

The Future of E-voting Implementation in Indonesian General Election Process: Constitutionality, Benefits and Challenges

Fahri Bachmid^{1*}, Hardianto Djanggaih²

^{1,2} Faculty of Law, Universitas Muslim Indonesia, South Sulawesi, Indonesia

*email: fshri.bachmid@umi.ac.id

DOI: <https://doi.org/10.31603/variajusticia.v18i1.6359>

Submitted: December 2021

Revised: April 2022

Accepted: May 2022

ABSTRACT

Keywords:
General
Elections; E-
Voting; Covid-19
Pandemic

The emergence of the COVID-19 pandemic has hampered the conduct of general elections in a number of countries. In the previous simultaneous regional elections in 2020, there was an increase in positive cases of COVID-19, which resulted in fatalities. This study seeks to examine the possibility of electronic voting (E-Voting) as an alternative policy to ensure safe elections during a pandemic, by examining the aspects of constitutionality, advantages, and challenges of its implementation.. This research employs a normative research methodology with a conceptual, constitutional, and comparative approach. The result shows that, from a constitutional standpoint, the protocol for implementing E-Voting is consistent with the principles of direct, general, free, confidential, honest, and fair elections mandated in the Republic of Indonesia's 1945 Constitution, and thus can be used as an alternative election policy in the future. E-voting also offer potential benefits for the democratic, efficient, and secure electoral system that can be used in the current pandemic situation. However, there are a number of obstacles to its implementation in Indonesia due to systemic flaws in e-voting, such as its security and validity, as well as the condition of voters and insufficient infrastructure in the Indonesian context.

1. INTRODUCTION

Elections are the most crucial aspect of a modern democratic system defined as community participation in state administration, through the election of officials and their representatives in government.¹ The vast majority of countries around the world hold elections on a regular basis. For example, 30 countries held head of government elections in 2019 and 40 countries held legislative elections.²

However, during 2020 democratic events in a number of countries will indeed be jeopardized due to the emergence of Corona Virus Disease 19 (COVID-19). Election

¹ Sofia Näsström, "Democratic Representation Beyond Election," *Constellations* 22, no. 1 (2015): 1–12, <https://doi.org/10.1111/1467-8675.12123>.

²www.electionguide.org, "Upcoming Election," <https://www.electionguide.org/elections/?inst=Assembly&cont=&yr=2019>, 2019.

postponements have become increasingly common around the world since the World Health Organization (WHO) declared this outbreak a Pandemic. According to International Institute for Democracy and Electoral Assistance (IDEA) records, between February and December, at least 75 countries decided to postpone national and subnational elections due to the pandemic.³⁴ where elections will cause crowds that become a vehicle for the spread of the virus.⁵ WHO has also recommended physical distancing and a series of health protocols to prevent the transmission of COVID-19.

Despite concerns about the impact of the pandemic, a number of countries are still holding elections as scheduled or have decided to resume elections that were previously postponed.. Indonesia is one of the countries that is still holding regional head elections (Pemilihan Kepala Daerah/pilkada) on December 9, 2020. Although the positive cases were still showing an average of 5000-6000 cases per day at the time, with the statistic continuing to rise. A week before the election, the highest number of additional positive cases reached 8,369 per day (December 3, 2020).⁶ Indonesia also ranks third highest in Asia with 16,111 fatalities.⁷ The public also doubts that the health protocol will be applied consistently when the election takes place.

According to Ramadani and Syahreza's research, the government's decision to hold regional elections in the midst of a pandemic contains a number of policy (antinomy of law).⁸ In essence, there is a contradiction between government policies that require physical distancing and prohibit crowding and local elections that encourage as much community participation as possible. For example, *tirto.id* journalism investigations discovered indications of violations of health protocols during the election process, where there were approximately 1,172 officers (Voting Organizers Group) who were positive but remained on duty on election day.⁹ As a result, a number of members of the Regional General Election Commission (KPUD) on duty also tested positive for Covid-19, even five of them eventually died.

³ IDEA International, "Global overview of COVID-19: Impact on elections", Multimedia and Reports, 2021. <https://www.idea.int/news-media/multimedia-reports/global-overview-covid-19-impact-elections>.

⁴ Myungsun Park et al., "Optimization of Primer Sets and Detection Protocols for SARS-CoV-2 of Coronavirus Disease 2019 (COVID-19) Using PCR and Real-Time PCR," *Experimental and Molecular Medicine* 52, no. 6 (2020): 963–77, <https://doi.org/10.1038/s12276-020-0452-7>.

⁵ Toby S. James and Sead Alihodzic, "When Is It Democratic to Postpone an Election? Elections during Natural Disasters, Covid-19, and Emergency Situations," *Election Law Journal: Rules, Politics, and Policy* 19, no. 3 (2020): 344–62, <https://doi.org/10.1089/elj.2020.0642>.

⁶ <https://covid19.go.id/peta-sebaran-covid19>

⁷ Worldometer, "Coronavirus Update Worldwide: Cases and Deaths from COVID-19 Virus Pandemic," *Worldometer.info*, November 2020, <https://www.worldometers.info/coronavirus/#countries>.

⁸ Rizki Ramadani and Farah Syah Rezah, "Regional Head Election During COVID-19 Pandemic: The Antinomy in the Government Policies," *Yuridika* 36, no. 1 (2021): 213, <https://doi.org/10.20473/ydk.v36i1.23528>.

⁹ Felix Nathaniel, "1.172 Petugas KPPS Positif COVID Tetap Bertugas di Pilkada 2020," *tirto.id*, December 9, 2020, <https://tirto.id/1172-petugas-kpps-positif-covid-tetap-bertugas-di-pilkada-2020-f7W2>.

As a result, the election's implementation resulted in a significant increase in positive cases. Not only Indonesia, but a number of other countries have seen an increase in cases following elections. Cassan and Sangnier's research at Metropolitan France also shows that holding local elections has accelerated the spread of Covid-19 in France.¹⁰ In light of the aforementioned conditions, it is clear that an alternative policy is required for the holding of a constitutional election while remaining consistent with the health protocol policy during the pandemic. Currently, a number of countries are refocusing their efforts on the use of electronic voting systems (e-voting).

In general, the E-voting model had been used for a long time before the pandemic. Estonia, which has been widely reviewed and referred to in terms of implementing safe and democratic e-voting, is one of the countries that is considered successful in implementing E-Voting. As a result, the purpose of this study is to examine the prospects of E-voting as an alternative to safe elections during the pandemic, both in terms of constitutionality and the benefits and challenges of its use in the Indonesian.

2. RESEARCH METHOD

As a normative legal research, this study uses secondary data consists of primary and secondary legal materials. Primary legal materials consist of statutory regulations related to the issues studied, while secondary legal materials refer to the literature review of previous studies.¹¹ Therefore, this study categorized as doctrinal legal research. Information from various aspects of the issues discussed in this research using several approaches, such as conceptual, constitutional and comparative approach. Data collected through literature studies, which then analyzed in descriptive-qualitatively.

3. RESULTS AND DISCUSSION

3.1. The Concept of E-Voting

The essence of democracy is associated with the formation of a common will, which includes a decision-making process based on the law that regulates how people express their opinions, such as the mechanism of general elections and voting. Under certain conditions, such as when there are too many people or when there is a state of emergency, the expression of opinion can be designed to be concise and simple. This can be accomplished through digitization, in which traditional voting methods are

¹⁰ Guilhem Cassan and Marc Sangnier, "Liberté, Egalité, Fraternité... Contaminé? Estimating the Impact of French Municipal Elections on COVID-19 Spread in France," *MedRxiv*, 2020, 2020.06.24.20138990.

¹¹ Rizki Ramadani and Andika Prawira Buana, "The Needed But Unwanted Independent Regulatory Agencies: Asking Their Legitimacy And Control In Indonesia," In *The 2nd International Conference of Law, Government and Social Justice (ICOLGAS 2020)*, pp. 674-684. Atlantis Press, 2020.

transformed into a digital system in an E-democracy ecosystem.¹² The term "E-democracy" refers to the use of information and communication technology (ICT) for all political procedures, with the primary goal of creating an effective citizen representation and policy-making system.¹³ In a nutshell, e-democracy is "the democratic use of Internet media to elect political leaders, participate in determining public policy, or both."¹⁴

E-Democracy has two main goals: first, to provide citizens with access to information and knowledge about the political process, services, and options available; and second, to transition citizens from passive information access to active citizen participation.¹⁵ The dissemination of political information and participation in electronic decision-making are the primary characteristics of e-democracy (e-voting). In general, the most important aspect of e-election is e-voting, which refers to the use of computers or computerized voting equipment to cast votes in elections (Figure 1).¹⁶

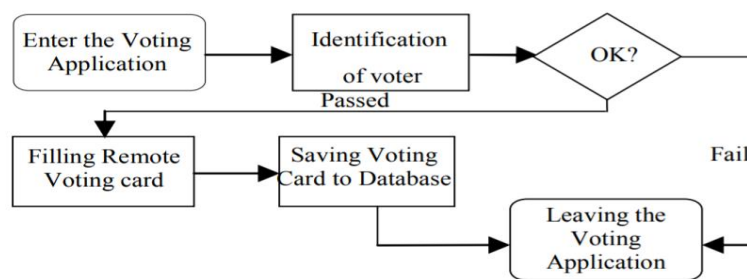


Figure 1. Procedure for voting in the e-voting system

Source: Al-Ameen and Talab, *The Technical Feasibility and Security of E-Voting*, 2013, 400

Furthermore, based on the method of implementation there are two types of e-voting, first regular e-voting System which is done by attending to a polling place. In this system, the voter must be identified by using a voter identification card. Second, the remote E-Voting system, which is done based on remote technology. In this system, Voters can vote using computers in remote locations such as their homes or locations far from polling stations. To be able to vote, they use computers and a networked internet connection. In remote system, voters can vote at regular intervals (usually office hours). They can also vote from other countries. If in a regular e-voting system, voters must be verified by an officer at a polling station, in remote e-voting, voters only need to verify

¹² Martin Hilbert, *The Maturing Concept of E-Democracy*., vol. 6, 2009, <https://doi.org/10.1080/19331680802715242>.The.

¹³ Eleftherios Iakovou Athanasios I. Bozinis, "Electronic Democratic Governance: Problems, Challenges, and Best Practices," *Journal of Information Technology Impact* 5, no. 2 (2005): 73–80.

¹⁴ Jeffrey Alan Johnson, "The Illiberal Culture of E-Democracy," *Journal of E-Government* 3, no. 4 (2007): 85–112, https://doi.org/10.1300/J399v03n04_05.

¹⁵ Michael Knight And Heba Refai Emad Abu-Shanab, "E-Voting Systems: A Tool For E-Democracy," *Management research and practice* 2, no. 3 (2010): 264-275.

¹⁶ Orhan Cetinkaya and Deniz Cetinkaya, "Validation and Verification Issues in E-Voting," *Proceedings of the European Conference on E-Government, ECEG* 5, no. 2 (2007): 63–70.

through the e-voting application. As depicted in figure 1, the first thing a voter must do is open the application and carry out a self-identification process, where the system checks the correctness of the voter's identity and matches it with the voter database on the central server. If the verification process is passed, then the next step is to vote on the voting card and save it in the application system which will automatically be stored in the central server data.

Generally, three actors are involved in the E-voting system: voters, registration authorities, and tallying authorities. Voters have the right to vote, and registration officials register eligible voters prior to "election day." This authority ensures that only registered voters are allowed to vote and that they can vote only once on election day, and the counting authority collects the votes cast and computes the election results. Counters, collectors, and/or counts may be the counting authority. Inuwa further said that the general online voting system is divided into six phases: registration, authentication, voting and saving votes, managing votes, counting votes, and auditing.¹⁷

3.2. Constitutionality of E-Voting

The struggle for women cannot be separated from the feminists who see inequality between men and women. Feminism theory is motivated by the idea that the majority of the legal order is built on a biased worldview in which the law is constructed in the male logic. Women are constructed to be in a lower position than men. This view has received resistance from the adherents of Legal Feminism theory. The resistance is shown by Gramsci, the increasing of ideological awareness. The use of this route is important, because women have been imprisoned in the ideology of male primacy. They are in a false consciousness about the reality of the world (which favors men), as if that reality is normal, natural and unchangeable. As long as women are still trapped in a false consciousness and do not have awareness of the world they live in, gender discrimination and marginalization will continue to be maintained.¹⁸ The struggle of feminists is carried out with the struggle for gender equality at the level of legislation.

The enactment of Law Number 23 of 2004 led to the emergence of reports of acts of domestic violence which are increasingly being exposed and documented. Prior to the enactment of Law Number 23 of 2004, criminal acts that led to domestic violence were associated with the Criminal Code, Law Number 1 of 1974 concerning Marriage, Law Number 7 of 1984 concerning the Ratification of the Convention on the Elimination of All Forms of Discrimination Against Women, and Law Number 39 of 1999 concerning Human Rights.

¹⁷ Ibrahim Inuwa and N D Oye, "The Impact of E-Voting in Developing Countries: Focus on Nigeria," *International Journal of Pure and Applied Sciences and Technology* 30, no. 2 (2015): 43–53.

¹⁸ Yoan N. Simanjuntak dan Markus Y. Hage Tanya, Bernard L., *Teori Hukum Strategi Tertib Manusia Lintas Ruang Dan Generasi* (Yogyakarta: Genta Publishing, 2010).

The rule of law principle essentially desires that all policymaking and government administration be guided by laws that have been jointly determined. The concept of the rule of law is inextricably linked to the concept of constitutionalism, or the limitation of power through the constitution (limited government). In this regard, the constitution serves an important function as a fundamental basic law and a basis for a more practical law.. According to C. F. Strong, a constitutional document must include the functions and duties of state institutions, the limitations of their powers, and the rights of the people.¹⁹ In the context of the rule of law, the implementation of democratic values must also be in line with the constitutional rules and legal regulations that have been agreed..

The term constitutionality itself according to the Merriam Webster dictionary means “the quality or state of being constitutional, especially: accordance with the provisions of a constitution.” The emphasis on the constitution as a basic rule of the state, particularly in the context of general elections, is reflected in the provisions of Article 1 paragraph (2) of the Republic of Indonesia's 1945 Constitution, which states that "Sovereignty is in the hands of the people and implemented according to the Constitution." Furthermore, Article 22E paragraph (1) requires that general elections be held every five years in a direct, general, free, secret, honest, and fair (*langsung, umum, bebas, rahasia, jujur, adil*) manner. Article 2 of Law No. 17 of 2017 Concerning General Elections reaffirms the provisions concerning election principles. Furthermore, Article 4 states that the purpose of holding elections is to: a. strengthen the democratic state administration system; b. hold fair and transparent elections; c. ensure consistency of electoral system arrangements; d. provide legal certainty and prevent duplication in election management; and e. bring about effective and efficient election management.

Although the constitution does not explain each of these election principles in detail, the explanation can be found in Law Number 8 of 2012 concerning the General Election of Members of the DPR, DPD, and DPRD, which has now been incorporated into Law Number 17 of 2017:²⁰

- a. Direct, which means that voters have the right to vote directly according to their conscience, without the use of intermediaries.
- b. General, which means that all citizens over the age of 17 or married have the right to vote, and those over the age of 21 have the right to be elected without discrimination (exceptions).
- c. Free, meaning that voters have the right to vote according to their conscience without any influence, pressure, or coercion from anyone/with anything.

¹⁹ C. F. Strong, "Modern Political Constitution, The English Language Book Society, Sidgwick and Jackson Limited." (1966).

²⁰ Frenki, “Asas-Asas Dalam Pelaksanaan Pemilihan Umum Di Indonesia Menurut Fiqh Siyasah,” *ASAS: Jurnal Hukum Ekonomi Syariah* 8, no. 1 (2016): 57.

- d. Confidential, which means that voters are guaranteed by regulations that no party will know who they vote for or to whom their vote is given (secret ballot).
- e. Truthful, the implementation of implementers, the government and political parties participating in the elections, election supervisors and observers, including voters, and all parties involved indirectly, in accordance with applicable laws and regulations.
- f. Fair, in holding elections every election and political parties participating in the election receive the same treatment and are free from fraud by any party

The application of this principle in the organization of elections in Indonesia is very influential in general elections. The contents of each of these principles are extremely relevant to the smooth running of a safe election in Indonesia. Each principle is a unit that cannot be separated and is complementary to one another, with these election principles serving as indicators of the successful implementation of a democratic election.²¹ The concept of E-voting, which implementation model is based on electronics, is new in Indonesia, where there is no definite blueprint. As a result, it is critical to consider the extent of the constitutionality of E-voting if it is to be implemented continuously in the future, possibly even replacing the traditional paper-based electoral system.

In general, there are a number of e-voting requirements mentioned in the e-voting protocol, and compliance with this protocol is considered to be capable of making the implementation of E-voting run successfully, namely: privacy; appropriateness; uniqueness; uncoercibility; acceptance-freedom; justice; transparency; accuracy; and reliability.²² Below Table 1 is the Conformity of E-Voting with Election Principles in the Constitution.

Table 1. Conformity of E-Voting with Election Principles in the Constitution

Election Principles (Article 22 E Paragraph (1) 1945 Constitution	Protocols in the Implementation of E-Voting
Direct	<ul style="list-style-type: none"> • Eligibility: everyone can vote, but Only eligible voters participate in the election. They should register before the election day and only registered eligible voters can cast votes;
General	<ul style="list-style-type: none"> • Uniqueness: Only one vote for a voter should be counted. It is important to notice that uniqueness does not mean un-reusability, where voters should not vote more than once. • Accuracy: All cast votes should be counted. Any vote cannot be altered, deleted, invalidated or

²¹ Risdiana Izzaty and Xavier Nugraha, "Perwujudan Pemilu Yang Luberjurdil Melalui Validitas Daftar Pemilih Tetap," *Jurnal Suara Hukum* 1, no. 2 (2019): 155, <https://doi.org/10.26740/jsh.v1n2.p155-171>.

²² Orhan Cetinkaya and Deniz Cetinkaya, *Lo.cit.*

	copied. Any attack on the votes should be detected. Uniqueness should also be satisfied for accuracy.
Free	<ul style="list-style-type: none">• Uncoercibility: Any coercer, even authorities, should not be able to extract the value of the vote and should not be able to coerce a voter to cast his vote in a particular way. Voter must be able to vote freely
Confidentiality	<ul style="list-style-type: none">• Privacy: It is the inability to link a voter to a vote. Voter privacy must be preserved during the election as well as after the election for a long time• Receipt-freeness: It is the inability to know what the vote is. Voters must neither be able to obtain nor construct a receipt which can prove the content of their vote to a third party both during the election and after the election ends. This is to prevent vote buying or selling.
Truthful	<ul style="list-style-type: none">• Transparency: The whole voting process must be transparent. Bulletin boards may be used to publicise the election process. The security and reliability of the system must not rely on the secrecy of the network which cannot be guaranteed.• Robustness: Any number of parties or authorities cannot disrupt or influence the election and final tally. To have confidence in the election results, robustness should be assured.
Fair	<ul style="list-style-type: none">• Fairness: No partial tally is revealed before the end of the voting period to ensure that all candidates are given a fair decision. Even the counter authority should not be able to have any idea about the results.

Source::Analysed from the Secondary source.

The constitutionality of e-voting is based on the principle that e-voting must be as close to the traditional voting system as possible while also complying with the provisions of the constitution and electoral principles.²³ Based on the table above, it is clear that the protocol for implementing E-voting is fundamentally consistent with general election principles mandated by the Republic of Indonesia's 1945 Constitution. As a result, if implemented consistently and consistently, the E-voting policy can be a viable option for organizing democratic elections. and constitutional, as well as a number of advantages that will be mentioned later.

So far, the debate over electoral constitutionality has centered solely on the applicability of the presidential and parliamentary thresholds. However, the implementation of the Constitutional Court Decision Number 55/PUU-XVII/2019, which

²³ Epp Maaten, "Towards Remote E-Voting : Estonian Case," *Proceedings of the 1st Conference on Electronic Voting*, 2004, 83–90.

mandates that elections be held concurrently, in 2019 has placed a tremendous burden on election organizers, resulting in fatalities. Given these circumstances, it is inconceivable that simultaneous elections be held in an emergency situation such as the COVID-19 pandemic. Elections may be constitutional, but their implementation, which has resulted in deaths, deserves to be revisited because there has been a violation of the most fundamental constitutional rights, namely the right of everyone to life.

Since 2009, when the Constitutional Court issued Decision Number 147/PUUVII/2009, there has been discussion about the implementation of e-voting in the Indonesian electoral system. The decision examines Article 88 of Law Number 32 of 2004 Concerning Regional Autonomy, which allows voting for regional head elections to be collected using the e-voting method. In March 2010, the Constitutional Court ruled that the use of e-Voting is constitutional as long as it does not violate the principles of an abundant and fair election, allowing E-Voting to be used on a larger scale, including general elections for regional heads and deputy regional heads (Pemilukada).²⁴ Thus, the protocol in the concept of E-voting is strengthened by a decision from the Constitutional Court, in addition to being in accordance with the principle of fairness.

Article 85 (1) letter b of the Law of the Republic of Indonesia No. 10 of 2016 concerning the Second Amendment to Law No. 1 of 2015 concerning Stipulation of Government Regulations in Lieu of Law No. 1 of 2014 concerning the Election of Governors, Regents, and Mayors to Become Laws states that voting at the time of election can be done through electronic voting equipment. Article 85 (2a) the use of electronic voting while taking into account the Regional Government's infrastructure and community readiness based on the principles of efficiency and ease of use.²⁵ Now, there are 981 villages around Indonesia that have implemented E-voting in the election of leaders, although it has never been used for national elections.²⁶ However, in the future, the government needs to take further steps by building a remote E-voting system or internet voting, thereby maximizing election efficiency while still enforcing Health protocols during the pandemic.

3.3. The E-Voting System's Benefits During the COVID-19 Pandemic

When compared to traditional paper-based voting systems, the e-voting system has a number of advantages. Traditional paper-based voting, as Ameen and Talab explain,

²⁴ Ashfi Arfawati, "Keabsahan Pemilihan Kepala Desa Berbasis E-Voting Pada Pemilihan Kepala Desa Di Kabupaten Sidoarjo," *Mimbar Keadilan* 14, no. 1 (2021): 84–94, <https://doi.org/10.30996/mk.v14i1.4664>.

²⁵ Vicko Taniady, Brillian Aditya Prawira Arafat, and Hari Sutra Disemadi, "Sistem E-Voting Dalam Pemilihan Kepala Daerah 2020 Saat Pandemi Covid-19: Perbandingan Indonesia, Australia Dan Brazil," *Ekspose: Jurnal Penelitian Hukum Dan Pendidikan* 19, no. 2 (2020): 1055–64.

²⁶ Tareq Muhammad, Aziz Elven, and Ahmad Al-muqorrobin, "Consolidating Indonesia 's Fragile Elections Through E-Voting: Lessons Learned from India and the Philippines," *Indonesia Comparative Law Review* 3, no. 1 (2020): 63–80.

spent for the time and inconvenient. E-voting not only speeds up the entire election process, but it also reduces the burden of implementation costs and is more convenient for voters and organizers alike. Furthermore, it can reduce the possibility of voting and calculation errors. Furthermore, Mateen mentioned the main benefits of e-voting include: reduced costs, increased participation and voting options, better speed and accuracy, placement and counting of votes, greater accessibility and flexibility for people with disabilities.

From the experiences in Pakistan, there are several indications that the use of e-voting is better than manual election as stated by Zafar and Pilkjaer such as Correct Result, Accuracy, Time-saving, Transparency, Low Budget, Solvable.²⁷ In addition, E-voting can also eliminate the possibility of invalid and doubtful votes, which in many cases are the cause of controversy in elections.²⁸ In detail, Purwati Nani stated the reasons and considerations for using e-Voting, namely more efficient and effective, no duplication of voter data, very accurate vote counting results, no corrupted votes, and faster vote counting.²⁹ For an archipelagic country like Indonesia, E-voting is perfect for reducing the time and budget for conducting general elections.

A number of these benefits make e-voting very suitable for use in times of emergency, such as the current COVID-19 pandemic. Since the World Health Organization (WHO) declared it a pandemic, all countries have been forced to implement strict health protocols, which essentially amount to physical separation.³⁰ Both voters and the government are in a quandary when it comes to the holding of elections. According to Husayan Kassai's Forbes article, "Voters face a choice: Go to the polls to vote but potentially expose themselves to the virus, or stay home and miss out on voting altogether."³¹

If the government insists on holding elections in a traditional system during the pandemic, two risks must be faced: voters will still participate in elections but risk being exposed to the virus and causing fatalities, or voters will not vote, resulting in low voter participation and an impact on the legitimacy of election results. This is evident in the context of Indonesia's simultaneous regional head elections in 2020. According to the findings of Ramadani and Farah's research, efforts to strike a balance between election

²⁷ Ch Naveed Zafar and Anthony Pilkjaer, "E-Voting in Pakistan," *Systems Science*, 2007, 111.

²⁸ Slamet Risnanto et al., "Success Implementation of E-Voting Technology In Various Countries : A Review," 2020, 150–55.

²⁹ Nani Purwati, "Perancangan Sistem E-Voting Untuk Pemilihan Kepala Daerah (Pilkada)," *Jurnal Bianglala Informatika* 3, no. 1 (2015): 18–27, [http://download.portalgaruda.org/article.php?article=379105&val=6595&title=perancangan sistem e-voting untuk pemilihan kepala daerah \(pilkada\)](http://download.portalgaruda.org/article.php?article=379105&val=6595&title=perancangan%20sistem%20e-voting%20untuk%20pemilihan%20kepala%20daerah%20(pilkada)).

³⁰ Arianti Anggraeni Mangerengi Rizki Ramadani, Yuli Adha Hamzah, "Indonesia's Legal Policy During Covid-19 Pandemic: Between The Right To Education And Public Health" 6, no. 1 (2021): 125–56.

³¹ Husayn Kassai, "The U.S. Election And The Pandemic: Is E-Voting The Way Forward?" [forbes.com](https://www.forbes.com), September 2020.

participation and health issues result in policy contradictions that cause casualties, both in terms of election organizers and election participants.³² By utilizing an internet-based remote voting system via E-voting, voters are not required to gather in one location, which increases the risk of transmission or the emergence of new COVID-19 clusters. Internet voting is a type of e-voting in which voters cast their ballots using a computer with internet access. It is the concept of E-voting, which a voter can use from any location, such as home, office, public internet terminal, etc., by using his or her own computer that is connected to the internet.³³ Thus, a general election can be realized in accordance with the aspects of the health protocol that ensures the safety of voters and election organizers.³⁴

According to the Center for Digital Societies (CFDS), there are at least two factors that encourage the use of e-voting during the COVID-19 pandemic. For starters, electronic voting can reduce direct human contact. When compared to traditional direct voting under normal conditions or using health protocols, e-voting is far safer due to the absence of human contact and greater mobility from location to location.³⁵ Second, reduce the cost of elections. The pandemic has also had an effect on the country's economy, with many areas experiencing a recession. This is due to increased health-care budget absorption, which is accompanied by a decrease in state revenues. As a result, state officials must think more carefully about how large budgets are spent. It is expected that e-voting will reduce the budget when compared to traditional methods because it will reduce the cost of printing ballots, which absorbs the majority of the budget.³⁶

3.4. Challenges of implementing E-voting in Indonesia: Learning from Estonia

Although the use of technology can solve problems effectively and efficiently, this does not guarantee that its adoption and implementation will be flawless. In the context of implementing E-Voting in Indonesia, the existing challenges can be divided into two categories: first, those related to the inherent weaknesses of the e-voting system, which are generally related to issues of data validation and security; and second, those related to the condition of voters and the completeness of supporting facilities and infrastructure, given Indonesia's status as a developing country.

³² Rizki Ramadani and Farah Syah Rezah, *Op.cit.*, p. 210.

³³ Aggelos Kiayias, "Electronic Voting-A Brief Study of Remote Internet Voting in Estonia," *Handbook of Financial Cryptography and Security*, 2010, 59–82.

³⁴ Gayashi Jayasinghe and Rohan Samarajiva, "Remote Voting in a Pandemic : Options For," no. April (2020): 1–9.

³⁵ CFDS, "PILKADA 2020: Coronavirus, Online Voting, And Security Risk," *cfds.fisipol.ugm.ac.id*, Januari 2021.

³⁶ Ekta Walia Sanjay Kumar, "Analysis of Electronic Voting System in Various Countries," *International Journal of Computer Science Engineering* 3, no. 5 (2011): 1825–30, <http://www.enggjournals.com/ijcse/issue.html?issue=20110305>.

Concerning the first challenge, Karmanis stated that the use of technology could create new problems, such as the E-voting system, which was originally designed to eliminate the use of paper, but without paper copies, voters could not check and ensure that their votes were recorded correctly and validly counted in the total votes.³⁷ E-voting has also raised many concerns about the potential for fraud and privacy violations associated with internet voting. This includes the possibility that non-voting voters will be penalized, as well as an easy way for them to sell their votes.

If there is no verification and validation system in place, e-voting results can be manipulated at each stage of the process. The majority of people may accept the e-voting model, but some are concerned about its privacy, security, and accuracy. If the verification and validation (V&V) process is used on the e-voting system, public trust will increase and voter participation will be easier to achieve. Furthermore, the use of e-voting opens the door to malware attacks. Malicious code, for example, can use vulnerabilities in voting software to spread viruses from machine to machine. As a result, the virus can infect the local management system when the voting engine sends the results to the central election database to be counted. An attacker could also tamper with e-voting machines left unattended at polling stations.

When it comes to data security, Indonesia has a poor track record. One of the cases that has occurred in Indonesia in an attempt to hack a website is the General Election Commission data leak, in which hackers allegedly sold data on the Indonesian population of 2.3 million on dark web forums.³⁸ The public was also shocked a few months ago when Jokowi's vaccine certificate was leaked and spread across several social media platforms. It is suspected that a number of netizens accessed the Cares for Protect application using Jokowi's NIK, which was widely distributed on the internet. According to the SophosLab report, Indonesia has the highest Threat Exposure Rate. The percentage of computers affected by malware attacks over a three-month period is referred to as the Threat Exposure Rate. According to the report, Indonesia is the most frequently targeted country for cyber attacks.³⁹

To work well, an E-voting system must first incorporate a number of design principles as proposed by Gerlach, namely:⁴⁰

³⁷ Matt Bishop and David Wagner, "Risks of E-Voting," *Communications of the ACM* 50, no. 11 (2007): 120-120.

³⁸ Karmanis, "Electronic-Voting (e-Voting) Dan Pemilihan Umum (Studi Komparasi Di Indonesia, Brazil, India, Swiss Dan Australia)," *MIMBAR ADMINISTRASI FISIP UNTAG Semarang* 18, no. 2, (2020): 1-14.

³⁹ Johan Ericka Wahyu Prakasa, "Peningkatan Keamanan Sistem Informasi Melalui Klasifikasi Serangan Terhadap Sistem Informasi," *Jurnal Ilmiah Teknologi Informasi Asia* 14, no. 2 (2020): 75, <https://doi.org/10.32815/jitika.v14i2.452>.

⁴⁰ Frank Gerlach, "Seven principles for secure e-voting." *Communications of the ACM* 52, no. 2 (2009): 8-8.

- a. Guaranteed security, where all protocols and techniques must be proven mathematically secure;
- b. trustworthy design responsibility, in which the government, through security institutions, must be responsible for creating a safe voting system;
- c. source code that must be made public and accessible to the general public;
- d. A vote verification system to ensure that all votes in the final election tally were correctly calculated.
- e. voter accessibility, in which the system should be accessible to all and simple to use.
- f. Expert supervision; a team of experts chosen and approved by all major political parties involved in the election.

The second challenge is related to the condition of voters and the completeness of facilities and infrastructure that support the implementation of e-voting. Voting with electronic media requires that voters be active internet users who not only have the necessary internet devices, but also have knowledge of using computers and information technology in general. This has the potential to create a digital divide among voter groups, for example, between citizens who are tech-savvy and unfamiliar with new technologies and those who cannot access the internet due to social or financial factors. In the most extreme situation, this condition can lead to loss of voter representation.

Indonesia is one of the countries that could face this problem. According to survey results from the Ministry of Communication and Information Technology in collaboration with the Data Insight Center, which measures digital literacy index through 7 pillars and 4 sub-indices based on "A Global Framework of Reference on Digital Literacy Skills," digital literacy in Indonesia has not reached a "good" level. If the highest index score is 5, Indonesia's digital literacy index is just slightly higher than 3.⁴¹ These findings are related to factors such as younger age, gender, education level, and whether a person lives on or off the island of Java. According to the World Bank, internet access in Indonesia will not be evenly distributed until 2019. There is still a gap in internet access for adult users aged 15 and up in both urban and rural areas. In particular, only 36% of adults in rural areas have used the internet, whereas adults in urban areas have up to 62% coverage.⁴²

In terms of supporting infrastructure and facilities, the internet network is critical to the E-Voting system. However, according to the Ministry of Communication and Information (Kemenkominfo), there are approximately 9,113 areas that are not covered by the 4G network and 3,435 areas that are not covered by the internet network. There

⁴¹ Kominform, "Status Literasi Digital Indonesia 2020: Hasil Survei Di 34 Provinsi," no. November (2020): 1–90, https://kominform.go.id/content/detail/30928/siaran-pers-no-149hmkominform112020-tentang-hasil-survei-indeks-literasi-digital-nasional-2020-akses-internet-makin-terjangkau/0/siaran_pers.

⁴² Databoks.katadata.id, "Bank Dunia: Akses Internet Desa dan Kota Indonesia Masih Timbang," katadata.id, Juli 2021.

are approximately 12,548 non-internet areas (blankspots) in Indonesia. Furthermore, the Director General of Post and Information Technology at the Ministry of Communication and Informatics revealed a number of challenges and obstacles encountered in improving the quality of internet network providers in Indonesia, including geographical constraints imposed by the country's vastness and island-like nature. This condition is difficult to address due to the difficulty of constructing network and data facilities in underdeveloped, leading, and outlying (3T) areas. Then there's the issue of people's limited purchasing power when it comes to accessing the internet.⁴³

In terms of internet services, cellular data traffic in Indonesia continues to rise, but not all customers have access to high-speed internet. According to data from the Internet.org agency, 75 percent of cellular data users in the country still rely on the 2G GSM/EDGE network, whose speed is far behind that of the 3G network, let alone 4G. Aside from facilities and services, most computing support software available today faces the challenge of providing an intuitive and user-friendly platform.⁴⁴

Based on this, Indonesia should study the use of E-Voting in countries that have routinely and successfully held elections using electronic systems, particularly those based on internet voting. Several countries, including France, the Netherlands, Switzerland, the United Kingdom, and the United States, have experimented with Internet voting over the last decade. Estonia, a former Soviet republic on the Baltic Sea and now a full member of the European Union, is the country with the fastest growing use of Internet voting. Since 2005, Estonia has used e-voting, which has proven to be more accessible, flexible, and time-saving, potentially leading to a significant increase in voter turnout. This is very reasonable when compared to traditional (paper-based) voting, which requires a person to travel to a polling station and takes approximately 44 minutes, whereas e-voting only takes 6 minutes.

Estonia is the only country that has used Internet voting consistently and without interruption in elections at all levels. There have been no significant attacks on the system or protests or opposition to the implementation of E-voting in more than 15 years, which is an interesting fact given that in other countries, citizens and political groups are actively advocating for a moratorium on E-voting. There are four major factors that make Internet voting a viable option in Estonia: First, widespread Internet penetration; second, a legal framework that addresses Internet voting issues; third, an identification system that allows for digital voter authentication; and fourth, a political culture that encourages Internet voting.

⁴³ CNN Indonesia "Kominfo Ungkap Masalah Internet di Indonesia," *cnnindonesia.com*, Desember 2020.

⁴⁴ Buckingham Shum et al., "How to Cite: Hypermedia Support for Argumentation-Based Rationale: 15 Years on from GIBIS and QOC," *PaechComputer Science Edi-Torial*, 2006.

Since 2000, internet access has been recognized as a fundamental human right in Estonian law. During the 2005 national elections, 9,317 Estonians voted online (roughly 1.85 percent of all voters). Then, in 2007, Estonia used internet-based voting for the second time in their national parliamentary elections, with 30,275 people voting online (5.4 percent of all voters). In terms of supporting facilities, citizens are provided with an Estonian national identity card containing a microchip to identify voters. To vote online with a remote system, voters need to purchase special software to read the identification card.⁴⁵ If a person does not have their own computer with a reader, the government has provided public computer facilities with this automatic reader, which anyone can use.

Internet voting has always been available as a remote voting option, allowing voters to cast ballots from convenient locations, including abroad. Overall political, public, and administrative support has also aided in this. Estonia has a legal framework that encourages the development and use of online voting. The Digital Signature Act (DSA) of 2002 is one of them. Individuals can use digital signatures to authenticate themselves in online transactions (particularly government transactions), including voting, under the DSA and related administrative laws. Estonia has begun to issue identity cards with embedded digital certificates for online individual authentication, which is then combined with a personal identification number (PIN).⁴⁶

In countries that have successfully implemented e-voting, it is concluded that they have conducted trials, feasibility studies, and have a strong legal structure.⁴⁷ In this context, Indonesia still has a lot of homework to do to improve the legal structure, especially in the realm of cyber and data security. Law number 19 of 2016 concerning information and electronic transactions does not appear to be optimal in preventing cyber attacks in Indonesia. For this reason, the discussion and ratification of the bill on the protection of personal data must be rushed. In addition, there is also no regulation that specifically covers and regulates technical matters related to the use of E-voting in the context of national and regional elections. In general, according to Jimly Asshiddiqie, there are a number of things that must be done as a preparatory step in planning the implementation of the E-Voting system in Indonesia. Among other things, it is necessary to prepare for E-Voting planning, starting from the preparation of election personnel and participants, population data preparation, technical preparation related to technology, and the need for preparation in the community.

⁴⁵ Kyra Mozley, "Remote E-Voting : More than a Technical Challenge," no. March (2021): 1–11.

⁴⁶ Orhan Cetinkaya, "Towards Secure E-Elections in Turkey : Requirements and Principles Deniz Cetinkaya," n.d. In *The Second International Conference on Availability, Reliability and Security (ARES'07)* (pp. 903-907). IEEE.

⁴⁷ Slamet Risnanto et al., "E-Voting Readiness Mapping for General Election Implementation," *Journal of Theoretical and Applied Information Technology* 98, no. 20 (2020): 3280–90.

4. CONCLUSION

The results of the analysis show that, in terms of constitutionality, the concept of E-Voting is in accordance with the principles of direct, general, free, confidential, honest, and fair elections as mandated in the 1945 Constitution of the Republic of Indonesia, so that if implemented in accordance with the existing protocol, it can be an alternative election policy, even replacing the conventional electoral system in the future, or be implemented optionally as in Estonia. E-voting has also demonstrated a number of advantages as an electoral system that is not only constitutional, but also democratic, flexible, efficient, and safe to use in the current pandemic situation. However, there are a number of challenges in its implementation in Indonesia due to the internal weaknesses of e-voting if it is not supported by a safe and reliable system. Furthermore, the government must consider the typology of Indonesian voters, who are still dealing with the issue of digital divide and the development of infrastructure, which is still minimal and uneven.

REFERENCES

- Al-Ameen, Abdalla, and Samani Talab. "The Technical Feasibility and Security of E-Voting." *International Arab Journal of Information Technology* 10, no. 4 (2013): 397–404.
- Arfawati, Ashfi. "Keabsahan Pemilihan Kepala Desa Berbasis E-Voting Pada Pemilihan Kepala Desa Di Kabupaten Sidoarjo." *Mimbar Keadilan* 14, no. 1 (2021): 84–94. <https://doi.org/10.30996/mk.v14i1.4664>.
- Athanasios I. Bozinis, Eleftherios Iakovou. "Electronic Democratic Governance: Problems, Challenges, and Best Practices." *Journal of Information Technology Impact* 5, no. 2 (2005): 73–80.
- Bishop, Matt, and David Wagner. "Risks of E-Voting," 2007.
- Cassan, Guilhem, and Marc Sangnier. "Liberté, Egalité, Fraternité... Contaminé? Estimating the Impact of French Municipal Elections on COVID-19 Spread in France." *MedRxiv*, 2020, 2020.06.24.20138990.
- Cetinkaya, Orhan. "Towards Secure E-Elections in Turkey : Requirements and Principles Deniz Cetinkaya," n.d.
- Cetinkaya, Orhan, and Deniz Cetinkaya. "Validation and Verification Issues in E-Voting." *Proceedings of the European Conference on E-Government, ECEG* 5, no. 2 (2007): 63–70.
- Emad ABU-SHANAB, Michael KNIGHT and Heba REFAI. "E-VOTING SYSTEMS: A TOOL FOR E-DEMOCRACY." *European Journal of Hospital Pharmacy* 21, no. 5 (2014): 267–69. <https://doi.org/10.1136/ejhpharm-2014-000536>.
- Frenki. "Asas-Asas Dalam Pelaksanaan Pemilihan Umum Di Indonesia Menurut Fiqh Siyasah." *ASAS: Jurnal Hukum Ekonomi Syariah* 8, no. 1 (2016): 57.
- Hilbert, Martin. *The Maturing Concept of E-Democracy: Vol. 6*, 2009. <https://doi.org/10.1080/19331680802715242>.The.
- Inuwa, Ibrahim, and N D Oye. "The Impact of E-Voting in Developing Countries: Focus on Nigeria." *International Journal of Pure and Applied Sciences and Technology* 30, no. 2 (2015): 43–53.

- Izzaty, Risdiana, and Xavier Nugraha. "Perwujudan Pemilu Yang Luberjurdil Melalui Validitas Daftar Pemilih Tetap." *Jurnal Suara Hukum* 1, no. 2 (2019): 155. <https://doi.org/10.26740/jsh.v1n2.p155-171>.
- James, Toby S., and Sead Alihodzic. "When Is It Democratic to Postpone an Election? Elections during Natural Disasters, Covid-19, and Emergency Situations." *Election Law Journal: Rules, Politics, and Policy* 19, no. 3 (2020): 344–62. <https://doi.org/10.1089/elj.2020.0642>.
- Jayasinghe, Gayashi, and Rohan Samarajiva. "Remote Voting in a Pandemic : Options For," no. April (2020): 1–9.
- Johnson, Jeffrey Alan. "The Illiberal Culture of E-Democracy." *Journal of E-Government* 3, no. 4 (2007): 85–112. https://doi.org/10.1300/J399v03n04_05.
- Karmanis. "Electronic-Voting (e-Voting) Dan Pemilihan Umum (Studi Komparasi Di Indonesia, Brazil, India, Swiss Dan Australia)," 2020, 1–14.
- Kiayias, Aggelos. "Electronic Voting-A Brief Study of Remote Internet Voting in Estonia." *Handbook of Financial Cryptography and Security*, 2010, 59–82.
- KOMINFO. "Status Literasi Digital Indonesia 2020: Hasil Survei Di 34 Provinsi," no. November (2020): 1–90.
- Maaten, Epp. "Towards Remote E-Voting : Estonian Case." *Proceedings of the 1st Conference on Electronic Voting*, 2004, 83–90.
- Mozley, Kyra. "Remote E-Voting : More than a Technical Challenge," no. March (2021): 1–11.
- Muhammad, Tareq, Aziz Elven, and Ahmad Al-muqorrobin. "Consolidating Indonesia ' s Fragile Elections Through E-Voting : Lessons Learned from India and the Philippines." *Indonesia Comparative Law Review* 3, no. 1 (2020): 63–80.
- Näsström, Sofia. "Democratic Representation Beyond Election." *Constellations* 22, no. 1 (2015): 1–12. <https://doi.org/10.1111/1467-8675.12123>.
- Park, Myungsun, Joungha Won, Byung Yoon Choi, and C. Justin Lee. "Optimization of Primer Sets and Detection Protocols for SARS-CoV-2 of Coronavirus Disease 2019 (COVID-19) Using PCR and Real-Time PCR." *Experimental and Molecular Medicine* 52, no. 6 (2020): 963–77. <https://doi.org/10.1038/s12276-020-0452-7>.
- Prakasa, Johan Ericka Wahyu. "Peningkatan Keamanan Sistem Informasi Melalui Klasifikasi Serangan Terhadap Sistem Informasi." *Jurnal Ilmiah Teknologi Informasi Asia* 14, no. 2 (2020): 75. <https://doi.org/10.32815/jitika.v14i2.452>.
- Purwati, Nani. "Perancangan Sistem E-Voting Untuk Pemilihan Kepala Daerah (Pilkada)." *Jurnal Bianglala Informatika* 3, no. 1 (2015): 18–27.
- Ramadani, By Rizki. "The Needed But Unwanted Independent Regulatory Agencies: Asking Their Legitimacy And Control In Indonesia," 2020.
- Ramadani, Rizki, and Farah Syah Rezah. "Regional Head Election During COVID-19 Pandemic: The Antinomy in the Government Policies." *Yuridika* 36, no. 1 (2021): 213. <https://doi.org/10.20473/ydk.v36i1.23528>.
- Risnanto, Slamet, Yahaya Bin, Abd Rahim, and Nanna Suryana Herman. "Success Implementation of E-Voting Technology In Various Countries : A Review," 2020, 150–55.
- Risnanto, Slamet, Yahaya Bin Abd Rahim, Nanna Suryana Herman, and A. Abdurrohman. "E-Voting Readiness Mapping for General Election Implementation." *Journal of Theoretical and Applied Information Technology* 98, no. 20 (2020): 3280–90.
- Rizki Ramadani, Yuli Adha Hamzah, Arianti Anggraeni Mangerengi. "Indonesia's Legal

-
- Policy During Covid-19 Pandemic: Between The Right To Education And Public Health” 6, no. 1 (2021): 125–56.
- Sanjay Kumar, Dr. Ekta Walia. “Analysis of Electronic Voting System in Various Countries.” *International Journal of Computer Science Engineering* 3, no. 5 (2011): 1825–30.
- Shum, Buckingham, Allen H Dutoit, Raymond McCall, Ivan Mistrik, Simon J Buckingham Shum, Albert M Selvin, Maarten Sierhuis, Jeffrey Conklin, Charles B Haley, and Bashar Nuseibeh. “How to Cite: Hypermedia Support for Argumentation-Based Rationale: 15 Years on from GIBIS and QOC.” *PaechComputer Science Edi-Torial*, 2006.
- Taniady, Vicko, Brillian Aditya Prawira Arafat, and Hari Sutra Disemadi. “Sistem E-Voting Dalam Pemilihan Kepala Daerah 2020 Saat Pandemi Covid-19: Perbandingan Indonesia, Australia Dan Brazil.” *Ekspose: Jurnal Penelitian Hukum Dan Pendidikan* 19, no. 2 (2020): 1055–64.
- Tanya, Bernard L., Yoan N. Simanjuntak dan Markus Y. Hage. *Teori Hukum Strategi Tertib Manusia Lintas Ruang Dan Generasi*. Yogyakarta: Genta Publishing, 2010.
- www.electionguide.org. “Upcoming Election.”
<https://www.electionguide.org/elections/?inst=Assembly&cont=&yr=2019>, 2019.
- Zafar, Ch Naveed, and Anthony Pilkjaer. “E-Voting in Pakistan.” *Systems Science*, 2007, 111.

