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SMART CONTRACTS AND LAND ADMINISTRATION
A NEW FRAMEWORK FOR PROPERTY CONVEYANCE

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Abstract

This paper extends and refines existing discourse on the role of smart contracts within the land sector, giving a more nuanced view of possible applications, the opportunities, and existing blockers. Inspired by action research, and utilizing multiple case studies, the paper reports on findings from pilot projects on the use of smart contracts on the blockchain in Sweden, Australia, and Canada. It incorporates background research on contemporary models of property conveyance including paper-based submissions, electronic recording with third party providers, and direct digital submissions to a land registry. The paper touches on models of trust, centralization vs. decentralization, data security, and cost and business models of different implementation approaches, amongst other topics. Findings suggest that blockchain-based smart contracts are a near term solution with practical applications to addressing land administration challenges and opening up new ownership opportunities in property markets.

Key Words: Blockchain, Conveyancing, Land Registration, PropTech

1. INTRODUCTION

The initial hype around blockchain applied to the land sector is giving way to more balanced debate, if not exemplar pilots and prototypes. From these developments, it is increasingly clear that the decision to place an entire title registry on the blockchain is something that governments, the conventional custodians of these records, will consider only in the context of maturing technology, the satisfaction of cyber-security considerations, and through addressing the many policy, legal, economic and societal implications.

These broader concerns aside, and though full tokenization of property may still be many years away, a number of other important use cases have emerged for blockchain technology that could prove highly valuable for land administration and property markets. Most notably smart contracts on the blockchain, in the shorter term, can provide a secure, auditable, more easily distributable solution to support property record changes among buyers, sellers, the land registry, financial institutions, attorneys, and other parties connected to property transactions.

The development of blockchain technology has allowed customizable programming logic to be stored in blockchains[1]. This path of development has enabled the creation of smart contracts. Note that for the purposes of this paper, we have largely set the broader discussion of blockchain aside in order to evaluate the advantages and challenges of this enabling technology.

Built around action research principles, and utilizing multiple case studies, this paper reports on findings from pilot projects on the use of smart contracts on the blockchain in Sweden, Australia, and Canada. It incorporates background research on contemporary models of property conveyance including paper-based submissions, electronic recording with third party providers, and direct digital submissions to a land registry. The paper explores models of trust, centralization vs. decentralization, data security, and cost and business models of different implementation approaches.

The overarching aim to extend and refine existing discourse on the role of smart contracts within the land sector, giving a more nuanced view of possible application, the opportunities, and existing blockers. Preliminary findings suggest that blockchain-based smart contracts are a near term solution with practical applications to addressing land administration challenges and an alternative framework for opening up new ownership opportunities in property markets. Why does this matter? It matters because beyond the

[1] Smart Contracts - How will Blockchain Technology Affect Contractual Practices, Research Institute of Finnish Economy, Jan. 2017

economic and social purposes, land registries are often an influential starting point of governance changes and land registry efficiency is a key measure of ease of doing business.

2. BACKGROUND ON CONVEYANCING FRAMEWORKS

Procedures for enabling the transfer of immovable property developed over millennia. Notwithstanding vastly different social and environmental contexts, and the land transfer mechanisms they espoused, Larsson (1991)[2] suggests any situation, a means of transaction and evidence piece can be identified. Using these constructs, he suggests four major phases of development can be observed – particularly if a western standpoint is taken. Initially, transfer processes were linked to localized social customs, involving symbolic gestures to validate transfers, and witnesses as the key form of evidence. Paper based systems followed, with private conveyancing between two consenting parties being supported by the creation of a deed (or legal document). Systems for registration of those deeds, with a trusted third party (i.e. state or religious institution), subsequently followed. The input or involvement of that third party may have been rather limited. In cases where involvement grew to include the writing of a government backed title or certificate, terminology evolved to contrast 'deeds registration' from 'title registration' – the 'Torrens' system being one variety of such systems.

The period of European colonization resulted in those deeds and title registration systems being transferred globally[3]. Consequently, the statutory, if not formal, land transfer processes, in most nation states find antecedence in either deeds registration, title registration, or a combination of the two (e.g. Trinidad and Tobago). Whereas deeds registration systems record legal fact, title registration systems record legal consequence. The required higher levels of government involvement oversight in title systems sees them sometimes referred to as 'positive systems', in contrast to 'negative' deeds systems[4]. As pointed out by Henssen (2010), 'improved' deeds registration systems now appear very similar in practice and process to title registration systems. Regardless of the statutory system in use, transacting parties are required to compile a set of legal documents (or instruments) to get the transaction onto the

[2] Larsson, G. (1991). *Land Registration and Cadastral Systems: Tools for land information and management*. Longman Scientific & Technical.

[3] Henssen, J. (2010). *Land registration and cadastre systems: principles and related issues*. Technische Universität München.

[4] It should be noted that it is usually Anglophone literature that makes these distinctions, with preference for title registration apparently being transferred into the subsequent terminology

register. Specifications for these documents, and perhaps complexity in requirements, typically increased over time – dependent on the drivers and problem cases (e.g. fraud) experienced within a jurisdiction. In many cases it will require the completion of a prescribed transfer form, a contract of sale, and a mortgage creation instrument.

Modern deeds and title registration systems were responses to identified weaknesses in earlier transfer methods. The strength of both lies in their simplicity with regards to four principles (Henssen, 2010). First, the registration principle (sometimes called 'curtain' in Torrens literature) demands that in order for a transaction to be considered 'legal fact' it needs to be recorded in the authoritative 'book' (or DB in modern systems). This means person-to-person, without government oversight, transactions are not recognized legally. The major reasoning here is to stop a land unit (or parcel) being transferred multiple times by a single party: the authoritative book would reveal the land has already been transferred. Second, the principle of publicity demands that the book and transactions within, must be available and accessible for the public to view. The principle helps to remove information asymmetries and ensure transparency in conduct, for both transacting parties, and the government alike. In practice, books are not fully open: privacy and security controls are placed on the ways and means for accessing transacting data. Third, the consent principle articulates that for any changes to be recorded in the book, relating to a person or parcel, the impacted parties must give consent. This principle builds on the previous two, with anti-fraud being a major motivation. Finally, the principle of specialty declares that both parties and land units must unambiguously defined. This is usually achieved through person and parcel ID systems, and the use of cadastral maps and field sketches. The IDs make transaction processes simpler, and also seek to minimize identity fraud. It should be noted that literature on Torrens and other titling systems expand the four principles to include: curtain, mirror, and insurance[5]. Each of these generally seeks to increase the power of the registration body and fast track dispute resolution.

Despite the successes of both systems, they carry limitations – or at least perceived weaknesses. First, regarding **time**, transfer processes generally take weeks, if not months, to complete. In contemporary economies, this lag between transaction instigation and completion has been increasingly argued as anachronistic by the property sector and related actors. Second, **cost** to transfer, particularly in developing contexts, is argued as prohibitive. A transfer usually involves a range of professionals and several parallel processes, each attracting fees or duties. In theory, modern IT should reduce costs of storage, processing,

[5] Torrens and other Titling systems add to the four abovementioned principles, including the insurance principle, whereby the authority responsible for the book (i.e. government) will provide compensation to parties judged to have been defrauded of property, due to inadequate checks by the registry, at the time of registration.

and transparency provision – yet have these gains been passed on, or is a level of rent seeking persistent to some systems? Arguments and examples can be presented from both sides. What is more clear, is that if cost to register is too high, informal non-statutory transactions will occur, outside of the books – undermining the utility and value of the register, and the first principle abovementioned. Third, like all administrative developments, **complexity** seeps into processes overtime – in terms of parties, processes, and systems involved. Regulatory reform is often a response, yet regulatory reform has often proved difficult to deliver in the land sectors in many jurisdictions. Fourth, **duplication** of effort is also evident in many systems. This may include repeating data entry, superfluous checking of documents, and so on. Duplication could be considered a subset of the cost issue. Finally, and perhaps most importantly, despite the best efforts of both deeds and registration systems, **fraud** is still possible and certainly occurs. This can be actioned by buyers, sellers, agents, or even the registry officials: the systems and controls are still penetrable with loopholes relating to instruments, documents and processes available for exploitation.

Like most sectors, over the last 40 years, technology in the form of digital systems, databases, internet, and web services have greatly impacted upon registration systems – in terms of function and service delivery. These have served to reduce existing limitations in both systems in terms of time, cost, complexity and duplication: many cases of cost reduction and process simplification (or access) can be observed. However, the new technological approaches also opened up new opportunities for fraud – and as such, most land administration systems have tended to take a conservative stance and have been late technology adopters. Contemporary systems tend to use a mix of digital and paper-based processes and documents (i.e. hybrid). Whilst the developments are yet to fundamentally challenge or alter the underlying theoretical principles inherent to both deeds and registration systems, emerging concepts and tools relating to Digital Ledger Technologies (DLTs i.e. Blockchain), including Smart Contracts, create interesting questions, if not opportunities. We now turn our attention to the specific, and perhaps most readily usable, case of Smart Contracts.

3. DEFINING SMART CONTRACTS

There is ample material on smart contracts and we encourage readers to explore other sources for comprehensive discussions of the topic. Here, we seek to provide the just the fundamentals of smart contracts from a high-level technical, security, and legal perspective.

3.1 ORIGINS AND BASICS

Nick Szabo[6] is credited with coining the term "smart contract." According to Szabo, "A smart contract is a set of promises, specified in digital form, including protocols within which the parties perform on these promises." A shorter definition is from Barclays Bank, "an agreement whose execution is both automatable and enforceable". Smart contracts:

- Embed the 'if, then, else' of contracts into computer code
- Enable computers to complete actions previously requiring human involvement
- Incorporate all binding elements of a contract, or specific clauses
- Incorporate workflows to connect disparate parties to a transaction

Table 1 highlights the primary differences between Traditional and Smart Contracts: because a contract, including the terms of agreement, has been converted to computer code, downstream execution of many of the contract terms and tasks can be achieved through automated processes. These processes can include the transfer of property title, settlement-related payments, or payment credits to cover escrow accounts.

Table 1. Traditional Contracts vs. Smart Contracts

Criteria	Traditional Contract	Smart Contract
Specification	Natural language + legal prose	Code
Identity and Consent	"Wet" signatures	Digital signatures
Dispute Resolution	Judges, arbitrators	Consensus via Blockchain
Nullification	Parties via legal enforcement Process of breached terms	Parties via Agreed Upon Digital Nullification workflow and block consensus
Payment	Independent third-party Process	Automatic, based on executed terms (Built into Contract)
Escrow	Independent third-party Process	Automatic, Based on executed terms (Built into Contract)

To highlight some of the key differences referenced in the table, we begin with identity as represented by digital signatures. Digital signatures, using asymmetric cryptography which dates back to the 1970's, are

[6] Szabo, N. (1997). Formalizing and securing relationships on public networks. *First Monday*, *2*(9). (Freely available online)

fundamental to the integrity of smart contracts. Every transaction connected to a smart contract must be signed. The integrity of the system rises and falls on the level of confidence the network has that each party to the contract is, in fact, who they claim to be and that they are signing with their own key. In essence, this is the very reasoning for the principle of specialty in registration systems.

Again, every person required to execute their part of the contract must have a digital key. The challenges for architects of a smart contract network is to balance the privacy concerns of a central authority, one that issues keys against the trust and reliability concerns of keys assigned by a decentralized authority. Key management is certainly a non-trivial issue, but multi-signature frameworks and custody models have emerged to address both security and consumer adoption concerns.

3.2 LEGAL DIMENSIONS

Can legal acts be concluded in the form of smart contracts, therefore conferring rights and imposing obligations on parties? Again, we refer the reader to other sources for fuller treatment of the legal perspective. Smart contracts, in many ways, already exist today in many forms (Szabo references the Coke Machine that operates on an implicit contract where a dollar is exchanged for a can of soda). When we rent a movie on Netflix or download an app from Apple or Google, we are electronically signing a contract (and frequently approving a debit from our account) in return for use of an asset. Obviously land is generally a complex transaction, and as demonstrated above, has its own body of legislative and regulatory controls and processes. Indeed, in order for smart contracts to take hold in the context of land, existing legal systems and accompanying administrative procedures would generally need adaption to incorporate the smart contract concept (at least if the transaction is to be considered ‘legal’ under any form of deeds or title registration system).

At any rate, one of the primary concerns of the legal community and policymakers is the notion that smart contracts might operate beyond human control and bind the parties to agreements or expose them to unintended liabilities through malicious behavior by hackers (e.g., the infamous DAO hack). This is certainly a concern, and designers of smart contract-based systems should take an approach where technology design can be aligned with legal pathways.

Hemmo[7] notes that "Contracts enable organized collaborative activity and are used to carry out economic activity." This view allows the contracting mechanism to be positive and actionable, versus the common perspectives that contracts are primarily designed to manage risk and exposure, thus resulting in the limiting of business activity[8].

In the projects referenced in this paper, the contracts were designed as a workflow where the workflow rules define what "messages" (e.g., defining the buyer who must sign-off on a contract) are acceptable at every state. Digital signatures are used to establish message authenticity, (i.e. to prevent attacker impersonating one of parties, posting invalid or malicious information, etc.) and to indicate that the signing party is responsible for message's contents -- similar to a signature on a paper document or contract.

Esplix (the smart contract tool), and other similar frameworks, allows smart contracts to operate in a more settled legal space defined by laws like the US's Uniform Electronic Signatures Act ("UETA") and Electronic Signatures in Global and National Commerce Act ("ESIGN") that already recognize, enable, and validate the use of electronic signatures and electronic records.

4. SMART CONTRACTS IN LAND REGISTRATION

As noted above, for smart contracts to take hold in land registration processes, at least those transactions taking place in formal, legal, and/or statutory systems – a level of reform to existing legislative, regulatory, and administrative processes would be required: transactions involving moveable property are subject to specific land in each jurisdiction (i.e. beyond regular contract law). That said, it is possible to explore the potential role of smart contracts in the land registration and transfer process.

To start the discussion, the concept of "boundary connectors", the opposite of barriers to entry, is introduced. Boundary connectors – technology, data, and collaborative business arrangements - enable business processes to cross organizational and jurisdictional lines. A simple example is the strategy of

[7] Lauslahti, Kristian, Mattila, Juri, Seppäla, Timo (2017). *Smart Contracts – How will Blockchain Technology Affect Contractual Practices?* ETLA The Research Institute of the Finnish Economy.

[8] Note that in the land registry case studies documented in this paper, ChromaWay utilized a technology called Esplix. Esplix is non-Turing complete (not a fully operational program to avoid loops which enabled the DAO hack) and operates as a system for exchanging signed messages.

introducing regional "smart pass" transponders to allow vehicles to quickly and securely cross local highway jurisdictions (a "smart pass" is simply a smart contract device; a fee is deducted in exchange for the right to pass through a toll gate).

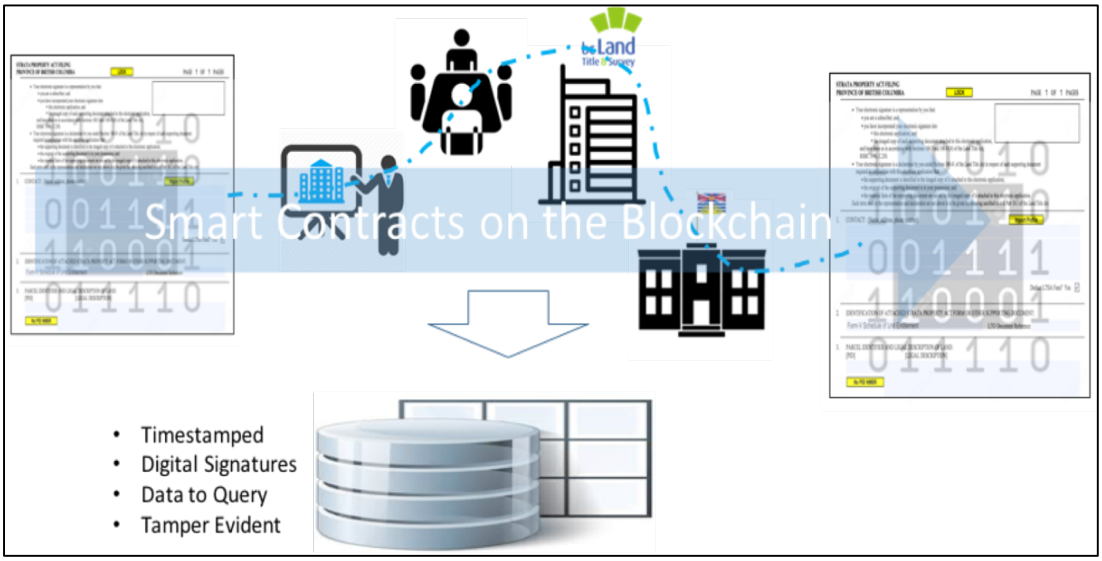

Figure 1. Smart Contracts on the Blockchain

The processing of land registration and associated mortgage lending processes can be thought of in a similar fashion (see **Figure 1**). The distributed ledger serves to connect buyers, sellers, settlement agents, lenders, and land registries into a single network (i.e., the road network) and the smart contract acts as a sort of "transponder" guiding the property transfer (or other transaction) to move across the ledger network.

The smart contract in a land registration transaction:

- Employs digital signatures (typically though use of an approved private key) that provides the signed transactions that are submitted to the blockchain ledger
- Specifies the data required by network partners to process/approve a transaction
- Enables automated processing of escrow payments or other types of actions based on predetermined rules.
- Describes the definition of a completed task(s) (e.g., signatures, collected data, etc.) that permits the contract to proceed

- Enables participants with a user interface (e.g., as a smartphone) or systems (e.g., application servers) to complete the tasks required by the codified contract.

```
    (buyers-bank-receive-purchase-sum ()
        "Buyers bank received purchase sum"
            (guard
                (signatures buyers_bank)
                (eql seller-sign-bill-agreement-contract "1")
                (eql buyer-sign-bill-agreement-contract "1")
            )
            (update
                state :purchase-sum-received
            )
    )

    (send-contracts-to-lnd ()
        "send contract to land registry "
            (guard
                (signatures buyers_bank )
            )
            (update
                state :mortage-contract-sent
            )
    )

    (approve-contract-by-lnd ()
        "approve contract by land registry"
            (guard
                (signatures land_registry )
            )
            (update
                state :mortgage-deed-contract-approved
            )
    )
)
```

Figure 2. Smart Contract Excerpt

Figure 2 is an excerpt of a smart contract developed for the real estate consortium formed in Sweden to process property transactions. In the snippet provided, the smart contract dictates that (1) the buyer's bank must sign-off (with its private key) that it received the purchase sum and (2) the buyer's bank must also sign the contract that is sent to the land registry and (3) The land registry, in turn, must sign that it approves the purchase contract received from the Buyers Bank. In this way the smart contract defines and orchestrates the parties to the contract and the enforces the actions they must take to advance the contract

and associated processes towards completion. The demonstrator illustrates the potential to use the smart contract in the context of established land transfers in a developed context.

5.0 INCREASING TRANSPARENCY IN PROPERTY TRANSACTIONS

Why would a jurisdiction bother to implement smart contracts though? Much of the discussion about the blockchain and land registries seems to focus on storing land titles on the distributed ledger itself. This is a logical, and a potentially beneficial long-term objective. However, it's also not a necessary action at this early stage of blockchain development. Turning real property into bearer assets (like bitcoin) is a risky step without further extensive testing, improved digital identity infrastructure, and adoption of a widely accepted governance frameworks. By way of example, the Swedish Consortium guiding the land registration project prohibited the tokenization of land even in the prototype. From another vantage point, placing property titles on the blockchain is a somewhat trivial technical exercise (see Georgia's action to anchor title to the Bitcoin blockchain[9]), though it clearly had certain agreed upon benefits (e.g. the ability to reconstruct the registry should it be destroyed).

What's significantly more important, and of greater value, to registries, is creating a better mousetrap for how data gets into the registry (i.e., the ledger). This is, by the way, even more important with regard to blockchains. After all, why create an immutable blockchain if the data, itself, is of suspect integrity? Today, in 90% of registries across the developed and developing world, paper and wet signatures are the basis for which property transactions are executed. In many cases, the few claiming digital signatures take wet ink signatures from the buyer and seller and use a trusted intermediary to provide a digital signature.

Registries and other counterparties to land transactions have virtually no view into the circumstances (where and when the agreements were signed) of the agreements or the true identities of the parties executing the agreements. In some cases, they depend on professional standards of representation, but in other cases they rely on essentially unknown notaries and other "trusted" intermediaries. Registries also lack a view into the integrity of the documents presented to the counterparties (e.g., a property transfer or

[9] https://www.mitpressjournals.org/doi/pdf/10.1162/inov_a_00276

a lien release form). Some registries are trying to address this problem. For example, British Columbia requires the interest holder to apply for a discharge, not the property owner.

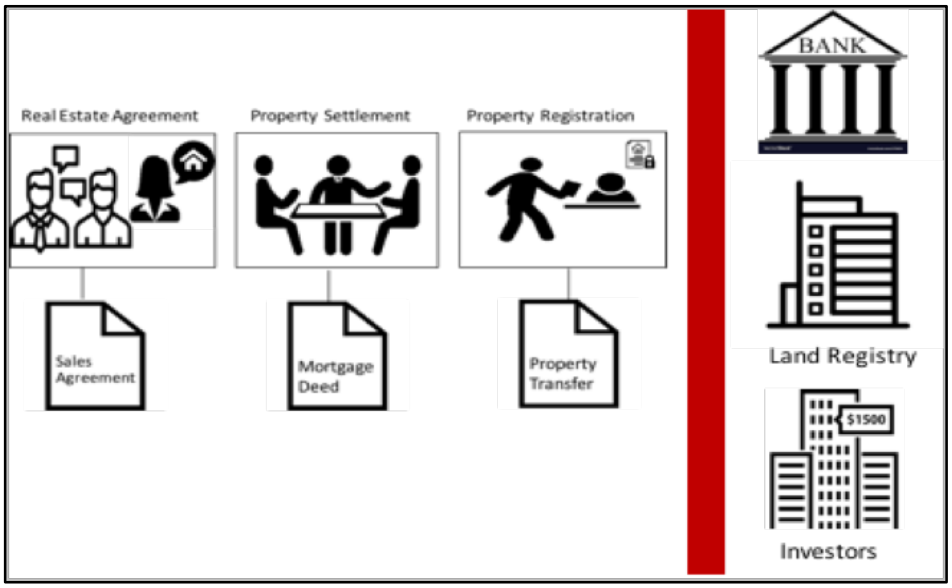

Figure 3. Transparency Challenge in Property Transactions

Figure 3 provides an illustration of the transparency problem in current property transactions. The buyer and the seller might sign a sales contract mediated by a real estate agent(s), sign a mortgage deed and other disclosures at a settlement table witnessed by settlement agents and notaries, and forward property transaction requests to the registry itself.

These are all essentially "trustless" transactions where trust in the signatories to these agreements are based on compliance with standard practice and law, not verifiable signatures or cryptographic methods. By contrast, in a trustless infrastructure utilizing smart contract and a distributed ledger, every transaction is recorded and verified in a transparent manner, and the system creates trust by default. This is perhaps the greatest and most important benefit of the smart contract approach, and cuts to the heart of the major reason for having any form of registration system, paper or digital, in the first instance.

6.0 CONCLUSION: THE SEARCH FOR PROBLEMS IN LEGITIMATE SOLUTIONS

McKinsey recently published an article titled, "Blockchain's Occam Problem[10]." Occam's principle is that simpler solutions are more likely to be correct than complex ones. The authors argue that Blockchain, similar to Occam, is simply too complex for most business use cases.

It's a useful survey piece and offers some fair evidence of both the opportunity of blockchain, as well as the raising of legitimate questions. The hype has been remarkable, much has been invested, ROI can certainly be lacking in many cases.

But here's the "but."

Similar to the notion that blockchain provides a solution in search of a problem, critics are frequently in a desperate search of problems for legitimate solutions. For example, the authors point to the quantum computing threat which, according to the majority of experts[11], is at the very least 20 years away. At that point, the property industry must have a defensible encryption framework or we are all in trouble (and blockchain will be the least of our problems!).

One major concern for this type of article is that it is inherently anti-innovation. In the Occam article, the authors state "*Organizations must start with a problem. Unless there is a valid problem or pain point, blockchain likely won't be a practical solution.*" This is a very narrow, traditional enterprise software-oriented view of an emerging technology. Blockchain is an infrastructure-oriented protocol that allows decentralized, secure data sharing and value transfer among independent, untrusted entities across the internet. Once can fairly ask, what was the "valid problem" the internet solved in 1992? Surely, few could have predicted that Facebook, Amazon, and Google would be the leading companies in our economy.

[10] https://www.mckinsey.com/industries/financial-services/our-insights/blockchains-occam-problem

[11] https://www.scientificamerican.com/article/how-close-are-we-really-to-building-a-quantum-computer/

The other, perhaps most important, concern with the McKinsey article is the binary nature of the critique - *the blockchain is successful or it's not*. This is an extremely high level of to evaluate a collection of technologies which together comprise "the blockchain." These solutions include smart contracts, distributed ledgers, distributed computing, signed transaction, consensus algorithms, tokenization, crypto currencies, asymmetric key encryption, etc.

In many ways, there is no such thing as "The Blockchain," there's simply differentially designed systems created by human beings seeking to address their goals. We encourage readers and decision makers in the land administration area to not become carried away with the “hype” of blockchain criticism, but to evaluate these technologies against the specific functions they perform, not only in comparison to an imagined future, but also in relation to the limitations and glaring weaknesses of current land administrative systems.

ACKNOWLEDGEMENTS

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REFERENCES

See footnotes throughout the document.

APPENDIX A - SMART CONTRACT CASE SUMMARIES

Sweden Land Registry Consortium

Lead Sponsor	Lantmäteriet
Partners	Kairos Future, Evry, Telia (ID provider), SBAB Bank, Landshypotek Bank, and ChromaWay
Technology	Esplix Smart Contract, Postchain Blockchain
Core Land Administration Process	Property Transfer
Process Participants	Buyer, Seller, Real Estate Agent, Buyer Bank, Seller Bank, Land Registry
Key Current Problems	▪ The current process takes 28 steps ▪ Land registry is "involved" very late in the process ▪ Limited data re-use ▪ Process time is unnecessarily lengthy (i.e., weeks to months) ▪ Documents signed on paper, sent by regular mail ▪ Identity checking is done manually
Smart Contract Features	▪ Only parties to the contract are privy to the data in the contract ▪ The contract will not fully execute without satisfaction of the data and signing requirements ▪ The contract protocol can be distributed through third party vendors or directly through registry developed apps
Primary Project Challenges	Swedish law does not allow for the use of electronic signatures for property transactions.
Key Benefits	▪ Significant reduction in the number of steps needed for a property transaction. ▪ Greater transparency into the process for all parties (including the banks, land registry, etc.). ▪ Simpler, less expensive distribution of the standard property transfer protocol using a smart contract.
Status of Project	The blockchain network has been deployed to production inc. smart contract protocol. Initial production testing complete. Production transactions can start once the digital signature restrictions addressed.

NEW SOUTH WALES LAND REGISTRY SERVICES

Lead Sponsor	New South Wales Land Registry Services (NSW LRS)
Partners	ChromaWay Asia Pacific and ChromaWay AB
Technology	Esplix Smart Contract, Postchain Blockchain
Core Land Administration Process	Discharge of Mortgage Lien
Process Participants	Mortgagor, Mortgagee, Land Registry
Key Current Problems	▪ After settlement, existing mortgages liens are often not removed. ▪ Mortgage holders often aren't aware that liens exist on their property. ▪ The process is overly complicated, more steps than necessary.
Smart Contract Features	▪ The contract automatically calls the NSW LRS system to return the title data into the smart contract. ▪ The mortgagor can initiate the lien release and not be dependent on the mortgagee ▪ The contract protocol can be distributed through third party vendors or directly through registry apps.
Primary Project Challenges	▪ Australia is divided into six states, so there are some challenges in creating a national data standard for e-conveyance using blockchain ▪ Australia has launched an electronic lodgment initiative with a provider national provider. The states are free to develop alternative solutions, but additional planning is required on how to best proceed in this environment.
Key Benefits	▪ In 2016-2017, NSW LRS processed 930,809 conveyance transactions, of which 25% (237,964) were mortgage related. At the time of the study, less than 20% of mortgage lien releases were submitted fully electronically. A better "uptake" could be possible through decentralized smart contracts.
Status of Project	The Discharge of Mortgage Lien process prototype was completed and approved by NSW LRS. A fuller pilot of property transactions utilizing smart contracts on the blockchain is being planned for 2019.

Land Title and Survey Authority (LTSA) of British Columbia

Lead Sponsor	Land Title and Survey Authority of British Columbia (LTSA)
Partners	LTSA, Landsure Systems Ltd., ChromaWay AB
Technology	Esplix Smart Contract, Postchain Blockchain
Core Land Administration Process	Pre-Sales Assignment Reporting which addresses the registration of primarily condominium properties previous to sale.
Process Participants	Assignee, Assignor, Realtor, OSRE (government planning agency) Property Developer, LTSA (land registry), and PTB (Property Taxation Branch)
Key Current Problems	This is a new business function of LTSA and the smart contract alternative approach was evaluated in parallel to the development to the "traditional" approach using a central database. Note that the overall goal of the business function is to inject more transparency to condo re-assignment for tax and planning purposes.
Smart Contract Features	▪ The planning agency (OSRE) "pushes" a property filing number to LTSA for database storage. When an assignor (new buyer) request assignment of the property, it will utilize the filing number in the smart contract. ▪ The contract protocol can be distributed through third party vendors or directly through registry apps.
Primary Project Challenges	▪ No significant challenges with this project. The LTSA project team was primarily comprised of their technology and business analysis organization – LandSure Systems. This greatly facilitated the technology knowledge transfer and development process.
Key Benefits	▪ Property Taxation Branch (PTB) can query the smart contract data ledger at any time to view the state of transfers. ▪ Moves the burden on the property developers to reporting transfer to generating reporting from the process to buyers and sellers.
Status of Project	The prototype project was completed. LTSA is now evaluating next steps for the use of smart contract/blockchain technology.

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