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To illustrate the novelty of this area of law, I note that the word 'blockchain' is not recognised by my Microsoft Word processor. It is underlined in red to indicate that I have erred in my typing. This presents several challenges for the traditionally conservative field of law. Technology is developed, businesses are formed, and products are consumed – only after these steps are completed do lawsuits and regulations emerge. Twenty-first century technology has made this approach untenable as lawyers are incorporating blockchain in their firms to transition to modern data storage and facilitated transactions. The rate of technological innovation is accelerating and the law is lagging.

One of the features of blockchain technology on the horizon is the smart contract. Semi-contract, semi-code: wholly nebulous. This article describes the basic nature of smart contracts, explores instances in which they have been implemented and analyses the current legislation in the United States that has attempted to address the emergence of the smart contract. I suggest that while state legislators have endeavoured to tackle the imminent contractual tech boom, their proposals demonstrate a premature accommodation of smart contracts and an incomplete attempt to predict the future of technological development. I acknowledge the irony of predicting that legislators err in attempting to make predictions. Nonetheless, it is important to consider these issues. Smart contracts are here to stay and ruminating over their legitimacy could ease their introduction into mainstream usage. Carving out an ambiguous state for them in state legislation, however, is hasty and its effects unforeseeable.

What is a smart contract?

Smart contracts are self-executing digital agreements facilitated and applied through blockchain technology.[2] They are composed of a code of 'if… then...' clauses that trigger an agreed upon outcome when fulfilled. By placing a smart contract's code onto a public, permissionless and decentralised platform like that of blockchain,[3] the parties to a smart contract are essentially cutting out intermediaries.[4] When the elements of the smart contract are met by both parties the smart contract automatically executes itself.[5] However, the term 'contract' can be misleading: smart contracts are not necessarily legal contracts and do not always qualify as enforceable agreements.

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1 This article is the work of the author alone and does not represent the views of the International Bar Association.

2 Hingley T. 'Blockchain and Contracts – a Smart New World', *FinTech Freshfields* (2017), www.freshfields.com/en-gb/our-thinking/campaigns/digital/fintech/blockchain-and-smart-contracts accessed 15 August 2019.

3 Blockchain represents a whole other area that cannot be adequately addressed in this paper. For a better understanding of decentralised transaction ledgers, see Mignon, V. 'Blockchains – perspectives and challenges' in Kraus, D, Obrist, T and Hari O (eds), *Blockchains, Smart Contracts, Decentralised Autonomous Organisations and the Law* (Northampton, 2019).

4 Tinianow, A. 'Insurance Interrupted: How Blockchain Innovation is Transforming the Insurance Industry', Forbes (9 January 2019 at 0930). www.forbes.com/sites/andreatinianow/2019/01/09/insurance-interrupted-how-blockchain-innovation-is-transforming-the-insurance-industry/#6b817cdc3ec6 accessed 15 August 2019.

5 'Smart Contracts', in Blockchain Hub https://blockchainhub.net/smart-contracts accessed: 15 August 2019.

History

Traditional contracts under common law are made up of three essential elements: offer, acceptance, and consideration. The interpretation of these elements is the most commonly litigated theme in American contract law.[6] If smart contracts are composed of each element, they are legally enforceable.[7]

Cryptographer, legal scholar and blockchain expert Nick Szabo coined the term 'smart contract' back in 1996.[8] Given Szabo's legal training, the use of the word 'contract' is somewhat surprising: contract law is more remedial and applied ex post facto, while smart contracts do not truly account for the possibility of breach and operate almost exclusively ex ante.[9] It is therefore necessary to highlight the distinction between smart contracts, which refer to a broad set of computer programs and smart legal contracts, which are computer-coded legal contracts facilitated by blockchain technology.[10] This paper will use the term 'smart contract' to refer to the latter. Most of these smart contracts manage and control assets on behalf of others. This could take the form of a business agreement between co-owners of a business in which the smart contract manages assets.[11]

The nature of blockchain and, by association, smart contracts, eliminates the need for contractual parties to trust one another when entering into an agreement.[12] As Nick Paumgarten, writing for *The New Yorker* explains:

> 'The proposition is that computer code, unlike, say, Hammurabi's or the Federal Reserve's, is impartial—that it can eliminate, or at least greatly reduce, the role of toxic subjectivity. This could cover a simple exchange of digital money, or the sale of a house, or an insurance payout, or a bet. Szabo's preferred metaphor was the vending machine. You don't generally require someone to vouch for the machine. In a smart-contract world, as he described it, if a borrower hasn't paid off his car loans in time his car just stops working, as per the terms of the loan, which are embedded in the code and integrated into the mechanism of the car.'[13]

With the vending machine analogy in mind, the future of smart contracts is palpable, especially in the context of derivative markets and fast-paced financial transactions.

Ethereum

A comment on smart contracts would be inadequate without referencing Ethereum. Unlike its popular blockchain cryptocurrency cousin Bitcoin, Ether is used to purchase computing power

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6 See Schwartz, A and Scott, R E. 'Contract Interpretation Redux', 119 YALE LJ 926, 926 & n3 (2010).

7 Aparicio Bijuesca, M B 'The Challenges Associated with Smart Contracts: Formation, Modification, and Enforcement', in Chamber of Digital Commerce – Smart Contracts Alliance, Smart Contracts: Is the Law Ready? (September 2018) https://lowellmilkeninstitute.law.ucla.edu/wp-content/uploads/2018/08/Smart-Contracts-Whitepaper.pdf accessed: 15 August 2019.

8 Szabo, N. 'Formalizing and Securing Relationships on Public Networks'. First Monday Vol 2 N 9 (1 September 1997), https://ojphi.org/ojs/index.php/fm/article/view/548/469 accessed: 15 August 2019. Ironically, in the world of distributed ledgers and immutable recorded data, different authors cite Szabo's papers to three different years of publication: 1994, 1996, or 1997.

9 Werbach, K and Cornell, N. 'Contracts Ex Machina', in 67 Duke LJ 313 at 318 (November 2017)https://advance.lexis.com/api/permalink/9e773100-5be9-49e0-81ef-8755a6d8b893/?context=1000516 (accessible with LexisAdvance account) accessed: 15 August 2019.

10 See William Mougayar, W. '9 Myths Surrounding Blockchain Smart Contracts', Coindesk (18 April 2016) (Explaining that smart contracts are not necessarily contractual agreements) www.coindesk.com/smart-contract-myths-blockchain accessed 15 August 2019.

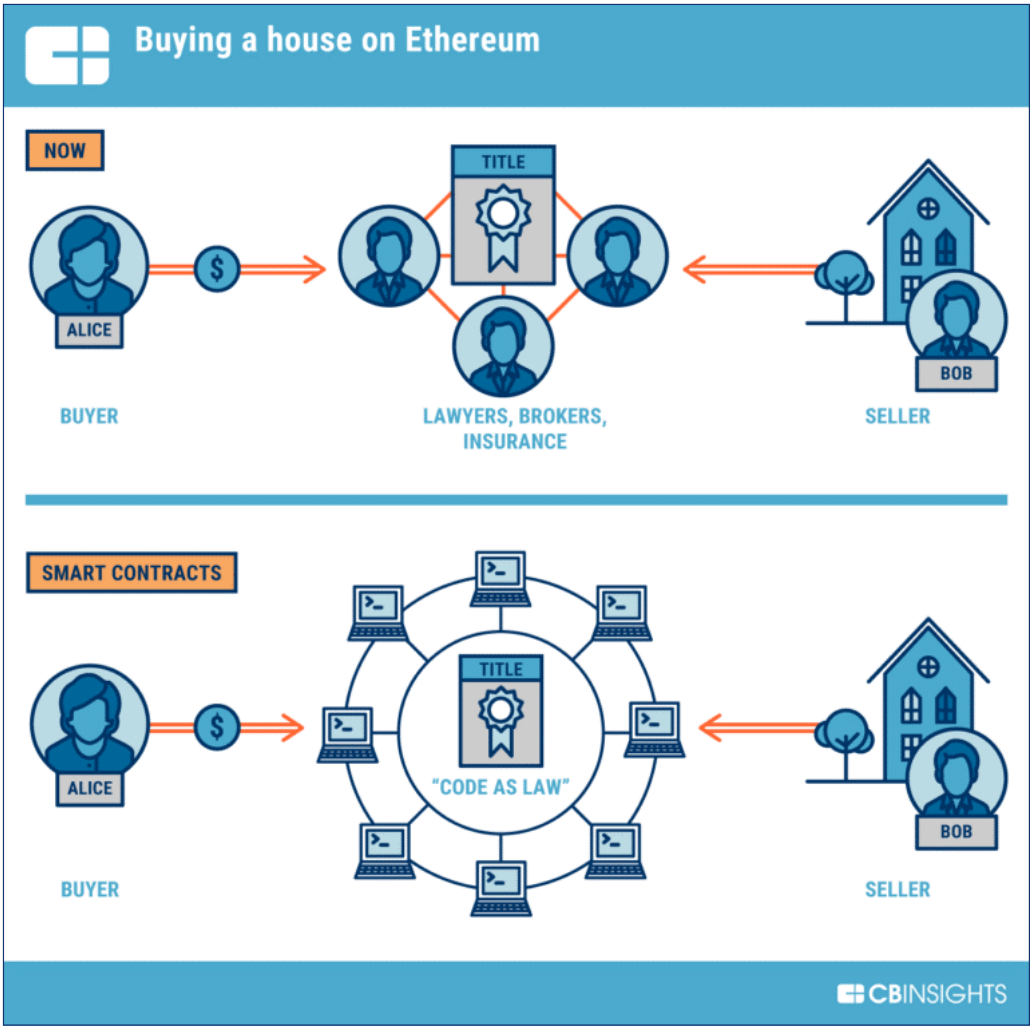
11 Reyes, C L. 'If Rockefeller Were a Coder', 87 Geo Wash L Rev 374, 397 (March 2019).

12 For a full description of the interplay between blockchain, smart contracts and lawyers, see Andreas Sherborne's 'Blockchain, Smart Contracts and Lawyers' (International Bar Association, December 2017).

13 Paumgarten, N. 'The Prophets of Cryptocurrency Survey the Boom and Bust', in The New Yorker (15 October 2018) www.newyorker.com/magazine/2018/10/22/the-prophets-of-cryptocurrency-survey-the-boom-and-bust.

on the Ethereum network as opposed to circulating as a general-use currency.[14] The creators of Ethereum designed the platform to enable software developers to write complex smart contracts more simply. This relies on the use of Ether to generate the necessary computing power to generate and execute code.

Figure 1: How smart contract works versus a traditional contract[15]



Current use and potential of smart contracts

Smart contracts have been leveraged in the context of debt securities, insurance plans and financial derivatives since they are self-executing and these particular types of transactions can be performed without the facilitation of a third party.[16] This third party has typically been a lawyer or a legal professional whose expertise costs significant money; removing this factor from the equation is a cost-saving option for many blockchain-wielding companies.[17] Notably, several insurance companies

14 Werbach, K and Cornell, N. 'Contracts Ex Machina', 67 Duke LJ 313, 334 (November 2017).

15 Graphic from *CB Insights* (17 December 2017) www.cbinsights.com/research/what-is-ethereum accessed 24 July 2019.

16 Yermack, D. 'Corporate Governance and Blockchains', Review of Finance, Vol 21, Issue 17-31, at 7 (March 2017), https://doi.org/10.1093/rof/rfw074 accessed 15 August 2019.

17 Barclays has invested in the formation of an internal team whose purpose is to investigate the inclusion of smart contracts in the bank's corporate infrastructure. For information on this venture, see Pete Rizzo, 'How Barclays Used R3's Tech to Build a Smart Contracts Prototype', in Coindesk (26 April 2016 at 2127) www.coindesk.com/barclays-smart-contracts-templates-demo-r3-corda accessed 15 August 2019.

have initiated smart contract models that automate the processing of claims.[18] The self-execution of the contract can depend on outside variables; many scholarly articles give the example of commercial airline flight agreements, in which a customer purchases a flight with insurance attached to a smart contract, which would automatically disburse a reimbursement of said flight if certain conditions were met (flight delays in particular).[19]

International law firm Hogan Lovells attempted to create a smart earthquake insurance contract that outlined key conditions that would govern payouts via Ethereum-based code.[20] This experiment ran into vulnerabilities that highlighted that entirely code-based contracts were not yet advanced enough to encapsulate the nuances of traditional earthquake insurance contract conditions.[21] The efforts of a big law firm in this field of contract law reveals its relevance, but their lack of success in creating a functional smart agreement highlights the long way that blockchain-reliant contracts still have to go in order to become integrated into the mainstream.

The functionality of these smart contracts relies heavily on high numbers of established corporations buying into the system.[22] As Dr Lee Braine of the Investment Bank CTO Office at Barclays revealingly told CNBC, 'the industry behind it won't work unless there is a collaboration of banks behind it'.[23] Ironically, heavy hitters are reluctant to adopt a system that carries unknown risk with it.

Smart contracts and the American judicial system: compatibility or lack thereof? The 2016 DAO attack

Theoretically, smart contracts and distributed ledger technology (DLT) are intended to simplify convoluted and nuanced contracts that mandate complex interpretation. While smart contracts are practical – especially in the financial sector – the event of a breach or dispute is particularly problematic and unpredictable. The parties of the self-executing smart contract may face challenges if their coded contract is somehow hacked or if their personal circumstances change. In a traditional contract, external forces might override the underlying agreement and yield to a judicial compromise.

However, the infamous case of Ethereum's Decentralised Autonomous Organisation (DAO) debacle in 2016 demonstrates the inherent obstacles in a 'code is law, law is code' system.[24] When an unknown

18 Tinianow, A. 'Insurance Interrupted: How Blockchain Innovation is Transforming the Insurance Industry', Forbes (9 January 2019 at 0930) www.forbes.com/sites/andreatinianow/2019/01/09/insurance-interrupted-how-blockchain-innovation-is-transforming-the-insurance-industry/#6b817cdc3ec6 (discussing the use of smart contracts by companies like Etherisc and FlightDelay, which enables users to obtain insurance against the risk that their flight will be delayed or cancelled – they purchase the insurance policy using a credit card and, in the event their flight is delayed by 45 minutes or more, they are paid automatically without any need to submit additional paperwork) accessed 15 August 2019.

19 *Ibid.*

20 Norton, S 'Law Firm Hogan Lovells Learns to Grapple with Smart Contracts' (*The Wall Street Journal*, 1 February 2017) https://blogs.wsj.com/cio/2017/02/01/law-firm-hogan-lovells-learns-to-grapple-with-blockchain-contracts accessed 15 August 2019.

21 *Ibid.*

22 Simantov, N '6 Major Companies That Went Blockchain in 2018', in Medium (16 January 2019) https://medium.com/orbs-network/6-major-companies-that-went-blockchain-in-2018-712666afba0c accessed 15 August 2019.

23 Kharpal, A. 'Barclays Used Blockchain Tech to Trade Derivatives', in CNBC (19 April 2016 at 0627), www.cnbc.com/2016/04/19/barclays-used-blockchain-tech-to-trade-derivatives.html accessed 15 August 2019.

24 In his 2018 *New Yorker* article (see n 13), Nick Paumgarten analysed the feasibility of the incorporation of blockchain, cryptocurrency, and smart contracts in future businesses.

attacker 'hacked'[25] into the system and drained a DAO of 3.6 million ether (the currency used on the Ethereum platform), said attacker released an open letter to the DAO and Ethereum community stating that his actions were legal under the premise that the ether constituted smart contracts that had already been executed and could not be undone.[26] The attack demonstrates the challenges of smart contracts – they are intended to exist as their own arbitrators without consideration of something going wrong and necessitating the intervention of a court.[27] The US Securities and Exchange Commission (SEC) found that the DAO tokens constituted securities and would have been subject to federal securities laws. However, Ethereum was deliberately acting outside the scope of regulation and none of these securities were registered.[28]

Ultimately, the SEC's laws applied to the DAO's 'sale' of 'securities' and 'whether or not a particular transaction involves the offer and sale of a security – regardless of the terminology used – will depend on the facts and circumstances, including the economic realities of the transaction'.[29] In other words, the SEC claims that new technology does not nullify traditional laws in theory.[30] In practice, Ethereum remedied the attack on its own and was not subjected to further SEC investigation.

This outcome demonstrates that, although contract and securities laws might apply to blockchain and smart contracts, these systems are still operating independently from the judicial system. One of the main factors of blockchain and smart contracts is the rejection of government interference. Judicial intervention and government legislation can therefore be perceived as undermining the foundations of the technology.

Legislation regarding smart contracts

Several states in the US have passed laws in response to the recent blockchain boom – notably Arizona, Delaware, Nevada, Tennessee and Wyoming.[31] The relevance of the American legislative system is reflected in projections that blockchain spending in the US is predicted to grow to between US$41–US$60bn by 2025.[32] Given the magnitude of the economy, any legislation or regulation will affect the market and is worth further scrutiny.

As of July 2019, Wyoming has passed 13 blockchain-enabling laws in order to adopt the role of 'the Delaware of digital asset law' and provide a framework in which blockchain users and creators have a

25 Strictly speaking, however, the hacker did not 'hack' the code, but rather used the terms of the existing smart contracts to accomplish something others later found objectionable, ie, the diversion of their money. See Raskin, M. *The Law and Legality of Smart Contracts*, 1 GEO L TECH REV 305, 337 (2017) https://georgetownlawtechreview.org/wp-content/uploads/2017/05/Raskin-1-GEO.-L.-TECH.-REV.-305-.pdf (last accessed: Aug 15, 2019).; see also, SEC, Report of Investigation Pursuant to section 21(A) of the Securities Exchange Act of 1934: The DAO, No 81207 (25 July 2017) accessed 15 August 2019.

26 'An Open Letter to the DAO and the Ethereum Community' *Steemit* https://steemit.com/ethereum/@chris4210/an-open-letter-to-the-dao-and-the-ethereum-community (posted 2016, accessed 9 July 2019).

27 Briefly, Ethereum creators opted for a 'hardfork' that overwrote the history of the blockchain and reversed all transactions in order to restore the 'stolen' ethers. See Siegel, D. 'Understanding the DAO Attack' in *Coin Desk* (25 June 2016 at 1600) www.coindesk.com/understanding-dao-hack-journalists accessed 15 August 2019.

28 SEC, see above, n 24.

29 *Ibid.*

30 Dale, B '"Yes, this Thing's a Security, STFU" – A Close Read of the SEC's DAO Investigation' in *The Observer*, (26 July 2017 at 1617) https://observer.com/2017/07/sec-dao-report-securities accessed 15 August 2019.

31 See Tenn Code Ann § 47-10-202 (2018); Ariz Rev Stat Ann § 44-7061 (2018); SB 398, 2017 Leg, 79th Sess (Nev 2017); Assemb B 2658, 2018 Leg, Reg Sess (Cal 2018); Assemb B 8780, 2018 Leg, Reg Sess (NY 2018); HB 5553, 100th Gen Assemb, Reg Sess (I1 2018); LB 695, 105th Leg, 2d Sess (Neb 2018).

32 Research and Markets produced data projecting a US$41bn market value – the US is expected to hold 40 per cent of worldwide blockchain technology investment, see 'Research and Markets' report at www.researchandmarkets.com/research/fs2pbr/blockchain_in_the?w=12 accessed 15 August 2019.

space that acknowledges their property rights and offers regulatory relief.[33] This legislation enables smart contracts to take control of digital assets, all while exempting tokens from state securities laws.[34] Arizona mirrored several of Wyoming's recent moves and has even defined a smart contract as 'an event-driven program, with state that runs on a distributed, decentralized shared and replicated ledger and that can take custody over and instruct transfer of assets on that ledger'.[35] Delaware has not specifically attended to smart contracts, but the legislature has ensured companies can keep their list of shareholders on blockchain. This move received attention back in 2017 considering Delaware's status as place of incorporation for a majority of Fortune 500 companies.[36]

Given that the blockchain field is still in its infancy, it is improbable that smart contracts will become part of the corporate status quo. While Arizona's definition may appear in conjunction with the modern, techy trend and Wyoming's efforts are forward-thinking, there are hidden challenges in these ventures. Jurisdiction will be tricky in the event of a dispute. If smart contracts are entered into via blockchain, the parties to said contract can remain anonymous – how would the plaintiff file a suit and serve the opposing party if they are unknown to one another in the real world? Granted, blockchain pseudonyms are tied to real identities, but the process of discovery in this context has not been decided and will prove challenging if litigation is necessary.

Flexibility is still out of reach for today's smart contracts and, like cryptocurrency, smart contracts rely on the participation of a large number of companies and individuals to give them legitimacy.[37] Blockchain and smart contracts are not, as proponents claim and laws assume, 'trustless' systems[38] – lawyers and businesspeople must trust fellow humans who are coding these programs and contracts. In order to justify their stance, proponents of smart contracts typically predict that companies and the greater public will ultimately trust the system of blockchain and smart contracts.[39] We will need to trust that coders have the capabilities and the intentions to formulate appropriate codes to correspond to contracts.[40] Cooperation between legal and coding experts could facilitate progress towards creating a cohesive contractual coding system.

Why is this immediately pertinent? At the time of writing (July 2019), fully trusting and creating parameters for blockchain and smart contracts are folly. Legislators do not have sufficient understanding of the platforms and infrastructure that are ever-changing, unpredictable and volatile. This is not to say that they are ignorant and ill-educated, rather that one simply cannot anticipate in which direction and at what speed this technological organism may grow. In fact, most states that have passed blockchain laws concurrently created blockchain task forces to

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33 Long, C 'What Do Wyoming's 13 New Blockchain Laws Mean?' in Forbes, (4 March 2019, 0729) www.forbes.com/sites/caitlinlong/2019/03/04/what-do-wyomings-new-blockchain-laws-mean/#913f9ab5fde6.

34 *Ibid.*

35 Title 44 – Trade and Commerce, Chapter 26: Electronic Transactions, Article 5, 44 - 7061. Arizona Revised Statutes. See www.azleg.gov/arsDetail/?title=44 accessed 9 November 2018.

36 SB 69, 149th Gen Assemb (Del 2017). Given that 2/3 of Fortune 500 companies are incorporated in the state of Delaware, this law will undoubtedly have an effect on how these large companies operate and they will likely set a standard for other companies around the world; for more information on Delaware's blockchain law, see Roberts, J J 'Why Delaware Made it Easier for Business to Use Blockchains' in *Fortune* (22 August 2017) https://perma.cc/H6WE-WVF3.

37 Tse, G 'Smart Contracts: A Boon or Bane for the Legal Profession?' in Taylor Vinters Insights (24 September 2018) www.taylorvinters.com/article/smart-contracts-a-boon-or-bane-for-the-legal-profession accessed 15 August 2019.

38 See Raskin, n 24, at 319.

39 *Ibid.*

40 Zou, M, Cheng, G, and Hederedia, MS 'In Code We Trust? Trustlessness and Smart Contracts' in *Computers and Law* (April, 2019).

facilitate informed decision-making.[41] States like Wyoming are creating regulatory legislation to attract companies that use blockchain technology to incorporate in their state.[42] Upon closer investigation, however, the intervening minutes and projects between the creation of these task forces and the present reveal that these task forces have had little substantive work.[43]

Instead of pre-empting developments, blockchain buffs argue that it is best to allow the industry to grow naturally without government interference. Even experts in the field claim contract law in its current state is more than sufficient to cover smart contracts.[44] Miren Aparicio, lawyer and former World Bank consultant, emphasised 'the law is ready – we do not need specific legislation for the smart contracts by state law, under e-commerce laws'.[45] Ms Aparicio has a point, but she underestimates the breadth and applicability of said laws in the blockchain domain.[46]

Corporations such as Amazon still present user agreements that customers can access and read in plain language, thus justifying the laws that assert they implicitly agree to them regardless of whether they actually read them or not.[47] Thus, the language of both the Uniform Electronic Transactions Act (UETA) 1999 and the Electronic Signatures in Global and National Commerce Act (ESIGN) 2000 and their respective legislative histories explain that contracts and transactions entered into with the assistance or use of electronic agents are enforceable and as binding on their principals as if human agents had been involved. On the other hand, the vast majority of people do not know how to read or write code.[48] If the smart contract is unreadable to the parties agreeing to it, the linguistic challenges may prevent integration and enforcement.

Other experts approach the linguistic subject from a different angle. Angela Walch notably finds that the terminology of blockchain itself prevents clear regulation.[49] She finds that the words 'control' and 'execute' have a very different meaning in the 'smart' legal contract world compared with the traditional contract world. This discrepancy, in Walch's opinion, is likely to lead to unpredictable outcomes that would call for judicial intervention in the real world, while in the blockchain world, similar judicial intervention may not be as feasible. With

41 Margaret Lyle et al.; 'State Laws Addressing Blockchain Technology', in Blockchain for Business Lawyers 185, 202–213 (Cox, J and Rsumussen, M, eds, 2018).

42 Temte, M. 'Wyoming Law Division: Blockchain Challenges Traditional Contract Law: Just How Smart Are Smart Contracts?' in 19 Wyo L Rev 87 (2019).

43 On Wyoming's Legislation website, the task force has very few minutes and meetings, and no projects listed. See Blockchain Task Force Committee Minutes for 2018–2019 www.wyoleg.gov/Committees/2018/S3 accessed 15 August 2019.

44 The Digital Chamber of Commerce specialises in blockchain and cryptocurrency trade, and has advocated for a hands-off legislative approach in individual states. Their White Paper states that the current federal statutes in existence (the UETA and ESIGN) validate the use of blockchain and smart contract code as legal contracting. See, The Digital Chamber of Commerce, Unif L Comm'n, Joint Statement in Response to State 'Smart Contracts' Legislation.

45 Aparicio, M quoted in Stanley, A. 'Can Code Really Be Law? New Report Clarifies Smart Contract Misconceptions' in Forbes (27 September 2018, 0901). www.forbes.com/sites/astanley/2018/09/27/can-code-really-be-law-new-report-clarifies-smart-contract-misconceptions/#66e12aa734e2 (last accessed: Aug 15, 2019).

46 Section 14 of UETA states: 'Automated Transaction: In an automated transaction, the following rules apply: (1) A contract may be formed by the interaction of electronic agents of the parties, even if no individual was aware of or reviewed the electronic agents' actions or the resulting terms and agreements. (2) A contract may be formed by the interaction of an electronic agent and an individual, acting on the individual's own behalf or for another person, including by an interaction in which the individual performs actions that the individual is free to refuse to perform and which the individual knows or has reason to know will cause the electronic agent to complete the transaction or performance. (3) The terms of the contract are determined by the substantive law applicable to it.'

47 See 'Right Signature' by Citrix at https://rightsignature.com/legality/e-sign-act accessed 15 August 2019.

48 Precise numbers on code literacy are difficult to come by, but some data estimates indicate that between 2–2.5 per cent of all workers in the US in 2015 had a development-related role in which familiarity with coding languages is highly likely. See DQYDJ https://dqydj.com/number-of-developers-in-america-and-per-state (last updated 20 April 2019).

49 Walch, A. 'The Path of the Blockchain Lexicon (And the Law)' in *Review of Banking & Financial Law* Vol 36 (2017) https://ssrn.com/abstract=2940335 accessed 15 August 2019.

the proposition that education and cooperation is key in this setting, Walch's arguments are especially important if a programmer, a banker and a lawyer are set to meet and exchange ideas about the 'execution' of a contract or its 'breach'. These words are likely to have different meanings for each individual expert.

The combined impact of these challenges and pre-emptive legislation could be an over-reliance on the judiciary, which is not yet trained to hear smart contract-related cases.

Conclusion

Ultimately, it is unlikely that contract law and current legislation will cover the possible uses and disputes stemming from smart contracts. On the other hand, the same could have been said about email, internet, and online commerce as well and yet, agreements between merchants and buyers on Amazon are still honoured. The adaptability of law and legislation is advantageous and flexible in the context of technology. However, given the mechanism and automatisation of smart contracts, there is a risk that incidents such as the 2016 DAO attack will occur in different contexts and affect more people as the blockchain boom becomes more mainstream.

The most realistic solution to this hypothetical problem is education. If legislators wish to outline parameters of smart contract usage and enforcement, they must be equipped with the proper tools in this field. These significant issues have motivated the creation of companies such as Sagewise,[50] OpenLaw[51] and Rocket Lawyer[52] that are positioning themselves to become experts in cryptography and dispute resolution. This combination puts them at the key intersection of legal and programming code that may prove invaluable in the next decade. Companies like this could be in an ideal position to advise legislators on the interplay between law and blockchain. The main challenge is that smart contracts are not particularly well suited to accommodate legal arrangements that are relational in nature.[53] Precise clauses are necessary and very little room is available for human error. Smart contracts will affect actual human reality and it is paradoxical that they should not be anchored in that context.

50 Sagewise advertises itself as 'the safety net for smart contracts and the toolkit for errors and disputes in smart contracts'; see www.sagewise.io/use-cases accessed 15 August 2019.

51 OpenLaw says any business, from startup to large public enterprises, can leverage [their] products for an efficient, secure way to generate and transfer tokens through a legal agreement that is signed and executed on a blockchain. See https://app.openlaw.io/about accessed 15 August 2019.

52 Rocket Lawyer partnered with Ethereum in 2018 to launch secure, blockchain-enabled legal contracts. See https://techstartups.com/2018/09/06/rocket-lawyer-partners-ethereum-blockchain-startup-consensys-accelerate-launch-secure-blockchain-enabled-legal-contracts accessed 15 August 2019.

53 De Filippi, P and Wright, A. 'Smart Contracts as Legal Contracts' in *Blockchain in the Law* (Harvard University Press, 2018), see www.jstor.org/stable/j.ctv2867sp.7 accessed 15 August 2019.