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ENFORCING CONSTITUTIONAL RIGHTS THROUGH COMPUTER CODE

Steven Young⁺

Methods of lawmaking and law enforcement have advanced significantly since humans first grouped together in societies.¹ In the past, laws were passed orally and understood by the small community in which they operated.² Later, laws were written down, and eventually codified in Constitutions.³ This made it possible for individuals to make legal claims against their government.⁴ Law is “a rule of civil conduct prescribed by the supreme power in a state commanding what is right, and prohibiting what is wrong”⁵ and “it is requisite to the very essence of a law, that it be made by the supreme power”.⁶ Today, many recognize the “supreme power” in a state should be the people, but in many countries, the people do not reign supreme.⁷

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¹ See John W. Griggs, *The Annual Address: Lawmaking*, 20 ANN. REP. A.B.A. 257, 258–59 (1897) (describing the historical underpinnings of lawmaking); see also Robert S. Alexander, *The History of the Law as an Independent Profession and the Present English System*, 19 FORUM 185, 187–96 (1983) (examining the history of the legal profession).

² See generally Griggs, *supra* note 1, at 267 (tracing the history of English law from villages and tribes to English common law of the 19th century).

³ Lloyd Duhaime, *The Timetable of World Legal History*, DUHAIME.ORG (last updated May 3, 2014), <http://www.duhaime.org/LawMuseum/LawArticle-44/Duhaimes-Timetable-of-World-Legal-History.aspx>.

⁴ David J. Shestokas, *U.S. Constitution's First Amendment: Right to Petition for Redress of Grievances*, DAVID J. SHESTOKAS (July 1, 2013), <http://www.shestokas.com/constitution-educational-series/us-constitutions-first-amendment-right-to-petition-for-redress-of-grievances/>.

⁵ 2 WILLIAM BLACKSTONE, COMMENTARIES *44.

⁶ *Id.* at *46.

⁷ See Letter from Thomas Jefferson to John Taylor (Nov. 26, 1798), in JEFFERSON: POLITICAL WRITINGS, 369 (Joyce Appleby & Terence Ball eds. 1999) (objecting to the laws of the Alien and Sedition Acts because “our general government has, in the rapid course of 9

Blockchain technology presents the next leap forward.⁸ This note will explore how blockchain technology can be used to automatically enforce the law and prevent government overreach. When a government's powers are encoded on a blockchain, its limitations will not be mere redress in a court of law, but will be the code itself.⁹ The inherent capabilities of blockchain technology can *ex ante* prevent a government from acting *ultra vires*; it can prevent government overreach before the government act occurs.¹⁰

There are already many articles about how Bitcoin and blockchain technology will improve financial inclusion and give more of the world's population access to needed financial resources.¹¹ Others have written on the government regulation of blockchain technology, but little has been written about how blockchain technology can be used to improve constitutional protections.¹² This note explores the possibility of using blockchain in the public sphere for state governance and presents specifics on how and why that is possible.

Blockchain technology is the foundation on which Bitcoin was created. The technology can now be used to make "smart contracts" which self-execute digital contracts.¹³ Those smart contracts can connect to digital property and to real world property through the Internet of Things ("IoT"), and have the potential to

or 10 years, become more arbitrary, and has swallowed more of the public liberty than even that of England.").

⁸ See Niall Firth, *Want to make your vote really count? Stick a blockchain on it*, NEW SCIENTIST (Sept. 6, 2017), <https://www.newscientist.com/article/mg23531424-500-bitcoin-tech-to-put-political-power-in-the-hands-of-voters/> (explaining how blockchain technology can be used for voting systems). See generally J. B. Ruhl, *Block What?*, 21 TYL 4, 5 (2017) (stressing the future applications of blockchain).

⁹ See Carla L. Reyes, *Blockchain-Based Agencies*, 42 ADMIN. & REG. L. NEWS 9, 10 (2017) (conceptualizing distributed ledger technology code as a foreign legal system). But see Ian Bogost, *Cryptocurrency Might be a Path to Authoritarianism*, ATLANTIC (May 30, 2017), <https://www.theatlantic.com/technology/archive/2017/05/blockchain-of-command/528543/> (forecasting blockchain as a possible boon to authoritarianism).

¹⁰ See George Walker, *Financial Technology Law – A New Beginning and a New Future*, 50 INT'L L. 137, 144 (2017) (describing how distributed ledger technologies allow end users to control access to their data and monitor who accesses their data and in addition blockchain technologies can perform historically governmental duties like collect taxes).

¹¹ DON TAPSCOTT & ALEX TAPSCOTT, *BLOCKCHAIN REVOLUTION: HOW THE TECHNOLOGY BEHIND BITCOIN IS CHANGING MONEY, BUSINESS, AND THE WORLD* 49–50 (2016); Alastair C. Clegg, *Could Bitcoin Be a Financial Solution For Developing Economies?*, U. OF BIRMINGHAM 6 (2014), <http://www.cs.bham.ac.uk/~rjh/courses/ResearchTopicsInHCL/2013-14/Papers/Alastair.pdf>. But see Joshua Chambers, *Backlash begins against Blockchain Project*, GOVINSIDER (July 11, 2016), <https://govinsider.asia/smart-gov/backlash-begins-against-government-blockchain-project/> (describing online backlash in Britain when UK government attempted to use blockchain in its welfare system).

¹² Marcella Atzori, *Blockchain Technology and Decentralized Governance: Is the State Still Necessary?*, SSRN at 1 (Dec. 1, 2015), https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2709713.

¹³ Aaron Wright & Primavera De Filippi, *Decentralized Blockchain Technology and the Rise of Lex Cryptographia*, SSRN 8 (2015), https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2580664.

have real world impact.¹⁴ As explained *infra*, blockchain technology is immutable and trustless and, when used on a public system, can change the nature of the relationship between governments and those they govern.¹⁵ It will ensure citizens' rights are protected because it creates codified limitations on the government, and will grant individuals greater power over their government.¹⁶ These limitations are self-enforcing through smart contracts – with two effects.¹⁷ First, users (*i.e.* the government) are unable to operate outside of the encoded limitations, preventing *ultra vires* acts before they occur.¹⁸ Second, it removes the need for a trusted intermediary to enforce the laws that oversee government action.¹⁹ When something is codified on the blockchain, the code becomes law because the law is now a set of inviolable rules, not just a document you can take to court.²⁰ This paper discusses how far that idea can be taken.

WHAT IS BLOCKCHAIN TECHNOLOGY

It is necessary to know how blockchain technology works in order to understand how it can change the application of the law.²¹ Blockchain technology uses peer-to-peer communication to distribute a ledger of transactions across a network of computers, and using cryptography, creates a single computing environment that is secure and has no single owner or central authority.²² This technology has several characteristics that make it uniquely capable of changing

¹⁴ Konstantinos Christidis & Michael Devetsikiotis, *Blockchains and Smart Contracts for the Internet of Things*, IEEE ACCESS J. 2292, 2292 (June 3, 2016), <http://ieeexplore.ieee.org/document/7467408/>.

¹⁵ *Id.* (“[T]he blockchain enables *trustless* networks, because the parties can transact even though they do not trust each other.”).

¹⁶ See Vasilis Kostakis, Primavera de Filippi & Wolfgang Drechsler, *Can Blockchain, A Swiftly Evolving Technology, Be Controlled?* HUFFINGTON POST (May 3, 2017, 7:55 AM), http://www.huffingtonpost.com/entry/can-blockchain-a-swiftly-evolving-technology-be-controlled_us_5909c330e4b03b105b44bda6 (“Blockchain has the ability to ‘codify’ transactions by deploying small snippets of code directly onto the blockchain. This code, generally referred to as a ‘smart contract’, executes automatically when certain conditions are met.”).

¹⁷ See Victor Li, *Bitcoin’s Useful Backbone*, 102 A.B.A. J. 31, 31 (2016) (“Because of its recording capabilities, blockchain can be used to create smart contracts that are self-enforcing.”).

¹⁸ See Kenneth A. Grady, *Mine the Data Buried in Your Computers*, BUS. L. TODAY 1, 3 (2016) (explaining how smart contracts are unchangeable and can govern a transactions between individuals).

¹⁹ See Reyes, *supra* note 9, at 10–11 (describing how distributed ledger technology could displace legal rules).

²⁰ *Code is Law and the Quest for Justice*, ETHEREUM CLASSIC (Sept. 8, 2016), <https://ethereumclassic.github.io/blog/2016-09-09-code-is-law/>.

²¹ See *generally* Christidis & Devetsikiotis, *supra* note 14, at 2293 (comparing how blockchain works to a set of nodes that link users together creating individual networks).

²² CHRIS DANNEN, INTRODUCING ETHEREUM AND SOLIDITY: FOUNDATIONS OF CRYPTOCURRENCY AND BLOCKCHAIN PROGRAMMING FOR BEGINNERS 1 (2017).

public legal protections.²³ The relevant inherent characteristics of blockchains are decentralization, consensus-based decision-making, and trustlessness.²⁴ These characteristics allow for parties to create “smart contracts” that enforce obligations automatically.²⁵

A. Inherent Characteristics

Blockchain technology is based on the concept of ledger-keeping that banks have used for centuries, but distributes the ledger across a network, relying on peer-to-peer consensus to ensure that the blockchain is not corrupted.²⁶ A blockchain’s strength comes from the connected computers agreeing that the transactions on the network are legitimate, like having several ledgers to verify the same money was not spent twice.²⁷ This system is secure because, rather than a single point of failure (*e.g.* a central server), or multiple points of failure (*e.g.*, a cloud drive with various contributors), it requires a majority of the computing power of the entire network of computers to “hack” a single transaction.²⁸ Even if a party interested in creating false transactions on the blockchain corrupted one computer, the rest of the computers would check the record of transactions among each other, and ignore any inconsistent transactions.²⁹ Each computer on the blockchain holds a copy of the ledger, and the more computers that are on the network, the more secure the network.³⁰ Each set of transactions on a blockchain are called “blocks.”³¹ Each block is created by verifying transactions at regular intervals.³² Blocks are verified when each computer across the network reaches consensus that the transactions are correct.³³ Each block is preceded and followed by other blocks, meaning that any nefarious parties must corrupt a block, and all preceding blocks, before the next block of transactions can be

²³ See generally Christidis & Devetsikiotis, *supra* note 14 (explaining how the elimination of a need for a trusted intermediary is the cornerstone of blockchain).

²⁴ See generally *id.* (identifying the functions of a blockchain).

²⁵ See *id.* at 2296.

²⁶ See generally *id.* at 2293 (explaining the peer-to-peer process of data validation with a common ledger of transactions).

²⁷ See Wright & De Filippi, *supra* note 13, at 38 (describing the use of an incorruptible public ledger for “blockchain-based governance”).

²⁸ See *id.* at 6. (describing how the blockchain verification process can only be corrupted by “a majority of the computational power of the entire network.”).

²⁹ See Ruhl, *supra* note 8, at 4 (“[T]here is no central banker or other intermediary running the show. This distributed system of permissioned peer-to-peer users makes fraud and theft more than very difficult—it’s essentially impossible.”).

³⁰ See generally Christidis & Devetsikiotis, *supra* note 14, at 2294 (explaining how the complex computations involved in verifying information make taking over the network physically impossible).

³¹ Wright & De Filippi, *supra* note 13, at 6.

³² Christidis & Devetsikiotis, *supra* note 14, at 2293.

³³ Wright & De Filippi, *supra* note 13, at 7.

verified and added to the blockchain.³⁴ This is nearly impossible to do.³⁵ It also means that all computers, regardless of their location in the world, have the same ability to confirm and witness what occurs on the blockchain.³⁶ The regular interval of block creation is the greatest equalizing aspect of blockchain technology; it ensures that consensus to add a block to the blockchain is made equally available to all participants on the blockchain.³⁷

This verification process of the blockchain is inherently a “tool of distributed consensus”³⁸ and an ideal system for “scaling democracy”³⁹ because it allows each user to have equal say in and access to the process.⁴⁰ This equality is designed into the computing process, and can be used for a political process when such processes are on the blockchain.⁴¹ In addition to being an ideal tool for scaling democracy, blockchains are also an ideal tool for ensuring a party does not act outside of its mandate because parties cannot act outside of the encoded powers granted to them.⁴² Indeed, “the predominant direct social scalability benefit of the blockchain is trust minimization.”⁴³ Satoshi Nakamoto, the anonymous creator of Bitcoin, articulated that blockchain is “completely decentralized, with no central server or trusted parties, because everything is based on crypto proof instead of trust.”⁴⁴ When this is applied to government, it could be the system that gives equal political power to all.

³⁴ See Christidis & Devetsikiotis, *supra* note 14, at 2293 (stating that if block cannot be traced back to an actual transaction, then they blockchain will be discarded).

³⁵ See Wright & De Filippi, *supra* note 13, at 7 (describing the periodic synchronization of the blockchain network between the other users of blockchain ensures the block of transactions will be verified).

³⁶ DANNEN, *supra* note 22, at 4.

³⁷ Vinay Gupta, *Building the Hyperconnected Future on Blockchains* 6 (2017), http://govtechioneersrace.com/wp-content/uploads/2017/02/WGS_Blockchain_EN_Web-1.pdf.

³⁸ *A Next-Generation Smart Contract and Decentralized Application Platform*, GITHUB, <https://github.com/ethereum/wiki> (last updated Jan. 9, 2018).

³⁹ Nick Szabo, *Money, blockchains, and social scalability*, UNENUMERATED (Feb. 9, 2017), <http://unenumerated.blogspot.com/2017/02/money-blockchains-and-social-scalability.html>.

⁴⁰ Gupta, *supra* note 37.

⁴¹ See Garry Gabison, *Policy Considerations for the Blockchain Technology Public and Private Applications*, 19 SMU SCI. & TECH. L. REV. 327, 346–47 (2016) (discussing how blockchain could aid with government transparency and e-voting by show the legitimacy of a party’s vote).

⁴² See Patrick Murck, *Who Controls the Blockchain?*, HARV. BUS. REV. (Apr. 19, 2017), <https://hbr.org/2017/04/who-controls-the-blockchain> (explaining that the decentralized nature of a blockchain empowers its members with the same amount of input and control to prevent any one party from taking advantage of the system).

⁴³ Szabo, *supra* note 39.

⁴⁴ Satoshi Nakamoto, *Bitcoin open source implementation of P2P currency*, P2P FOUND. (Feb. 11, 2009, 10:27 PM), <http://p2pfoundation.ning.com/forum/topics/bitcoin-open-source> (discussing how the digital signature aspect is satisfied under conventional currency and transfers, but double spending remains a problem, and bitcoin will resolve that issue).

“Trust minimization,” as opposed to a lack of trustworthiness, means that a party does not need to have faith in another party because that other party does not have the ability to violate the agreement.⁴⁵ Blockchains inherently do not require users to trust each other because blockchains are based on a digital ledger that is stored and verified through cryptography across the entire network.⁴⁶ The blockchain is described as “[a] set of partially trusted intermediaries . . . [that replace] a single and fully trusted intermediary.”⁴⁷ This trustlessness, when applied to a system of rules on a blockchain, ensures the underlying transaction falls within the norms of the system, enforces the agreement automatically without relying on a third-party intermediary, and removes the users’ ability to act *ultra vires*.⁴⁸

B. Smart Contracts

Blockchain technology is being adapted to create “smart contracts.”⁴⁹ Traditional contracts are agreements designed to be enforceable through a judicial system.⁵⁰ A smart contract is an agreement that is self-enforcing because it is written in computer code and includes enough information from each party to eliminate the parties’ ability to breach the contract.⁵¹ The contract’s conditions are written in computer code, and when those conditions are met, the actions

⁴⁵ See DANNEN, *supra* note 22.

⁴⁶ Nolan Bauerle, *What is a Distributed Ledger?*, COINDESK, <https://www.coindesk.com/information/what-is-a-distributed-ledger/> (last visited Dec. 19, 2017).

⁴⁷ Szabo, *supra* note 39. *But see* Joseph Poon & Thaddeus Dryja, *The Bitcoin Lightning Network: Scalable Off-Chain Instant Payments*, DIG. CURRENCY & BLOCKCHAIN TECH. NAT’L INST. 2-3 (2016) (discussing that a centralized system may create a system which only acts in the interest of one individual and that in situations which only involve two parties it may not be worth blocking the entire blockchain system).

⁴⁸ Josh Stark, *Making Sense of Blockchain Governance Applications*, COINDESK (Nov. 20, 2016, 2:53 PM), <https://www.coindesk.com/making-sense-blockchain-governance-applications/> (discussing the technical governance which is required with blockchain technology and how the rules must be recorded as well as having a recorded set of voting guidelines).

⁴⁹ See VITALIK BUTERIN, *A NEXT GENERATION SMART CONTRACT & DECENTRALIZED APPLICATION PLATFORM 13* (2014), http://www.the-blockchain.com/docs/Ethereum_white_paper-a_next_generation_smart_contract_and_decentralized_application_platform-vitalik-buterin.pdf [hereinafter *ETHEREUM WHITE PAPER*] (explaining the basics of Ethereum smart contracts including how cryptographics may only allow for the final stages of a contract to be released once certain conditions have been met, and how this technology could be used in financial transactions, voting, and other contractual issues).

⁵⁰ *Contract*, BLACK’S LAW DICTIONARY (10th ed. 2014) (defining a “contract” as an agreement between two or more parties which is enforceable by law).

⁵¹ *Smart Contracts Explained*, BLOCKCHAIN TECHNOLOGIES, <http://www.blockchaintechnologies.com/blockchain-smart-contracts>, (last visited Dec. 19, 2017) (discussing smart contracts and showing that they are pre programmed computer terms which then executes between two parties and will enforce itself).

specified by the code are automatically triggered.⁵² This automaticity allows users to create a relationship where there is “a zero-tolerance policy where parties have no choice but to execute the contract.”⁵³ Smart contracts define and automatically enforce the consequences of non-performance.⁵⁴ Stock and bond traders have already used smart contracts to execute financial transactions.⁵⁵ Others are testing smart contracts for use with real-life applications like ride-sharing or renting apartments.⁵⁶

Smart contracts are still a new concept, and there are still many questions to answer. For instance, though the code takes away the parties’ ability to breach the contract, the underlying conditions could still be affected by outside factors, which are difficult to program into the code.⁵⁷ However, a smart contract could include code that automatically begins dispute resolution, or even reaches out to experts in the field to discuss the issue and come to a decision about damages or

⁵² Poon & Dryja, *supra* note 47, at 7 (discussing how a blockchain can operate through a trail of multiple decentralized channels and allow outputs to be created based on the terms of the pre-coded agreement).

⁵³ Wright & De Filippi, *supra* note 13, at 25-26. *But see* Reggie O’Shields, *Smart Contracts: Legal Agreements for the Blockchain*, 21 N.C. BANKING INST. 177, 183 (2017) (detailing how smart contracts and blockchain allow the automatic enforcement of agreements, such as car payments and rent, and demonstrating the downsides in the inability to alter the contract and the expenses associated their enforcement).

⁵⁴ *See A Beginner’s Guide to Smart Contracts*, BLOCKGEEKS, <http://blockgeeks.com/guides/smart-contracts/> (last visited Dec. 19, 2017) (explaining how smart contracts are a way to create an agreement which will automatically trigger with a specific event and has rules and penalties which process along with the contract sequence).

⁵⁵ *The Blockchain Revolution, Smart Contracts and Financial Transactions*, DLA PIPER (Apr. 26, 2016), <https://www.dlapiper.com/en/us/insights/publications/2016/04/the-blockchain-revolution/> (discussing how smart contracts in the financial field could potentially allow for contracts to be programmed with any relevant term and records keeping to be done for as long as the contract is valid or until fulfilled).

⁵⁶ Joe Carmichael, *Arcade City Is a Blockchain-Based Ride-Sharing Uber Killer*, INVERSE (Mar. 30, 2016), <https://www.inverse.com/article/13500-arcade-city-is-a-blockchain-based-ride-sharing-uber-killer> (discussing a future ride-sharing application which would allow for blockchain to facilitate in decentralizing the technology and possibly also allow for users to vote on changes to the Ethereum smart contracts); *Smart Tenancy Contracts*, MIDASIUM, <http://midasium.herokuapp.com/smart-tenancy> (last visited Dec. 19, 2017) (explaining how smart contracts in real estate would potentially allow for more transparency and fewer costs as the contract is being automatically monitored through blockchain technology).

⁵⁷ Jeremy Nation, *Microsoft’s Azure Stack Releases Enterprise Smart Contracts*, ETHNEWS (July 20, 2017), <https://www.ethnews.com/microsofts-azure-stack-releases-enterprise-smart-contracts> (explaining how Microsoft’s smart contracts are comprised of six elements: schemas, counterparties, logic, external sources, ledgers and contract binding (which executes the agreement), but also discusses how the “cloud” concept could alter this); Angela Walch, *The Bitcoin Blockchain as Financial Market Infrastructure: A Consideration of Operational Risk*, 18 N.Y.U. J. LEGIS. & PUB. POL’Y 837, 855 (2015) (identifying the largest security risks to blockchain technology include status, decentralized structure, development, and expertise and how while software always is prone to bugs blockchain is almost resistant to viruses and the older the blockchain the stronger it may be (unlike most software)).

fault once it appears that the contract will not be fulfilled.⁵⁸

For example, if the smart contract were for an international shipment, and the ship sank, the smart contract would know the contract was not fulfilled, and could automatically engage its dispute resolution provision by submitting the dispute to arbitration to determine whose insurance should pay.⁵⁹ Alternatively, it would automatically engage its insurance smart contract, speeding up that claims process.⁶⁰ There will still be a need for real-life decision-makers, however, the decision process would be sped up, and the claims process could be simplified.⁶¹

By controlling a government's powers through blockchain smart contracts, individuals can create a smart contract with the State.⁶² This will be a "Smart Social Contract" that gives explicit government powers granted by the citizens and prevents the government from acting outside of those powers.⁶³ When a government is on a blockchain, citizens do not have to trust government officials to act only within their granted powers.⁶⁴

BLOCKCHAIN TECHNOLOGY CAN CHANGE GOVERNANCE

Governments form from a need for societies to make collective decisions and allow people to have different views to reach consensus, respond to today's

⁵⁸ See *Smart Contracts: Coding the Fine Print*, NORTON ROSE FULBRIGHT 18, https://www.accmeetings.com/AM16/faculty/files/Article_471_734F_NRF24493_Smart_Contracts_V6_LR.PDF (last visited Dec. 19, 2017) (debating whether or not smart contracts are legally enforceable, but how they also may help identify the party who breached the contract, therefore aiding in how damages should be determined).

⁵⁹ Ryan Surujnath, *Off the Chain: A Guide to Blockchain Derivatives Markets and the Implications on Systemic Risk*, 22 *FORDHAM J. CORP. & FIN. L.* 257, 271 (2017) (explaining how smart contracts are "self-enforcing" and can automatically go through the actions of revoking the agreement and instituting any penalties).

⁶⁰ Scott Farrell, Claire Warren, Roslyn Hinchliffe & Johanan Ottensooser, *How to use humans to make "smart contracts" truly smart*, KING & WOOD MALESONS (July 7, 2016), <http://www.kwm.com/en/knowledge/insights/smart-contracts-open-source-model-dna-digital-analogue-human-20160630>.

⁶¹ *Not-so-clever contracts*, *ECONOMIST* (July 28, 2016), <https://www.economist.com/news/business/21702758-time-being-least-human-judgment-still-better-bet-cold-hearted> (exploring the idea that while blockchains and smart contracts are beneficial, they still leave room for hacking, error in coding, and once set in code there is zero room for alteration, all of which humans could help with as well as making decisions when unique circumstances exist); Farrell et al., *supra* note 60 (discussing how smart contracts are able to increase speeds of results as they are automatic and can process data faster than a human, provided that all coding is correct and accounts for all fields which should be considered).

⁶² Don Tapscott & Alex Tapscott, *Here's Why the Blockchain Powers Prosperity*, *FORTUNE* (May 22, 2016), <http://fortune.com/2016/05/22/why-blockchain-powers-prosperity/>.

⁶³ *Id.*

⁶⁴ *Id.* (considering how blockchains can facilitate in allowing the government to become more transparent, higher performing, hold representatives accountable, and lessen influence by lobbyists).

needs, and plan for the future.⁶⁵ When societies group together, they create a “Social Contract,” which forms the basis of their model of governance.⁶⁶ The Social Contract has often been created implicitly; many philosophers have posited that humanity’s move from a state of nature to a social contract was based on a tacit consent to surrender some rights or freedoms to a higher authority.⁶⁷ With blockchain technology, citizens can move beyond a tacit social contract, and make an explicit contract based on the blockchain, called a “Smart Social Contract.”⁶⁸

The inherent characteristics of blockchain technology can change governance in several specific areas. First it will allow individuals to have more power over their own identifying information and data, and more privacy from government.⁶⁹ Second, a “digital common law” will develop as individuals use smart contracts between each other, removing the need for government oversight.⁷⁰ Third, any government power that can be connected digitally can have strict limitations put on it that are inviolable unless the citizens consent to it.⁷¹

A. Individual Power over Data and Privacy

Blockchain technology’s inherent characteristics will allow individuals to have greater power over their own identification and personal data.⁷² It will also limit how much the government will be able to do in secret.⁷³

Individuals in charge of identity and communication

In the current system, we rely on central bodies to provide us with a myriad

⁶⁵ C. Edwin Baker, *Michelman on Constitutional Democracy*, 39 TULSA L. REV. 511, 531 (2004) (discussing how democracy requires that decisions be made collectively despite individual beliefs, and that at different points in time there will be winners and losers).

⁶⁶ Celeste Friend, *Social Contract Theory*, INT’L ENCYCLOPEDIA OF PHIL., <http://www.iep.utm.edu/soc-cont/> (last visited Dec. 19, 2017).

⁶⁷ Richard A. Posner, *Law and Economics Is Moral*, 24 VAL. U.L. REV. 163, 170 (1990) (referencing John Locke’s belief that for a social contract individuals must sacrifice their own rights to protect the liberties of others).

⁶⁸ See DEMOCRACY EARTH FOUND., THE SOCIAL SMART CONTRACT 10 (2017), <http://democracy.earth/#paper> (exploring how blockchain technology can assist in the voting process through the distribution of “voting tokens” to individuals, setting up ballot criteria, and imposing other restrictions).

⁶⁹ Jonathan Chester, *How the Blockchain Will Secure Your Online Identity*, FORBES (Mar. 3, 2017, 8:10 AM), <http://www.forbes.com/sites/jonathanchester/2017/03/03/how-the-blockchain-will-secure-your-online-identity/>.

⁷⁰ *Id.*

⁷¹ Wright & De Filippi, *supra* note 13, at 13.

⁷² Chester, *supra* note 69.

⁷³ See generally Jemma Green, *Blockchains, Diamonds and the New Technology*, FORBES (Aug. 20, 2017, 6:45 PM), <https://www.forbes.com/sites/jemma-green/2017/08/20/blockchains-diamonds-and-the-new-transparency/#19ab1db56a6c> (explaining the transparency the blockchain provides).

of identifying documents.⁷⁴ Blockchain computing is changing that by creating applications that allow users to maintain and control their identification.⁷⁵ Through digital “black boxes”, each element of an individual’s identity can be controlled and distributed to the extent that the individual desires.⁷⁶

There are companies that are already making applications to give individuals complete control over their identification and identifying data.⁷⁷ One, called Civic, allows users to sign up for their app which then collects identifying information about them; this is then verified through governmental agencies.⁷⁸ Importantly, once the identity information is verified, it is given a cryptographic hash and is stored it on the blockchain, and Civic erases all information from their servers.⁷⁹ Once that is complete, a person only has to share whatever specific information is asked for, and only what they want to share.⁸⁰ This allows individuals to control their data, metadata and other identifying information.⁸¹ On the blockchain, citizens can have complete control of who knows what about them.⁸²

A common example given of how a user-controlled identification can be used is that of a driver’s license. It contains more information than just that a certain individual is allowed to drive.⁸³ It has birthday, weight, home address, etc.⁸⁴ This extra information is not necessary to show that they are licensed to drive.⁸⁵ Blockchain applications are already being developed to replace ID cards.⁸⁶ These

⁷⁴ See generally Chester, *supra* note 69.

⁷⁵ *Id.*

⁷⁶ See generally Michael Mainelli, *Blockchain Could Help Us Reclaim Control of Our Personal Data*, HARV. BUS. REV. (Oct. 5, 2017), <https://hbr.org/2017/10/smart-ledgers-can-help-us-reclaim-control-of-our-personal-data>.

⁷⁷ See generally Chester, *supra* note 69.

⁷⁸ Chester, *supra* note 69. Toby Shapshak, *Identity Service Civic Launches, Offers \$1m ID Theft Insurance*, FORBES (July 19, 2017, 7:29 AM), <https://www.forbes.com/sites/toby-shapshak/2016/07/19/identity-service-civic-launches-offers-1m-id-theft-insurance/#641077152ac6>.

⁷⁹ Chester, *supra* note 69.

⁸⁰ *Id.*

⁸¹ *Id.*

⁸² Shapshak, *supra* note 78

⁸³ See Benjamin Din, Reuben Fischer-Baum & Kevin Uhrmacher, *New Driver’s License Requirements Are Coming to U.S. Airports. Is Your State Ready?*, WASH. POST (Sept. 13, 2017), https://www.washingtonpost.com/graphics/2017/national/real-ids/?utm_term=.2a06785bd357 (stressing the importance of having a valid driver’s license for identification purposes to fly domestically and discussing the measures that states must take to make their respective driver’s licenses compliant under a federal system).

⁸⁴ Chester, *supra* note 69.

⁸⁵ *Id.*

⁸⁶ Suzanne Woolley, *Want to Ditch Social Security Numbers? Try Blockchain*, BLOOMBERG (Oct. 9, 2017, 11:54 AM), <https://www.bloomberg.com/news/articles/2017-10-09/want-to-ditch-social-security-numbers-try-blockchain> (describing the system that Estonia’s government has implemented which uses ID card with an electronic chip that can be used to access Estonia’s government functions).

applications will contain a user/citizen's information, and will be able to broadcast the specific identifying information the user/citizen wants to share to the other party who needs the information.⁸⁷ To follow the driver's license example, this would mean that if a police officer were to pull someone over and asks for their license, the individual would need only to show that they are holding a license to drive, and would not need to share any extra information.⁸⁸ This could help protect individuals from police abuse of power based on profiling (at least by name).⁸⁹ The person could use that same app when entering a bar to show that they are over 21, but not exactly what age they are.⁹⁰ This may seem far-fetched, but Estonia already offers a blockchain-secured identity to its citizens.⁹¹ The possibilities are far reaching, but there are myriad benefits to giving individuals power over their data.

In addition to controlling their identity, the blockchain will give individuals greater privacy in their communication from government eyes.⁹² The decentralized nature of the blockchain eliminates the need for centralized e-mail, file-sharing, or social media networks and servers.⁹³ Decentralization simultaneously makes privacy easier to protect and is more resilient to external attack having no central point of weakness.⁹⁴ Transactions on the blockchain are verified through cryptographic functions that are nearly impossible to duplicate.⁹⁵ Coupled with these cryptographic functions, communications become encrypted, and citizens can be better protected from government intervention.⁹⁶ There are already decentralized and encrypted cloud storage and computing power sharing programs.⁹⁷ This means that, “[b]y design, the decentralized, encrypted nature of

⁸⁷ Laura Shin, *You Can Now Hold Ether in Blockchain, One of the World's Most Popular Cryptocurrency Wallets*, FORBES (Aug. 17, 2017, 12:00 PM), <https://www.forbes.com/sites/laurashin/2017/08/17/you-can-now-hold-ether-in-blockchain-one-of-the-worlds-most-popular-cryptocurrency-wallets/#5abbc7b76200>.

⁸⁸ Chester, *supra* note 69; *see also* MELANIE SWANN, *BLOCKCHAIN 10* (2015), <http://w2.blockchain-tec.net/blockchain/blockchain-by-melanie-swan.pdf> (“Digital identity can be confirmed with the blockchain through securely encoded driver's licenses, identity cards, passports, and voter registrations.”).

⁸⁹ *See generally id.*

⁹⁰ *Id.*

⁹¹ *Security and Safety*, E-ESTONIA, <https://e-estonia.com/solutions/security-and-safety/ksi-blockchain/> (last visited Dec. 19, 2017).

⁹² Wright & De Filippi, *supra* note 13, at 13.

⁹³ *Id.*

⁹⁴ *Id.* at 14.

⁹⁵ Malaka Gharib, *Blockchain Could Be A Force for Good. But First You Have to Understand It*, NPR (Jan. 11, 2017, 10:31 AM), <https://www.npr.org/sections/goatsand-soda/2017/01/11/503159694/blockchain-could-be-a-force-for-good-but-first-you-have-to-understand-it>.

⁹⁶ Wright & De Filippi, *supra* note 13, at 13.

⁹⁷ Frisco d'Anconia, *Is Blockchain Technology Really the Answer to Decentralized Storage?*, COINTELEGRAPH (Sept. 24, 2017), <https://cointelegraph.com/news/is-blockchain-technology-really-the-answer-to-decentralized-storage>.

these platforms makes them seemingly censor-proof—no centralized organization is technically able to view the content of any file on the network or stop its transmission.⁹⁸ If blockchain computing does nothing else, the increased privacy will be a powerful tool to protect individuals from illegal government spying.⁹⁹

Government, and others, will be unable to breach because of blockchain cryptography and decentralization

Recent revelations of CIA programs using various Internet-connected home devices highlight the need for individuals to have privacy protections from a powerful government actor.¹⁰⁰ When our smart appliances are connected to a blockchain, there will not be a centralized control point that is susceptible to hack,¹⁰¹ as opposed to the current system which has allowed for many appliances to be hacked because they are controlled and coordinated from a central server.¹⁰² Rather, information will be encrypted and stored in many different locations.¹⁰³ When an individual's information is on a blockchain, it will be divided among thousands of computers, and any attempt to access their information without their keys or permissions will be fruitless.¹⁰⁴

Internet-enabled devices can be transformed into smart property¹⁰⁵ when registered on a blockchain and using smart contracts to transact with outside connections for the information and connectivity that it needs.¹⁰⁶ This will allow devices to connect to what the user wants, when the user wants, and no more.¹⁰⁷

⁹⁸ Wright & De Filippi, *supra* note 13, at 13.

⁹⁹ *Id.* at 22.

¹⁰⁰ Andy Greenberg, *Wikileaks Reveals How The CIA Could Hack Your Router*, WIRED (June 15, 2017, 5:57 PM), <https://www.wired.com/story/wikileaks-cia-router-hack/>; Bruce Golding, Jamie Schram & Mark Moore, *How CIA allegedly turns everyday device into high-tech spy weapons*, N.Y. POST (Mar. 7, 2017, 10:02 PM), <http://nypost.com/2017/03/07/how-the-cia-turns-everyday-devices-into-high-tech-spy-weapons/>.

¹⁰¹ Wright & De Filippi, *supra* note 13, at 13-14 (utilizing the example of blockchain aiding voting systems because individual users could ensure their vote had been counted as opposed to a centralized system that depended on counting votes).

¹⁰² Mike Gault, *The CIA Secret to Cybersecurity that No One Seems to Get*, WIRED (Dec. 20, 2015, 7:00 AM), <https://www.wired.com/2015/12/the-cia-secret-to-cybersecurity-that-no-one-seems-to-get/>; see also Alison DeNisco Rayome, *33% of businesses hit by DDoS attack in 2017, double that of 2016*, TECHREPUBLIC (October 11, 2017, 5:46 AM), <https://www.techrepublic.com/article/33-of-businesses-hit-by-ddos-attack-in-2017-double-that-of-2016/>.

¹⁰³ Ari Juels & Ittay Eyal, *Blockchains—focusing on bitcoin misses the real revolution in digital trust*, PHYS.ORG (July 18, 2016), <https://phys.org/news/2016-07-blockchainsfocusing-bitcoin-real-revolution-digital.html>.

¹⁰⁴ *Id.*

¹⁰⁵ Andrew Wagner, *Smart Property in Action*, BITCOIN MAG. (Aug. 14, 2014, 4:48 PM), <https://bitcoinmagazine.com/articles/smart-property-action-1408049337/>.

¹⁰⁶ *Id.*

¹⁰⁷ *Id.*

The IoT can still connect to anything on the Internet, but on a blockchain, it will have protections that normal connectivity does not offer.¹⁰⁸

If blockchain technology is adopted, “[it] could effectively counteract mass-surveillance by governmental or corporate entities.”¹⁰⁹ Indeed, individuals using the blockchain properly may even “eliminate the possibility for legitimate forms of surveillance used for prosecution and law enforcement.”¹¹⁰ If the majority of a population of a country is on a decentralized and encrypted platform, it will be nearly impossible to conduct surveillance on that population, but there are ways to facilitate this within a blockchain-based government.¹¹¹

Currently, there are systems in place for the government to go through to monitor someone here in the United States legally.¹¹² However, we know that the government has the power to monitor anyone at any time, and any corresponding breach of relevant law by the government must be litigated after the fact.¹¹³ If the government’s authority to wiretap were on the blockchain instead of just in the United States Code, then the government would not have the power to monitor an individual without going through the procedure that the voters/lawmakers had created.¹¹⁴ This is an easy example because, as recent revelations of the CIA indicate, most of the monitoring tools are computer programs.¹¹⁵ Programs are easily put on a blockchain, and their use is just as easily limited by requiring specific tokens to grant permission for their use.¹¹⁶ Additionally, there will be a record of the surveillance program being used that will be public and auditable by interested parties.¹¹⁷ Ultimately, blockchain could allow citizens to own their data and protect their privacy “through owning their personal identities rather

¹⁰⁸ IBM INST. BUS. VALUE, *Empowering the Edge*, 8, <https://www-935.ibm.com/services/multimedia/GBE03662USEN.pdf> (last visited Dec. 19, 2017).

¹⁰⁹ Wright & De Filippi, *supra* note 13, at 22.

¹¹⁰ *Id.*

¹¹¹ *See id.* (showing how blockchain technology would be able to combat the challenge of conducting surveillance on the population by eliminating the middleman and have direct lines of communication).

¹¹² Jason M. Breslow, *With or Without the Patriot Act, Here’s How the NSA Can Still Spy on Americans*, PBS (June 1, 2015), <http://www.pbs.org/wgbh/frontline/article/with-or-without-the-patriot-act-heres-how-the-nsa-can-still-spy-on-americans/>.

¹¹³ *See id.* (illustrating the NSA surveillance capabilities).

¹¹⁴ *See* Greg Miller, Ed O’Keefe & Adam Goldman, *Feinstein: CIA Searched Intelligence Committee Computers*, WASH. POST (Mar. 11, 2014), https://www.washingtonpost.com/world/national-security/feinstein-cia-searched-intelligence-committee-computers/2014/03/11/982cbc2c-a923-11e3-8599-ce7295b6851c_story.html?utm_term=.e04cccf4a94e (acknowledging the current difficulties that the government faces when dealing with a potential surveillance violation).

¹¹⁵ *Id.*

¹¹⁶ Philip Evans with Lionel Aré, Patrick Forth, Nicolas Harlé & Massimo Portincaso, *Thinking Outside the Blocks: A Strategic Perspective on Blockchain and Digital Tokens*, BOS. CONSULTING GROUP (Dec. 1, 2016), <https://www.bcg.com/blockchain/thinking-outside-the-blocks.html>.

¹¹⁷ *Id.*

than identities being owned by ... governments.”¹¹⁸

B. Digital Common Law

Blockchains are already being used to create and express various relationships.¹¹⁹ Businesses, individuals, and governments are already using blockchain technology for everything from document control, identification and even selling music.¹²⁰ As more and more people use blockchain-powered applications for everyday activities, regular usage will develop naturally to form a part of our legal system, as cyber law and other systems developed to regulate new inventions.¹²¹ Regular usage will improve smart contracts and blockchain computing, develop standards of practice, and create a common law of smart contracts.¹²² “Digital common law” “will enable new forms of trusted governance, commercial transactions, and social relationships.”¹²³ These relationships, like those which traditional common law develop on a case-by-case basis, will develop on their own and in lieu of any centralized oversight.¹²⁴

By combining smart contracts and decentralized organizations people can work together across limitless expanses to create new forms of governance.¹²⁵ This is because “[b]lockchain-based applications present a genuine promise for new kinds of scalable innovations in governance and institutional design, where the ideals for a corruption free and effective social democracy may come true.”¹²⁶

The future regulatory structure that can be built with blockchain technology

¹¹⁸ Alex Tapscott & Don Tapscott, *You might not realise it yet, but blockchain could change your life*, WORLD ECON. FORUM (June 6, 2016), <https://www.weforum.org/agenda/2016/06/this-is-how-blockchain-will-change-your-life/>.

¹¹⁹ See Mary Jo Foley, *Microsoft, Intel, banks form Enterprise Ethereum blockchain alliance*, ZDNET (Apr. 24, 2017), <http://www.zdnet.com/article/microsoft-intel-banks-form-enterprise-ethereum-blockchain-alliance/> (showing that Microsoft, Intel, Accenture and more than two dozen banks and other companies have formed alliances with blockchain).

¹²⁰ See *id.* (showing that a variety of different companies and banks have adopted blockchain technology, and are using it in their own unique way).

¹²¹ See Joe Dewey & Shawn Amual, *Blockchain Technology Will Transform the Practice of Law*, LEGAL TECH LABS (June 25, 2015), <https://biglawbusiness.com/blockchain-technology-will-transform-the-practice-of-law/> (showing a potential issue policy makers might face with the redressability in our court system).

¹²² See Max Raskin, *The Law and Legality of Smart Contract*, 1 GEO. L. TECH. REV. 305, 328 (2017) (exemplifying how torts could emerge for negligent coding and how existing common law would have to adapt).

¹²³ John Henry Clippinger & David Bollier, *The Rise of Digital Common Law: An Argument for Trust Frameworks, Digital Common Law and Digital Forms of Governance*, ID3 (2012), <https://idcubed.org/digital-law/the-rise-of-digital-common-law/>.

¹²⁴ See *id.* (comparing how bitcoin started with the same skepticism of centralized power and supportive of capitalism and free markets).

¹²⁵ See Wright & De Filippi, *supra* note 13, at 16 (explaining that by facilitating coordination and trust, a blockchain enables new forms of collective action that have the potential to bypass existing governance failures, and thus resolve many of the common problems governments face).

¹²⁶ Wright & De Filippi, *supra* note 13, at 36.

has been called “*Lex Cryptographia*.”¹²⁷ This is a play on the naming convention of the *lex mercatoria*, the system of trading principles used by merchants throughout medieval Europe.¹²⁸ The *lex cryptographia* concept is similar to *lex mercatoria* in more than name only.¹²⁹ Blockchain users and coders are actively and tacitly developing the rules, regulations, and culture of the emerging norms that will develop into its own system of laws.¹³⁰ Institutions are being created within—and run on—blockchain code; this, like the *lex mercatoria*, is executed outside of government control, and “independent from the state.”¹³¹

Though many advocates see blockchain computing, and the related *lex cryptographia*, as an ultimate replacement for most types of governance and law enforcement.¹³² However, it seems more likely that existing models of governance will remain, and could be improved by using blockchain code.¹³³ This could form more than a *lex cryptographia* and could actively change the way that the social contract is made and enforced.¹³⁴ Indeed, by using blockchain smart contracts to control government actors, individuals could form and participate in a Smart Social Contract— a codified Constitution on the blockchain.¹³⁵ With the same technology upon which the digital common law will be built, citizens can have a “more transparent, accountable governance system that is holistic in scope - and only minimally dependent upon legacy institutions of law and policymaking” that is created by, and voted on by, the citizenry who will be affected by this new law.¹³⁶ More than a group of smart contracts changing an overall system, the Social Smart Contract will be the active architecture that both technologi-

¹²⁷ See generally *id.* at 4 (defining “*lex cryptographia*” as “rules administered through self-executing smart contracts and decentralized (autonomous) organizations”).

¹²⁸ See *id.* at 44–45 (explaining that merchants recognized “*lex mercatoria*” as “a universal set of rules that [are] applicable to everyone regardless of the geographical location”).

¹²⁹ See *id.* (acknowledging that *lex mercatoria* or “merchant law” was not “dictated,” “recognized,” or “enforced by any sovereign authority” because royal courts would “refuse[] to acknowledge the validity of foreign contractual deals”).

¹³⁰ See Nathaniel Popper, *Understanding Ethereum, Bitcoin's Virtual Cousin*, N.Y. TIMES (Oct. 1, 2017), <https://www.nytimes.com/2017/10/01/technology/what-is-ethereum.html> (detailing how the rules established in Ethereum’s software permit the programmability of its “decentralized network of computers”).

¹³¹ Wright & De Filippi, *supra* note 13, at 45.

¹³² Fiammetta S. Piazza, *Bitcoin and the Blockchain as Possible Corporate Governance Tools: Strengths and Weaknesses*, 5 PENN. ST. J.L. & INT’L AFF. 262, 301 (2017).

¹³³ See Steve Cheng, Mattias Daub, Axel Domeyer & Martin Lundqvist, *Using blockchain to improve data management in the public sector*, MCKINSEY & Co. (Feb. 2017), <https://www.mckinsey.com/business-functions/digital-mckinsey/our-insights/using-blockchain-to-improve-data-management-in-the-public-sector> (explaining the possibilities of how governments can adopt the blockchain technology and use it to build on common law).

¹³⁴ See *id.* (illustrating how Delaware has started to use smart contracts in some of its businesses, and the improvements it has made).

¹³⁵ See Wright & De Filippi, *supra* note 13, at 16 (explaining how people and can coordinate through codified smart contracts, without having to incorporate into traditional business entities).

¹³⁶ Clippinger & Bollier, *supra* note 123.

cally and constitutionally “enable[s] new forms of trusted governance, commercial transactions, and social relationships.”¹³⁷

The difference between a digital common law and a Social Smart Contract is similar to the difference between the common law system and the civil law system.¹³⁸ Both adapt but do so in different ways.¹³⁹ A Social Smart Contract is feasible because the decentralized, peer-to-peer nature of the blockchain overcomes most issues that limit the effectiveness of direct democracy.¹⁴⁰ Additionally, a body of law does not need to be adaptable in and of itself, as the common law is.¹⁴¹ If the populace is closely involved in more of the decision-making, as a direct democracy is, they can update new laws at will.¹⁴²

Because of the blockchain’s inherent scalability, a Smart Social Contract will have ability to adapt to changing circumstances, like a digital common law system.¹⁴³ This will occur system-wide, once the terms are agreed to, rather than on a piecemeal basis, one smart contract at a time.¹⁴⁴ A system-wide Smart Social Contract will allow individuals to have the same starting point when making deals with each other, and will allow for a Smart Constitution with built-in governmental limitations.¹⁴⁵

A SMART CONSTITUTION, ENCODING GOVERNMENTAL LIMITS

¹³⁷ *Id.*

¹³⁸ See generally S.B., *The Economist explains what is the difference between common and civil law?*, *ECONOMIST* (July 17, 2013), <https://www.economist.com/blogs/economist-explains/2013/07/economist-explains-10> (comparing common law systems where judges have a big role to civil law systems where judges play a more limited role).

¹³⁹ See generally *id.* (outlining that common law courts abide by precedents set by higher courts examining the same issues while civil law systems use past judgments are no more than loose guides).

¹⁴⁰ See Wright & De Filippi, *supra* note 13, at 39 (showing how smart contracts could improve the voting process of a proposed budget by being able to immediately release allocated funds if the vote results came back in favor of the budget).

¹⁴¹ See OLIVER WENDELL HOLMES, JR., *THE PATH OF THE LAW* 31–32 (2009) (analyzing how common law treated a contract as inseparable from the paper it was written on but the reasoning was general, so it would easily be applied in the future).

¹⁴² See Wright & De Filippi, *supra* note 13, at 11 (explaining how blockchain technology allows for the implementation of self-executing transactions, which would allow for an easier system of updating new laws).

¹⁴³ See Clippinger & Bollier, *supra* note 123 (demonstrating that the system can be highly attentive to shifting circumstances and preferences).

¹⁴⁴ See *id.* (stating that adoption will be directly proportional to its utility in serving the needs of communities and securing their trust and acceptance).

¹⁴⁵ See generally Nick Szabo, *Formalizing and Securing Relationships on Public Networks*, *FIRST MONDAY J.* (Sept. 1997), <http://firstmonday.org/ojs/index.php/fm/article/view/548/469> (analyzing the observability, verifiability, privity, and enforceability of smart contracts); Don Tapscott, *How the blockchain is changing money and business*, TED (June 2016), https://www.ted.com/talks/don_tapscott_how_the_blockchain_is_changing_money_and_business (discussing how blockchain is not only used in the financial industry and how it can effectively disrupt other industries such as music and government).

Governments are built upon laws.¹⁴⁶ Caligula, according to Dio Cassius, hung his laws on high pillars, making individual redress for grievances nearly impossible.¹⁴⁷ Most with a form of constitution (written or otherwise) that explains how that government works, and the relationship that the government has with its citizenry.¹⁴⁸ Individual and group rights are established in constitutions and laws.¹⁴⁹ Legal arguments are based on these laws and are used to ensure redress for violation of rights.¹⁵⁰ Through the written and printed word, democracy was able to flourish because individuals were given evidence of what the law was, and an ability to challenge the laws and the government in court.¹⁵¹

Blockchain code will allow for the evolution from a written legal system enforced by the courts, to the coding of the law that is self-enforcing. Some have said that “code is law,” but this is like saying “gravity is the law.”¹⁵² It is not a statement of legality, but of following immutable rules. When something is encoded on the blockchain, the network is unable to process things that do not conform with that code.¹⁵³ This process of encoding can be used to ensure government checks and balances will be followed and may not be circumvented.¹⁵⁴

¹⁴⁶ See Ganesh Sitaraman, *Our Constitution Wasn't Built for This*, N.Y. TIMES, Sept. 17, 2017, at SR1 (demonstrating the formation of the American government in Philadelphia).

¹⁴⁷ See CASSIUS DIO, ROMAN HISTORY, BK. LIX 357 (Loeb Classical Libr. ed., Harv. Univ. Press 1924) (c. 233 CE) (describing how Caligula hid the law by printing it small and hanging it high).

¹⁴⁸ See Sitaraman, *supra* note 146, at SR7 (rationalizing that the design of our Constitution was not based on a class-based system because the American people would not agree to that kind of government).

¹⁴⁹ See U.S. CONST. amend. V (laying out the Fifth Amendment rights of the United States Constitution); see also U.S. CONST. amend. X (laying out the Tenth Amendment rights of the United States Constitution); see also U.S. CONST. amend. XIV (laying out the Fourteenth Amendment rights of the United States Constitution).

¹⁵⁰ See generally STEPHEN HOLMES & CASS R. SUNSTEIN, *THE COST OF RIGHTS: WHY LIBERTY DEPENDS ON TAXES* CH. I (1999) (acknowledging that individuals enjoy rights to the extent that wrongs which were done unto them are fairly and predictably redressed by their governments).

¹⁵¹ See THE FEDERALIST NO. 53, at 253 (James Madison) (“Wherever the supreme power of legislation has resided, has been supposed to reside also a full power to change the form of the Government.”).

¹⁵² *Code is Law and the Quest for Justice*, *supra* note 20 (stating that coding is proof under blockchain, and because actions cannot be altered, this should be seen as strong evidence in support of laws); see also Tom W. Bell, *Copyrights, Privacy, and the Blockchain*, 42 OHIO N.U. L. REV. 439, 462–65 (2016) (showing how author’s using a pseudonym may still be able to win copyright cases as blockchain technology can help prove that they are the original author through timestamps and other blockchain aspects).

¹⁵³ See Jason Compton, *How Blockchain Could Revolutionize the Internet of Things*, FORBES (June 27, 2017, 10:41 AM), <https://www.forbes.com/sites/delltechnologies/2017/06/27/how-blockchain-could-revolutionize-the-internet-of-things/#47a28a986eab> (explaining how blockchain technology provides assurance that data is legitimate, and the process that introduces new data is well-defined).

¹⁵⁴ See *Checks, Balances, and Bitcoin: The Genius of the Blockchain*, MX (May 11, 2016, 9:14 AM), <https://www.mx.com/moneysummit/checks-balances-and-bitcoin-the-genius-of-the-blockchain> (discussing how the blockchain allows for checks and balances confirming that no one party is becoming too influential which is also supported through the

A Social Smart Contract applies the idea of a smart contract to the constitution.¹⁵⁵ There are already corporations that are governed by smart contracts, it is logical that if a corporation can do it, then smart contracts can be used to regulate a government.¹⁵⁶ By applying the constitution to a smart contract, the blockchain-powered Social Smart Contract will become a form of governance.¹⁵⁷ Blockchains running smart contracts “can be used to regulate social interactions between individuals . . . through a series of [smart contracts] whose provisions can be automatically enforced by the underlying code.”¹⁵⁸ Wright and De Filippi indicated the broad possibilities for blockchain use when they said:

By facilitating coordination and trust, a blockchain enables new forms of collective action that have the potential to bypass existing governance failures. It can thus potentially resolve many of the common problems related to the opacity and corruption inherent in the decision-making of many organizations. Large hierarchical organizations are both imperfect and inefficient. Their imperfections are, for the most part, due to excessive centralizations, delegated decision-making, regulatory capture, and sometimes even corruption. With the blockchain, most of these imperfections could evaporate. Interactions and organizations can be defined predefined by smart contract, and people or machines can interact without having to trust the other party. Trust does not rest with the organization, but rather within the security and auditability of the underlying code, whose operations can be scrutinized by millions of eyes. In that sense, decentralized organizations can be thought of as *open-sourced organizations*.¹⁵⁹

Currently, citizens hold their governments up to scrutiny.¹⁶⁰ Certainly, many

transparency aspects of the technology).

¹⁵⁵ See generally Clippinger & Bollier, *supra* note 123 (explaining what digital common law is and how trust networks are critical to its development).

¹⁵⁶ See Rob Marvin, *Blockchain in 2017: The Year of Smart Contracts*, PCMAG (Dec. 12, 2016, 2:48 PM), <https://www.pcmag.com/article/350088/blockchain-in-2017-the-year-of-smart-contracts> (recognizing the increased interest that the United States government and regulatory agencies have taken in blockchain).

¹⁵⁷ See generally Wessel Reijers, Fiachra O’Brolcháin & Paul Haynes, *Governance in Blockchain Technologies & Social Contract Theories*, 1 LEDGER J. 134, 136 (2016), <http://www.ledgerjournal.org/ojs/index.php/ledger/article/view/62> (discussing how governance works on the blockchain through social contracts).

¹⁵⁸ See Primavera De Filippi & Raffaele Mauro, *Ethereum: The decentralised platform that might displace today’s institutions*, INTERNET POL’Y REV. (Aug 24, 2014), <https://policyreview.info/articles/news/ethereum-decentralised-platform-might-displace-todays-institutions/318> (referring to the Ethereum network that can already do this, provided the correct things are attached to it).

¹⁵⁹ Wright & De Filippi, *supra* note 13, at 16.

¹⁶⁰ See Niall McCarthy, *Which Countries Have The Most And Least Confidence In Their Governments?*, FORBES (July 13, 2017, 8:25 AM), <https://www.forbes.com/sites/niallmccarthy/2017/07/13/which-countries-have-the-most-and-least-confidence-in-their-governments-infographic/#645b0298652d> (illustrating that government trust levels are generally determined by how its citizens view their government as stable and reliable and able to protect its citizens from risk).

Constitutions and laws already spell out individual rights and limits on government powers, however, the government still has the physical ability to violate those limits because most legal enforcement occurs *ex post facto*.¹⁶¹ However, parties cannot breach a smart contract or a Social Smart Contract.¹⁶² Once the citizens have agreed to a government bound by a particular set of rules expressed on a blockchain, creating their Smart Constitution,¹⁶³ the government cannot operate outside those rules.¹⁶⁴

The blockchain can eliminate the need for citizens to trust their government.¹⁶⁵ It also removes the need for any centralized body to coordinate the citizens and the various auxiliaries of the overall body.¹⁶⁶ This creates a system “[p]eople can thus coordinate themselves, in a trustless (since the trust has been shifted onto the technology) and decentralized manner, without having to rely on the services of any third party institutions - be it a corporate body or public institution.”¹⁶⁷

CONCLUSION

The technologies that are brought together to create blockchains create a system of governance that is inherently superior to a system that requires an additional party to enforce it; this superior system can be used to enforce the law.¹⁶⁸ It is distributed, consensus-based, and secure.¹⁶⁹ Through that technology, individuals can make smart contracts with each other.¹⁷⁰ These contracts can control anything that can be represented digitally, whether it be an .mp3 file or a painting that an artist has registered on the blockchain.¹⁷¹ These smart contracts already exist and a Digital Common Law is forming that will affect how blockchains are

¹⁶¹ *Ex Post Facto*, BLACK’S LAW DICTIONARY (10th ed. 2014) (“Done or made after the fact; having retroactive force or effect.”).

¹⁶² See generally Szabo, *supra* note 145.

¹⁶³ See Alex Tapscott, *Blockchain Democracy: Government of the People, by the People, for the People*, FORBES (Aug. 16, 2016, 2:38 PM), <https://www.forbes.com/sites/alextapscott/2016/08/16/blockchain-democracy-government-of-the-people-by-the-people-for-the-people/#2f41a37d4434> (explaining how a blockchain constitution can restore the public’s trust in political institutions).

¹⁶⁴ See generally Tamer Sameeh, *Utilizing the Blockchain & Smart Contract Technologies to Create a Decentralized Government*, DEEPDOTWEB (Jan. 4, 2018), <https://www.deepdotweb.com/2017/01/04/utilizing-the-blockchain-smart-contract-technologies-to-create-a-decentralized-government/> (discussing whether a traditional “state” is actually needed with the emergence of blockchain).

¹⁶⁵ De Filippi & Mauro, *supra* note 158.

¹⁶⁶ See *id.* (illustrating that on this new form of governance, people can coordinate themselves in a decentralized manner without having to rely on the services of any third-party institution).

¹⁶⁷ De Filippi & Mauro, *supra* note 158.

¹⁶⁸ See Wright & De Filippi, *supra* note 13, at 1.

¹⁶⁹ *Id.* at 2.

¹⁷⁰ *Id.* at 1.

¹⁷¹ *Id.* at 15.

used in the future.¹⁷²

The natural step past a Digital Common Law is to have a Smart Social Contract.¹⁷³ A Smart Social Contract will be blockchain version of the bargain that citizens have struck with their government.¹⁷⁴ Because anything the government owns or any transaction the government makes can be represented on the blockchain, the system is transparent for citizens.¹⁷⁵ A Smart Social Contract can be a Smart Constitution that is a specific blockchain for governance.¹⁷⁶

There are many things that can be done with blockchain technology; the most important possibility is that a government can be made to operate in a visible manner, unable to operate outside of its mandate.¹⁷⁷ This is very theoretical, but the technology is there; all that remains is the political will for governments to submit to have their powers encoded in a manner that ensures compliance with the Smart Constitution.¹⁷⁸ When something is codified, and connected to the blockchain, “code is law”¹⁷⁹. When the code is the law, any entity tied to it is powerless to act outside of the code.¹⁸⁰ This will ensure that governments stay within their expressed powers.¹⁸¹

¹⁷² *Id.* at 40-41.

¹⁷³ See Clippinger & Bollier, *supra* note 123 (demonstrating that as digital technologies become smarter and more interconnected a new style of government is needed).

¹⁷⁴ See *id.* (displaying that no system of law can work unless it enables the member of a community to develop social trust with the system).

¹⁷⁵ See Larry Myler, *Transparent Transactions: How Blockchain Payments Can Make Life Easier for B2B Companies*, FORBES (Nov. 9, 2017, 4:08 PM) <https://www.forbes.com/sites/larrymyler/2017/11/09/transparent-transactions-how-blockchain-payments-can-make-life-easier-for-b2b-companies/#3837474270b5> (illustrating how transparent blockchain technology is for the citizens).

¹⁷⁶ See Atzori, *supra* note 12, at 33 (illustrating the major challenge that global civil society will have when adapting to blockchain technology).

¹⁷⁷ See *id.* at 9-10 (showing how blockchain technology could lead to a more transparent, autonomous and innovative global society).

¹⁷⁸ See *id.* at 5 (explaining how there are political technology based entrepreneurs who are in the process of creating a do-it-yourself governance service entirely based on the blockchain).

¹⁷⁹ De Filippi & Mauro, *supra* note 158.

¹⁸⁰ *Code is Law and the Quest for Justice*, *supra* note 20 (explaining how the code in blockchain acts as a uniform law).

¹⁸¹ See Kostakis et al., *supra* note 16 (illustrating how no one has power to alter the code binding a given transaction).