN 613 156 433)* (Product Disclosure Statement, 1 June 2019) 1 <https://assets.brickx. com/downloads/brickx-pds-2019-06-01.pdf>:

　　BrickX Financial Services is the Responsible Entity of the BrickX Platform and the issuer of Interests and has contracted BrickX to assist in preparing this Document. BrickX is a corporate authorised representative (number 001000043) of BrickX Financial Services, authorised to market the BrickX Platform and arrange to deal in Interests and Bricks ...

57 Ibid 9.

58 Ibid.

Similar schemes have been initiated internationally. Typically, investors own shares in a property trust or a company, which is the registered owner of the property. For example, a scheme was proposed in the USA last year,[59] which provided for ownership of fractional shares of five-unit building in Brooklyn, New York, represented by tokens purchased through a website built on the Ethereum blockchain. The proposal promised that 'investors would reap a proportionate amount of rental income. If the building grows in value, so would those shares'.[60] Although the scheme details were not publicly available, the model was likened to a real estate investment trust ('REIT'), a well-known and established model of property investment.

From a technical perspective, the interests purchased in a system such as this, or BrickX, would be represented on a blockchain by coloured coins. Coloured coins are a specific type of cryptocurrency tokens 'marked with metadata linking them to off-chain assets' (that is, assets that exist in physical form, rather than purely digital assets) where the 'colour' represents the type of rights associated with that asset.[61] Tokenisation therefore involves establishing a proxy for a part interest in nominated land, but does not involve a registered interest in that land. Instead, it results in an investment in a land-owning company or other legal entity that pays dividends to each investor equating to rent, and a capital return based on their nominated property's capital gain. Such schemes are managed investments in terms of the *Corporations Act 2001* (Cth). Tokenisation can be achieved with or without FinTech.[62]

Tokenisation of real estate is sometimes referred to as a form of fractionalisation, because the real estate is fractionalised financially, and although some property rights are also 'fractionalised' (for example, the receipt of an amount of money that is equal to a pro rata share of rental income), the registered ownership rights are not fractionalised. This is the distinction we make in our analysis here.

2 Fractionalisation

To take tokenisation one step further is to provide each of the interest holders not only with a *financial* fraction but also with a fraction of the real property itself, where that fractionalised interest is registered on a blockchain. The proposed Bricklet scheme appears to be one such example.[63]

'Fractionalised ownership' is therefore a method of sharing ownership of a high-value tangible asset between several unrelated parties to mitigate costs and risks of sole ownership. Fractionalised ownership accordingly involves a

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59 Helen Zhao, 'Soon You Could Own Shares of This Brooklyn Apartment Building with Tokens Costing Just a Few Dollars', *CNBC News* (online, 19 March 2018) <www.cnbc.com/2018/03/19/own-shares-of-brooklyn-building-with-tokens-blockchain-real-estate.html>.

60 Ibid.

61 Graglia and Mellon (n 52) 22.

62 'FinTech' means 'the application of new digital technologies to financial services ... [and] the development of business models and products which rely on these technologies and more generally on digital platforms and processes': Organisation for Economic Co-operation and Development ('OECD'), *Financial Markets, Insurance and Pensions: Digitalisation and Finance* (2018) 10.

63 See *Bricklet* <https://bricklet.com.au/>.

direct interest in land, recorded in the land register, held in common with multiple other co-owners. Fractionalisation can be achieved without the need for any technological intervention or FinTech and is governed either by the agreement of the co-owners between each other, or by common law and property law statutes. We are interested here in fractionalised ownership through blockchain.

To take the bricklet proposal as an example, under a fractionalised ownership scheme in a new strata title development, each lot may be divided into, for example 20 fractions[64] where each fraction is recorded both as a coloured coin on a blockchain, and in the land title register. While there is no compulsion to link the register to the blockchain, the greater the interoperability between the blockchain and parties who may deal with the owners of the fractional interests, the greater the benefit from the blockchain[65] and the stronger the use case. For this reason, in our analysis we assume that the relevant land titles registry is included as a participant on the blockchain along with, at the very least, the developer, the owners of the fractional interests, and the tenant. The developer, as the first registered owner, would sell fractions to individual purchasers via blockchain, and the transaction will simultaneously be recorded on the register. Each fraction may be provided with a specific folio identifier corresponding to its encoded coin identifier (for example, Bricklet 1 in Lot 1 in Scheme X). On such a private permissioned blockchain, the participants transact through coins representing their fraction. Each participant would have linked wallets (or bank accounts) on the blockchain. Identity oracles may also be required to verify identity.[66]

Ownership could in principle be transferred seamlessly if blockchain integration is complete including the capacity to perform identity checks. The transaction of purchase and sale is effected through cryptography and hashing, and the proof of work is confirmed by all nodes in the network. Funds are transferred automatically when set algorithmic conditions have been satisfied from the wallet of the incoming owner to the wallet of the outgoing owner through a smart contract.

On this scenario, fractionalised ownership would work using smart contracts on the blockchain to manage rights between fractional owners. A tenancy coin could be issued and the weekly rent, after being deducted by smart contract from the wallet of the relevant tenant, can be distributed between the property manager and the 20 bricklet owners. For example, if repairs were required, contributions from the current owners will be deducted automatically and proportionately from their wallets. Because transactions are transparent and immutable, owners are protected. Rental income should in principle cover outgoings and potentially provide a surplus income.

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64 These fractions of a lot are the 'bricklets' in the bricklet proposal.
65 Graglia and Mellon (n 52).
66 It is worth noting that in Baar (canton of Zug, Switzerland) a property was tokenised by blockimmo. There is no Torrens title in Switzerland, though. See Blockimmo, '"Hello World" from the Crypto Valley: First Real Estate Transaction on Blockchain', *Medium* (online, 1 March 2019) <https://medium.com/blockimmo/hello-world-from-the-crypto-valley-first-real-estate-transaction-on-blockchain-2bf985b0ff3>.

III Nature of property owned in fractionalised interests

In any system of interests in land held on the blockchain, whether tokenised or fractionalised, the nature of the interest held will depend on the degree of integration of the blockchain into the land registry. The defining feature of the Torrens system is that a legal estate in land is created upon registration by the state.[67] Importantly in the bricklet proposal, and as envisaged in the fractionalised system we describe above, the intention is to maintain state registration of the interest and therefore it is clear that a legal estate in fee simple is contemplated. However, it is the dual transaction on blockchain that raises the possibility that other interests or types of property will be created.

A Real property vs personal property

Interests in land to be dealt with both on the blockchain and through the state land register — a system of dual, albeit interoperable, ledgers — raises the possibility of two discrete types of property interest: an estate in fee simple, real property, and blockchain 'bricklets' or coloured coins. Each owner is registered on the title and will therefore hold a legal interest in land that attracts all the rights of real property. But each owner also has rights under the blockchain agreement, enforced by a smart contract.

The rights that exist between owners and, on the framework we adopt here that is presumably regulated via smart contracts on the blockchain, may amount to an intangible personal property right, which could be traded on the blockchain without meeting prescribed real property sales requirements. Such a right might be described as a chose in action, a personal property right 'enforceable by an action'.[68]

The distinction between real and personal property in Australia is one of the hallmarks of the common law system,[69] reflected in the fundamental distinctions in the way real and personal property interests are treated in law. For example, the sale of real property is subject to the provisions of states' respective Torrens statutes[70] and other regulatory regimes.[71] By contrast, personal property can generally be traded more freely[72] and without the formal requirements associated with real property transactions, such as the requirement of a written contract of sale, and various prescribed terms and statutory cooling off periods in some states.[73]

67　See, eg, the famous words of Barwick CJ in *Breskvar v Wall* (1971) 126 CLR 376, 385: that Torrens title 'is not a system of registration of title but a system of title by registration'.

68　*Loxton v Moir* (1914) 18 CLR 360, 379.

69　Simon Fisher, *Commercial and Personal Property Law* (1997) Butterworths 23.

70　Eg, in Queensland, the *Land Title Act* (n 41).

71　Such as strata title legislation.

72　Subject to any security interests registered against the personal property under the *Personal Property Securities Act 2009* (Cth) ('*PPSA*').

73　Eg, in South Australia a cooling-off period of 2 days applies: *Land and Business (Sale and Conveyancing) Act 1994* (SA) s 5; and in Queensland the cooling-off period is 5 days: *Property Occupations Act 2014* (Qld) s 166.

An important attribute of real property is that it is subject to 'the closed list'[74] principle under the common law, which prescribes that there are only certain interests that can be registered against the title of real property, that would consequently establish a specific right in the property itself.[75] As Edgeworth explains:

> In essence, the principle holds that landowners are not at liberty to customise land rights, in the sense of re-working them in an entirely novel way to suit their particular individual needs and circumstances.[76]

In considering the effect of bricklets and the potential for creating new types of rights, the closed list principle needs to be borne in mind. To the extent that bricklets may constitute two separate types of rights the distinctions between real and personal property would manifest in a number of ways.

First, any personal transactions in relation to the land, such as those contractually provided for on the blockchain, and that exist outside of the closed list, may not be eligible to be enforced against the land itself. Personal rights created through contract may be held concurrently with real rights in land and may be enforceable against contracting parties. For example, a mortgage held over land may include personal covenants between a borrower and lender. However, personal rights held under a contract cannot be enforced against the land itself unless it is a registered interest in land.[77] So long as the rights are derived under processes independent of creation of an indefeasible title — and existing legislation does not provide for the rights to be linked — there is the possibility that they will become 'decoupled' with consequences for their value and the bricklet owners' rights as between themselves.

Secondly, holding two separate types of rights that are not legislatively interlinked may result in two separate markets: one for real property (an interest on the land register) and the other for personal property (on the blockchain). The differential nature of the interests will have consequences for the value of the personal property on the blockchain, and the real property on the land register. As the premise of the system is to promote ownership of (fractionalised interests in) real property, and thereby become part of the real property market, this question goes to the heart of the efficacy of the system to achieve its stated goals.

Thirdly, division of interests into real and personal property raises concerns about commercial dealings with the interests, especially where they may be subject to security. While security over real property can be registered against the title, security interests over personal property are subject to the provisions of the *Personal Property Securities Act 2009* (Cth) ('*PPSA*') and the

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74 The *numerus clausus* principle, commonly referred to as a principle governing land law, is firmly established under the common law. See Brendan Edgeworth, 'The *Numerus Clausus* Principle in Contemporary Australian Property Law' (2006) 32(2) *Monash University Law Review* 387.

75 Eg, mortgages, easements and fee simple interests.

76 Edgeworth (n 74) 387.

77 The concept of indefeasibility provides that only registered interests are enforceable against the land itself: see, eg, *Land Title Act* (n 41) s 184(1).

registration or non-registration of security interests under the Act may affect ownership rights,[78] depending on the priority of the security interest holder. There are complex provisions dealing with priorities and the enforcement of security interests under the *PPSA*, which fall outside the scope of this article. Suffice to say that the possible conflicts between security interest holders in the real property (the land itself, which includes the buildings on the land) and the personal property (the units or 'bricklets' held on the blockchain) present a very real risk to all parties. The flexibility of the trading opportunities of the bricklets on the blockchain would allow owners to trade them and conceivably to use them as security in a commercial sense (as a personal property asset), whilst the interests in land will be treated as real property, subject to the relevant Torrens statute and the established principle of *numerus clausus*[79] under the common law.

Although the issues raised here could be addressed contractually, when issues of insolvency arise, for example, in the case of both real and personal property, registered interests will have priority over unregistered personal interests. In such a case, complex questions of priorities will arise between security interest holders in the real and personal aspects of the property.

Property cannot be real and personal property at the same time.[80] Yet to create a system that might generate differential interests raises complex and intersecting questions of priorities that will need to be provided for.

B Dealings 'off register'

The Torrens system of registered (legal) interests in land is no barrier to the creation of equitable interests in land, which are contemplated by the Torrens legislation.[81] An equitable interest in land is inherently less secure, less desirable, and less valuable than a legal estate, but nonetheless constitutes an interest in land.

Without going into the diverse ways of creating an equitable interest in land, the complementary blockchain transaction may itself create an equitable interest in land through comprising an agreement to create a legal interest,[82] or perhaps creating a personal equities exception to a registered interest.[83] There may also be equitable interests created that are not contemplated by the blockchain transactions, for example, through estoppel or trusts that are not recorded on the register and are not the subject of a smart contract.

While equitable interests are not necessarily a mainstream event in real property transactions — at least to the extent that they raise a litigated dispute — the possibility of equitable interests erodes claims to certainty and transparency of land titles that are replicated on blockchain. The Torrens

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78 See, eg, *Albarran v Queensland Excavation Services Pty Ltd* (2013) 277 FLR 337; *Graham v Portacom New Zealand Ltd* [2004] 2 NZLR 528.

79 Edgeworth (n 74).

80 Apart from chattels real (leasehold interests) which are the only 'hybrid' category in property law.

81 See, eg, *Heid v Reliance Finance Corporation Pty Ltd* (1983) 154 CLR 326; *Bahr v Nicolay [No 2]* (1988) 164 CLR 604.

82 *Walsh v Lonsdale* (1882) 21 Ch D 9.

83 *Bahr v Nicolay [No 2]* (n 81).

system accommodates equities through various means,[84] and they therefore remain a reality that needs to be contemplated also by any technologies superimposed upon the register.

IV Regulating co-owners' relationships

Inherent in fractionalised ownership, is the creation of an estate in fee simple — a legal right to possession of a defined lot for an indeterminate term — that is co-owned by multiple owners of that single lot. Because of the physical nature of the lot and its character as a residence, it is not possible to conceive of one bricklet in isolation from all other bricklets within that lot. Bricklet owners will therefore inevitably become co-owners with attendant rights and obligations inter se.

In the interoperable system we assume here, blockchain lends itself to encoding the co-owners' responsibilities to each other within smart contracts. Although some characterise smart contracts as 'the' contract, they are more a manifestation of the terms of the parties' underlying agreement. To a large extent therefore, the parties' relationships with each other will be governed by agreements that will be self-executing upon the occurrence of identified events. There are, however, challenges in the management of the co-owners' rights arising in particular from the nature of their interests as real property.

A defining feature of co-ownership of real property is the unity of possession enjoyed by each co-owner, giving each the freedom to possess the entirety of the property in common with all others.[85] This simultaneously gives each party the right to control the property and yet renders each owner subject to the actions of all other owners. Even if there is a management agreement, there may still be rights attached to the fee simple estate that afford a right to each owner to exercise control in respect of their own interest. It is the unity of possession and its interpretation at common law that raises numerous challenges for investors and potentially for the platform operator. There is no suggestion so far that co-owners' relationships will be regulated as, for example, through strata legislation. This leaves parties to deal with their responsibilities and liabilities either at common law, or through agreement.

A Distribution of rent and capital, costs and outgoings

Each interest holder will receive a proportionate distribution of rent, and capital increases — the latter upon sale. These payments can be distributed between co-owners via smart contracts encoded into the blockchain. Purchasers of an interest will incur proportionate costs of buying that interest in land: stamp duty, transfer fees, etc, will be payable pro rata, according to the buyer's share. Inevitably, rates and outgoings will also be apportioned. For so long as there are funds in the common account — from rent — there will be funds to pay for outgoings. There are, however, two drawbacks.

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84 Eg, through the personal equities exception to indefeasibility and the caveat system. See, eg, ibid; *Butler v Fairclough* (1917) 23 CLR 78.
85 *Bull v Bull* [1955] 1 QB 234; *Thrift v Thrift* (1975) 10 ALR 332.

The first is that the blockchain is unlikely to be integrated into a financial ecosystem beyond those who are signed up to it.[86] The more entities signed up to the platform, the easier it will be to keep outgoings within the blockchain ecosystem. The local council (for rates), body corporate, insurers, maintenance companies and other service providers will require payment from pooled funds. Each payment that needs to be made off-blockchain requires a person to do so. Once there is a third party involved, off-blockchain, the use case for fractionalised ownership is somewhat weakened, and a tokenised system appears a more efficient way to manage the scheme.

In addition, regulation of outgoings via the blockchain platform requires access to funds. If rent does not cover outgoings, or if there is no tenant, then there will need to be a mechanism for collecting funds from the parties. This aspect may be dealt with via the blockchain if the parties' financial resources are part of the blockchain infrastructure, but this of course still depends on each party retaining sufficient funds to be available in case of contingencies.

Where there is a shortfall in funds, co-owners may be jointly and severally liable for outgoings associated with the property where this is agreed, or where it is provided for in the relevant statute.[87] Where one owner does so, they are entitled to a proportionate accounting from the other owners registered on the title at the time of payment.[88] Where interests have since been transferred, the enforcing owner would likely need to recover contribution 'offline', that is, independently of any smart contract. Similar concerns apply to the distribution of the proceeds of insurance in case of loss or damage, and for other payments and liabilities incurred.

B Possession

A further feature of co-ownership is that all co-owners have a right in common with each other to possession of the whole property.[89] A single owner cannot claim a proportionate part of it for themselves. In this respect, fractionalised interests do not comprise a divisible part of the land. As bricklet owners are investors, this is not a problem at first glance: an investor does not intend to occupy the property. However, the unity of possession also results in a number of derivative rights that affect the obligations between the parties.

If the property is in a strata development (as our example assumes) there is the question of voting rights on the body corporate. Strata legislation deals with disputes between owners of different lots but does not deal with disputes between co-owners of a single lot.[90] Co-owners will need a system to sort out how they will vote on body corporate matters — and this is likely to occur via mechanisms on the blockchain which, in general terms, is a technology that

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86 See commentary on integration of blockchain in, eg, Graglia and Mellon (n 52).
87 See, eg, *Local Government Regulation 2012* (Qld) s 127(3); *Land Tax Act 2010* (Qld) s 8, where 'owner' is defined in s 10(1)(b) as 'a person jointly or severally entitled to receive rents and profits from the land'; *Local Government Act 1993* (NSW) s 560(3).
88 *Loibner v Owens* (2006) 15 BPR 28,315; *McKay v McKay* [2008] NSWSC 177.
89 *Bull v Bull* (n 85); *Thrift v Thrift* (n 85).
90 'Dispute' is defined in s 227 of Queensland's *Body Corporate and Community Management Act 1997* (Qld) to include disputes between owners of one lot and another, or owners and the body corporate, etc — but not between co-owners of one lot.

can accommodate voting systems.[91] They will also, however, need a system for resolving disputes between the parties as to body corporate matters, amongst other points of contention.

Questions of liability and possession between co-owners can be resolved via an agreement — and smart contracts encoded into blockchain can manage many of these obligations. However, so long as the blockchain is not fully integrated into the land title system and the broader financial and land management ecosystem, it is inevitable that the parties will need to transact outside the blockchain. Each time this occurs, the case for using blockchain weakens and raises attendant questions about managing the parties' respective rights.

The bricklet proposal is a good example of how we have moved away from the physicality of land, towards embracing assumptions of liquidity that underpin its free (perhaps frictionless) and paperless trade.[92] However, and crucially, our land titling system is still dependent upon the legal right to possession of land. Developing a system of fractionalised interests cannot escape that physical reality.

C Leasing

The premise of fractionalised ownership of real property rests not upon providing housing for the landowners, but on their deriving a rental income. Bricklet owners will therefore collectively become a landlord, with attendant responsibilities and liabilities. Additionally, there is another interest created: namely, that of a tenant. In analysing the issues arising from the tenant's interest, we assume that as with the bricklets themselves, the tenant's interest is created on the blockchain and their relationship with the collective landlord is managed through smart contracts, and that there is at the very least capacity to register the interest also on the Torrens register.

As with the bricklets themselves, the landlord–tenant relationship can exist both as real and personal property. Indeed, the lease is uniquely characterised as a chattel real. The law recognises its inherently dual characteristic as both real and personal property. The contract between landlord and tenant contains covenants variously categorised as interests that touch and concern the land,[93] and as personal obligations.[94] But in addition to the contract of lease, the tenant is recognised as holding a leasehold estate in land — one that is protected under Torrens statutes for unregistered leases whose terms are less than 3 years,[95] and for all registered leases. Thus, an interest in land may be created via blockchain where the bricklet owners enter into a smart contract with the tenant, and where the lease is not registered. The tenant will have a

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91 See generally Nir Kshetri and Jeffrey Voas, 'Blockchain-Enabled E-Voting' (2018) 35(4) *IEEE (Institute of Electrical and Electronics Engineers) Software* 95.

92 For a discussion on the dephysicalisation of property, see Sarah Keenan, 'From Historical Chains to Derivative Futures: Title Registries as Time Machines' (2019) 20(3) *Social and Cultural Geography* 283.

93 *Spencer's Case* (1583) 5 Co Rep 16a; 77 ER 72.

94 *The Progressive Mailing House Pty Ltd v Tabali Pty Ltd* (1985) 157 CLR 17.

95 See, eg, *Land Title Act* (n 41) s 185(1)(b).

legal estate in land if the lease is less than 3 years,[96] or an equitable lease if it is unregistered and for a term exceeding 3 years.

Based on our analysis of the dual nature of the freehold/bricklet interest as real and personal property, this scenario raises a number of interesting questions concerning the relationship between the tenant's interest and that of the owners. The tenant's interest will exist on the blockchain alongside the owners' bricklets again, via a coloured coin. If the tenant's interest is characterised as personal property, it is unclear whether it serves to 'burden' the bricklets. It would certainly be seen as an asset in the hands of the bricklet owners, in that the lease represents their entitlement to future income. A person seeking to buy a bricklet would want to know that there were potential for rental income arising from their investment.

But the tenant's obligation to pay rent depends upon their entitlement to possession of the land. It is necessarily implicated in the land register, and is dependent upon each co-owner, collectively as the landlord, themselves being entitled to the legal right to possession of the whole of the land. The tenant's leasehold estate is derivative of the landlords' collective fee simple estate and its attendant legal right to possession of the land, coupled with their unity of possession.

In addition to the legal right of exclusive possession for a term,[97] the tenant has other rights, exercisable jointly and severally against the bricklet holders as the landlord. Many of these are codified in residential tenancies legislation,[98] which have also expanded on the common law implied covenants of quiet possession[99] and non-derogation from grant.[100] Beyond lease covenants, there are further tenants' rights such as relief against forfeiture[101] that implicate all landlords, in potential actions that will necessarily occur off-blockchain. Lying in equity, such actions depend upon a nuanced weighing of circumstances. A self-executing smart contract resulting in eviction of a tenant will not necessarily assist landlords in managing their liability for forfeiture.

On the other hand, recording leasehold interests on the blockchain could protect tenants. Encoding the lease as part of the bundle of transactions and relationships managed by the blockchain would provide not only notice of the lease but, if suitably encoded, could also ensure an incoming landlord — a bricklet purchaser — were bound by its terms. Where the lease is self-executing on blockchain, there is no scope for a *Friedman v Barrett; Ex parte Friedman*[102] scenario, whereby the new owner refused to renew the lease because he was not contractually bound to do so. Where all parties, including the tenant, sign up to their obligations on the blockchain, the blockchain serves a similar role to the land register not only through notice, but through assuring the allocation of rights and responsibilities.

96 See, eg, *Property Law Act 1974* (Qld) s 12(2).
97 *Radaich v Smith* (1959) 101 CLR 209.
98 See, eg, *Residential Tenancies and Rooming Accommodation Act 2008* (Qld).
99 See, eg, *Malzy v Eichholz* [1916] 2 KB 308.
100 See, eg, *Telex (Australasia) Pty Ltd v Thomas Cook & Son (Australasia) Pty Ltd* [1970] 2 NSWR 257.
101 See, eg, *Shiloh Spinners Ltd v Harding* [1973] AC 691.
102 [1962] Qd R 498.

Of note, despite the blockchain providing a form of management of the parties' joint financial responsibilities, including the tenant's rental payments, tenanted properties will still inevitably require some kind of in-person management. The asset is not truly digital — the coin is a mere representation of the physical asset — and the very nature of the interests being created involves the right to physical possession. A fully integrated data network installed within each physical unit (that is, the internet of things)[103] may go some way to executing lease obligations encoded in the blockchain: measuring wear and tear through sensors, geoblocking or locking the unit in the case of rental arrears, tracking the number of occupants or other aspects of the use of the premises. Automating these processes raises a host of other foundational issues about the leasing relationship and tenants' rights, that are beyond the scope of this article.

Suffice to say that there remains either a question of management of a physical asset both for the landlord and for the tenant through 'off blockchain' intervention, or a question of the role of multiple and interoperable technologies in doing so.

V Conclusion

Despite the absence of any details about the mechanics of the bricklet proposal, it is possible to envisage the operation of a fractionalised land title system managed through both blockchain and a Torrens register. However, as we have identified, to work this would require at a bare minimum the interoperability of the blockchain and the land register — and to maximise the benefits of such a system would require much broader interoperability including with financial services and land administration systems more widely. In other words, even at a minimum, such a proposal would require sophisticated legislative reform that does not yet appear to be in train. Considering the lead up time to implementing e-conveyancing in Australian jurisdictions, the idea of an interoperable blockchain with the Torrens register in the short-term seems somewhat ambitious.

Further, pondering the means of linking fractionalised land title on the blockchain with the register is only part of the story. This addresses the administration of records and proof of title, without contemplating more extensive implications of the proposal. As we see it, issues such as co-ownership, property management and the potential for conflicting security interests need to be addressed, to mitigate likely risks for investors in the scheme.

Lastly, and a pragmatic outcome of the ambiguous nature of the property interest (or interests) created, there is the possibility that the value of discrete bricklets may be independent of the market value of the lot as a whole, resulting in the possibility that prices may be artificially inflated and unstable. The very people who are touted to benefit from the scheme may find themselves ultimately disadvantaged if these types of schemes either cause

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103 The internet of things describes enabling everyday objects to send and receive data via the internet by embedding computing devices in them.

property prices to rise further, due to a demand for invisible bricklets, or to create a market parallel to the real property market, with lower value bricklets.

Our analysis is not to suggest that such a scheme is not possible, or that it is necessarily not viable. However, the concept raises multiple property-related questions that must be answered for the scheme to become a reality.