Decrypting Democracy: Incentivizing Blockchain Voting Technology for an Improved Election System

JANE SUSSKIND*

TABLE OF CONTENTS

* © Jane Susskind. J.D. Candidate 2018, University of San Diego School of Law; B.A. 2011, Political Science, University of California, San Diego.

I. INTRODUCTION

It's 4:00 p.m. on a Tuesday. As the clock continues to tick, a young woman frantically types, eager to finish a report that needs to be on her boss's desk by the end of the day. A single mother of two, she rushes out of the office to pick up her children from school and heads home to start preparing dinner. Right when she sets her keys down, she remembers what day it is. It's not just any Tuesday—it is Election Day. After four years with a president that does not represent her, she is ready for change. Increased funding for education, criminal justice reform, and a clean energy initiative are all on her state's ballot this year, and all affect her and her children's lives.

She knows the power of her vote, yet she is painfully aware of her current limitations. *I cannot leave work early, and there is no way I can make it to the polls before my kids get out of school. Next election*, she thinks. *I'll vote next election*. This is an all-too-common experience for millions of Americans.[1] It is easy to believe that the political landscape of this nation would change if this busy single mother, and millions of other Americans, had the option to vote by using an app on a smartphone or by logging on to a home computer. Blockchain technology is ready to provide this nation with secure, accessible, and inclusive elections.

Put simply, blockchain is a list of transactions involving value.[2] Each "block" is a transaction that forms a link that, once verified, joins other

1. Campbell Robertson, *Millions on Election Day Make a Different Decision: Not Voting*, N.Y. TIMES (Nov. 8, 2016), http://www.nytimes.com/2016/11/09/us/politics/voter-turnout.html. In the 2016 presidential election, ninety-two million eligible voters did not cast a ballot. *See* Michael P. McDonald, *2016 General Election Turnout Rates*, UNITED STATES ELECTIONS PROJECT, http://www.electproject.org/2016g (last visited Feb. 5, 2018) (listing statistics from each state's official Secretary of State website).

2. *See How Does Bitcoin Work?*, BITCOIN, https://bitcoin.org/en/how-it-works [https://perma.cc/HTL5-3TTD] (defining blockchain as a "shared public ledger" of confirmed transactions). Because this is a somewhat abstract concept, an analogy may help to clarify

links to create a linear "chain" of that transaction's history.[3] Because each link is built on the last, any attempt to tamper with individual transactions breaks a link in the chain, invalidating the blockchain.[4]

As a result, blockchain technology provides a cryptographically secure and transparent method for transferring "digital assets."[5] Although blockchain technology is most commonly recognized as the technology that underpins virtual currencies, such as Bitcoin, it may also hold the key to facilitating secure online elections in America.

To preface the need for blockchain voting, Part II addresses the current problems with voting in the United States. Part III provides an elementary explanation of blockchain. Parts IV and V outline current election laws and explain how implementing blockchain voting would very likely comply with these laws. Transitioning to a new voting system, however, does not come without challenges. Thus, the remainder of Part V outlines valid concerns with and counterarguments against blockchain voting. Part VI advocates for congressional action, tracing the failed regulation of Bitcoin back to the lack of uniform guidance.

The time is ripe for modernization, yet current proposals for online voting lack the sophistication necessary to implement a secure and trusted system. Thus, Part VII of this Comment proposes that Congress pass a bill authorizing

---

blockchain's structure. Think about blockchain as a book. A book is a collection of ideas, characters, and themes that make up a story. Authors change the direction of that story by selecting different words and developing different characters. The result is a unique "chain" of events that creates the story. Now envision each "block" as a page in the book. If one page is missing or inaccurate, the rest of the story cannot be developed. It breaks the narrative and makes it impossible to build upon the previous storyline. This is essentially the idea behind blockchain, but instead of one author, there are many different parties verifying that the transactions that go into the chain, or the information written on each page, is correct.

3. Although comparing blockchain to a physical chain may help conceptualize it, this drastically oversimplifies the technology. For a more technical discussion of how blockchain works, see Steven Norton, *CIO Explainer: What Is Blockchain?*, WALL ST. J.: CIO J. (Feb. 2, 2016, 12:49 AM), http://blogs.wsj.com/cio/2016/02/02/cio-explainer-what-is-blockchain; *see also* Dave Hudson, *Blockchain, What Art Thou? Defining an Industry Buzzword*, COINDESK (Jan. 16, 2016, 4:40 PM), http://www.coindesk.com/blockchain-what-art-thou-buzzword [https://perma.cc/AR3K-FY2H].

4. *See* Hudson, *supra* note 3 (describing the process of cryptographic hashing as it relates to ensuring the secure construction of a chain).

5. "Digital assets" can include anything from digital currency, share and financial securities, smart property, digital subscriptions, event tickets, crowdfunding, etc. For a more detailed description, see generally BITFURY GRP., DIGITAL ASSETS ON PUBLIC BLOCKCHAINS (Mar. 15, 2016), http://bitfury.com/content/5-white-papers-research/bitfury-digital_assets_on_public_blockchains-1.pdf [https://perma.cc/ZH8U-3BE8].

the use of blockchain voting and incentivizing states to modernize voting systems using this innovative technology.

II. DEMOCRACY FUNCTIONS BEST WHEN THE MOST PEOPLE PARTICIPATE

The right of all eligible citizens to vote is a constitutionally protected right.[6] It is a defining feature of our representative government and fundamental to the advancement of our democratic society.[7] However, there are three main threats to our existing voting system today that, if left unchecked, could compromise the representative nature of our democracy: (1) economic barriers to voting in person; (2) confusion surrounding mail-in ballots; and (3) insecure methods for counting ballots. These barriers, not surprisingly, have resulted in lower participation.[8] In 2014, just 36.3% of eligible voters participated in the midterm general election —the worst turnout in 72 years.[9] In 2016, 28.5% of eligible voters participated in the Republican and Democratic presidential primaries, despite the excitement surrounding anti-establishment candidates like Donald Trump and Bernie Sanders.[10] Of those voters, about half voted for Hillary Clinton or

6. Kramer v. Union Free Sch. Dist., 395 U.S. 621, 626–27 (1969) (holding that a state law limiting the right to vote in school district elections must further a compelling state interest and be narrowly tailored in order to be valid, thereby elevating the right to vote to the strict scrutiny requirements applicable to other fundamental rights); Reynolds v. Sims, 377 U.S. 533, 554 (1964) ("Undeniably the Constitution of the United States protects the right of all qualified citizens to vote, in state as well as in federal elections.").

7. *Reynolds*, 337 U.S. at 555 ("The right to vote freely for the candidate of one's choice is of the essence of a democratic society, and any restrictions on that right strike at the heart of representative government.").

8. Scott Clement, *Why Don't Americans Vote? We're "Too Busy."*, WASH. POST: FIX (July 17, 2015) (citing THOM FILE, U.S. CENSUS BUREAU, WHO VOTES? CONGRESSIONAL ELECTIONS AND THE AMERICAN ELECTORATE: 1978–2014 (July 2015), https://www.census.gov/content/dam/Census/library/publications/2015/demo/p20-577.pdf [https://perma.cc/4P6S-2DZ9]), https://www.washingtonpost.com/news/the-fix/wp/2015/ 07/17/why-dont-americans-vote-were-too-busy [https://perma.cc/P9MW-RC4M] (noting that a general lack of interest is at the top of the list of reasons why people did not vote in 2014)

9. The Editorial Board, *The Worst Voter Turnout in 72 Years*, N.Y. TIMES (Nov. 11, 2014), http://www.nytimes.com/2014/11/12/opinion/the-worst-voter-turnout-in-72-years.html.

10. Drew DeSilver, *Turnout Was High in the 2016 Primary Season, but Just Short of 2008 Record*, PEW RES. CTR.: FACT TANK (June 10, 2016), http://www.pewresearch.org/fact-tank/2016/06/10/turnout-was-high-in-the-2016-primary-season-but-just-short-of-2008-record [https://perma.cc/ANA4-L2CE]. Despite a "heated battle" between Hillary Clinton and Bernie Sanders, Democratic voter turnout was still far below the 2008 record of 19.5%. *Id.* What is more troubling, however, is the fact that even if turnout *had* reached numbers close to the 2008 record, just one in five eligible voters would have participated in nominating our future leaders. *See* Dan Roberts, *Crashing the Parties: Sanders and Trump Victories Vindicate the 'Outsiders,'* GUARDIAN (Feb. 10, 2016, 8:09 AM), https://www.

Donald Trump.[11] That means that 14% of eligible voting adults, or just 9% of the whole nation, picked the two viable presidential nominees of the 2016 election.[12]

The fate of our elections has been placed in the hands of primary voters, a very small and highly partisan group of dedicated voters.[13] To win, candidates need only appeal to this small and ideologically driven segment of the electorate, ignoring the needs of the majority of Americans they are elected to represent.[14] As a result, most 2016 general election voters were presented with two candidates they did not support.[15] Forced to vote for the lesser of two evils or risk wasting a vote on a third-party candidate, 42% opted out of participating altogether.[16] The 2016 election was

---

theguardian.com/us-news/2016/feb/10/donald-trump-bernie-sanders-new-hampshire-primary-anti-establishment-outsider-campaigns [https://perma.cc/2MET-HE2J].

11. Alicia Parlapiano & Adam Pearce, *Only 9% of America Chose Trump and Clinton as the Nominees*, N.Y. TIMES (Aug. 1, 2016), http://www.nytimes.com/interactive/2016/08/01/us/elections/nine-percent-of-america-selected-trump-and-clinton.html.

12. *Id.*

13. *See* PEW RESEARCH CTR., PARTISANSHIP AND POLITICAL ANIMOSITY IN 2016 (June 2016), http://assets.pewresearch.org/wp-content/uploads/sites/5/2016/06/06-22-16-Partisanship-and-animosity-release.pdf [https://perma.cc/83X5-SYUC] (finding a strong link between political participation and partisan antipathy). "Today, 55% of Democrats and 58% of Republicans view the other party in deeply negative terms," marking the first time in twenty years of Pew Research Center Surveys where the majority of partisans "not only have an unfavorable view of the other party, but a *very* unfavorable one." *Id.* at 9. Pew notes that these voters tend to participate at higher rates, citing that "partisans who are highly engaged in politics—those who nearly always vote and have either donated money to or volunteered for a campaign in the past year—feel more coldly toward members of the other party . . . ." *Id.* at 14. For example, "individuals with no negative partisan stereotypes were less likely to participate in politics. Conversely, those who associate three or more negative traits with people in the opposing party . . . participate in politics at the highest rates." *Id.* at 34. This is expounded by columnist Ezra Klein, who states, "American politics is increasingly driven by a small group of highly ideological, highly partisan, highly politically engaged people." Ezra Klein, *The Single Most Important Fact About American Politics*, VOX (Apr. 28, 2016, 8:00 AM), http://www.vox.com/2014/6/13/5803768/pew-most-important-fact-american-politics [https://perma.cc/Q3V3-TT4J].

14. *See* Shawn M. Griffiths, *When Only Partisan Voters Vote, Only Partisan Candidates Are Elected*, IVN (June 16, 2014), http://ivn.us/2014/06/16/partisan-voters-vote-partisan-candidates-elected [https://perma.cc/48PV-6HT4].

15. *See* Eliza Collins, *Poll: Clinton, Trump Most Unfavorable Candidates Ever*, USA TODAY (Aug. 31, 2016, 9:47 AM), http://www.usatoday.com/story/news/politics/onpolitics/2016/08/31/poll-clinton-trump-most-unfavorable-candidates-ever/89644296 [https://perma.cc/4QY6-ZYHE].

16. Michael D. Regan, *What Does Voter Turnout Tell Us About the 2016 Election?*, PBS NEWSHOUR (Nov. 20, 2016, 3:03 PM), http://www.pbs.org/newshour/updates/voter-

not decided by an enthusiastic nation yearning for change—it was decided by those who chose not to vote.[17] It is precisely this phenomenon that makes reform so necessary.

A. Our Flawed System: What's Wrong with Voting in America

1. The Rising Cost of Voting in Person

For many Americans, the cost and inconvenience of turning out to the polls are simply not worth the benefit of voting. To cast a ballot in person, a voter must first find and travel to the voter's polling station. This is not an easy task for all Americans.[18]

Of further inconvenience, general elections are uniformly held on Tuesdays.[19] Although instituting elections on a weekday may have fit the needs of our formerly agrarian society, holding elections on a weekday discourages otherwise eligible voters from participating.[20] As a result,

---

turnout-2016-elections [https://perma.cc/MHQ6-YR5C] (citing to low turnout in key swing states like Ohio, Wisconsin, Iowa, and Michigan as a factor in deciding the election).

17. Omri Ben-Shahar, *The Non-Voters Who Decided the Election: Trump Won Because of Lower Democratic Turnout*, FORBES (Nov. 17, 2016, 4:30 PM), http://www.forbes.com/sites/omribenshahar/2016/11/17/the-non-voters-who-decided-the-election-trump-won-because-of-lower-democratic-turnout [https://perma.cc/J8L5-9GAS].

18. In the 2016 general election, 3.3 million registered voters cited "inconvenient polling places" as a reason why they did not vote. This number was calculated by multiplying the total number of reported registered voters in November 2016 by the percentage of registered voters who cited to "inconvenient polling place" as a reason for not voting. *See Voting and Registration in the Election of November 2016: Table 1*, U.S. CENSUS BUREAU (May 2017), https://www.census.gov/data/tables/time-series/demo/voting-and-registration/p20-580.html [https://perma.cc/M2QQ-AHHX] [hereinafter *Table 1*, U.S. CENSUS BUREAU] (follow "Table 1" hyperlink for excel sheet); *Voting and Registration in the Election of November 2016: Table 10*, U.S. CENSUS BUREAU (May 2017), https://www.census.gov/data/tables/time-series/demo/voting-and-registration/p20-580.html [https://perma.cc/M2QQ-AHHX] [hereinafter *Table 10*, U.S. CENSUS BUREAU] (follow "Table 10" hyperlink for excel sheet). An additional four million registered voters reported to have "transportation problems" that prevented them from voting. This number was calculated by multiplying the total number of reported registered voters in November 2016 by the percentage of registered voters who cited to "transportation problems" as a reason for not voting. *See Table 1*, U.S. CENSUS BUREAU, *supra*; *Table 10*, U.S. CENSUS BUREAU, *supra*.

19. Evan Andrews, *Election 101: Why Do We Vote on a Tuesday in November?*, HISTORY (Oct. 30, 2013), http://www.history.com/news/ask-history/why-do-we-vote-on-a-tuesday-in-november [https://perma.cc/ZK6D-8KPV].

20. *See* Matthew Rozsa, *The Real Reason Many Americans Don't Vote*, DAILY DOT (Dec. 11, 2015, 7:21 AM), http://www.dailydot.com/via/election-day-holiday-too-poor-to-vote [https://perma.cc/EVM6-NTHB] (explaining that "in a culture where Americans get little time off, whether it's to vote or do anything else," voting is too expensive). Advocates of implementing weekend voting argue that "[o]ur current system penalizes single parents, people working two jobs, and those who have to choose between getting a paycheck and casting a ballot." *E.g.*, Steve Israel & Norma J. Ornstein, Opinion, *Everybody's Voting for the Weekend*, N.Y. TIMES (Oct. 24, 2008), http://www.nytimes.com/2008/10/24/

over twenty-two million registered voters did not vote in the November 2016 election because they were "too busy" or had a "conflicting schedule."[21] In a society that values time as money, the economic cost of leaving work to vote is too high.

In addition to the cost and inconvenience of voting, voter discrimination is still prevalent in several states across the nation.[22] For example, a bill in

---

opinion/24ornstein.html. Weekend voting, some argue, is just the fix our political system needs to spur increased civic engagement. *E.g.*, Emma-Kate Symons, *The Simple Fix That Could Make the US A Lot Better at Democracy (and More Like the French)*, QUARTZ (June 18, 2017), https://qz.com/994868/the-simple-fix-that-could-make-the-us-a-lot-better-at-democracy-and-more-like-the-french [https://perma.cc/2FD5-XY78] (noting that in France, which votes on the weekend, 75% of eligible voters cast ballots in the deciding round of the 2017 French presidential election).

21. This number was calculated by multiplying the total number of reported registered voters in November 2016 by the percentage of registered voters who cited to "too busy, conflicting schedule" as a reason for not voting. *See Table 1*, U.S. CENSUS BUREAU, *supra* ; *Table 10*, U.S. CENSUS BUREAU, *supra* note 18.

22. *See Protecting Minority Voters: Our Work Is Not Done*, NAT'L COMM'N ON VOTING RIGHTS, http://votingrightstoday.org/ncvr/resources/discriminationreport [https://perma.cc/6MG8-HXBM]. Some scholars argue that the holding in *Shelby County v. Holder* amplifies the risk of voter discrimination. *See, e.g.*, Marcus Hauer, Shelby County v. Holder*: Why Section 5 of the Voting Rights Act Is Constitutional and Remains Necessary to Protect Minority Voting Rights Under the Fifteenth Amendment*, 38 VT. L. REV. 1027, 1029 (2014); Ronson P. Honeychurch, *Exclusive Democracy: Contemporary Voter Discrimination and the Constitutionality of Prophylactic Congressional Legislation*, 37 U. HAW. L. REV. 535, 538 (2015) (arguing that despite progress, "discrete groups continue to have disproportionately lower rates of voter registration and voter turnout"). In *Shelby County v. Holder*, the Supreme Court analyzed the constitutionality of §§ 5 and 4(b) of the Voting Rights Act of 1965. 133 S. Ct. 2612 (2013). Section 5 required states with a history of voter discrimination to receive federal approval before making changes to their voting practices, commonly referred to as "preclearance requirements." *Id.* at 2615. Section 4(b) set forth the formula for deciding which states would be subject to preclearance requirements, commonly referred to as the "coverage formula." *Id.* This formula was created in 1965 and was "initially set to expire after five years." *Id.* In analyzing § 4(b), the Court noted that "[c]overage today is based on decades-old data and eradicated practices." *Id.* at 2627 ("The formula captures States by reference to literacy tests and low voter registration and turnout in the 1960s and early 1970s. But such tests have been banned nationwide for over 40 years."). Accordingly, the Court struck down § 4(b)'s coverage formula, effectively rendering § 5's preclearance requirements meaningless, as there are no longer any states subject to these requirements. *Id.* at 2631 ("Congress could have updated the coverage formula at that time, but did not do so. Its failure to act leaves us today with no choice but to declare Section 4(b) unconstitutional. The formula in that section can no longer be used as a basis for subjecting jurisdictions to preclearance."). In a country with "vestiges of discrimination against the exercise of the franchise by minority citizens," however, there is arguably a continuing need for preclearance coverage. *Id.* at 2634 (Ginsberg, J., dissenting); *see also* Elizabeth Resendez, *In the Aftermath of* Shelby County*: An Analysis on Why Texas Should Be Required To Pre-Clear All Voting*

Texas that required voters to present photo identification prevented over 600,000 people from participating in the electoral process.[23] In striking this bill down, Judge Haynes of the Fifth Circuit Court of Appeals explained that although Texas legislators passed the voting restrictions to prevent fraud, "the cloak of ballot integrity could be hiding a more invidious purpose," namely, discrimination.[24] As of February 2018, however, thirty-four states had voter identification laws, with eighteen of those states requiring a photo identification card.[25]

Because of these obstacles, minority and low-income voters tend to vote at a much lower rate,[26] threatening to silence the very voices a representative democracy aims to protect.[27]

Changes, 17 SCHOLAR 1, 11 (2015) (discussing "second-generation barriers" to voting for minority voters, such as gerrymandering).

23. S.B. 14, 2011 Leg., 82d Sess. (Tex. 2011). Senate Bill 14 required voters to show some form of ID, such as a driver's license, military identification card, citizenship certificate, weapons permit, or passport. These forms of identification are hard to retrieve without proper paperwork. As a result, Senate Bill 14 effectively prevented over 600,000 people who could not secure the specified form of identification from participating. Jim Malewitz, *Texas Voter ID Law Violates Voting Rights Act, Court Rules*, TEX. TRIB. (July 20, 2016, 1:00 PM), https://www.texastribune.org/2016/07/20/appeals-court-rules-texas-voter-id/ [https://perma.cc/HL6Z-A5ZK].

24. Veasey v. Abbott, 830 F.3d 216, 241 (5th Cir. 2016), *cert. denied*, 137 S. Ct. 612 (2017).

25. *Voter Identification Laws by State*, BALLOTPEDIA, https://ballotpedia.org/Voter_identification_laws_by_state [https://perma.cc/77GV-EACP]. These laws have an overwhelming impact on minority voters. *See* Zoltan Hajnal et al., *Voter Identification Laws and the Suppression of Minority Votes*, 79 J. POL. 363, 363, 368 (2017); Wendy Underhill, *Voter Identification Requirements / Voter ID Laws*, NCSL (June 5, 2017), http://www.ncsl.org/research/elections-and-campaigns/voter-id.aspx [https://perma.cc/JQU9-JVVT].

26. For example, in the 2016 election, the share of African American voters decreased from 12.9% in 2012 to 11.9%, despite a slight increase in the number of eligible African American voters. William H. Frey, *Census Shows Pervasive Decline in 2016 Minority Voter Turnout*, BROOKINGS (May 18, 2017) (citing Thom File, *Voting in America: A Look at the 2016 Presidential Election*, U.S. CENSUS BUREAU (May 10, 2017), https://www.census.gov/newsroom/blogs/random-samplings/2017/05/voting_in_america.html [https://perma.cc/98J6-2X3K]), https://www.brookings.edu/blog/the-avenue/2017/05/18/census-shows-pervasive-decline-in-2016-minority-voter-turnout [https://perma.cc/MD2K-ARU2]; *see also* PEW RESEARCH CTR., THE POLITICS OF FINANCIAL INSECURITY: A DEMOCRATIC TILT, UNDERCUT BY LOW PARTICIPATION 1–2 (Jan. 8, 2015), http://www.people-press.org/files/2015/01/1-8-15-Financial-security-release.pdf [https://perma.cc/J2H5-KJXU] (finding that 94% of the "most financially secure Americans" were registered to vote, while just 54% of the "least financially secure Americans" were registered).

27. *See* PEW RESEARCH CTR., *supra* note 26, at 12; Hajnal, *supra* note 25, at 364.

2. The Inadequacies of Mail-In Voting

The issues facing voters in America are not limited to those who choose to cast their ballots in person. Mail-in and absentee voting present their own sets of challenges to the administration of fair elections.[28]

In Veasey v. Abbott, the court identified arguably the biggest flaw inherent in mail-in voting: the substantial time lapse between the time one votes and the day of the election.[29] Judge Haynes explained that with mail-in voting, "voters lose the ability to account for last-minute developments, like candidates dropping out of a primary race, or targeted mailers and other information disseminated right before the election."[30] This can lock absentee voters into voting for someone or something they no longer support.

Furthermore, some states do not have the infrastructure to account for absentee ballots that are returned on Election Day, delaying finality of election results. In the 2016 California primary, for example, election officials counted ballots weeks after the Democratic presidential primary.[31] Many of those who registered right before the primary election did not even receive their mail-in ballots until after the primary was over.[32] In a hotly contested primary election, this left an overwhelming number of Americans feeling robbed of a fair election.[33] Coupled with concerns over the amount of time it takes to register for and return a mail-in ballot, this lack of assurance could result in more people opting out of the process altogether.

---

28. In Florida, for example, ballots returned without a signature or with a signature that does not match the county's file are rejected. In 2012, this resulted in 2% of all ballots cast by mail being rejected by county election officials, a margin big enough to decide the outcome of the election. Adam Liptak, *Error and Fraud at Issue as Absentee Voting Rises*, N.Y. TIMES (Oct. 6, 2012), http://www.nytimes.com/2012/10/07/us/politics/as-more-vote-by-mail-faulty-ballots-could-impact-elections.html.

29. The issue of mail-in voting and the burdens imposed on absentee or mail-in voters are discussed in more detail in the lower court's decision. *See* Veasey v. Perry, 71 F. Supp. 3d 627, 688–90 (S.D. Tex. 2014).

30. Veasey v. Abbott, 830 F.3d 216, 256 (5th Cir. 2016) (citing *Veasey*, 71 F. Supp. 3d at 689).

31. Ian Lovett, *California Today: Yes, They're Still Counting the Presidential Primary Votes*, N.Y. TIMES (June 29, 2016), http://www.nytimes.com/2016/06/29/us/california-today-presidential-primary-vote-count.html ("Three weeks after the state's Democratic

32. *Id.* (explaining that issues receiving the correct mail-in ballot on time also extended to independent voters, a group more likely to vote for Senator Sanders in the primary election).

33. *Id.*

3. Room for Error: The Vulnerabilities of Current Vote Counting Measures

In Reynolds v. Sims, Chief Justice Warren emphatically stated that "the right to elect legislators in a free and unimpaired fashion is a bedrock of our political system."[34] The process of vote counting in U.S. elections, however, is anything but unimpaired.[35]

One such impediment is the role of provisional ballots in our election system. Federal law mandates that all voters are entitled to cast a provisional ballot when there is uncertainty as to a voter's eligibility.[36] These ballots are most frequently given to voters whose names do not appear on their respective polling places' registration lists.[37] Many poll workers, however, are not trained to administer provisional ballots, leaving voters uninformed of their right to participate.[38] Those who do fill out a provisional ballot are left to wonder whether their vote will actually be verified.[39] Unbeknownst to thousands of Americans, their ballots will

---

34. 377 U.S. 533, 562 (1964).

35. In recent history, this was most notably realized in the 2000 election between George W. Bush and Al Gore. After Florida was deemed 'too close to call,' the state underwent a recount, drawing national attention to the issues plaguing punch-card voting systems. In response to growing concerns, Congress passed the Help America Vote Act (HAVA) in 2002, which replaced the old system with electronic voting machines. Although this quashed public concern momentarily, it created a new set of concerns and vulnerabilities in our election system. Law & Crime Staff, *Here's What Happens If Florida Is Too Close To Call*, LAW & CRIME (Nov. 8, 2016, 8:45 PM), https://lawandcrime.com/uncategorized/heres-what-happens-if-florida-is-too-close-to-call/ [https://perma.cc/E74T-ZVWL]; *see also* Brian Barrett, *America's Electronic Voting Machines Are Scarily Easy Targets*, WIRED (Aug. 2, 2016, 9:57 AM), https://www.wired.com/2016/08/americas-voting-machines-arent-ready-election [https://perma.cc/KQC9-Y9T4] (analyzing in-depth the current state of electronic voting machines). For a discussion of registration issues plaguing the election process, see *Top 5 Reasons Why the World Needs Our Voting Platform*, FOLLOW MY VOTE, https://followmyvote.com/top-5-reasons-why-the-world-needs-our-voting-platform [https://perma.cc/CV3S-CJWD] (noting that there are more than 6.9 million overlapping voter registrations nationwide).

36. Help America Vote Act of 2002, Pub. L. No. 107-252, § 302, 116 Stat. 1666, 1706 (codified as amended at 52 U.S.C. § 21082 (2014)); *see also Provisional Ballots*, NCSL (June 19, 2015), http://www.ncsl.org/research/elections-and-campaigns/provisional-ballots [https://perma.cc/RR4K-MNM7] (noting that the requirement is codified in the federal Help America Vote Act of 2002).

37. *See Provisional Balloting*, ELECTION PROTECTION, http://www.866ourvote.org/issues/provisional-balloting [https://perma.cc/3HRZ-AN72].

38. *Id.* ("It is important to know that many poll workers are improperly trained to handle provisional ballots, and may fail to inform voters' of their right to cast a provisional ballot.").

39. This recently occurred in California's 2016 primary election, where voters flocked to the polls only to be greeted by antiquated machines and incomplete voter rolls. Matt Pearce, *'It Was Just Chaos': Broken Machines, Incomplete Voter Rolls Leave Some Wondering Whether Their Ballots Will Count*, L.A. TIMES (June 7, 2016, 7:49 PM), http://www.

never be counted due to administrative errors on the part of poll workers and election officials.[40]

Furthermore, antiquated electronic voting systems currently in use are vulnerable to attacks.[41] In Virginia, for example, state officials were forced to decertify 3,000 WINvote machines after discovering that "anyone within a half mile could have modified every vote, undetected"—no technical experience needed.[42]

Lastly, one of the biggest concerns with vote counting methods is the lack of transparency. Currently, a voter has no way to verify that those administering the election actually record his or her vote.[43] Furthermore, there is no mechanism in place for verifying that the total number of votes is accurate.[44] The necessity of transparency in a healthy democracy has long been acknowledged, yet our current system leaves oversight in the hands of election officials, rather than in the hands of the voters themselves.

---

latimes.com/politics/la-pol-ca-voting-problems-20160607-snap-htmlstory.html [https://perma.cc/MCZ9-BK25] ("Instead of a quick in-and-out vote, many California voters were handed the dreaded pink provisional ballot—which takes longer to fill out, longer for

will be counted.").

40. *See, e.g.*, Benjamin F.C. Wallace, *Charting Procedural Due Process and the Fundamental Right To Vote*, 77 OHIO ST. L.J. 647, 648 (2016) (narrating the story of an Ohio voter whose vote was discarded after she was forced to fill out a provisional ballot in the wrong polling location).

41. Nsikan Akpan, *Here's How Hackers Might Mess with Electronic Voting on Election Day*, PBS (Nov. 8, 2016, 8:13 AM), http://www.pbs.org/newshour/updates/heres-how-hackers-could-mess-with-electronic-voting/ [https://perma.cc/VG69-9D3K].

42. Jeremy Epstein, *Decertifying the Worst Voting Machine in the US*, FREEDOM TO TINKER (Apr. 15, 2015) https://freedom-to-tinker.com/2015/04/15/decertifying-the-worst-voting-machine-in-the-us/ [https://perma.cc/MF49-8APK]; *see* Kim Zetter, *Virginia Finally Drops America's 'Worst Voting Machines,'* WIRED (Aug. 17, 2015, 7:00 AM), https://www.wired.com/2015/08/virginia-finally-drops-americas-worst-voting-machines/ [https://perma.cc/H4HU-DE33]. Virginia has since transitioned to using only paper ballots to safeguard the state's elections against insecure machines and threats of hacking. Patricia Sullivan, *Paper Ballots Make a Comeback in Virginia this Fall*, WASH. POST (Oct. 7, 2017), https://www.washingtonpost.com/local/virginia-politics/paper-ballots-make-a-comeback-in-virginia-this-fall/2017/10/07/724106ec-a92b-11e7-850e-2bdd1236be5d_story.html [https://perma.cc/92P6-TCY4].

43. *See Blockchain Voting: The End to End Process*, FOLLOW MY VOTE, https://followmyvote.com/blockchain-voting-the-end-to-end-process [https://perma.cc/WK5D-DE5P] [hereinafter *Blockchain Voting*]. This issue is especially troublesome for voters who cast a provisional ballot. *See Provisional Balloting*, *supra* note 37.

44. *See Blockchain Voting*, *supra* note 43.

B. The Current State of Online Voting

To resolve these issues, many advocates suggest modernization through online voting.[45] Their proposals are met with criticism, however, with concerns about fraud and hacking overshadowing the potential for innovation.[46] This criticism is not without merit. In 2004, computer scientists found the Secure Electronic Registration and Voting Experiment—or "SERVE"—vulnerable to a variety of potentially catastrophic cyber-attacks.[47] More recently, a military voting pilot implemented in 2010 by District of Columbia election officials failed after being hacked within forty-eight hours of going live.[48] Another thirty-six hours passed before election officials even detected the infiltration.[49]

Threats of hacking are more prevalent now than ever, with recent evidence confirming that hackers probed voting systems in twenty-one states during the 2016 election.[50] Moreover, seventeen different intelligence agencies publicly reported in 2016 that "Russia was engaged in malicious cyber

---

45. *E.g.*, Logan T. Mohs, Comment, *The Constitutionality and Legality of Internet Voting Post*-Shelby County, 13 DUKE L. & TECH. REV. 181, 194 (2015).

46. For a list of organizations that are critical of online voting, see *Internet Voting*, VERIFIED VOTING, https://www.verifiedvoting.org/resources/internet-voting/#fn-45112-3 [https://perma.cc/WU6D-FXTU].

47. DAVID JEFFERSON ET AL., A SECURITY ANALYSIS OF THE SECURE ELECTRONIC REGISTRATION AND VOTING EXPERIMENT (SERVE) 2 (Jan. 21, 2004), https://pdfs.semanticscholar.org/686f/cad1a7d837ec3ce4ea2e54063a756075d270.pdf?_ga=2.115516038.1809557259.1518415809-1168257884.1518415809 [https://perma.cc/TR83-GBCR]. Designed for military and overseas voters, the system was found to be subject to "fundamental security problems that leave it vulnerable to a variety of well-known cyber attacks . . . any one of which could be catastrophic." *Id.*

48. Scott Wolchok et al., *Attacking the Washington, D.C. Internet Voting System*, *in* FINANCIAL CRYPTOGRAPHY AND DATA SECURITY 114, 114 (Angelos D. Keromytis ed., 2012).

49. *Id.* at 123. The engineer of the hack stated that "[a] real attack might be completely Sarah Wheaton, *Voting Test Falls Victim to Hackers*, N.Y. TIMES (Oct. 8, 2010), http://www.nytimes.com/2010/10/09/us/politics/09vote.html.

50. Eric Geller & Darren Samuelsohn, *More Than 20 States Have Faced Major Election Hacking Attempts, DHS Says*, POLITICO (Oct. 3, 2016, 2:08 PM), http://www.politico.com/story/2016/09/states-major-election-hacking-228978 [https://perma.cc/6X65-NRSH]. Although DHS made this information public in late 2016, September 2017 marked the first time that government officials contacted individual state election officials to let them know their systems had been targeted, confirming that the allegations were true. Sari Horwitz et al., *DHS Tells States About Russian Hacking During 2016 Election*, WASH. POST (Sept. 22, 2017), https://www.washingtonpost.com/world/national-security/dhs-tells-states-about-russian-hacking-during-2016-election/2017/09/22/fd263a2c-9fe2-11e7-8ea1-ed975285475e_story.html [https://perma.cc/8YGQ-CK7U]. However, "in only a handful of states, including Illinois, did hackers actually penetrate computer systems, according to U.S. officials, and there is no evidence that hackers tampered with any voting machines." *Id.*

activity in an attempt to destabilize our political system."[51] This claim may have serious implications for the immediate future of Internet voting, regardless of whether the claims are true.[52]

Neither SERVE nor the Military Voting pilots, however, used decentralized ledger technology, or blockchain.[53] Rather, they relied on voters using a standard browser to connect to a central server, with no guarantee of auditability.[54]

III. A CRASH COURSE ON BLOCKCHAIN TECHNOLOGY

This Comment advocates for experimentation with blockchain voting to remove the barriers preventing full participation in the election process. First, however, it is critical to distinguish blockchain from the technology used in the failed online voting efforts discussed above, and build a foundational understanding of how this technology works, its origins, and the present and future applications of blockchain technology.

51. Press Release, The White House, Press Briefing by Press Secretary Josh Earnest, 12/12/16 (Dec. 12, 2016), https://www.whitehouse.gov/the-press-office/2016/12/12/press-briefing-press-secretary-josh-earnest-121216 [https://perma.cc/XM3D-9J6C].

52. The 115th Congress has responded to this threat with proposed legislation, ranging from legislation that aims to establish investigatory commissions, to legislation that promotes proactive education for local election officials, to legislation that develops a program to update computer security at political campaign committees. *See, e.g.*, S. 27, 115th Cong. (2017–2018); S. 1510, 115th Cong. (2017–2018); H.R. 356, 115th Cong. (2017–2018); H.R. 1907, 115th Cong. (2017–2018); H.R. 3623, 115th Cong. (2017–2018); H.R. 3751, 115th Cong. (2017–2018). For example, on September 14, 2017, U.S. Senators Kirsten Gillibrand (D-New York) and Lindsey Graham (R-South Carolina) introduced Senate Bill 1821 (S.B. 1821), which would establish the National Commission on the Cybersecurity of United States Election Systems. S. 1821, 115th Cong. (2017–2018). The Commission would be "based on a model similar to the 9/11 Commission that investigated the terror attacks in New York, Washington, and Pennsylvania [and] would look into the cyber-attacks that took place during the 2016 election cycle and make recommendations on the best way to protect our nation going forward," said Sen. Gillibrand in a press release. Press Release, Kirsten Gillibrand, U.S. Senator, N.Y., Gillibrand, Graham Propose Legislation To Establish National Commission on Cybersecurity of U.S. Election Systems (Sept. 15, 2017), https://www.gillibrand.senate.gov/news/press/release/gillibrand-graham-propose-legislation-to-establish-national-commission-on-cybersecurity-of-us-election-systems [https://perma.cc/69P6-C7FQ].

53. *See* JEFFERSON ET AL., *supra* note 47, at 4.

54. *See id.*

A. The Past: The Origins of Blockchain Technology

Blockchain technology was designed by Satoshi Nakamoto in 2008 to allow parties to make direct transfers of value online.[55] The Satoshi white paper, just nine pages in length, lays out the foundation for this peer-to-peer electronic payment system, called Bitcoin.[56] In this paper, Nakamoto outlined how to practically implement Bitcoin, detailing the role of hashing, proof-of-work, mining, incentives, and providing a mechanism for verification of transfers.[57]

For this system to be successful, Nakamoto recognized the need for a process that allowed parties to verify that money involved in a transaction had not already been spent.[58] Therefore, blockchain provides a distributed ledger that can be used to verify transactions.[59]

One of blockchain's defining characteristics is that it does not require a trusted third party, like a bank, to administer or verify transactions.[60] Rather, it is decentralized and anyone can independently verify transactions according to a predetermined set of rules.[61] These rules cannot be changed by any one person, and rather are determined by a mathematical function called a "hash function."[62] Blockchain is secure against attempts to tamper with individual transactions because the cryptographic signature of the latest block, or transaction, is built using the previous transaction's signature.[63] Thus, if someone tries to modify a transaction after it has been added to the ledger, anyone with a copy of the blockchain can compare the signatures

---

55. *See Frequently Asked Questions: Who Created Bitcoin?*, BITCOIN, https://bitcoin.org/en/faq [https://perma.cc/Q3FZ-RE3X].

56. *See generally* SATOSHI NAKAMOTO, BITCOIN: A PEER-TO-PEER ELECTRONIC CASH SYSTEM (2009), https://bitcoin.org/bitcoin.pdf [https://perma.cc/PK2E-4QHJ]. This white paper, published in a cryptography mailing list in 2009, was the first implementation of a virtual currency. *Frequently Asked Questions: Who Created Bitcoin?*, *supra* note 55.

57. *See* NAKAMOTO, *supra* note 56, at 1–5.

58. *Id.* at 2 ("The problem of course is the payee can't verify that one of the owners did not double-spend the coin. . . . We need a way for the payee to know that the previous owners did not sign any earlier transactions.")

59. *See* Hudson, *supra* note 3.

60. *Id.*; s*ee* William Mougayar, *Why the Blockchain Is the New Website*, FORBES (Dec. 21, 2015, 1:14 PM), http://www.forbes.com/sites/valleyvoices/2015/12/21/why-the-blockchain-is-the-new-website [https://perma.cc/G8HG-HNTV] ("The fundamental innovation with the blockchain is that the ownership of the asset is with the owner of the asset, not with a (central) party who owns a database that points to a record that says who is the owner.").

61. *See* Mougayar, *supra* note 60.

62. For a more technical discussion of how hashing works, see Joseph Chow, *Blockchain Underpinnings: Hashing* (Jan. 13, 2016), https://medium.com/@ConsenSys/blockchain-underpinnings-hashing-7f4746cbd66b#.xt9aczme6 [https://perma.cc/C28A-LW92].

63. Norton, *supra* note 3.

and see that it is fake.[64] By creating a system based on mathematical proofs rather than trust, Nakamoto eliminated the need for a centralized institution to verify transfers, thereby increasing financial integrity while reducing transaction costs.[65] The result is a system impervious to fraud.

B. The Present: Why Blockchain?

The startup community has since embraced Blockchain, with companies expanding its use far beyond the realm of digital money.[66] Trending among startup companies and business owners, investments in blockchain technologies continue to rise, reaching almost $300 million in the first six months of 2016.[67] Blockchain is now embraced by even the very institutions it was created to circumvent: central banks.[68]

Blockchain is attractive to businesses because of its ability to create a ledger that is immutable, distributed, and cryptographically secure.[69] "With

64. *See id.*

65. *See* NAKAMOTO, *supra* note 56, at 1.

66. BlockSign, for example, employs blockchain technology to create legally binding contracts. Danny Bradbury, *BlockSign Utilises Block Chain To Verify Signed Contracts*, COINDESK (Aug. 27, 2014, 10:54 AM), http://www.coindesk.com/blocksign-utilises-block-chain-verify-signed-contracts [https://perma.cc/KYM8-EX67]. Ubitquity uses public ledger technology to record and verify transfers of real property, recording its first ownership transfer in July 2016. Ian Allison, *Blockchain-Powered Real Estate Platform Ubiquity Records First Property Ownership Transfer on the Bitcoin Public Ledger*, INT'L BUS. TIMES (July 11, 2016), http://www.ibtimes.co.uk/blockchain-powered-real-estate-platform-ubitquity-does-first-property-ownership-transfer-bitcoin-1569980 [https://perma.cc/3LL9-3VHQ]. Everledger, a London-based startup, is using blockchain to create a public ledger to track a diamond's transaction history in hopes of preventing fraud and promoting ethical sourcing. Gian Volpicelli, *How the Blockchain Is Helping Stop the Spread of Conflict Diamonds*, WIRED (Feb. 15, 2017), http://www.wired.co.uk/article/blockchain-conflict-diamonds-everledger [https://perma.cc/WF3R-FEDW]; *What We Do*, EVERLEDGER, http://www.everledger.io/ [https://perma.cc/LDE7-973T].

67. *VC Blockchain Investments Approach $300 Million in H1 2016 as Banks Lead Deployments*, JUNIPER RES. (Aug. 16, 2016), https://www.juniperresearch.com/press/press-releases/vc-blockchain-investments-approach-$300-millio-(2) [https://perma.cc/525R-ESLN].

68. *See* Adam Ludwin, *Why Central Banks Will Issue Digital Currency*, CHAIN (June 6, 2016), https://blog.chain.com/why-central-banks-will-issue-digital-currency-5fd9c1d3d8a2 [https://perma.cc/N6ZA-JV3B]. It is even predicted that by 2025, 10% of global gross product will be stored on blockchain technology. GLOB. AGENDA COUNCIL ON THE FUTURE OF SOFTWARE & SOC'Y, WORLD ECON. FORUM, DEEP SHIFT: TECHNOLOGY TIPPING POINTS AND SOCIETAL IMPACT 24 (2015), http://www3.weforum.org/docs/WEF_GAC15_Technological_Tipping_Points_report_2015.pdf [https://perma.cc/323P-96QH].

69. This means that there is a record of a transaction's history, information added to the record is unchangeable, the record is made public to everyone involved, and all parties

the decentralization of trust," William Mougayar, general partner at Virtual Capital Ventures, writes, "we will be able to exchange anything we own, and challenge existing trusted authorities and custodians that typically held the keys to accessing our assets, or verifying their authenticity."[70] Essentially, blockchain empowers companies to securely exchange any of their assets without the need for a middleman, allowing reduced transaction costs in areas beyond purely financial transaction.

C. The Future: Preparing for Crypto-Voting

Much like the Internet transformed the ways in which we communicate, blockchain has the power to revolutionize almost any industry.[71] Consider how cryptography could be used to protect patient records from breaches of security caused by experienced hackers,[72] or how blockchain could be used to facilitate peer-to-peer smart contracts that transfer financial products such as insurance.[73] Blockchain technology might even help ease the tension between copyright law and privacy, allowing authors who wish to remain anonymous to benefit from the Copyright Act without revealing their identities.[74] Most importantly, blockchain can help revolutionize voting in elections by allowing secure and anonymous digital voting in democratic elections.[75]

---

can trust the accuracy of the record. *See The Magic of the Blockchain*, CHAIN (Nov. 16, 2015), https://blog.chain.com/the-magic-of-the-blockchain-636bf28feb64 [https://perma.cc/GK9H-T7ZA].

70. Mougayar, *supra* note 60.

71. For example, blockchain has established itself as a new medium of currency. *See* Ludwin, *supra* note 68; *see also* Joichi Ito et al., *The Blockchain Will Do to the Financial System What the Internet Did to Media*, HARV. BUS. REV. (Mar. 9, 2017), https://hbr.org/2017/03/the-blockchain-will-do-to-banks-and-law-firms-what-the-internet-did-to-media [https://perma.cc/KVV3-9C67] ("[Blockchain technology] is more likely to do to the financial system and regulation what the internet has done to media companies and advertising firms.").

72. Jacob Donnelly, *Healthcare: Can the Blockchain Optimize and Secure It?*, BITCOIN MAG. (Jan. 12, 2016, 1:53 PM), https://bitcoinmagazine.com/articles/healthcare-can-the-blockchain-optimize-and-secure-it-1452624836 [https://perma.cc/V4P8-H7UW].

73. JOSHUA DAVIS, PEER TO PEER INSURANCE ON AN ETHEREUM BLOCKCHAIN 1, http://dynamisapp.com/whitepaper.pdf [https://perma.cc/MMW7-7F8P].

74. *See* Thomas W. Bell, *Copyrights, Privacy, and the Blockchain*, 42 OHIO N.U. L. REV. 439, 461–62 (2016) (explaining that to fully enforce a copyright, an author who remains nameless must act through a trusted intermediary, resulting in much lower profits and the risk that the author's identity is leaked by the intermediary).

75. Matthew Daniel, *Blockchain Technology: The Key to Secure Online Voting*, BITCOIN MAG. (June 27, 2015, 6:24 PM), https://bitcoinmagazine.com/articles/blockchain-technology-key-secure-online-voting-1435443899 [https://perma.cc/2PJ6-J67E] ("There is a common misconception that voting cannot be done online in a secure way. However, the introduction of blockchain technology is changing the conversation . . . .").

Congress too has recognized blockchain's potential growth and pushed for the adoption of a national policy to protect this technology:

> Whereas blockchain technology with the appropriate protections has the potential to fundamentally change the manner in which trust and security are established in online transactions through various potential applications in sectors including financial services, payments, health care, energy, property management, and intellectual property management . . . .[76]

Introduced in July 2016 by bipartisan members of the House Energy and Commerce Committee, H.R. 835 is an effort to situate the United States as a global leader in the new wave of Financial Technology, or FinTech.[77] Speaking on the House Floor on September 12, 2016, U.S Representative Adam Kinzinger, who introduced the bill, cited its necessity "to ensure that the United States is competitively positioned to leverage this next wave of technology for the economy and for consumers' benefits."[78] Due to the overwhelmingly positive responses from bipartisan lawmakers, the resolution passed in September of 2016, making it the first FinTech resolution introduced, and passed, in the U.S. House of Representatives.[79]

---

76. H.R. Res. 835, 114th Cong. (2016).

77. *Id.*; *see* Press Release, Energy & Commerce Comm., "FinTech Is the Future"—Kinzinger & Cárdenas Encourage Innovation at Intersection of Financial and Technology Industries (July 20, 2016), https://energycommerce.house.gov/news-center/press-releases/fintech-future-kinzinger-c-rdenas-encourage-innovation-intersection [https://perma.cc/X8D3-LEXZ].

78. Rep. Adam Kinzinger, *Sep 12: Rep. Kinzinger Speaks on the House Floor Re: H. Res 835*, YOUTUBE (Sept. 12, 2016), https://www.youtube.com/watch?v=yXaLpx37Slg.

79. Press Release, Adam Kinzinger, Congressman, 16th District of Illinois, Reps. Kinzinger and Cárdenas Pass First 'FinTech' Bill (Sept. 12, 2016), http://kinzinger.house.gov/news/documentsingle.aspx?DocumentID=399393 [https://perma.cc/479W-J8UF]. Members of the Trump administration have similarly acknowledged the transformational impact blockchain technology could have on the public policy sector. "We are approaching this with an open mind," Mark Calabria, chief economist for Vice President Mike Pence, explained at a Blockchain Summit held in March 2017. Aaron Stanley, *The Trump Administration Is Buying into Blockchain Tech*, COINDESK (May 17, 2017, 4:24 PM), http://www.coindesk.com/the-trump-administration-is-buying-into-blockchain-tech [https://perma.cc/56LB-YVZH].

Although there has been extended analysis of the costs and benefits of blockchain in the FinTech industry,[80] in the business community,[81] and in the context of corporate governance,[82] little has been written about the legal implications of applying this technology to elections. Thus, the first legal question is whether Congress can encourage states to integrate blockchain voting into federal elections while comporting with the Constitution and current voting laws.

IV. CURRENT VOTING LAWS IN AMERICA

The United States Constitution delegates authority over certain aspects of elections to state and federal governments.[83] In the election of Senators and Representatives, states are granted control over the time, place, and manner in which elections are held.[84] This includes broad authority over the structure and procedures for administering elections.[85] Congress, however, reserves the right to make alterations to state election systems "at any time by Law . . . except as to the Places of choosing Senators."[86] In a presidential

80. *See generally* KPMG, THE PULSE OF FINTECH, Q2 2016: GLOBAL ANALYSIS OF FINTECH VENTURE FUNDING (Aug. 17, 2016), https://assets.kpmg.com/content/dam/kpmg/xx/pdf/2016/08/the-pulse-of-fintech-q2-report.pdf [https://perma.cc/WPX4-7ZKW] (providing a detailed look at trends and predictions in the funding of blockchain focused companies).

81. In Delaware, then Governor Jack Markell introduced an initiative to embrace the emerging applications of blockchain and welcome technology industries and businesses into the state of Delaware. Aptly called the Delaware Blockchain Initiative, this plan incorporates legal ambassadors and consumer groups from the industry into the decision-making process to work with lawmakers and legal counsel to determine the best policy for regulating blockchain technology. Press Release, Del. Office of the Governor, Governor Markell Launches Delaware Blockchain Initiative (May 2, 2016), http://www.prnewswire.com/news-releases/governor-markell-launches-delaware-blockchain-initiative-300260672.html [https://perma.cc/Z9VQ-DHCV]. Since the introduction of this initiative, Delaware has passed legislation recognizing "distributed ledgers" or "blockchain" as a platform for trading stock. Samuel Haig, *Delaware Passes Bill Recognizing Stock Trading via Blockchain Technology*, BITCOIN (July 3, 2017), https://news.bitcoin.com/delaware-passes-bill-recognizing-stock-trading-via-blockchain-technology [https://perma.cc/Y6GV-4X6Q].

82. For a more detailed discussion about the possibility of adapting voting mechanisms used to make decisions in the corporate setting to Bitcoin, see Michael Abramowicz, *Cryptocurrency-Based Law*, 58 ARIZ. L. REV. 359, 386–90 (2016). Specifically, Abramowicz discusses the appeal and drawbacks of applying systems such as proportionate voting, vote-buying, and a jury system to Bitcoin. *Id.*

83. U.S. CONST. art. I, § 4; *id.* art. II, § 1.

84. *Id.* art. I, § 4 ("The Times, Places and Manner of holding Elections for Senators and Representatives, shall be prescribed in each State by the Legislature thereof . . . .").

85. *See Election Administration at State and Local Levels*, NCSL (June 15, 2016), http://www.ncsl.org/research/elections-and-campaigns/election-administration-at-state-and-local-levels.aspx [https://perma.cc/6D2D-4ZXN] ("The result is that no state administers elections in exactly the same way as another state, and there is quite a bit of variation in election administration even within states.").

86. U.S. CONST. art. I, § 4.

election, the President and Vice President are elected through the Electoral College, a process outlined in the Twelfth Amendment.[87] State legislatures retain control over how members of the Electoral College are elected, with some states administering primary elections and others using caucuses to appoint electors.[88] Congress, however, reserves the right to determine the time and day of general elections, which must be uniform across all fifty states.[89]

Although the Constitution affords individual states wide latitude over the administration of elections, Congress has on several occasions exercised its constitutional authority to regulate state election systems. To remedy the invidious discrimination against black voters following the abolishment of slavery,[90] Congress passed the Voting Rights Act of 1965,[91] enforcing the Fifteenth Amendment guarantee of the right to vote to all citizens, regardless of race.[92] To encourage increased participation in national elections, Congress passed the National Voter Registration Act of 1993, making it easier for Americans to register to vote.[93] To address public concern resulting from an election deemed too close to call by officials, Congress passed the Help America Vote Act of 2002, calling for, among other things, the replacement of the punch card voting systems with electronic voting machines.[94] To ensure the right to vote extended to active service members located overseas, Congress enacted the Uniformed and Overseas Citizens Absentee Voting Act in 1986,[95] which, as amended by the Military and Overseas Voter

87. *Id.* art. II, § 1, cl. 3, *amended by* U.S. CONST. amend. XII.

88. *Id.* art. II, § 1, cl. 2; *see also* Annenberg Classroom, *Common Interpretation: Article II. The Executive Branch*, NAT'L CONST. CTR., http://constitutioncenter.org/interactive-constitution/articles/article-ii/article-ii-annenberg/interp/19 [https://perma.cc/JMD9-YJ7D] (providing the common interpretation of Article II).

89. U.S. CONST. art. II, § 1, cl. 4.

90. South Carolina v. Katzenbach, 383 U.S. 301, 308 (1966) ("The Voting Rights Act was designed by Congress to banish the blight of racial discrimination in voting, which has infected the electoral process in parts of our country for nearly a century.").

91. Voting Rights Act of 1965, Pub. L. No. 89-110, 79 Stat. 437 (codified as amended in scattered sections of 52 U.S.C. (Supp. III 2016)).

92. U.S. CONST. amend. XV, § 1.

93. National Voter Registration Act of 1993, Pub. L. No. 103-31, 107 Stat. 77 (codified as amended at 52 U.S.C. §§ 20501–20511 (Supp. III 2016)).

94. Help America Vote Act of 2002, Pub. L. No. 107-252, 116 Stat. 1666 (codified as amended at 52 U.S.C. §§ 20901–21145 (Supp. III 2016)).

95. Uniformed and Overseas Citizens Absentee Voting Act of 1986, Pub. L. No. 99-410, 100 Stat. 924 (codified as amended at 52 U.S.C. §§ 20301–20311 (Supp. III 2016)).

Empowerment Act in 2009,[96] requires states to send absentee ballots to overseas voters at least forty-five days before the election.[97] Congress has thus demonstrated its legal authority to pass a law authorizing states to modernize their voting systems to better reflect the technology-driven nature of our current society.

Any new law drafted to incentivize voting must, however, comport with current voting laws and constitutional requirements. This includes the Help America Vote Act (HAVA), which, as noted above, was passed to address the problems with voting systems that persisted after the 2000 election.[98] Characterized as "the most important voting rights bill since the passing of the Voting Rights Act in 1965,"[99] it remains virtually unchanged today.[100]

HAVA imposed several changes to the state-based administration of elections, including the grant of federal funds to states for modernizing voting equipment.[101] One condition, however, was that states comply with a set of standards required for all voting systems used in federal elections.[102] The HAVA standards require that all state voting systems: (1) Provide voters the opportunity to privately verify, and if necessary change their vote before casting a ballot;[103] (2) notify voters who have selected more than one candidate for a single office and give them the opportunity to rectify this error while preserving confidentiality;[104] (3) produce a record of the votes within audit capacity;[105] (4) make participation equally as accessible—and private—to individuals with disabilities;[106] (5) provide accessibility for voters who speak minority languages;[107] (6) comply with

96. Military and Overseas Voter Empowerment Act, Pub. L. No. 111-84, §§ 575–589, 123 Stat. 2190, 2318–35 (2009).

97. *Id.*; Press Release, U.S. Dep't of Justice, Fact Sheet: Move Act (Oct. 27, 2010), https://www.justice.gov/opa/pr/fact-sheet-move-act [https://perma.cc/9JKJ-R9TU].

98. ARTHUR L. BURRIS & ERIC A. FISCHER, CONG. RESEARCH SERV., RS20898, THE HELP AMERICA VOTE ACT AND ELECTION ADMINISTRATION: OVERVIEW AND SELECTED ISSUES FOR THE 2016 ELECTION 1 (2016).

99. Richard B. Saphire & Paul Moke, Litigating Bush v. Gore in the States: Dual *Voting* Systems and the Fourteenth Amendment, 51 VILL. L. REV. 229, 244 (2006) (quoting 147 CONG. REC. H9290 (daily ed. Dec. 12, 2001) (statement of Rep. Lewis)).

100. In 2009, the MOVE Act amended HAVA to authorize compliance with newly established requirements for overseas voters. BURRIS & FISCHER, *supra* note 98, at 2.

101. 52 U.S.C. § 20901(b)(1)(F) (Supp. III 2016). No funds for state election programs have been appropriated since 2010. BURRIS & FISCHER, *supra* note 98, at 22.

102. These voting system standards are codified in § 21081 of Title 52 of the U.S. Code. 52 U.S.C. § 21081 (Supp. II 2014).

103. *Id.* § 21081(a)(1)(A)(i)–(ii).

104. *Id.* § 21081(a)(1)(A)(iii)–(C).

105. *Id.* § 21081(a)(2).

106. *Id.* § 21081(a)(3).

107. *Id.* § 21081(a)(4).

the error rate no greater than that in 2002;[108] and (7) adopt a uniform definition of what constitutes a vote.[109]

For purposes of HAVA, "voting system" includes the total combination of mechanical and electronic equipment—including software, firmware, and documentation required to program, control, and support the equipment—used to define ballots, cast and count votes, report results, and audit the process.[110] Additionally, it includes the practices used to test, maintain, and modify the system and make information available to voters.[111]

It does not, however, outline specific systems that are permitted. Instead, any new voting system must comply with these seven standards and fit within the definition of voting system to be used in an election for federal office. To determine whether state voting systems comply with these standards, HAVA established the Election Assistance Commission (EAC),[112] an independent, bipartisan federal agency authorized to adopt voluntary voting system guidelines and provide testing for national certification of hardware and software.[113]

In 2005, the EAC adopted the Voluntary Voting System Guidelines, a 228-page document providing a set of requirements against which state-voting systems can be tested and nationally certified.[114] Although HAVA does not require all voting systems to be certified under the EAC's process, most states require compliance with the EAC guidelines.[115] Thus, in order to incentivize innovation, states must be confident that their new voting

108. *Id.* § 21081(a)(5).
109. *Id.* § 21081(a)(6).
110. *Id.* § 21081(b)(1).
111. *Id.* § 21081(b)(2).
112. *Id.* § 20921.
113. *Id.* § 20922.
114. U.S. ELECTION ASSISTANCE COMM'N, VOLUNTARY VOTING SYSTEM GUIDELINES (2005), https://www.eac.gov/assets/1/28/VVSG.1.0_Volume_1.PDF [https://perma.cc/FN38-TM58] ("The purpose of [the guidelines] is . . . to determine if [state voting systems] provide all the basic functionality, accessibility and security capabilities required to ensure the integrity of voting systems."). The EAC has updated the guidelines several times since 2005. In September 2017, for example, the EAC approved a set of principles and guidelines focusing on improving functionality, accessibility, accuracy, auditability, and security. Press Release, U.S. Election Assistance Comm'n, Committee Approves Next Generation of Voting System Guidelines (Sept. 12, 2017), https://www.eac.gov/news/2017/09/12/committee-approves-next-generation-of-voting-system-guidelines/ [https://perma.cc/S4YM-8F5C].
115. BURRIS & FISCHER, *supra* note 98, at 6.

system will become certified and their financial investment will not be in vain.[116]

In addition to the standards set forth in HAVA, certain provisions of the Voting Rights Act of 1965 (VRA) are still applicable today and must be considered before altering state voting systems. Relevant to this discussion is the prohibition of minority vote dilution codified in § 2 of the VRA.[117] As amended,[118] § 2 prohibits states from employing a voting practice that results in a denial or abridgment of the right to vote on account of race, color, or membership of a language minority group—regardless of discriminatory intent.[119] To prove a violation, the claimant need only show that the challenged voting procedure has a racially discriminatory effect when viewed under the "totality of [the] circumstances."[120] Thus, § 2 makes clear that a facially neutral state voting practice can still be challenged on vote dilution grounds if there is a discriminatory effect on minority voters.

Therefore, any new voting system must fit within the standards set forth in HAVA and must be designed to minimize any disparate impact on minority voters. With these laws in mind, Part V of this Comment envisions a blockchain voting system.

V. BLOCKCHAIN: THE KEY UNLOCKING THE FUTURE OF INTERNET VOTING

A blockchain voting system would not only satisfy the voting standards mandated by HAVA and § 2 of the Voting Rights Act, but it would remedy the shortcomings plaguing current voting systems today.

A. Complying with HAVA's Voting System Requirements

Blockchain voting allows voters to maintain anonymity while verifying their vote, satisfying HAVA's first voting system requirement.[121] To fully

116. Currently, the process of certification is complex and expensive, creating another barrier to state innovation in voting systems. *Id.*

117. Voting Rights Act of 1965, Pub. L. No. 89-110, § 2, 79 Stat. 437, 437 (codified as amended at 52 U.S.C. § 10301 (Supp. III 2016)).

118. Prior to 1982, minority voters needed to establish that a voting system was adopted with a discriminatory intent to win a vote dilution claim. City of Mobile v. Bolden, 446 U.S. 55, 70 (1980), *superseded by statute*, Voting Rights Act Amendments of 1982, Pub. L. No. 97-205, 96 Stat. 134, *as recognized in* Thornburg v. Gingles, 478 U.S. 30 (1986). Congress revised § 2 to clarify that a violation can be proven by discriminatory effect alone. *Thornburg*, 478 U.S. at 35.

119. 52 U.S.C. § 10301(a).

120. *Id.* § 10301(b); *see also Thornburg*, 478 U.S. at 46 ("Plaintiffs must demonstrate that under the totality of the circumstances, the devices result in unequal access to the electoral process.").

121. 52 U.S.C. § 21081(a)(1)(A)(i)–(ii) (Supp. II 2012).

understand this point, it is important to distinguish between Bitcoin and blockchain technology.[122] Bitcoin is a virtual currency that uses blockchain technology to verify online transfers of money. Bitcoin cannot provide for anonymous transactions.[123] Although this could pose a problem with Internet voting,[124] it is desirable for money transfers, which rely on attribution of ownership.

Blockchain is the technology that *creates* the public ledger used to verify Bitcoin's online transfers. Blockchain can be utilized far beyond the scope of virtual currencies.[125] Thus, Bitcoin's lack of anonymity does not preclude blockchain from being used to distribute data anonymously.[126] Depending on the type of cryptography used, blockchain can enable "end-to-end verifiable online elections without compromising on security or voter anonymity."[127]

Not only can a blockchain voting system preserve anonymity, it can prevent voters from selecting more than one candidate for a single office, thereby complying with HAVA's second voting system requirement.[128] It is not uncommon for absentee voters to fill out their ballots incorrectly, either by selecting too many candidates per ticket or inadvertently leaving

122. Because of its novelty, many people improperly conflate blockchain with Bitcoin. This is understandable, as any Google search for "blockchain" will provide results including "Bitcoin" and vice versa. This improper association of Bitcoin and blockchain is widely cited among the tech community. Ed Featherston, *Blockchain: Why It's So Much More Than Bitcoin*, DOPPLER (Nov. 20, 2017), https://www.cloudtp.com/doppler/blockchain-why-its-so-much-more-than-bitcoin/ [https://perma.cc/Q3F2-MH53]; *see also* Mike Orcutt, *Congress Takes Blockchain 101*, MIT TECH. REV. (Mar. 15, 2017), https://www. technology review.com/s/603820/congress-takes-blockchain-101 [https://perma.cc/V9PF-LGYJ] (explaining the inevitability of misconceptions among policymakers as to the difference between blockchain technology and Bitcoin).

123. Bitcoin's own website is transparent about this fact, plainly stating that "Bitcoin is not anonymous." BITCOIN, https://bitcoin.org/en/you-need-to-know [https://perma.cc/5KRF-PXYL].

124. Anonymity is the cornerstone of our democratic election system. Private voting reduces the social pressure to vote a certain way, prevents potential employers for discriminating based on political preference or choices, lessens the effect of group-think, and disallows bribery in the form of vote-buying—a method only truly effective if it can be verified that a person voted a certain way. *See* A. Michael Froomkin, *Flood Control on the Information Ocean: Living with Anonymity, Digital Cash, and Distributed Databases*, 15 J.L. & COM. 395, 407–09, 412, 414 (1996).

125. *See* discussion, *supra* Section II(B).

126. *See* Daniel, *supra* note 75.

127. *Elliptic Curve Cryptography & Online Voting*, FOLLOW MY VOTE, https://followmy vote.com/online-voting-technology/elliptic-curve-cryptography JU64].

128. 52 U.S.C. § 21081(a)(1)(A)(iii)–(C) (Supp. II 2014).

a box blank.[129] Confronted with erroneous ballots, election officials are instructed to invalidate these votes.[130] With blockchain voting, however, programmers can create notifications that appear throughout the voting process, alerting the voter to any clerical or administrative errors made.[131] Informing the voter of these errors *during* the process would provide voters an opportunity to fix their mistakes before submitting their ballots.

Another class of voters who would benefit from blockchain voting is those with disabilities. Well over a decade has passed since the passage of HAVA, and despite its mandate for increased accessibility for disabled voters, turnout among those with disabilities remains low.[132] Blockchain, however, offers a convenient alternative for those unable to travel to a physical polling location. By allowing voters to participate in elections without leaving their homes, blockchain voting could help disabled voters overcome some of the obstacles associated with voting, thereby satisfying HAVA's fourth voting system requirement.[133] Furthermore, developers can easily program the application to appear in all languages, increasing accessibility among those who speak a minority language, in compliance with HAVA's fifth voting system requirement.[134]

Finally, by providing voters the means to independently check each vote, blockchain voting could inject some much-needed transparency into the electoral process. Follow My Vote, an organization dedicated to improving elections with new technology, envisions such a system: "each voter would . . . be allowed to audit each ballot in the ballot box to confirm the vote totals being reported by our blockchain voting system are accurate, without revealing

---

129. *See* Katie Orr, *Mail-In Ballots Are Convenient, but Also Present Challenges*, KQED NEWS: CAL. REP. (Apr. 10, 2016), https://ww2.kqed.org/news/2016/04/10/mail-in-ballots-are-convenient-but-also-present-challenges [https://perma.cc/8PAP-Q83U].

130. In California's mail-in voting system, for example, there is no way to check if someone voted too many times in the same race until the ballot is already mailed, leading to the invalidation of these votes. *See id.*

131. Dan Lohrmann, *Can Blockchain Technology Secure Your Vote?*, GOV'T TECH. (Apr. 29, 2017), http://www.govtech.com/blogs/lohrmann-on-cybersecurity/can-blockchain-technology-secure-your-vote.html [https://perma.cc/E65U-KMKX].

132. In the 2012 presidential election, voter turnout was 5.7% lower among those with disabilities. LISA SCHUR ET AL., DISABILITY, VOTER TURNOUT, AND VOTING DIFFICULTIES IN THE 2012 ELECTIONS 22–23 (July 18, 2013), http://smlr.rutgers.edu/sites/default/files/images/Disability%20and%20voting%20survey%20report%20for%202012%20elections.pdf [https://perma.cc/GV8C-V3HX]. This equates to three million less votes nationwide. *Id.* at ii. NPR similarly reports that about one-third of voters with disabilities reportedly struggled with voting in the 2012 presidential election—"whether it was getting into the polling place, reading the ballot, or struggling with a machine." Pam Fessler, *Voters with Disabilities Fight for More Accessible Polling Places*, NPR (Oct. 24, 2016, 2:56 PM), http://www.npr.org/2016/10/24/499177544/disabled-voters-fight-for-more-accessible-polling-places.

133. 52 U.S.C. § 21081(a)(3) (Supp. II 2014).

134. *Id.* § 21081(a)(4).

the identity of each voter."[135] Because each vote will be stored on a public ledger, anyone may count the votes themselves, and "because of the blockchain audit trail, they can verify that no votes were changed or removed, and no illegitimate votes were added."[136] This will not only decrease the risk of error, complying with HAVA's sixth voting system requirement, but it will pave the way for publicly auditable results, complying with HAVA's third voting system requirement.

B. Satisfying Section 2 of the Voting Rights Act

As discussed above, in order to prove voter dilution under § 2 of the VRA, a claimant must show that, given the totality of the circumstances, the challenged voting procedure resulted in a discriminatory effect.[137] Here, there is concern that a voting system relying on Internet access and technological prowess may have a disparate impact on voters who do not have equal access to the Internet.[138] Legislation authorizing increased convenience of voting for those with Internet access, therefore, could arguably have a discriminatory effect on some voters.[139]

This claim could only be successful, however, if blockchain voting became the *only* voting system in America.[140] Much like absentee voting was implemented as an alternative to physical polling procedures, blockchain voting would initially be an addition to, rather than a replacement of, current voting systems. A blockchain voting system could even be set up at physical polling locations with free Internet, allowing those without individual Internet access to use the same blockchain enabled system.[141]

---

135. *Blockchain Voting*, *supra* note 43.

136. *Blockchain Technology in Online Voting*, FOLLOW MY VOTE, https://followmyvote.com/online-voting-technology/blockchain-technology [https://perma.cc/85JC-L3JB].

137. *See* discussion *supra* Part IV.

138. Some critics have even gone so far as to suggest that a system comprised exclusively of Internet voting would be unconstitutional, as it would place restrictions on voting based on wealth status, in violation of the Twenty-Fourth Amendment. Brett Stohs, *Is I-Voting I-Llegal?*, 2 DUKE L. & TECH. REV. 13, 13 (2003); *see* U.S. CONST. amend. XXIV, § 1. Internet voting would only violate the Twenty-Fourth Amendment, however, if the implemented system mandated that the only way one can vote is through *individual* Internet access. Mohs, *supra* note 45, at 185.

139. Stephen B. Pershing, *The Voting Rights Act in the Internet Age: An Equal Access Theory for Interesting Times*, 34 LOY. L.A. L. REV. 1171, 1207 (2001).

140. Mohs, *supra* note 45, at 185.

141. *Id.* at 190.

States, however, would still have full constitutional authority to offer in-person and mail-in procedures in conjunction with blockchain systems.

Even if states shifted toward blockchain-only voting systems, courts would be hard-pressed to find a violation in today's technologically advanced society. Although blockchain voting requires Internet access on either a computer or smartphone, minority voters increasingly have access to the Internet[142] and own smartphones.[143] Although white voters with individual access to the Internet and a smartphone, by percentage, still slightly outnumber minority voters, current trends show that the gap is rapidly narrowing.[144] Some scholars even suggest that Internet voting could increase turnout among minority groups,[145] eliminating potential grounds for a vote dilution claim under § 2.

C. Remedying Ailments to Current Voting Systems and Online Proposals

We trust the Internet to perform critical functions in almost all other areas of our lives, so why not voting? The answer is simple: the integrity of our elections is just too sacred to be held hostage by underlying threats of fraud.[146] Blockchain, however, is cryptographically secure because it is *decentralized* in nature.[147] Unlike current electronic voting methods, there is no machine to be hacked and no central computer network to compromise.[148]

---

142. *See Internet/Broadband Fact Sheet*, PEW RES. CTR. (Jan. 12, 2017), http://www.pewinternet.org/fact-sheet/internet-broadband [https://perma.cc/NT6S-F2FJ].

143. *See Mobile Fact Sheet*, PEW RES. CTR. (Jan. 12, 2017), http://www.pewinternet.org/fact-sheet/mobile [https://perma.cc/D799-BWNP] (reporting that 75% of Hispanic adults and 72% of African American adults own a smartphone, compared to 77% ownership among white adults).

144. *See Internet/Broadband Fact Sheet*, *supra* note 142. African American and Hispanic minorities are gaining Internet access more rapidly than white Americans. In 2010, 68% of African Americans and 71% of Hispanics in America used the Internet. *Id.* In 2016, those numbers jumped to 85% and 88% respectively, an increase of 17% for both groups, whereas white Americans only saw an increase of 10% between that same period. *Id.* Today, 88% of both white and Hispanic Americans use the Internet. *Id.*

145. Decreasing the number of physical polling locations would save money, allowing officials to redirect funds to voter outreach and education efforts among minority voters. *See* Mohs, *supra* note 45, at 190.

146. Just 29% of likely voters support online voting, with most voters sharing in the belief that "it's easier to corrupt than other voting methods." *Most Reject Online Voting, See Higher Risk of Fraud*, RASMUSSEN REP. (Sept. 15, 2016), http://www.rasmussenreports.com/public_content/politics/elections/election_2016/most_reject_online_voting_see_higher_risk_of_fraud [https://perma.cc/84GF-8DPV]. This threat has intensified since instances of Russia hacking U.S. elections were discussed by both the administration and published in the mainstream media. *See* discussion, *supra* Section II(B).

147. Some critics still believe blockchain voting systems are susceptible to hacking. *See* discussion, *infra* Part V(E).

148. *See* Barrett, *supra* note 35.

As a result, votes would be stored "across a network of thousands of computers" instead of in one central location.[149]

What makes it incorruptible is that new data, or blocks are added to the database, or chain, only when they are validated by a set of rules previously agreed upon by the network.[150] Moreover, each block is signed by a special cryptographic method called hashing that ties the new block to every block that came before it.[151] Any attempt to modify a previous transaction would invalidate this signature and be detectable. It is this attribute that makes the blockchain "cryptographically secure." In the context of voting, if a hacker tries to manipulate the election results by altering previously recorded votes, it can be detected by anyone—election manipulation, will be rejected.[152]

Blockchain can also remedy the inadequacies associated with mail-in voting. By giving individual voters access to a digital ballot box, this system would put voters back in control of their vote, empowering them to change their mind as events unfold.[153] If a voter changes his or her mind, this system affords voters the opportunity to "return to the system and switch his or her votes at any time before the election deadline closes."[154]

149. Adele Peters, *Democracy Is Getting a Reboot on the Blockchain*, FAST COMPANY (Aug. 10, 2016), https://www.fastcoexist.com/3062386/democracy-is-getting-a-reboot-on-the-blockchain [https://perma.cc/3AUV-3E8R]. There are, however, real vulnerabilities with a peer-to-peer system. For a discussion of these threats, see *infra* Part V(E).

150. *See* discussion *supra* Section III(B).

151. *See Blockchain Technology in Online Voting*, *supra* note 136.

152. *See id.*

153. *See What*, FOLLOW MY VOTE, https://followmyvote.com [https://perma.cc/GX9N-PFXQ].

154. *Id.* Follow My Vote provides an interesting argument as to why this technology could disrupt the two-party system. A common argument for why voters refrain from casting a ballot for third-party candidates is the "fear of wasting their vote." *Id.* By opening up the process and allowing voters to view election results as they come in, voters can see how their votes are affecting the dominant party candidates and "counteract this vote-splitting effect and shake up the current two-party system." *Id.* Whether this is a good or bad result, it could potentially increase voter turnout among disenfranchised voters hoping to have a meaningful impact on the election. It could, however, have an unpredictable impact on the integrity of the election, with voters increasingly trying to game the system. These potential strengths and weaknesses would need to be taken into consideration when analyzing feasibility on a national level.

D. Proposals and Implementations for Utilizing Blockchain to Vote

Because of the apparent benefits of using decentralized ledger technology to enable democratic voting systems, companies and governments around the world are already experimenting with this technology. Democracy Earth Foundation, for example, is using an open-source platform called Democracy OS to try to solve the corruption rampant within democratic institutions.[155] In an attempt to bring democracy into the 21st century, the organization is launching a pilot program in Colombia, which, if successful, may open the door to official use of blockchain technology in elections in Latin America.[156]

Echoing this sentiment, Follow My Vote has laid the groundwork for a cryptographically secure voting system poised to "disrupt the established voting industry."[157] Their system proposes encoding a voting system within a Decentralized Autonomous Corporation (DAC) on the Bitshares platform.[158] Instead of being managed by election officials, this system would instead be managed by individual users from across the state or country—depending on the scope of the election—called delegates.[159] Delegates would then be responsible for verifying the authenticity of votes before being recorded in the blockchain.[160]

"[B]lockchain technology is strongest when everyone is using the same network."[161] Thus, it is important that blockchain voting implementation is uniform among states. Blockchain technology, however, varies immensely

---

155. DEMOCRACY EARTH, http://democracy.earth [https://perma.cc/EH98-KFAP]; Peters, *supra* note 149.

156. Peters, *supra* note 149.

157. *How*, FOLLOW MY VOTE, https://followmyvote.com [https://perma.cc/746R-AW3G]. Experimentation is not limited to domestic efforts. In Moscow, the Department of Information Technology is exploring blockchain voting to expand direct democracy efforts. Samburaj Das, *Moscow To Use Blockchain Tech in 'Active Citizen' Project*, CRYPTOCOINS NEWS (Aug. 30, 2016, 7:15 PM), https://www.cryptocoinsnews.com/moscow-to-use-blockchain-in-active-citizen-project/ [https://perma.cc/ZL9Z-BQ5D]. The "Active Citizen" project would allow voters to "weigh in" on government issues via blockchain polls and surveys. *Id.*

158. *See* ADAM KALEN ERNEST, THE KEY TO UNLOCKING THE BLACK BOX: WHY THE WORLD NEEDS A TRANSPARENT VOTING DAC 2, 7 (July 4, 2014), https://followmyvote.com/wp-content/uploads/2014/08/The-Key-To-Unlocking-The-Black-Box-Follow-My-Vote.pdf [https://perma.cc/7W9S-GH57]. The organization's white paper explains that "[t]he benefits of using a DAC for hosting elections are inherent in a DACs design, as it embodies many of the characteristics that a legitimate electronic voting system requires: security, accuracy, transparency, anonymity, forgiveness, fairness, and efficiency." *Id.* at 8.

159. *Id.* at 7.

160. *See id.*

161. Ito et al., *supra* note 71.

based on a wide array of features.[162] Public blockchains, for example, allow any user to participate in the consensus process.[163] Private blockchains, however, grant permission in a more limited manner, sometimes restricting rights to modify or read the blockchain to only a few users.[164]

Uniformity can come in two forms. First, Congress could mandate that all state blockchain voting systems use the same permissions, features, and method of consensus.[165] Second, states could create a blockchain consortium, allowing for collaboration through an open source ledger and resulting in one shared blockchain system.[166] This approach would allow for members of the consortium, or participating states, to work together to agree on the permissions, features, and method of consensus for the shared system.[167]

---

162. *Id.* (comparing the variation in blockchain technologies to the competing technologies that emerged at the onset of the Internet). The two most notable variations of blockchain are Bitcoin and Ethereum. Bitcoin blockchain was the first public blockchain and remains the most widely used variation. Ethereum blockchain has a smaller community of users, but features its own programming language, making it the foundation of streamlined smart contracts. Jonathan Chester, *Bitcoin or Ethereum, Which Blockchain Is Right for Your Startup?*, FORBES (Aug. 12, 2016, 11:11 AM), https://www.forbes.com/sites/ jonathanchester/ 2016/08/12/bitcoin-or-ethereum-which-blockchain-is-right-for-your-startup [https://perma.cc/ WB87-CMHC].

163. *Types of Blockchains*, BLOCKCHAINHUB, https://blockchainhub.net/blockchains -in-general [https://perma.cc/LQ76-5Q9L] (defining the consensus process as "the process for determining what blocks get added to the chain"). This type of system is secured through proof-of-work or proof-of-stake mechanisms. For a more detailed explanation of proof-of-work and proof-of-stake consensus mechanisms, see Joseph Young, *Proof-of-Work vs Proof-of-Stake: Merits and Disadvantages*, COINFOX (Sept. 14, 2016), http://www.coinfox. info/news/6417-proof-of-work-vs-proof-of-stake-merits-and-disadvantages [https://perma.cc/ 33Y9-84X6].

164. *See Types of Blockchains*, *supra* note 163.

165. *See* discussion *infra* Part VII(A) (proposing that all state blockchain systems be nationally certified).

166. *See Types of Blockchains*, *supra* note 163 (defining "consortium blockchains" as systems where the consensus process is controlled by a pre-selected set of members). In the corporate context, this could lead to new opportunities for collaboration and the sharing of information across industry groups. *See* GILBERT + TOBIN, BLOCKCHAIN AND SHARED LEDGERS: THE NEW AGE OF THE CONSORTIUM 4 (Nov. 9, 2016), https://www.gtlaw.com.au/file/ 12306/download?token=o0jm7TyM [https://perma.cc/3XSX-2FE4]. If the members in control of the consensus process are pre-selected and known parties, however, the system will look more like a private shared ledger, which is not fully decentralized. *Id.* at 14, 16.

167. *See* GILBERT + TOBIN, *supra* note 166, at 5 (explaining that participants in a blockchain consortium will need to construct a framework for decision making).

E. Counterarguments

Fundamental to any healthy functioning democracy is trust. Voters must trust that their vote is being counted and believe that the process is uninhibited by external influences. The potential for hacking and the complexity of a blockchain voting system might impede a voter's ability to trust in the new system, preventing widespread adoption.

Although blockchain voting is significantly more secure than other forms of Internet voting,[168] some critics argue that blockchain voting is not insulated from interception. Dr. Jeremy Clark, cryptographic voting system expert, warns that "[i]f voters generate or are provided cryptographic keys to use in the voting process, hackers will concentrate on compromising these keys through interception or malware."[169]

Attacks can come in a variety of forms. A Sybil attack, for instance, occurs when a hacker presents many different identities and manipulates the blockchain to the hacker's benefit.[170] A 51% attack occurs when one user owns more than 50% of the network power, allowing the hacker to prevent transaction confirmations (or votes) from being added to the blockchain.[171] These types of attacks, however, can be combatted with proof-of-work and proof-of-stake systems, which, when combined with cryptographic signatures and peer-to-peer networks, make attacks less likely.[172]

Another hurdle to the adoption of blockchain voting is lack of education. Voters lack the technical knowledge to distinguish between blockchain and regular models of Internet voting. If viewed in a similar light to Internet voting, blockchain voting could be thwarted due to lack of public trust in online voting mechanisms.[173] Thus, those unable to understand its advantages might resist adoption of blockchain voting.

Furthermore, there are still many areas of election law that pose a threat to the continuance of a participatory democracy. Some critics may argue that the overwhelming role that money plays in elections is to blame for

---

168. *See* discussion *supra* Section V(C).

169. Jackie Burns Koven, *Block the Vote: Could Blockchain Technology Cybersecure Elections?*, FORBES (Aug. 30, 2016, 5:01 PM), http://www.forbes.com/sites/realspin/2016/08/30/block-the-vote-could-blockchain-technology-cybersecure-elections [https://perma.cc/R32T-X2KW]. Dr. Clark still envisions future elections using blockchain voting, however, just in a more limited capacity. *Id.* ("An end-to-end verifiable voting system that uses a blockchain as a public ledger but requires voters to show up and vote in person is an excellent option for elections today . . . but reaching beyond that is too risky.").

170. Abramowicz, *supra* note 82, at 379 & n.113.

171. *Id.* at 379.

172. *Id.* at 380.

173. *See* Darren Samuelsohn, *Military, Overseas Votes Raise Risk of Hacked Election*, POLITICO (Nov. 1, 2016, 5:06 AM), http://www.politico.com/story/2016/10/elections-hacked-military-overseas-vote-230567 [https://perma.cc/F964-72PS].

voter apathy.[174] Some may fault the two major parties for hijacking our democracy and silencing minor party and non-partisan voters.[175] Some may cite the lack of voter education as the main reason for low participation.[176] Others may argue that the reason people no longer vote is not because of the process, but because qualified candidates are lacking.[177] And scholars may speculate that reclassification of U.S. election systems as "critical infrastructure" will increase regulation, and thereby insulate our elections from external threats.[178]

---

174. *See, e.g.*, *About*, CTR. FOR RESPONSIVE POL., http://www.opensecrets.org/about/ [https://perma.cc/L4D3-NBB2]; *Money in Politics*, BRENNAN CTR. FOR JUST., http://www.brennancenter.org/issues/money-politics [https://perma.cc/46LX-8JZG] (blaming the growing disconnect between voters and elected officials on "a campaign finance system that unfairly stacks the deck in favor of the few Americans able to give exceptionally large contributions"); *Money in Politics*, COMMON CAUSE, http://www.commoncause.org/issues/money-in-politics [https://perma.cc/77NH-TETY] ("American political campaigns are now financed through a system of legalized bribery. We're working to fix it.").

175. *See, e.g.*, INDEP. VOTER PROJECT, http://www.independentvoterproject.org [https://perma.cc/SRD6-KDR2] (arguing that closed primary systems silence non-partisan voters at an integral stage of the electoral process); *Mission*, CENTRIST PROJECT, https://www.centristproject.org/mission [https://perma.cc/48T5-GKUT] (aiming to elect five independent senators to drive meaningful change in the Senate); OPEN DEBATES, https://www.opendebates.org [https://perma.cc/3HFH-Z2NS] (seeking to open the presidential debates to minor party candidates).

176. *See, e.g.*, Bethany Brookshire, *4 Reasons Why Many People Don't Vote*, SCI. NEWS FOR STUDENTS (Nov. 7, 2016, 7:45 AM), https://www.sciencenewsforstudents.org/article/4-reasons-why-many-people-dont-vote [https://perma.cc/QV6F-446K] (noting that those "without a college degree . . . are less likely to seek out political information"); INDEP. VOTER PROJECT, *supra* note 175 (focusing on providing unfiltered political news to disenfranchised voters).

177. *See, e.g.*, Harry Enten, *Americans' Distaste for Both Trump and Clinton Is Record-Breaking*, FIVETHIRTYEIGHT (May 5, 2016, 8:29 AM), http://fivethirtyeight.com/features/americans-distaste-for-both-trump-and-clinton-is-record-breaking [https://perma.cc/A2JN-CWJK].

178. *See* Scott J. Shackelford et al., *Making Democracy Harder To Hack*, 50 U. MICH. J.L. REF. 629, 631–32 (2017) (discussing the implications of the Department of Homeland Security's classification of elections as critical infrastructure, thereby subjecting elections to the same level of scrutiny as other sectors, like the Food and Agriculture sector and the Information Technology Sector). Critical infrastructure is a designation established by the Patriot Act that refers to

> the United States that the incapacity or destruction of such systems and assets would have a debilitating impact on security, national economic security, national public health or safety, or any combination of those matters." 42 U.S.C. § 5195c(e) (2001). Elections, thus, are now prioritized alongside power grids, telecommunications, dams, banking institutions, and nuclear reactors, among other industries. *Critical Infrastructure Sectors*, DEP'T OF HOMELAND SEC., https://www.dhs.gov/critical-infrastructure-sectors [https://perma.cc/K37Q-D7L4].

This Comment, however, does not seek to claim that a transition into a blockchain enabled voting system is the only solution to rectify low voter participation. Nor does it advocate for the elimination of traditional voting methods. Rather, it identifies a growing threat to democracy and provides a potential solution aimed at creating a more effective and inclusive electoral process.

Despite these potential counterarguments, advancements in society no longer make online voting just a fantasy crippled by technological limitations and overarching security threats. It is a reality that is yearning to be explored. As with any new technology, however, Congress has been slow to respond.

VI. THE NEED FOR CONGRESSIONAL ACTION

If implemented in American elections, blockchain voting would comply with all current voting laws required for Federal elections.[179] Currently, however, there are no federal guidelines directly addressing online voting.[180] Thus, it is imperative that Congress take positive action to incentivize states to experiment with blockchain technology in voting systems. This should come in the form of a bill amending HAVA to include Internet voting in the definition of "voting system," the expansion of the Election Assistance Commission by adding members in the field of cryptography and blockchain, and the re-authorization of annual appropriations for pilot programs.

A. What Congress Should Not Do: The Failed Regulation of Bitcoin

Absent clear federal guidelines, blockchain technology could fall victim to the same shortcomings that have made Bitcoin regulation both inconsistent and unpredictable. When confronted with the rise of Bitcoin, Congress resisted passing a federal law for its regulation.[181] Instead, federal agencies attempted to fit this new technology into existing legal definitions drafted exclusively for commodity and government regulated fiat currencies.[182]

---

179. *See* discussion *supra* Sections V(A)–(B).

180. *See Internet Voting*, *supra* note 46.

181. The first agency to extend regulation to Bitcoin was FinCEN in 2013, four years after its creation. *What We Do*, FINCEN, https://www.fincen.gov/what-we-do [https://perma.cc/2G4C-7TKA]. As of 2017, "no clear statutory or textual basis exists to support FinCEN's finding that Bitcoin meets any definition of 'currency' beyond the mentioned FinCEN rulings." Christopher Burks, *Bitcoin: Breaking Bad or Breaking Barriers?*, 18 N.C. J.L. & TECH. 244, 259 (2017).

182. *See* Nicholas J. Ajello, Note, *Fitting a Square Peg in a Round Hole: Bitcoin, Money Laundering, and the Fifth Amendment Privilege Against Self-Incrimination*, 80 BROOK. L. REV. 435, 436, 448–49 (2015) ("Recent developments from United States federal courts

Virtual currencies, however, do not function in the same manner as traditional currencies.

One key difference between virtual currencies, like Bitcoin, and traditional currencies is that Bitcoin does not require transfers of currency to go through traditional institutions, like central banks.[183] Free from an institutionalized intermediary, Bitcoin is decentralized in nature, placing it outside the reach of government oversight.[184] Yet, despite this delineated difference, policymakers failed to create a uniform regulatory scheme catered to Bitcoin's novel architecture. Federal agencies continue to categorize virtual currencies alongside fiat and commodity currency for regulatory purposes, thereby subjecting Bitcoin to rules created for intrinsically different forms of currency.[185]

The first regulatory agency that provided authoritative guidance for the treatment of virtual currencies under federal law is the Financial Crimes Enforcement Network (FinCEN), a bureau of the U.S. Department of the Treasury.[186] Tasked with combatting money laundering, FinCEN enforces federal laws governing money services businesses in the United States.[187]

One such law is the Bank Secrecy Act,[188] which aims to prevent money laundering and requires federal agencies to warn of suspicious activity by

---

and regulatory bodies indicate that the existing money laundering regulatory framework will guide Bitcoin regulation."); *see also* Marco Santori, *Bitcoin Law: What US Businesses Need To Know*, COINDESK (Aug. 17, 2013, 8:52 AM), http://www.coindesk.com/bitcoin-law-what-us-businesses-need-to-know [https://perma.cc/6EXJ-3TCB] (highlighting the different levels of confusion surrounding the release of FinCEN's guidelines relating to the regulation of bitcoin).

183. Joshua J. Doguet, Comment, *The Nature of the Form: Legal and Regulatory Issues Surrounding the Bitcoin Digital Currency System*, 73 LA. L. REV. 1119, 1119 (2013) (citing NAKAMOTO, *supra* note 56, at 1–2, 4).

184. *Id*. at 1121 (citing Cindy Cohn, *EFF and Bitcoin*, ELECTRONIC FRONTIER FOUND. (June 20, 2011), https://www.eff.org/deeplinks/2011/06/eff-and-bitcoin [https://perma.cc/4FY8-28QV]).

185. *See* Ajello, *supra* note 182, at 448 ("Recent developments from United States federal courts and regulatory bodies indicate that the existing money laundering regulatory framework will guide Bitcoin regulation.").

186. DEP'T OF THE TREASURY FIN. CRIMES ENF'T NETWORK, APPLICATION OF FINCEN'S REGULATIONS TO PERSONS ADMINISTERING, EXCHANGING, OR USING VIRTUAL CURRENCIES 1 (Mar. 18, 2013), https://www.fincen.gov/sites/default/files/shared/FIN-2013-G001.pdf [https://perma.cc/2CCJ-HAQK] [hereinafter FINCEN GUIDANCE]; Santori, *supra* note 182 ("The first regime [for regulating bitcoin], and the regime that has received the most press over the past few months, is the law of money transmission.").

187. *What We Do*, *supra* note 181.

188. 31 U.S.C. § 5311 (2012).

creating registration, reporting, and record-keeping regulations for financial institutions.[189] In 2013, FinCEN published a policy providing guidance on the applicability of the Bank Secrecy Act to users and businesses engaging in the exchange of virtual currencies.[190] In order to be subject to the reporting requirements set forth in the Bank Secrecy Act, a person or business partaking in the transfer of virtual currencies must fall within the bureau's definition of a "money transmitter."[191] Thus, whether Bitcoin activity is subject to federal regulation rests upon whether a digital transfer is considered "money transmitting" within the definition outlined by FinCEN.[192]

The above-mentioned sequence illustrates the standard legal routine: Congress passes a law, an agency tasked with enforcement provides guidance on the applicability of the law while defining terms central to its implementation, and application of the law is then reviewed on a case-by-case basis. The determination of whether Bitcoin use fell squarely within these defined categories is anything but clear. As a result, its regulation has been both inconsistent and unpredictable. For businesses trying to capitalize on the popularity of virtual currencies, attempting to navigate a regulatory scheme "too complicated to deal with" may simply not be worth the risk.[193]

For states struggling to enforce anti-money laundering regulations, the uncertainty has culminated in conflicting judicial rulings. A federal district court in New York, for example, held that bitcoin is "money," thus virtual currency exchangers can be punishable under federal law.[194] At issue in

189. *Id.*

190. FINCEN GUIDANCE, *supra* note 186.

191. 31 C.F.R. § 1010.100 (2014); *id.*

192. Generally, FinCEN holds that a user of virtual currency is *not* a "money transmitting business" (MSB) for the purposes of BSA enforcement, whereas administrators and exchangers are, and are thus subject to the reporting requirements set forth in the BSA. FINCEN GUIDANCE, *supra* note 186, at 1.

193. Joe Southurst, *US State Regulators: Bitcoin Businesses Aren't Applying for Licenses*, COINDESK (Dec. 10, 2013, 5:23 PM), http://www.coindesk.com/us-state-regulators-bitcoin-businesses-licenses [https://perma.cc/6M5F-8YM2]. One example of this is the story of Mike Caldwell, who started a business selling freshly minted physical bitcoins as a novelty item, accepting only bitcoin in exchange for his product. His physical bitcoins soon became the most identifiable image of the intangible currency. After receiving a letter from FinCEN that defined his activity as money transmitting, however, Caldwell decided to shut down his business, citing confusion over the "federal regulatory hoops" as his reason for halting production. Robert McMillan, *US. Government Nastygram Shuts Down One-Man Bitcoin Mint*, WIRED (Dec. 12, 2013, 6:30 AM), https://www.wired.com/2013/12/casascius [https://perma.cc/T92Y-WST7].

194. United States v. Faiella, 39 F. Supp. 3d 544, 546 (S.D.N.Y. 2014) (noting that the federal law in place to prevent money laundering, § 1960 of the United States Code, was designed to "keep pace with such evolving threats"); *see also* Housing Programs Under Stewart B. McKinney Homeless Assistance Amendments Act, Pub. L. No. 102-550, § 1512, 106 Stat. 4012, 4057 (1992) (codified as amended at 18 U.S.C. § 1960 (2012)) (criminalizing people knowingly involved in an unlicensed money transmitting business).

United States v. Faiella was whether Faiella, charged with using bitcoin currency to operate an illegal market on the website "Silk Road," qualified as a "money transmitter" and thus was subject to punishment under § 1960 of the United States Code.[195] Finding that bitcoin was unequivocally money, District Judge Rakoff held that Faiella's activities constituted "transmitting" under § 1960.[196] The court further cited FinCEN's guidance to affirm that "virtual currency exchangers constitute 'money transmitters' under its regulations," and are punishable under federal law.[197] While the legal weight of this decision is limited to persuasive authority, it demonstrates at least one approach to virtual currency: treat bitcoin like money.

A Florida state court judge, however, has taken a different approach, ruling that because of the divergent nature of Bitcoin, it should *not* be classified as money for regulatory purposes.[198] "Nothing in our frame of references allows us to accurately define or describe Bitcoin," Judge Teresa Pooler acknowledged, dismissing money laundering charges against a defendant who sold bitcoins to an undercover detective allegedly using them to engage in illegal activity.[199] "Bitcoin has a long way to go before it is the equivalent of money," she added, noting that until the Florida Legislature drafts policy regulating this uniquely divergent currency, "attempting to fit the sale of Bitcoin into a statutory scheme regulating money services businesses is like fitting a square peg in a round hole."[200]

Bitcoin's application simply does not fit within the scope of existing federal definitions. While the regulatory nightmare surrounding Bitcoin may spell out the collapse of the virtual currency,[201] it has provided us with a

195. *Faiella*, 39 F. Supp. 3d at 546.
196. *Id.*
197. *Id.*
198. *See* Florida v. Espinoza, No. F14-2923, slip op. at 5–6 (Fla. Cir. Ct., July 22, 2016), http://www.miamiherald.com/news/local/crime/article91785802.ece/BINARY/Read%20the%20ruling%20(.PDF)#storylink=related_inline [https://perma.cc/S9MV-RHB9] (ruling that bitcoin is not currency because it "cannot be hidden under a mattress like cash and gold bars," and therefore, it cannot be regulated as a "monetary instrument" in accordance with Florida statutory law).
199. *Id.* at 5, 7–8.
200. *Id.* at 6. Marco Santori, Chairman of the Bitcoin Foundation's Regulatory Affairs Committee, notes that bitcoin entrepreneurs have similarly felt that the current regulatory scheme is the equivalent of "modern square pegs being jammed into round regulatory holes meant for ancient business models." Santori, *supra* note 182.
201. Jason Bloomberg, *Something Rotten in the State of Bitcoin*, FORBES (Jan. 18, 2016, 11:22 AM), https://www.forbes.com/sites/jasonbloomberg/2016/01/18/something-rotten-in-the-state-of-bitcoin/#45f5aaa13eed [https://perma.cc/T2PF-LZVH]; Jay Adkisson,

valuable lesson on how we can best promote blockchain voting and encourage innovation in our electoral system.

B. Lessons Learned: What Bitcoin's Failed Regulation Can Teach Us

Like Bitcoin, there are currently no federal standards or guidelines in place for Internet voting.[202] Accordingly, blockchain voting might not be interpreted uniformly by states to fit within the current definition of "voting system." Voting systems are statutorily defined as the mechanical and electronic equipment used in the election process as well as the practices used to test the system and maintain transparency.[203] While blockchain could conceivably fit within this definition,[204] it remains up for debate until Congress explicitly authorizes its use in state-administered elections.

Mirroring the uncertainty that surrounded Bitcoin's regulation, confusion as to what constitutes a voting system may lead to inconsistent and contradictory judicial rulings. A district judge in one state may not believe that a vote cast on the Internet is truly confidential, as it is more susceptible to fraud, and may rule that blockchain voting does not comply with HAVA's anonymity requirement.[205] A district judge in a different state, however, may believe that the *only* way to make voting systems fully accessible to individuals with disabilities, in line with HAVA's specified goal,[206] is to allow for cryptographically secure online elections. With Bitcoin, inconsistencies like these created a culture hostile toward experimentation.[207] Likewise, the potential for inconsistent regulation of blockchain voting might discourage states from investing, fearful that new voting systems might not satisfy HAVA's current voting system standards.[208]

Why Bitcoin Is So Volatile, FORBES (Feb. 9, 2018 11:10 PM), https://www.forbes.com/sites/jayadkisson/2018/02/09/why-bitcoin-is-so-volatile/#514cc90939fb [https:perma.cc/E99B-3NW5] (comparing investment in cryptocurrency, like Bitcoin, to the stock market bubble preceding the Great Depression).

202. *See Internet Voting*, *supra* note 46. After failed attempts to develop a secure online voting system for overseas and military voters, the federal government abandoned its efforts for online voting. *Id.*

203. *See* discussion *supra* notes 110–11.

204. *See* discussion *supra* Part V.

205. 52 U.S.C. § 21081(a)(1)(C) (Supp. II 2014).

206. *Id.* § 21081(a)(3).

207. Timothy B. Lee, *Bitcoin Was Supposed To Change the World. What Happened?*, VOX (Nov. 21, 2016, 10:10 AM), http://www.vox.com/new-money/2016/11/21/13669662/bitcoin-ethereum-future-explained [https://perma.cc/JRF3-EWRF] ("The Bitcoin community has been hampered by a dysfunctional culture that has grown increasingly hostile toward experimentation. That has made it difficult for the Bitcoin network to keep up with changing market demands.").

208. Although Bitcoin and blockchain are two uniquely different ventures, comparing their development is not far-fetched. Both are complex technologies, both are decentralized in

In fact, Congress's failure to provide clear guidelines for Internet voting has already resulted in stunted innovation, with many states passing laws *prohibiting* Internet voting systems.[209] With no guarantee that blockchain voting systems will be authorized for federal elections, states have no assurance that their new systems will pass federal scrutiny and be certified.[210] Risk-averse states will thus have little to no incentive to spend money on a system that may ultimately never come to fruition.

Just as Bitcoin functions differently than fiat currency, blockchain voting functions differently than traditional voting methods. For this reason, it is critical that blockchain regulation does not fall within the legal routine described above, muddied with uncertainty in enforcement.[211] Instead, Congress must clearly authorize and incentivize states to modernize voting systems. Congress has acted before to remedy the political ailments plaguing our electoral process.[212] In a political climate fueled by hyper-partisanship[213] and defined by increasing levels of voter dissatisfaction,[214] it is time for Congress to act again.

---

nature, and both are not federally regulated. Thus, using Bitcoin's regulatory mishaps to predict the possible fate of blockchain can provide valuable insight into an otherwise novel industry.

209. For example, California law prohibits casting a ballot over the Internet. *Frequently Asked Questions*, CAL. SEC'Y STATE, http://www.sos.ca.gov/elections/frequently-asked-questions [https://perma.cc/YN4C-VTEY]. For a full list of the progress of online registration and voting in each state, see *Online Voting and Voter Registration by State*, FOLLOW MY VOTE, https://followmyvote.com/voter-resources/online-voting-voter-registration-by-state (last visited Feb. 19, 2018).

210. Although HAVA does not require state voting systems to be federally certified, most states mandate that their voting system be tested and conform with the EAC guidelines for certification. *Voting Equipment Frequently Asked Questions*, U.S. ELECTION ASSISTANCE COMMISSION, https://www.eac.gov/voting-equipment/frequently-asked-questions/ [https://perma.cc/YM86-4ET5]; *see also* U.S. ELECTION ASSISTANCE COMM'N, CATEGORIES OF STATE, TERRITORY, AND DISTRICT OF COLUMBIA PARTICIPATION IN FEDERAL VOTING STANDARDS (Jan. 31, 2011), https://www.eac.gov/assets/1/6/State_Participation_in_Testing_and_Certification—Chart_Only_for_Website_01312011.pdf [https://perma.cc/28SR-64K7] (noting that thirty-five states require testing to federal standards, testing by a federally accredited laboratory, or federal certification).

211. *See* discussion *supra* Part VI(a).

212. *See* discussion *supra* Part IV.

213. *See* PEW RESEARCH CTR., *supra* note 13.

214. *See Congressional Performance*, RASMUSSEN REP. (July 5, 2017), http://www.rasmussenreports.com/public_content/politics/mood_of_america/congressional_performance [https://perma.cc/3QCC-JX44] (finding that just 15% of likely U.S. voters think Congress is doing a good or excellent job). Political dissatisfaction following the 2016 general election resulted in nationwide protests against the then president-elect Donald

VII. WHAT NEEDS TO BE DONE: DIGITAL DEMOCRACY ACT OF 2018

To incentivize states to modernize voting systems with blockchain technology, Congress should pass a bill to amend the Help America Vote Act of 2002 to include Internet voting in the definition of "voting system," expand the Election Assistance Commission by adding members in the field of cryptography and blockchain, and re-authorize appropriations for pilot programs. This Act may be cited as the "Digital Democracy Act of 2018."

A. Define "Voting System"

As is, HAVA defines voting system broadly, with no explicit indication that Internet voting falls within its definition. To mitigate the chilling effect this may cause, § 21081(b)–*Voting system defined* should be amended by adding the following after the function of a voting system is explained:

> (3) this includes, but is not limited to, any combination of –
>
> (A) optical scan paper ballot systems,
> (B) direct recording electronic (DRE) systems,
> (C) email, fax, or remote electronic transmission for military/overseas voters; and
> (D) decentralized ledger, or blockchain enabled Internet voting systems.

Because of the increased security risks that accompany any new voting technology, Congress should additionally require that states testing blockchain voting systems be certified by laboratories accredited by the Commission.[215] Section 20971(a)–*Certification and testing* should be amended by adding:

> (3) Mandatory use by states
>
> States employing a blockchain voting system under subtitle III must certify its voting system source code. Certification must be by a laboratory accredited by the Commission under this section before the system may be used by a county in conducting a pilot program.

Specifying that certification is mandatory for blockchain enabled voting systems, as opposed to applying the current statutory language that merely makes certification optional, will serve two distinct purposes. First, by

---

Trump, with millions organizing online efforts and petitions asking electors to vote against Trump in the Electoral College. *See* Daniel Brezenoff, *Electoral College: Make Hillary Clinton President.*, CHANGE.ORG, https://www.change.org/p/electoral-college-make-hillary-clinton-president-on-december-19-4a78160a-023c-4ff0-9069-53cee2a095a8 [https://perma.cc/W6M4-NSRF]; Christopher Mele & Annie Correal, *'Not Our President': Protests Spread After Donald Trump's Election*, N.Y. TIMES (Nov. 9, 2016), http://www.nytimes.com/2016/11/10/us/trump-election-protests.html.

215. Currently, § 20971 gives states the *option* to test and certify its voting system hardware and software. 52 U.S.C. § 20971(a)(2) (Supp. II 2014).

requiring that all blockchain voting systems be certified by a nationally accredited laboratory, Congress can ensure that all state systems use the same permissions, features, and method of consensus, thereby bolstering the strength of the blockchain voting system while satisfying the uniformity mandated by HAVA.[216] Second, certification can increase voter confidence that their ballot will be protected against external security threats, increasing public trust in the system.[217]

B. Expand the Election Assistance Commission

One of HAVA's main objectives is to improve elections by providing voluntary voting guidelines for states to follow.[218] To stay up to date with current technologies, HAVA mandates these guidelines be updated every four years,[219] authorizing the EAC to provide states with guidelines for blockchain voting if desired. The adoption of new guidelines, however, requires the review of the Standards Board and the Board of Advisors.[220] Thus, to ensure that the updated guidelines are drafted and reviewed by qualified experts, Congress must amend § 20943 and § 20944 of HAVA to include more cryptography and blockchain representatives on the Standards Board and the Board of Advisors, respectively.[221]

---

216. *Id.* § 21081(a)(6); *see* discussion *supra* Section V(D).

217. The need for increased cybersecurity in our elections has become increasingly critical, for "[o]ne in four American voters say they will consider not voting in upcoming elections due to concerns over cybersecurity." Joe Uchill, *One in Four Will Consider Not Voting in Elections Due to Cybersecurity*, THE HILL (July 12, 2017, 9:00 AM), thehill.com/policy/cybersecurity/341608-one-in-four-will-consider-not-voting-in-elections-due-to-cybersecurity [https://perma.cc/H8CZ-UGE4].

218. To guide in this task, HAVA authorized the creation of the Technical Guidelines Development Committee, comprised of the Director of National Institute of Standards and Technology and fourteen other experts, to provide an initial set of recommendations. 52 U.S.C. § 20961 (Supp. II 2014).

219. *Id.* § 21101.

220. 52 U.S.C. § 20962(c) (Supp. II 2014) (explaining that as part of the process of adoption of the voluntary voting system guidelines, "the Board of Advisors and the Standards Board shall review and submit comments and recommendations regarding the guideline (or modification) to the Commission").

221. Although the adoption of new guidelines also requires the involvement of and advise from the Technical Guidelines Development Committee, this Committee is sufficiently modern. Its members include the Director of the National Institute of Standards and Technology, a representative of the Institute of Electrical and Electronics Engineers, and other individuals with "technical and scientific expertise relating to voting systems and voting equipment." *Id.* § 20961(c)(1). The Act also authorizes the Director of the National Institute of Standards and Technology, at the request of the Committee, to provide technical

Currently, the Standards Board is composed of 110 members total—fifty-five state elections officials and fifty-five local election officials.[222] Tasked with reviewing the voluntary voting system guidelines,[223] the Board's only federal requirement for appointment is that members representing the same state may not be members of the same political party.[224] Section 20943(a)—*Composition* should be amended by changing the total number of members from 110 to 120 and appending to the end the following paragraph: "(1)(C) Ten shall be representatives from the National Science and Technology Council of the Office of Science and Technology Policy."[225]

The Board of Advisors, which also plays an integral role in reviewing and modifying the voluntary voting system guidelines,[226] is similarly lacking in technology experts.[227] There are thirty-seven members in total, with just four vacancies allocated for science and technology professionals.[228] Section 20944(a)—*In General* should be amended by changing the total number of members from thirty-seven to forty-one and adding at the end the following paragraph: "(a)(17): Four members representing professionals in the field of cryptography, all of whom shall be appointed by the Congressional Blockchain Caucus."[229]

Congress can help ensure that the new voting system guidelines are sufficiently compatible with blockchain voting by including experts in technology, lawmakers who understand the importance of blockchain technology, and cryptographers who understand blockchain's technical constraints and are trained to use cryptography to secure private information. These newly appointed experts could also encourage the creation of a collaborative blockchain

---

support to help develop the guidelines, specifically including "remote access voting, including voting through the Internet." *Id.* § 20961(e).

222. *Id.* § 20943(a)(1).

223. *Id.* § 20942.

224. *Id.* § 20943(a)(3).

225. *National Science and Technology Policy*, WHITE HOUSE, https://www.whitehouse.gov/ostp/nstc [https://perma.cc/8GG3-NWM2] (noting that one of the National Science and Technology Council's missions is to "coordinate science and technology policy across the diverse entities that make up the Federal research and development enterprise," qualifying members of this office to take part in the process of reviewing voting system requirements).

226. *See* 52 U.S.C. § 20942.

227. For a full list of the composition of the Board of Advisors, see *id.* § 20944(a).

228. *Id.*

229. The Congressional Blockchain Caucus was recently formed by Rep. Mick Mulvaney and Rep. Jared Polis to advance public policy in blockchain-based technologies. Recognizing the need for Congress to be better informed on the growing technology, Rep. Polis stated, "It's vital for Americans, businesses, and members of Congress to learn about blockchain so the U.S. can continue to secure its stance as the global leader of ingenuity." Press Release, Jared Polis, U.S. Congressman, 2d Dist. of Colo., Polis Launches Congressional Blockchain Caucus (Sept. 26, 2016), http://polis.house.gov/news/documentsingle.aspx?DocumentID=398230 [https://perma.cc/QXT8-67R3].

consortium, focused on developing the best model for blockchain-based voting systems.[230]

C. Re-authorize Appropriations for Pilot Programs

Although including blockchain experts in the decision-making process will likely provide more clarity for states hoping to explore blockchain voting, it does not help states fund new voting systems.[231] To fully incentivize states, counties, and private vendors to innovate before upcoming elections, the Commission must provide financial incentives to states for implementing blockchain pilot programs.

Currently, U.S. Code § 21051 allows the Commission to provide grants to carry out pilot programs that test and implement new technologies in voting systems.[232] Eligibility is conditioned upon certification that the pilot program will comply with HAVA's voting system standards, and funding is granted upon review of the Commission.[233] While a blockchain voting pilot program could comply with HAVA's standards,[234] appropriation of

230. The idea of a blockchain consortium is not a novel concept. In April 2016, Japan launched the first blockchain consortium, which has since grown to include 100 tech companies and startups. Michael del Castillo, *Japanese Blockchain Consortium Grows to More Than 100 Members*, COINDESK (Dec. 15, 2016, 7:35 PM), http://www.coindesk.com/japanese-blockchain-consortium-grows-100-members [https://perma.cc/68LR-P9Q6]. The financial industry has since followed suit, with over eighty financial institutes collaborating in a blockchain consortium led by startup R3. Anna Irrera, *Illinois Watchdog First U.S. Regulator To Join Blockchain Consortium R3*, REUTERS (Mar. 16, 2017, 12:55 PM), http://www.reuters.com/article/us-blockchain-illinois-idUSKBN16N2FN [https://perma.cc/YVC7-2HVV] (stating that the Illinois Department of Financial and Professional Regulation marks the first U.S. regulator to join R3). Similarly, IBM has partnered with Hyperledger and The Seam to form the first blockchain consortium in the commodities market, an effort that could transform the cotton industry and how it does business. Luke Parker, *The Seam and IBM Launch the First Cotton Industry Blockchain Consortium*, BRAVE NEW COIN (Jan. 9, 2017), https://bravenewcoin.com/news/the-seam-and-ibm-launch-the-first-cotton-industry-blockchain-consortium [https://perma.cc/C76F-PKTQ]. The consortium approach, Senior Vice President of IBM Research speculates, "can help create greater efficiency and serve as the foundation of a robust system for massive collaboration." *Id.*

231. Generally, elections in the United States are administered at the county level. Over the last fifty years, however, the cost of elections has shifted to states, with federal laws such as HAVA mandating increased involvement from state election officials. *See Election Costs: What States Pay*, NCSL (Jan. 11, 2018), http://www.ncsl.org/research/elections-and-campaigns/election-costs.aspx [https://perma.cc/8G93-W8EZ].

232. 52 U.S.C. § 21051(a) (Supp. II 2014).

233. *Id.* § 21051(b).

234. *See* discussion *supra* Section V(A).

funds was limited to the fiscal year 2003.[235] Thus, Congress should amend § 21053(a)—*In General* by striking "$10,000,000 for fiscal year 2003" and inserting "$15,000,000 for fiscal years 2019, 2020, 2021, 2022."[236]

To receive federal funds under HAVA, states are required to submit a plan outlining how the funds would be used.[237] Allocation of federal funds under the Digital Democracy Act of 2018 would similarly require a proposal from state entities requesting federal funding for the innovation of voting technology. Upon the Commission's approval of eligibility, the implementation of the state's proposed blockchain voting system would be monitored and evaluated by the Director of the National Institute of Standards and Technology and adjusted accordingly.[238] These evaluations would then be submitted to the Commission and ultimately included in the annual report to the Committee on House Administration of the House of Representatives and the Committee on Rules and Administration of the Senate, pursuant to § 20972.[239]

By clearly defining voting system to include Internet voting, injecting cryptography experts into the decision-making process, and providing federal funding for innovative technologies in voting systems, the Digital Democracy Act of 2018 could pave the way for experimentation in blockchain voting and greater political participation nationwide.

VIII. CONCLUSION

Once a technological enigma, the Internet is now deeply engrained in the fabric of our society, with more than 3.8 billion users worldwide.[240] Essential to present-day notions of connectivity, it is almost impossible to imagine life without it. We now seek out intimacy by swiping right;[241]

---

235. 52 U.S.C. § 21053(a) (Supp. II 2014).

236. This number is an approximation of the current and future value of ten million dollars, due to inflation. CPI INFLATION CALCULATOR, https://data.bls.gov/cgi-bin/cpicalc.pl?cost1=10%2C000%2C000&year1=200001&year2=201802 [https://perma.cc/86A6-AYMV].

237. *See Election Costs: What States Pay*, *supra* note 231.

238. This requirement originates from § 21051(c)(3) of the Help America Vote Act. 52 U.S.C. § 21051(c)(3) (Supp. II 2014) ("After the Commission has awarded a grant . . . the Commission may request that the Director monitor the grant, and (to the extent permitted under the terms of the grant as awarded) the Director may recommend to the Commission

239. *Id.* § 20927(2) ("A copy of each report submitted to the Commission by a recipient of such grants or payments which is required under such a program . . . .").

240. *Internet Users*, INTERNET LIVE STATS, http://www.internetlivestats.com/internet-users [https://perma.cc/7ZJK-63ZK].

241. Dating applications for your personal device, like Tinder, provide users the option of showing interest in a potential match by swiping right on someone's profile.

we broadcast our identities through social platforms; we reveal our hopes and aspirations in 140 characters or less;[242] we pay our taxes while sitting in a local coffee shop; we can even get our groceries delivered right to our doorstep.

Yet, our elections have remained relatively unchanged, with most voting taking place at physical polling locations. And while we trust the Internet in almost all other aspects of political electioneering, be it education, online voter registration, campaign fundraising, social media campaigns, or public opinion polls, arguably the most important function of democracy—the act of voting—has yet to transition.

The importance of creativity and modernization in advancing the democratic process is paramount. Thus, this Comment proposes that Congress amend HAVA to allow and incentivize states to explore the feasibility of adopting blockchain voting systems in public elections. By including blockchain voting in the definition of voting system, states can innovate with confidence. By adding cryptography experts in the EAC and tasking them with reviewing federal guidelines, Congress can ensure that guidelines aimed at informing states are compatible with blockchain voting systems. And by appropriating funds for the fiscal years leading up to the 2020 and 2022 elections, Congress can incentivize much-needed innovation in our political process.

Maybe our political system is not yet ready for an entirely new software program to disrupt traditional methods of voting. Maybe Americans are not ready to accept a technology that they cannot yet conceptualize. But maybe blockchain is the key we've been searching for to unlock our democracy.

Swipe right (or Left), OXFORD DICTIONARIES, https://en.oxforddictionaries.com/definition/swipe_right_%28or_left%29 [https://perma.cc/Q6BZ-9AGW].

242. When created in 2006, the social network Twitter famously limited the number of characters available in each "tweet" or message to 140. *Character Counting*, TWITTER DEVELOPER, https://dev.twitter.com/basics/counting-characters [https://perma.cc/A2VV-PNRN]. Twitter has since expanded its character count from 140 to 280 characters. Sara Perez, *Twitter Officially Expands Its Character Count to 280 Starting Today*, TECHCRUNCH (Nov. 7, 2017), https://techcrunch.com/2017/11/07/twitter-officially-expands-its-character-count-to-280-starting-today [https://perma.cc/KV8S-Y4CB].