THE FUTURE OF VOTING REFORM WITH BLOCKCHAIN TECHNOLOGY

AGNES BEATRICE GAMBILL, JD, LLM*

TABLE OF CONTENTS

In the preamble of the U.S. Constitution, the People are given extraordinary responsibility to secure domestic prosperity for all future generations. Without a voice, the People have no power. Voting is the manifestation of the People's voice, spirit, and will, without which our democratic nation would cease to function. Unfortunately, the polarized state of political affairs in America threatens to undermine the truth of the People's will. Extensive voting reform is not only needed, it is *required* "to form a more perfect Union, establish Justice, insure domestic Tranquility, provide for the common defence, promote the general Welfare, and secure the Blessings of Liberty to ourselves and our Posterity[.]"[1]

---

    1.   U.S. CONST. pmbl.

Blockchain has been cited as one of the most influential trends that will impact the future of industry and society.[2] In particular, blockchain technology has the ability to disrupt industries and processes requiring verification, authentication, and signature,[3] and is uniquely beneficial for the secure storage and transmission of information and transactions.[4] Given the number of use cases where blockchain has dramatically improved complex, interconnected processes, such as supply chain management and financial transactions, the technology lends itself naturally to the cause of voting reform.

Since 2012, the Electoral Integrity Project (EIP) has been gathering independent evidence about the quality of elections around the world. An array of flaws compromising electoral systems in democratic societies globally are described in brief:

> District boundaries are gerrymandered . . . . Independent media are muzzled. Citizens are ill-informed about choices . . . . Vote counts are fiddled . . . . Electoral registers are out of date . . . . Votes are bought . . . . Incompetent local officials run out of ballot papers. Incumbents are immune from effective challengers . . . . Women candidates face discrimination . . . . Voting machines jam. Lines lengthen . . . . Citizens cast more than one ballot. Legal requirements serve to suppress voting rights. Polling stations are inaccessible. Software crashes . . . . Courts fail to resolve complaints impartially.[5]

To understand these issues, Part I presents a case study of North Carolina election chicanery, describing major challenges observed during the state's elections over the past decade. Topics discussed include strict voter identification requirements, voter fraud, election recounts, and voter roll errors. Part II recommends practical blockchain-centric policies designed to restore electoral trust and improve basic electoral procedures for all states in the Union. Part III concludes that, in the next 10 years, blockchain-enabled voting may provoke radical changes to the electoral system, including the introduction of "smart" elections and the use of "carrot and stick" voting tax policies.

I. ELECTORAL INTEGRITY CHALLENGES IN NORTH CAROLINA

Like any democratic ecosystem, North Carolina has faced challenges conducting fair and free elections. According to a recently released EIP report, North Carolina's electoral integrity score for the 2016 elections was 58/100, positioning the state on the same level as "'pseudo-democracies' like Cuba,

---

2.   Amy Webb, *8 Tech Trends to Watch in 2016*, Harv. Bus. Rev. (Dec. 8, 2015), https://hbr.org/2015/12/8-tech-trends-to-watch-in-2016; Don Tapscott & Alex Tapscott, Blockchain Revolution: How the Technology Behind Bitcoin is Changing Money, Business, and the World (2016); Stephen Williams, Blockchain: The Next Everything (2019).

3.   Webb, *supra* note 2.

4.   Svein Ølnes, Jolien Ubacht & Marijn Jansenn, *Blockchain in Government: Benefits and Implications of Distributed Ledger Technology for Information Sharing*, 34 Gov't Info. Q. 355, 355 (2017).

5.   Pippa Norris, Why American Elections are Flawed (And How to Fix Them) 2–3 (2017).

Indonesia, and Sierra Leone."[6] In 2018, North Carolina's electoral integrity score fell seven points further to 46th place in the entire nation.[7] Such abysmal numbers have led political scientists to assert that North Carolina can no longer be classified as a full democracy.[8] Yet, numbers, rankings, and scores do not tell the whole story.

Tensions in North Carolina politics ballooned in 2010 when North Carolina Republicans took control of the General Assembly for the first time since 1870 due to growing discontent with the Obama administration.[9] Republican leadership was further consolidated in 2012 when a Republican governor was voted into office, giving the GOP veto power and total control over state legislative activity.[10] Not surprisingly, the dramatic shift in power, which occurred after 140 years of continuous Democratic reign, unsettled the status quo. Seizing the opportunity, Republicans overhauled long-standing voting procedures, which led to a number of politicized court battles and polarized news coverage.[11] At the same time, there has been no shortage of election scandals.

A. Voter Fraud Persists Over Time

Over the last several decades, North Carolina has had a small-scale yet consistent showing of voter fraud, which has damaged the public trust in the electoral process. In 1986, forty-one individuals were charged with buying votes in western North Carolina.[12] Between 2003 and 2016, twelve votes were unlawfully cast, and three county elections in southeastern North Carolina were overturned.[13] Between 2017 and 2019, at least twenty-one incidents of voter fraud were prosecuted.[14] Most notably, in 2018, the use of fraudulent absentee ballots actually swung a Ninth District Congressional election by a razor-thin margin.[15] Discovery of the fraud led to criminal charges, a new election, embarrassment for the state of North Carolina, and further polarization between political parties.[16]

---

6.   Andrew Reynolds, *North Carolina Is No Longer Classified as a Democracy*, NEWS & OBSERVER (Dec. 22, 2016, 11:06 PM), https://www.newsobserver.com/opinion/op-ed/article122593759.html.

7.   PIPPA NORRIS, HOLLY ANN GARNETT & MAX GRÖMPING, ELECTORAL INTEGRITY PROJECT, ELECTORAL INTEGRITY IN THE 2018 AMERICAN ELECTIONS 7 (2019), https://www.electoralintegrityproject.com/peius2018.

8.   Reynolds, *supra* note 6.

9.   Chris Kardish, *How North Carolina Turned So Red So Fast*, GOVERNING (July 2014), https://www.governing.com/topics/politics/gov-north-carolina-southern-progressivism.html.

10.   *Id.*

11.   *Id.*

12.   *Election Fraud Cases*, HERITAGE FOUND. https://www.heritage.org/voterfraud/search?state=NC&combine=&year=&case_type=All&fraud_type=All&page=0 (last visited May 25, 2020).

13.   *Id.*

14.   *Id.* The Heritage Foundation's database of election fraud cases highlights approximately twenty-one incidents occurring between 2017 and 2019, including voting by ineligible felons and ineligible aliens, voter registration fraud, and duplicate voting. *Id.*; *see also Three NC Residents Arrested on Voter Fraud Charges*, WBTV (June 12, 2019, 5:24 PM), https://www.wbtv.com/2019/06/12/three-nc-residents-arrested-voter-fraud-charges/.

15.   *Timeline: North Carolina's Absentee Ballot Scandal*, ASSOCIATED PRESS (Feb. 27, 2019), https://apnews.com/7fcfea814fe3479eb5623ce9511b09f0.

16.   Alan Blinder, *In North Carolina, Investigators Find Ballot 'Scheme' in House Race*, N.Y. TIMES (Feb. 18, 2019), https://www.nytimes.com/2019/02/18/us/north-carolina-election-fraud.html.

Two major audits by the North Carolina Board of Elections (Board) also revealed fraud.[17] In 2014, an audit report[18] identified 35,750 people who potentially double-voted,[19] an anomaly which was discovered by the state's examination of voting data stored in Interstate Crosscheck.[20] However, critics pointed out that Interstate Crosscheck's database results were flawed,[21] and that several double votes were a result of clerical error. For example, voters signed poll books incorrectly, election clerks scanned the wrong bar codes, and missing data codes were not entered properly.[22] Despite these errors, the 2014 audit report verified at least eighty-one individuals who were deceased before the election, yet who still cast a vote.[23]

In 2017, a Board audit[24] of the 2016 general election revealed 508 ineligible votes: 441 by felons, forty-one by non-citizens, twenty-four cases of double voting, and two cases of voter impersonation (one by mail and one in-person).[25]

B. Voter Rolls Are Rife with Errors

North Carolina elections are flawed due to voter roll inaccuracy. Notable irregularities were found in the Board's audit of death records from the Department of Health and Human Services for the 2012 election: 50,000 death records had not been sent to the Board of Elections, and 13,416 deceased voters remained on the voter rolls in October 2013.[26]

---

17.   *See* N.C. State Bd. of Elections, Presentation to Joint Legislative Elections Oversight Committee (2014) (available at https://wwwcache.wral.com/asset/news/state/nccapitol/2014/04/02/13534230/SBOE_JointCommitte e_April_2014.pdf).

18.   *Id.*

19.   Zachary Roth, *Voter Fraud in North Carolina? Not So Fast*, MSNBC (Apr. 3, 2014), http://www.msnbc.com/msnbc/voter-fraud-north-carolina-not-so-fast-0 (last updated Apr. 8, 2014, 11:45 AM); Russ Feingold, *The Crosscheck Voter Database Is a Security Threat*, NATION (Feb. 2, 2018), https://www.thenation.com/article/archive/the-crosscheck-voter-database-is-a-security-threat/.

20.   *See* N.C. STATE BD. OF ELECTIONS, POST-ELECTION AUDIT REPORT (2017), https://s3.amazonaws.com/dl.ncsbe.gov/sboe/Post-Election%20Audit%20Report_2016%20General%20Election/Post-Election_Audit_Report.pdf; *see also* LAUREN HARMON ET AL.,CTR. FOR AM. PROGRESS ACTION FUND, THE HEALTH OF STATE DEMOCRACIES 25–26 (2015), https://cdn.americanprogressaction.org/wp-content/uploads/2015/07/HSD-report-FINAL.pdf.   The Interstate Crosscheck Program was administered by the Kansas Secretary of State. *Id.*

21.   Chris Kromm, *After Initial Hysteria, Back-Pedaling Over NC Voter Fraud Claims*, FACING SOUTH (Apr. 11, 2014), https://www.facingsouth.org/2014/04/after-initial-hysteria-back-pedaling-over-nc-voter.html; Roth, *supra* note 19.

22.   Kromm, *supra* note 21.

23.   Laura Leslie, *State Elections Officials Seek Tighter Security*, WRAL (Apr. 2, 2014, 2:06 PM), https://www.wral.com/state-elections-officials-seek-tighter-security/13533579/.

24.   N.C. STATE BD. OF ELECTIONS, *supra* note 20, at 2.

25.   Editorial, *Now We Finally Know How Bad Voter Fraud is in North Carolina*, CHARLOTTE OBSERVER (Apr. 24, 2017, 5:52 PM), https://www.charlotteobserver.com/opinion/editorials/article146486019.html.

26.   Susan Myrick, *Election Reforms Reveal Vote Fraud*, CIVITAS INST. (Apr. 3, 2014), https://www.nccivitas.org/2014/elections-reforms-reveal-vote-fraud/.

Cleaning up voter rolls has garnered bipartisan support;[27] however North Carolina and other states are wary about how to remove duplicate registrations, deceased voters, and voters who have moved out of state without purging legitimate voters.[28] In *Husted v. A. Philip Randolph Institute*, the Supreme Court weighed in, affirming that states can take reasonable steps to remove voters from voter registration polls in order to ensure accuracy and uphold the integrity of the electoral process.[29]

Unfortunately, identifying voters for removal can involve multiple steps and take several years.[30] In Columbus, Ohio, for example, removing out-of-state voters from the voter roll may take six years:

> First, a voter must fail to partake in "voter activity," including not just casting a ballot but also other actions like signing a petition, for two years. Ohio then mails a pre-stamped, pre-addressed notice to the voter asking that he confirm he is still a resident of Ohio. If the notice is not returned, and the voter fails to cast a ballot in any election over the next four years, state officials may then remove the voter on the grounds that he is no longer a resident.[31]

The removal mechanism is a complex process because of statutory requirements, pursuant to the National Voter Registration Act (NVRA), and involve written confirmation of a change in residence to a place outside the jurisdiction or compliance with notice procedures.[32] The NVRA gives states the option to access change of address information through the United States Postal Service or devise their own programs to identify ineligible voters.[33] The lack of uniformity in how states initiate the notice process may cause further confusion among citizens who move on a frequent basis, such as students and recent graduates.

C. Voter ID Laws Are Controversial and Politicized

Debate over voter ID laws in North Carolina has been largely controversial and politicized, and has prevented any meaningful voting reform.[34] In 2013, the North Carolina legislature passed House Bill 589, otherwise known as the Voter Information Verification Act, which required voters to present valid, unexpired

---

27. *Bipartisan Support for Voter Registration Modernization,* BRENNAN CTR. FOR JUST. (Mar. 10, 2017), https://www.brennancenter.org/our-work/research-reports/bipartisan-support-voter-registration-modernization.

28. Roth, *supra* note 19.

29. *See generally* Husted v. A. Philip Randolph Inst., 138 S. Ct. 1833, 1848 (2018).

30. *Id.* at 1842.

31. *See generally* Hans A. von Spakovsky & Jason Snead, *Supreme Court Gives States the Green Light to Clean Up Voter Rolls*, HERITAGE FOUND. (June 11, 2018), https://www.heritage.org/election-integrity/commentary/supreme-court-gives-states-the-green-light-clean-voter-rolls.

32. *See generally id.*

33. *The National Voter Registration Act of 1993 (NVRA),* U.S. DEP'T JUST., https://www.justice.gov/crt/national-voter-registration-act-1993-nvra.

34. *See infra* notes 38–39, 41–42 and accompanying text.

photo identification at polling stations.[35] The purpose of the new law was to prevent in-person voter fraud.[36] Despite similar voter ID laws being enacted around the same time in fourteen other states,[37] Democrats hailed North Carolina's version as an "abomination"[38] and "the country's worst voter suppression law."[39] The law required strict identification requirements (no student IDs), reduced the number of days citizens could vote early, eliminated same-day voter registration during early voting season, and repealed out-of-precinct voting.[40] Critics claimed that the law made voting less convenient for minorities, the disabled, and young people.[41]

North Carolina's voter ID law also drew criticism from the Department of Justice (DOJ), which sued the State based on the law's discriminatory effect and intent.[42] The move by the DOJ was swift, coming directly after the Supreme Court invalidated a key part of the 1965 Voting Rights Act that previously required states with a history of discrimination to seek pre-approval from federal authorities before changing voting laws.[43] North Carolina Governor Pat McCrory called the Justice Department's lawsuit an example of "federal overreach that ha[d] no merit."[44]

D. Coordinated Election Fraud Operations Exist in North Carolina

Coordinated electoral fraud has also plagued North Carolina.[45] In 2019, an investigation was launched in Bladen County, North Carolina, when the Republican victor in the 9th Congressional District election won the race by 905 votes despite losing in six out of eight counties.[46] The investigation uncovered foul play: at least

---

35.   Voter Information Verification Act, 2013 N.C. Sess. Laws 381 (repealed 2018), https://www.ncleg.net/Sessions/2013/Bills/House/PDF/H589v9.pdf.

36*.   Id.*

37.   Amanda Holpuch, *North Carolina Voter ID Law Struck Down as 'Discriminatory' by Federal Court,* GUARDIAN (July 29, 2016, 2:44 PM), https://www.theguardian.com/us-news/2016/jul/29/north-carolina-voter-id-law-struck-down.

38.   Matthew Burns, Laura Leslie & Mark Binker, *Voting Changes Head to Governor*, WRAL.COM, https://www.wral.com/voting-changes-head-to-governor/12703982/ (last updated July 26, 2013, 6:11 AM).

39.   Ari Berman, *North Carolina Passes the Country's Worst Voter Suppression Law,* NATION (July 26, 2013), https://www.thenation.com/article/archive/north-carolina-passes-countrys-worst-voter-suppression-law/.

40.   *Id.*

41.   *Id.*

42.   Evan Perez, *Justice Department Sues North Carolina Over Voting Law,* CNN, https://www.cnn.com/2013/09/30/us/north-carolina-voting-lawsuit/index.html (last updated Sept. 30, 2013). Eric Holder criticized the Supreme Court's decision to overturn unconstitutional provisions of the Voting Rights Act and stated at a Congressional Black Caucus Foundation that the Justice Department would find ways to accomplish the goals of the section that were struck down. *Id.* The North Carolina State Conference of the NAACP and League of Women Voters also filed lawsuits against the state. *See* North Carolina NAACP v. McCrory, BRENNAN CTR. FOR JUST. (May 15, 2017), https://www.brennancenter.org/our-work/court-cases/north-carolina-naacp-v-mccrory.

43.   *See* Shelby Cty. v. Holder, 570 U.S. 529 (2013).

44.   Carrie Johnson, *Justice Department Sues North Carolina Over Voter ID Law,* NPR, (Sept. 30, 2013, 3:02 PM), https://www.npr.org/sections/thetwo-way/2013/09/30/227591062/justice-department-to-sue-north-carolina-over-voter-id-law.

45.   *See infra* notes 46–51 and accompanying text.

46.   Doug Bock Clark, *The Tearful Drama of North Carolina's Election-Fraud Hearings*, NEW YORKER *(*Feb. 24, 2019), https://www.newyorker.com/news/dispatch/the-tearful-drama-of-north-carolinas-election-fraud-hearings.

1000 mail-in votes were fraudulent.[47] Felony charges were eventually filed against a Republican political operative who tampered with and unlawfully submitted ballots without voters' knowledge.[48] *Time* magazine called the incident a "black mark on American democracy, a clear-cut case of electoral malfeasance that should have been caught much earlier in the process."[49] Notably, Bladen County has been under investigation five times since 2010 for the exploitative use of absentee ballots by *both* Democrats and Republicans.[50] Three elections in neighboring Robeson County have also been re-held due to fraud allegations and government corruption.[51]

E. Vote Recounts Undermine Confidence in Election Results

Vote recounts undermine public confidence in elections, as evidenced by the 2000 Florida presidential race.[52] Vote recounts in North Carolina's gubernatorial elections are also drawing close scrutiny. In 2016, sitting North Carolina Governor Pat McCrory petitioned for a partial recount of voting machine results in Durham County, even though the local board of elections determined that a recount was unnecessary.[53] While Democratic gubernatorial opponent Roy Cooper led the race by 10,000 votes, McCrory's campaign claimed that several precincts in Durham County had encountered technical problems and possible computer glitches.[54] North Carolina law gives candidates the right to request or demand a recount in various situations, such as close-vote-margins.[55]

The Civitas Institute also questioned the number of votes cast in the 2016 McCrory-Cooper gubernatorial election, claiming that same-day registration votes had been unlawfully counted because those votes were still pending verification.[56] The NAACP protested too, filing a lawsuit and alleging that the 1,500 provisional votes were not properly counted because the state DMV had failed to pass along

---

47. *Id.*
48. Richard Gonzales, *North Carolina GOP Operative Faces New Felony Charges that Allege Ballot Fraud,* NPR (July 30, 2019), https://www.npr.org/2019/07/30/746800630/north-carolina-gop-operative-faces-new-felony-charges-that-allege-ballot-fraud.
49. Philip Elliott, *Why North Carolina's Election Fraud Hurts American Democracy,* TIME (Feb. 22, 2019), https://time.com/5535292/north-carolina-election-fraud/.
50. Bruce Henderson & Will Doran, *In 2 NC Counties with 'Rough Politics,' Election Fraud Claims are Nothing New*, CHARLOTTE OBSERVER (Dec. 7, 2018, 4:29 PM), https://www.charlotteobserver.com/news/politics-government/election/article222739860.html.
51. *Id.*
52. Ron Elving, *The Florida Recount of 2000: A Nightmare that Goes on Haunting*, NPR (Nov. 12, 2018), https://www.npr.org/2018/11/12/666812854/the-florida-recount-of-2000-a-nightmare-that-goes-on-haunting.
53. Emily Cadei, *North Carolina Governor's Race Recount: Last Gasp of a Changing South?,* NEWSWEEK (Dec. 3, 2016), https://www.newsweek.com/north-carolina-governor-recount-changing-south-527911. Governor McCrory eventually asked for a full recount, pursuant to his right under N.C. GEN. STAT. ANN. § 163-182.7 (West 2019). *Id.*
54. *Id.*
55. N.C. Gen. Stat. § 163-182.7
56. Complaint at 1–2, De Luca v. N.C. Bd. of Elections, No. 16-913 (E.D.N.C. Nov. 21, 2016).

voter registration data to the Board before the election.[57] Although same-day registrations have a higher risk of being fraudulent,[58] the 1,500 provisional votes were still ultimately counted.[59]

Election audits are critical to maintaining free and fair elections, and state law ensures that recounts can happen in close elections. However, the persistent questioning of whether vote counts are valid that occurs in the media and in court rooms undermines the public's confidence in electoral management and procedures.[60]

II. BLOCKCHAIN VOTING SYSTEMS RESOLVE FLAWS IN BASIC ELECTORAL PROCEDURES

Blockchain technology should not be viewed as a panacea for every flaw responsible for injury to electoral integrity in North Carolina or broader U.S. elections. Equally, the technology should not be dismissed in perfunctory fashion as an inadequate replacement for tried and true voting procedures, such as hand-counting paper ballots by part-time poll workers. In fact, advancements in blockchain technology made in the next 10 years will lead to achievable and much-needed reform in U.S. voting policy.

Two hypothesized outcomes of widespread adoption of blockchain technology in voting systems include: (1) the alleviation of partisan polarization over basic electoral procedures and (2) the restoration of public trust through fraud prevention. Blockchain technology already has the mechanisms to solve basic flaws in America's electoral system. Technological advancements will continue to lead to improved security, voting privacy standards, and operational efficiencies.

A. Improving Electoral Management with a Tiered Blockchain Ecosystem

Voting reform begins with the adoption of professional standards in state and local elections. Article 1, Section 4 of the Constitution grants authority to state legislatures to regulate the time, place, and manner of elections, meaning that different states have different arrangements for basic procedures, such as verifying registration and identification.[61] To complicate matters, different counties also come up with different rules for managing local elections, such as local hours and where to place ballot information. Developing a tiered blockchain voting ecosystem that channels information between county-level and state-level blockchain systems would foster electoral integrity and streamline electoral management in state and local government.

---

57. David A. Graham, *What's Really Going On in North Carolina's Gubernatorial Race?*, Atlantic (Nov. 23, 2016), https://www.theatlantic.com/politics/archive/2016/11/whats-really-going-on-in-north-carolinas-gubernatorial-race/508520/.

58. At least 2% of same-day registration votes are fraudulent. *Id.*

59. *Id.*

60. Pippa Norris, *Do Perceptions of Electoral Malpractice Undermine Democratic Satisfaction? The US in Comparative Perspective*, 40 Int'l Pol. Sci. Rev. 5 (2018). Lack of confidence in elections paves the way for the erosion of democracy.

61. U.S. Const. art. I, § 4, cl. 1.

Characteristics of blockchain technology central to electoral management reform include transparency and immutability of stored data.[62] These characteristics are intrinsic to the technology due to blockchain's ability to securely store data and transactions on a distributed network of nodes, or computers.[63] In essence, all nodes share the same data and the same blockchain ledger.[64] New information can be added to the ledger only when all nodes agree, or reach consensus, that the data has been verified as uniform across all interconnected ledgers.[65] In doing so, a decentralized blockchain network automatically authenticates new information without having to rely on a central actor, such as a government agency or poll volunteer.[66] Old information is also never removed, thereby creating a transaction history that is fully auditable.[67]

B. Restore Public Confidence in Elections During a Pandemic with Blockchain Voting Systems

In the United States, blockchain voting apps[68] exist, but are not being used on an extensive scale. So far, voting pilots have been successfully conducted in elections in West Virginia, Utah, Colorado, and Oregon.[69]

Critics of blockchain voting apps comment that the technology is susceptible to hacking and other security vulnerabilities.[70] These criticisms are reasonable as the technology is still emerging, and continued investment in its development is of critical importance. However, the unexpected arrival of the COVID-19 pandemic prior to the 2020 U.S. presidential election has forced the country and critics to seriously consider how blockchain will shape the future of voting.

The federal government is also taking notice. Now that many Americans will have to mail in votes during the pandemic, the US Postal Service filed a patent for a blockchain-based voting system. The patent explains that registered voters will

---

62. Nathan Reiff, *Blockchain Explained*, INVESTOPEDIA (Feb. 1, 2020), https://www.investopedia.com/terms/b/blockchain.asp.

63. *Id.*

64. *Id.*

65. *Id.*

66. *Id.*

67. *Id.*; *cf.* Jacob Hoffman-Andrews, *E-Voting Machines Need Paper Audits to be Trustworthy*, ELECTRONIC FRONTIER FOUND. (Nov. 23, 2016), https://www.eff.org/deeplinks/2016/11/e-voting-machines-need-paper-audits-be-trustworthy.

68. *See e.g.* VOATZ, https://voatz.com (last visited May 25, 2020).

69. Tusk Philanthropies, *Mobile Voting is coming to local Oregon elections*, PRNEWSWIRE (Oct. 16, 2019), https://www.prnewswire.com/news-releases/mobile-voting-is-coming-to-local-oregon-elections-300939320.html; Makena Kelly, *Nearly 150 West Virginians voted with a mobile blockchain app*, THE VERGE (Nov. 10, 2018, 2:00 PM), https://www.theverge.com/2018/11/10/18080518/blockchain-voting-mobile-app-west-virginia-voatz; Daniel Palmer, *Utah County to Offer Blockchain Voting App in Municipal Elections*, COINDESK (July 23, 2019, 11:00 AM), https://www.coindesk.com/utah-county-to-offer-blockchain-voting-app-in-municipal-elections; Andrew Kenney, *Denver will allow smartphone voting for thousands of people (but probably not you)*, DENVER POST (Mar. 7, 2019, 1:18 PM), https://www.denverpost.com/2019/03/07/voting-smartphone-blockchain-denver/.

70. See MICHAEL A. SPECTER, JAMES KOPPEL & DANIEL WEITZNER, THE BALLOT IS BUSTED BEFORE THE BLOCKCHAIN: A SECURITY ANALYSIS OF VOATZ, THE FIRST INTERNET VOTING APPLICATION USED IN U.S. FEDERAL ELECTIONS (2020), https://internetpolicy.mit.edu/securityanalysisofvoatz_public/.

receive a "computer readable code in the mail [that] confirms identity and confirms correct ballot information … [,] separates voter identification and votes to ensure voter anonymity, and stores votes on a distributed ledger in a blockchain."[71]

Providing a secure way to cast a vote remotely could encourage voting participation by citizens who either distrust the mail-in voting system or who are at high risk of becoming seriously ill from the COVID-19 virus when visiting a polling station. Although the patent filing may be too late for the 2020 presidential election, the stage has been set for future adoption of blockchain technology in U.S. elections.

C. Verifying Voting Eligibility on the Blockchain

Using a blockchain voting system, voting eligibility could be authenticated instantly by checking encrypted data blocks that are stored on state agency nodes at the DMV, the Secretary of the State, the Board of Elections, or state divisions where vital records are kept. Data, such as birth and death certificates, signatures, criminal records, social security numbers, and postal addresses, could be automatically accessed and authenticated during the registration process. Many state DMV systems already link to state voter registration databases;[72] however transmitting these verification checks over a blockchain-based system would leave forensic evidence, such as whether transactions occurred correctly over multiple network access points. Large corporations that perform KYC/AML checks already conduct similar types of verification due diligence.[73]

Using automatic enforcement of smart contracts[74] based on fraud-prevention criteria, a blockchain voting system could quickly identify double voting attempts, duplicate registrations, dead voters, and ineligible voters (due to age, citizenship, felon status, or residence). In instances of fraud, access would be denied to ballots, digital or otherwise. Same-day registrants could also benefit from an immediate verification process. Likewise, instantaneous verification could limit the use of provisional ballots, reduce long wait times in polling lines, and increase voter turnout.[75]

In practice, state agencies would have to maintain an accessible, current, and encrypted database of records, such as felon status, birthdates, and death certificates, in order for verifications to be credible. For example, court and prison data for felons recently released on probation or parole would need to be updated regularly in order for voting eligibility to be processed accurately and timely.

For states that do not require voter identification, voters could have the option to electronically sign time-stamped digital affidavits or submit digital signatures with unique PIN codes or cryptographic hash functions (digital

---

71.   U.S. Patent No. 2020/0258338 (filed Feb. 7, 2020).
72.   *Automatic Voter Registration*, NAT'L CONF. ST. LEGISLATURES (Apr. 14, 2020), https://www.ncsl.org/research/elections-and-campaigns/automatic-voter-registration.aspx.
73.   Tony Raval, *KYC and AML: What All Banks Need to Know*, FORBES (Oct. 11, 2018), https://www.forbes.com/sites/forbestechcouncil/2018/10/11/kyc-and-aml-what-all-banks-need-to-know/#779118470fc6.
74.   Nigel Gophie, *What are Smart Contracts on Blockchain?*, IBM (July 2, 2018), https://www.ibm.com/blogs/blockchain/2018/07/what-are-smart-contracts-on-blockchain/.
75.   *Same Day Voter Registration*, NAT'L CONF. ST. LEGISLATURES (June 28, 2019), https://www.ncsl.org/research/elections-and-campaigns/same-day-registration.aspx.

fingerprints).[76] All data submissions and password access attempts would be automatically recorded on the blockchain, providing increased transparency and auditability.[77]

D. Verifying Voting Registration on the Blockchain

All voters, automatic registrants, and same-day registrants, could receive digital ballots upon verification.[78] Electronic transmission of these ballots could be encrypted for enhanced privacy to ensure anonymity of votes.[79] Ballots could also be automatically recorded on the blockchain for auditability if a recount dispute or fraud claim arises.[80] Voting registrations that are denied could be challenged through a smart contract dispute resolution process.[81] Encrypted digital ballots could be stored in a secure online portal and accessed by computer or mobile phone.[82]

On a blockchain voting system, cleaning voter rolls could happen automatically by ensuring that a voter's jurisdictional data reaches consensus with data hosted in other states' databases.[83] Currently, thirty states already have access to voter registration data, a privilege given to members of the Electronic Registration Information Center (ERIC).[84] Placing databases on a blockchain protocol would ensure the accuracy of the data and prevent manipulation.[85] Voters could also confirm or deny jurisdiction changes electronically during the voter eligibility verification process, pending amendment to Section 8(d) of the National Voter Registration Act.[86] The result of these proposed technological changes could lead to reduced administrative costs and fewer inefficiencies.

E. Decentralization Mitigates Risk of Voting System Malicious Attacks and Data Manipulation

Another key characteristic of blockchain technology is decentralization. When information is stored across a distribution of nodes (decentralization), hackers have a more difficult time penetrating a multi-pronged distribution network compared

---

76.   *See Cryptographic Hash*, SᴄɪᴇɴᴄᴇDɪʀᴇᴄᴛ, https://www.sciencedirect.com/topics/computer-science/cryptographic-hash (last visited May 25, 2020).

77.   *Voter Verification Without Identification Documents,* Nᴀᴛ'ʟ Cᴏɴғ. Sᴛ. Lᴇɢɪsʟᴀᴛᴜʀᴇs, https://www.ncsl.org/research/elections-and-campaigns/voter-verification-without-id-documents.aspx (last visited May 25, 2020).

78.   *Automatic Voter Registration*, *supra* note 80 (currently occurs in sixteen states and the District of Columbia).

79.   *See* Gophie, *supra* note 83.

80.   *See id.*

81.   *See id.*

82.   *See id.*

83.   *See id.*

84.   *See Ensuring the Efficiency and Integrity of America's Voter Rolls*, Eʟᴇᴄᴛʀᴏɴɪᴄ Rᴇɢɪsᴛʀᴀᴛɪᴏɴ Iɴғᴏ. Cᴛʀ., https://ericstates.org/ (last visited May 25, 2020).

85.   *See id.*

86.   U.S. Dᴇᴘ'ᴛ ᴏғ Jᴜsᴛɪᴄᴇ, *supra* note 33.

to focusing a malicious attack on a central control point.[87] As a result, the risk of system failure is significantly mitigated.[88] Decentralization also eliminates the need for reliance on a central actor that has complete governing authority.[89] Doing so reduces the risk of data manipulation by a single authority.[90]

Using a blockchain voting system, bad actors could not alter data blocks containing individual votes or records of official voting tallies without leaving the footprint of a malicious attempt on the blockchain.[91] Because all additions or deletions to data are recorded, the immutability of the data would restore integrity and public trust in the electoral process.[92]

Electoral administration by states and counties is already decentralized in nature, which has been useful in hindering hackers.[93] Encouraging states to overhaul currently-existing electronic voting machines and replace them with county-level blockchains that feed into a state-level blockchain ecosystem will provide additional layers of protection through cryptographic security measures, architectural decentralization, political decentralization, and logical decentralization.[94]

Significantly, the principles of state sovereignty over election matters, underpinned by Article 1 and Article 2 of the Constitution and bolstered by the architectural framework of federalism, organically lay a legal foundation for a democratic marketplace of decentralized voting establishments.

F. Blockchain Voting Alleviates Partisan Polarization Over Basic Electoral Procedures

The outcomes generated by a blockchain voting system alleviates most partisan concerns regarding basic electoral procedures. For example, completing voter verification on the blockchain would meet strict voting identification requirements (favored by Republicans). At the same time, citizens without formal identification cards can overcome voter verification barriers in flexible, alternative ways (favored by Democrats) through the blockchain ecosystem's ability to verify other unique identifying personal data located within a state's database or, alternatively, by giving voters the option to submit digitally encrypted affidavits that attest to their identity.[95]

The integrity of voting registration would be strengthened by providing automated and up-to-date cleanup of voter rolls, thereby denying registration access to duplicate registrants, potential double voters, dead voters, felons, and so on (favored by Republicans).[96] Ensuring the integrity and accuracy of the data

---

87. *See* Kshitiz Hamal, *What is Decentralization in Terms of Blockchain Technology*, HACKERNOON (Jan. 15, 2018), https://hackernoon.com/1-what-is-decentralization-in-terms-of-blockchain-technology-e266da2875c1.
88. *Id.*
89. *Id.*
90. *Id.*
91. Reiff, *supra* note 62.
92. *Id.*
93. *See* Reiff, *supra* note 62.
94. Hamal, *supra* note 87.
95. *See, e.g.*, Reiff, *supra* note 62.
96. *See id.*

through the use of immutable cryptographic hash values would also reduce the elimination of legitimate voters and false positives (favored by Democrats).[97] Early voters and same day registrants would benefit from immediate verification, thereby legitimizing votes and providing access to "young, itinerant, and minority voters" (favored by Democrats).[98] Immediate verification would reduce long lines at the polls and increase confidence in final vote counts (favored by both parties).[99] Votes would also be tamper-proof, as any attempts to change data would be recorded and auditable (favored by both parties).[100]

G. Blockchain Voting Increases Access and Improves Voter Turnout

Using a blockchain voting system could minimize logistical barriers to vote. In an ideal world, citizens could access the voting system on a technical device, such as a computer or mobile phone.[101] Research shows that 96% of the American public own a cellphone of some kind, and 81% own a smartphone.[102] Smartphone ownership also transcends race: 82% of White adults own smartphones; 80% of Black adults own smartphones; and 79% of Hispanics own smartphones.[103] However, lower income and rural Americans are more likely to be disenfranchised; 71% of Americans earning less than $30,000 own smartphones; and 71% of rural Americans own smartphones.[104] To mitigate factors such as income and geographical location, local blockchain voting mechanisms can be implemented for public use in places like public libraries, courthouses, or high schools.

The ease of accessing a blockchain voting system with a mobile phone could bolster voter participation by reducing the amount of time and effort involved compared to traditional means of voting. To illustrate this point, if every smartphone owner voted in the next election, the voter turnout rate would trump that of every election since 1918.[105] Furthermore, disabled citizens, overseas compatriots, and deployed military personnel would avoid having to rely on the sluggish, unreliable national and international mail systems, and instead, use a smartphone application that delivers enhanced security, speed, and convenience. A mobile blockchain voting system could also reduce the delays in determining who wins on election night as votes would be tallied automatically and accurately. Over time, the mobile blockchain application's user interface and cybersecurity architecture will continue to develop alongside broad technological advancement.

---

97.   *See id.*
98.   David A. Graham, *How North Carolina Became the Wisconsin of 2013*, ATLANTIC (July 1, 2013),   https://www.theatlantic.com/politics/archive/2013/07/how-north-carolina-became-the-wisconsin-of-2013/277007/.
99.   *Id.*
100.   *See* Reiff, *supra* note 62.
101.   *Mobile   Fact   Sheet*,   PEW   RES.   CTR.   (June   12,   2019), https://www.pewresearch.org/internet/fact-sheet/mobile/.
102.   *Id.*
103.   *Id.*
104.   *Id.*
105.   *Voter Turnout*, FAIRVOTE, https://www.fairvote.org/voter_turnout#voter_turnout_101 (last visited May 25, 2020).

Voting from a smartphone may also be a critical solution in times of war, natural disaster, or public health crises. The COVID-19[106] pandemic will be a significant test for the 2020 U.S. general election. This public health crisis is already serving as a driving catalyst for states and local governments to study and invest in mobile, secure, and blockchain-enabled voting systems.[107] A nationwide call for voting on the blockchain may be closer than America thinks.

III. CONCLUSION

In the next 10 years, advancements in blockchain technology may provoke radical transformation of voting policies and procedures that align with bipartisan priorities. At a minimum, states could start to hold elections digitally, similar to Estonia[108] and Switzerland,[109] and on the blockchain, similar to West Virginia, Utah, Oregon, and Colorado.[110]

To counteract misinformation, fake news, and deep fake technology, states could advocate for the use of "smart" elections conducted on mobile blockchain voting systems. Imagine voting on a device that provides interactive information about candidates as you vote, including campaign positions, proposed initiatives, and formal candidate statements. Advance approval from candidates would ensure that information is not mischaracterized. Candidate political positions would be secured in an immutable, secure format to foster transparency and enable voters to find direct sources of credible facts easily. Informational content would be recorded on the blockchain to hold victors accountable for initiatives undertaken during their terms.

Holding "smart" elections would foster civic engagement, lead to a more informed voting public, and strengthen confidence in the public vote. Over time, the success of "smart" elections could ultimately lead to a more frequent use of "smart" referendums, which would further embolden the democratic spirit of the United States.

Controversial voting policies may also be given consideration due to blockchain's innate characteristics of auditability, data accuracy, transaction speed, authentication, and decentralization. For example, a "failure to vote" tax or, alternatively, a tax credit may be introduced by Congress under the guise of advocating for the public purpose of maximum voter participation. A blockchain voting system could facilitate the implementation and execution of such a proposal,

---

106. *See Coronavirus (COVID-19)*, CTRS. FOR DISEASE CONTROL & PREVENTION, https://www.cdc.gov/coronavirus/2019-ncov/index.html (last visited May 25, 2020).

107. Representative Vincente Gonzalez, *It's Time to Consider Creating a Remote Voting System for Congress*, HILL (Mar. 17, 2020, 4:30 PM), https://thehill.com/blogs/congress-blog/politics/488081-its-time-to-consider-a-remote-voting-system-for-congress.

108. *Electronic Voting: What Europe Can Learn from Estonia*, MICROSOFT: EU POL'Y BLOG (May 10, 2019), https://blogs.microsoft.com/eupolicy/2019/05/10/electronic-voting-estonia/.

109. *Reorienting EVoting and Ensuring Stable Trial Operation*, EGOVERNMENT, https://www.egovernment.ch/en/umsetzung/schwerpunktplan/vote-electronique/ (last visited May 25, 2020).

110. *WV's Secure Mobile Voting Application*, W. VA. SECRETARY ST., https://sos.wv.gov/elections/Pages/MobileVote.aspx (last visited May 25, 2020); Joeri Cant, *Two More U.S. Jurisdictions Launch Blockchain-Based Mobile Voting*, COINTELEGRAPH (Oct. 18, 2019), https://cointelegraph.com/news/two-more-us-jurisdictions-launch-blockchain-based-mobile-voting.

as tax payments or credits could be easily tracked, tallied, and audited without incurring significant administrative costs and complexities.

Furthermore, a Congressionally-mandated "failure to vote" tax has a decent chance of passing constitutional muster under the reasoning articulated in *National Federation of Independent Business v. Sebelius* and *New York v. United States*.[111] A tax for failing to vote in elections would raise considerable revenue for States and would also expand voter participation. To counter potential critics of a "failure to vote" tax, proponents could invoke the Court's logic in *Sebelius*, and offer the following rebuttal: "it is abundantly clear the Constitution does not guarantee that individuals may avoid taxation through inactivity."[112] Alternatively, incentivizing voting in the form of a tax credit, pursuant to Congress's Sixteenth Amendment authority, would be a much more palatable option.[113]

Blockchain technology gives society a rare opportunity to rethink basic processes and ask provocative questions about the possibilities of meaningful change and innovation. As exemplified by the remarkable number of blockchain use cases recasting entire industries, the only indisputable question that remains is when—not if—blockchain technology will revolutionize voting in America.

---

111.   *See generally* Nat'l Fed'n of Indep. Bus. v. Sebelius, 567 U.S. 519 (2012); New York v. United States, 505 U.S. 144 (1992).

112.   *Nat'l Fed'n of Indep. Bus.*, 567 U.S. at 572.

113.   *See generally* Brushaber v. Union Pac. R.R., 240 U.S. 1 (1916).