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Research Article

Towards Transparent and Secure Elections: The Legal Landscape of Digital Electoral Systems in Indonesia

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Abstract

Background: This research explores the transformation of Indonesia's electoral process through digitalization and examines its implications for governance and legal frameworks. The study highlights the urgency of adopting technologies such as e-voting, e-recapitulation, and digital logistic systems to improve transparency, efficiency, and accountability in elections.

Methodology: A normative-juridical approach was employed, utilizing primary legal sources, secondary literature, and case studies to analyze the legal and technical challenges posed by the integration of technology in elections.

Objectives: The primary objective of this study was to assess the adequacy of Indonesia's existing legal frameworks, particularly Law No. 7 of 2017 on Elections, in accommodating digital election practices. It also aimed to identify regulatory gaps and propose legal reforms to support the adoption of digital technologies while safeguarding data privacy and cybersecurity.

Findings: It indicates that while digital technologies have enhanced the efficiency and accessibility of electoral processes,

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they also expose vulnerabilities such as data security breaches, disinformation campaigns, and legal ambiguities regarding the legitimacy of digital results. Furthermore, the study identifies the need for comprehensive legal reforms to address these issues and ensure the integrity of elections.

Originality/Novelty: This research contributes novel insights into the legal complexities of digital elections and offers a framework for regulatory improvements. By addressing gaps in existing laws and promoting adaptive governance, it provides a foundation for strengthening democratic practices in the digital era.

Introduction

Digital transformation in the implementation and supervision of elections has become an urgent need in the modern era of technology.[1] Elections as the main pillar of democracy require a transparent, accountable, and efficient system to maintain the legitimacy and integrity of the election process and results.[2] The development of information technology offers great potential in improving election governance, from voter registration, vote recapitulation, to more effective supervision.[3] In Indonesia, the adoption of technology in the implementation of elections began to be introduced through the Political Party Information System (Sipol), the Voter Data Information System (Sidalih), and the Recapitulation Information System (Sirekap). These systems are designed to increase the transparency and accuracy of election data. However, the implementation of this technology still faces various legal, technical, and social challenges that require further analysis.[4]

[1] Chris Marsden, Trisha Meyer, and Ian Brown, "Platform Values and Democratic Elections: How Can the Law Regulate Digital Disinformation?," *Computer Law & Security Review* 36 (April 2020): 105373, https://doi.org/10.1016/j.clsr.2019.105373.

[2] Eman Daraghmi, Ahmed Hamoudi, and Mamoun Abu Helou, "Decentralizing Democracy: Secure and Transparent E-Voting Systems with Blockchain Technology in the Context of Palestine," *Future Internet* 16, no. 11 (October 23, 2024): 388, https://doi.org/10.3390/fi16110388.

[3] Nic Cheeseman, Gabrielle Lynch, and Justin Willis, "Digital Dilemmas: The Unintended Consequences of Election Technology," *Democratization* 25, no. 8 (November 17, 2018): 1397–1418, https://doi.org/10.1080/13510347.2018.1470165.

[4] Herie Saksono, "Digital Pilkada: Have Local Elections (Pilkada) Been Affected by Digitalization? Attainment, Challenges, and Policy Solutions," *Jurnal Bina Praja* 12, no. 2 (December 16, 2020): 287–99, https://doi.org/10.21787/jbp.12.2020.287-299.

Previous research by Huda et al highlighted the importance of digitizing elections to increase efficiency and transparency. Raden explained how digital transformation in the 2024 simultaneous elections can accelerate data processing and minimize the potential for fraud.[5] On the other hand, research conducted by Fachry et al examines the role of the Election Supervisory Agency (Bawaslu) in dealing with election violations in the digital era. They emphasize the importance of technology-based digital supervision to detect and take action against violations quickly and accurately. Fachry et al also identified several challenges faced by Bawaslu, such as limited human resources, low digital literacy among the public, and minimal regulations governing legal action against violations in the digital realm. This study recommends strengthening institutional capacity and developing a technology-based supervision model as a solution to these problems.[6]

While prior research has explored the technical and institutional aspects of digital elections and supervisory mechanisms, there remains a significant research gap in constructing a legal framework that holistically addresses both implementation and supervision of digital electoral processes. This paper builds upon the technical findings of Huda et al. and the institutional observations of Fachry et al. by contributing a normative legal analysis of how constitutional and electoral laws can adapt to support a fully digitized election ecosystem. It introduces an integrated legal framework that not only interprets existing laws like Law No. 7 of 2017 but also proposes necessary reforms to bridge legal ambiguities and ensure lawful governance in digital elections. This paper offers novelty by discussing how constitutional law can provide a clearer framework to support the integration of technology in the implementation and supervision of elections simultaneously. This study examines how existing regulations, especially Law Number 7 of 2017 concerning Elections, need to be revised to accommodate broader digitalization and how the role of supervision by Bawaslu can be strengthened through technology. With this approach, this study is expected to be able to provide a stronger legal basis to face the challenges of digitalization of elections in the future.

The main objective of this study is to analyze the legal aspects that support digital transformation in the implementation and supervision of elections in Indonesia. This study seeks to identify existing legal gaps, while formulating recommendations to strengthen the regulation and governance of election digitalization. Furthermore, this study also aims to examine the role and effectiveness of Bawaslu in implementing technology for election supervision in the digital era. Thus, the results of this study are expected to provide theoretical and practical contributions in the development of constitutional law that is adaptive to technological advances.

[5] Dimyati Huda, Agus Edi Winarto, and Lestariningsih Lestariningsih, "Analysis of 2024 General Election Digitalization System as An Effort to Improve The Quality of Democracy in Indonesia," *Journal of Development Research* 7, no. 2 (November 30, 2023): 272–82, https://doi.org/10.28926/jdr.v7i2.313.
[6] Rifa Fachry et al., "The Strategy of North Sumatra Province Bawaslu in Preventing Violations of Election in 2019 through Social Media," *Politea : Jurnal Politik Islam* 4, no. 2 (December 25, 2021): 43–52, https://doi.org/10.20414/politea.v4i2.4285.

Research Method

This study employs a normative-juridical method by systematically analyzing relevant statutory provisions, judicial decisions, and doctrinal commentaries to assess the adequacy of Indonesia's legal framework in supporting digital electoral systems. The primary legal materials include Law No. 7 of 2017, the Personal Data Protection Law, and related election regulations. Secondary sources consist of peer-reviewed legal scholarship, policy reports, and empirical studies on digital democracy and electoral integrity. Legal interpretation methods, grammatical, systematic, and teleological are applied to these sources to uncover normative inconsistencies and legal gaps. Logical argumentation is then used to synthesize findings and formulate evidence-based legal recommendations.

Data collection techniques are carried out through library research by tracing relevant literature and legal documents related to election digitalization and technology-based election supervision. Data analysis is carried out qualitatively using legal interpretation methods and logical argumentation to formulate applicable recommendations.

Digital Democracy and Election Governance

Digital democracy, as conceptualized by Kneuer, draws on the theoretical frameworks of e-democracy, which highlight the intersection between democratic processes and legal regulation in the digital sphere. It refers not only to the use of information and communication technology (ICT) to enhance participation and transparency but also to the evolving legal obligations and protections necessitated by such usage. [7] In this context, digital democracy becomes a legal construct regulated by constitutional principles, data protection norms, and electoral integrity frameworks. Therefore, the implementation of systems like e-voting and Sirekap must be examined not only for their operational efficiency but also for their compliance with legal standards of legitimacy, accountability, and data privacy. This concept covers various aspects, ranging from broader political participation through digital platforms, the dissemination of transparent and accurate information, to increasing accountability in the decision-making process. In the context of elections, digital democracy plays a role as an instrument to strengthen the electoral process by utilizing technology to accelerate and simplify the administrative process, increase transparency, and build public trust.[8]

Applications of digital democracy in elections include the use of e-voting systems, e-vote recapitulation, and voter information systems. These systems allow voters to interact directly with election organizers through digital platforms, thereby strengthening

[7] Marianne Kneuer, "E-Democracy: A New Challenge for Measuring Democracy," *International Political Science Review* 37, no. 5 (November 22, 2016): 666–78, https://doi.org/10.1177/0192512116657677.
[8] Leif Sundberg, "Electronic Government: Towards e-Democracy or Democracy at Risk?," *Safety Science* 118 (October 2019): 22–32, https://doi.org/10.1016/j.ssci.2019.04.030.

accessibility and inclusivity.[9] In addition, the application of technology also opens up opportunities to monitor the election process in real time, provide assurance of the accuracy of published data, and reduce the potential for fraud. In Indonesia, systems such as the Political Party Information System (Sipol) and the Recapitulation Information System (Sirekap) have begun to be implemented to improve election governance and ensure better transparency.[10] However, the implementation of these systems still faces various technical and legal challenges that need to be overcome to increase their effectiveness.

The principle of transparency is one of the main pillars of digital democracy. Transparency in elections includes the provision of open and accurate information regarding all stages of the election process, from voter registration, election logistics, to vote counting and recapitulation of results. Transparency presented through digital technology allows the public to monitor the election process directly, thereby reducing the possibility of data manipulation and increasing public trust in the election results. For example, the Sirekap application allows the public to access the vote counting results at each polling station (TPS) in real time, providing visual evidence that supports the legitimacy of the election results.[11]

Furthermore to transparency, effectiveness is also an important principle in digital election governance. The use of technology in elections allows organizers to simplify the administrative process, speed up vote counting time, and minimize human error. Technologies such as electronic recapitulation systems and digital-based voter databases make it easier to manage voter data centrally and reduce the potential for inaccuracy. This effectiveness also has an impact on cost savings, because technology can reduce the need for manual labor and minimize the use of paper in the election process.[12] However, this effectiveness is highly dependent on the readiness of the technological infrastructure and the capacity of the human resources operating the system. Therefore, improving digital skills for election organizers is an urgent need.

Public trust is a fundamental element in realizing credible elections and legitimacy of their results. Public trust in digital elections is built through the implementation of a secure, transparent, and accountable system. The security of voter data and voting results is a top priority to avoid cyber attacks and digital manipulation that can damage the integrity of the election. For this reason, strict regulations and an efficient monitoring system are

[9] Yusa Djuyandi et al., "Using Vote E-Recapitulation as A Means to Anticipate Public Disorders in Election Security in Indonesia," *Humanities & Social Sciences Reviews* 7, no. 5 (September 28, 2019): 111–22, https://doi.org/10.18510/hssr.2019.7515.
[10] Jaka Raharja et al., "Analysis of Information Quality and Data Security in the KPU (General Elections Commission) SIDALIH (Voter Data Information System) Application," 2023, 90–100, https://doi.org/10.1007/978-3-031-35822-7_7.
[11] Hidayatun Indriyani and Agata Meyer, "Use of Information Technology in Counting (Situng) and Recapitulating (Recapitalized) Votes for the 2024 Election," *Focus Journal Law Review* 3, no. 1 (May 13, 2023), https://doi.org/10.62795/fjl.v3i1.94.
[12] Uzma Jafar, Mohd Juzaiddin Ab Aziz, and Zarina Shukur, "Blockchain for Electronic Voting System—Review and Open Research Challenges," *Sensors* 21, no. 17 (August 31, 2021): 5874, https://doi.org/10.3390/s21175874.

essential. For example, in several countries, the electronic vote counting process is equipped with an independent audit to ensure the validity of the results. In Indonesia, the challenge in building public trust lies in low digital literacy and concerns about the vulnerability of the system to cyber attacks. Therefore, strengthening cybersecurity and public education regarding the use of technology in elections are strategic steps to build public trust.[13]

Although digital democracy offers various advantages, such as transparency, effectiveness, and increased public participation, its implementation also faces complex challenges. One of the main challenges is the digital divide that still occurs in several regions, especially in rural areas that do not yet have adequate internet access.[14] Furthermore, resistance to the change from conventional methods to digital methods is also an obstacle that must be overcome. Training and education for the community and election organizers about the importance of technology in elections is part of the solution to overcome these obstacles.

On the legal side, digital democracy also requires regulatory support that is adaptive to technological developments. Law Number 7 of 2017 concerning Elections in Indonesia still has shortcomings in regulating aspects of election digitalization, especially related to data security and the legitimacy of technology-based election results. Therefore, the revision of this law is a priority to create a clearer and stronger legal framework in supporting the application of technology in elections.

Digital Transformation in Election Implementation

Digital transformation in organizing elections is a strategic step to increase efficiency, transparency, and accountability in a modern democratic system. Elections as a vital process in democracy require adaptation to advances in information technology in order to address the various challenges faced in their implementation. The use of information technology such as e-voting, e-recapitulation, and logistics information systems has become a promising solution to improve the quality and effectiveness of elections in various countries, including Indonesia.

E-voting technology allows voters to vote electronically, either through special devices at polling stations or via the internet. This system is designed to speed up the voting process and reduce the risk of manual manipulation. E-voting also offers easy access for voters who live in remote areas or are abroad. However, the implementation of e-voting requires a solid infrastructure and strong cybersecurity to protect voter data from cyber attacks and

[13] Basit Shahzad and Jon Crowcroft, "Trustworthy Electronic Voting Using Adjusted Blockchain Technology," *IEEE Access* 7 (2019): 24477–88, https://doi.org/10.1109/ACCESS.2019.2895670.
[14] Kenichiro Onitsuka, AR Rohman Taufiq Hidayat, and Wanhui Huang, "Challenges for the next Level of Digital Divide in Rural Indonesian Communities," *THE ELECTRONIC JOURNAL OF INFORMATION SYSTEMS IN DEVELOPING COUNTRIES* 84, no. 2 (March 20, 2018), https://doi.org/10.1002/isd2.12021.

digital manipulation.[15] In addition, this system requires clear regulations to ensure the legitimacy of election results and public trust.

Furthermore to e-voting, an e-recapitulation (e-rekap) system has been implemented to speed up the counting and reporting of vote results. In Indonesia, the use of the Recapitulation Information System (Sirekap) by the General Election Commission (KPU) is an example of the implementation of this technology. Sirekap allows for faster and more accurate vote counting by uploading the results of each polling station (TPS) in real time.[16] This system strengthens transparency because the uploaded data can be accessed by the public and election participants, thereby reducing the potential for fraud. However, e-recap still faces technical challenges such as limited internet networks in some areas and the readiness of human resources to operate the technology.

Digital transformation also involves a logistics information system that supports the management and distribution of election logistics. This system includes tracking the distribution of ballots, forms, and other equipment in real time. With a logistics information system, election organizers can monitor the movement of logistics and identify potential obstacles or shortages before voting day. This efficiency helps minimize delays and distribution errors, which are often the source of problems in conventional elections. However, the effectiveness of this system is highly dependent on the availability of technological infrastructure and the capacity of logistics managers at the local level.[17] Although digital transformation offers various advantages, its implementation also poses significant legal challenges. One of the main challenges is the legal vacuum governing the use of technology in elections. Law Number 7 of 2017 concerning Elections in Indonesia has not specifically regulated the mechanism for implementing digital elections, including e-voting and e-recapitulation. As a result, there is legal uncertainty that can lead to disputes over election results in the future.

The aspect of personal data protection is also a crucial issue in the implementation of election technology. Digital systems used in elections collect and store sensitive voter data, including their identities and political preferences. Without adequate regulations regarding data security, these systems are vulnerable to hacking and misuse. Therefore, data protection must be strictly regulated through a revision of the election law that strengthens aspects of cybersecurity and privacy.[18] Cybersecurity is another challenge that must be faced in the digital transformation of elections. The threat of cyber attacks, such

[15] Alex Wilner, "Cyber Deterrence and Critical-Infrastructure Protection: Expectation, Application, and Limitation," *Comparative Strategy* 36, no. 4 (August 8, 2017): 309–18, https://doi.org/10.1080/01495933.2017.1361202.
[16] Steven Lie, Arya Wicaksana, and Moeljono Widjaja, "A Blockchain-Based E-Recapitulation System for Indonesia'S Presidential Election," *Journal of Logistics, Informatics and Service Science* 11, no. 4 (April 30, 2024): 313–29, https://doi.org/10.33168/JLISS.2024.0419.
[17] I Gede Wahyu Wicaksana, "Indonesia's Maritime Connectivity Development: Domestic and International Challenges," *Asian Journal of Political Science* 25, no. 2 (May 4, 2017): 212–33, https://doi.org/10.1080/02185377.2017.1339618.
[18] Muhammad Khaeruddin Hamsin, Abdul Halim, and Rizaldy Anggriawan, "Digital Lending in Smart Society: Legal and Sharia Perspectives on Consumer Privacy and Ethical Collection Practices," ed. Y. Jusman et al., *SHS Web of Conferences* 204 (November 25, 2024): 07001, https://doi.org/10.1051/shsconf/202420407001.

as system hacking or data manipulation, can damage the integrity of election results and reduce public trust.[19] To overcome this problem, high security standards, strict system audits, and collaboration with cybersecurity experts are needed to identify and address security gaps.

In addition to legal and security challenges, the readiness of human resources is also a determining factor in the success of implementing election technology. Election organizers at the central and regional levels must be intensively trained to operate digital systems. Digital literacy among the community also needs to be improved so that voters feel comfortable and trust the system used. An effective dissemination program can help reduce resistance to change and increase participation in digital elections.[20]

The efficiency offered by digital technology is not only limited to the voting and counting process, but also includes reducing operational costs. E-voting and e-recapitulation systems can reduce the need for manual labor and printing large numbers of ballots.[21] However, the initial investment in procuring reliable hardware and software can be a financial constraint for developing countries. To overcome these challenges, a comprehensive and adaptive legal framework is needed to address technological advances. The revision of the election law must include provisions that regulate technology security standards, personal data protection, and strict audit and supervision procedures. Furthermore, collaboration with international institutions that have experience in digital elections can be a reference in formulating effective regulations.

Election Supervision in the Digital Era

Election supervision in the digital era is a strategic effort to ensure integrity and transparency in the democratic process. Amidst advances in information technology, digital-based supervision has become an important instrument to detect and take action against election violations quickly and accurately. The Election Supervisory Agency (Bawaslu) as the institution responsible for election supervision has utilized technology to strengthen its function. The digital supervision model implemented by Bawaslu includes an online monitoring system, an online reporting platform, and the use of analytical data to detect patterns of violations.[22] One of the innovations adopted by Bawaslu is the Election Supervision Information System (Siwaslu), which allows real-time monitoring of various

[19] Mohamad Fadil Imran and Dwi Asmoro, "Public Awareness on Data: Case in Indonesian Elections and Advocating For Cybersecurity Reinforcement," *Journal of Governance* 9, no. 1 (March 18, 2024), https://doi.org/10.31506/jog.v9i1.23854.
[20] Firya Qurratu'ain Abisono, Sri Hastjarjo, and Vincentia Ardhana Destyani, "Digital Literacy Landscape of Novice Voters in the 2024 Election in Indonesia," *Informasi* 54, no. 2 (September 30, 2024): 115–24, https://doi.org/10.21831/informasi.v54i2.71246.
[21] Teguh Ilham, Eko Budi Santoso, and Hasna Azmi Fadhilah, "Optimizing Electronic Voting System in Village Head Elections: Evaluation and Recommendations from Sleman Regency, Indonesia," *ICST Transactions on Scalable Information Systems* 11, no. 1 (November 13, 2023), https://doi.org/10.4108/eetsis.4372.
[22] Nawang Mega Arum, "Analysis of Election Monitor Participation In Governance By Bawaslu In The Implementation of Elections," *Asian Journal of Social and Humanities* 2, no. 11 (August 22, 2024): 2739–58, https://doi.org/10.59888/ajosh.v2i11.363.

stages of the election. Through Siwaslu, Bawaslu can monitor the process of updating voter data, campaigns, logistics distribution, to voting and vote counting. This system also allows supervision of digital campaign content, including political advertisements on social media. With sophisticated data analysis capabilities, Bawaslu can identify suspicious activities, such as black campaigns and the spread of false information (hoaxes).

Although digital supervision offers many advantages, its implementation is not without challenges. One of the main challenges is the limited technological infrastructure, especially in remote areas with limited internet access. Another challenge is the lack of digital literacy among election organizers and the public, which can hinder the optimal use of technology. In addition, cybersecurity is a crucial issue that requires serious attention. The threat of hacking of the monitoring system can damage data integrity and public trust in election results.[23] Public participation in election monitoring also plays an important role in ensuring the effectiveness of technology-based monitoring models. Bawaslu has encouraged public involvement through participatory monitoring programs, where the public can report election violations directly through applications or online platforms. For example, the Gowaslu application developed by Bawaslu allows citizens to quickly file reports of violations by including photo or video evidence. This model expands the scope of monitoring and increases accountability for the election process.

However, the effectiveness of the technology-based monitoring model is highly dependent on the level of community participation. Low digital literacy and minimal public understanding of reporting procedures are obstacles that need to be overcome. Intensive socialization and digital literacy training are important steps to increase the capacity of the community to actively participate in election monitoring. Furthermore, Bawaslu needs to build a strong verification system to ensure the validity of incoming reports, in order to avoid misuse of the reporting platform.[24] The technology-based monitoring model also faces challenges in processing and analyzing large amounts of data. Elections involving millions of voters produce very complex and diverse data. Therefore, the development of artificial intelligence technology and big data processing algorithms is crucial to increase the efficiency of data analysis. This technology can help Bawaslu identify violation patterns automatically and provide early warnings of potential fraud.

In the context of digital campaign monitoring, Bawaslu also faces challenges in regulating and monitoring political advertising on social media.[25] Platforms such as Facebook, Twitter, and Instagram are the main means of political campaigns, but regulations

[23] Holly Ann Garnett and Toby S. James, "Cyber Elections in the Digital Age: Threats and Opportunities of Technology for Electoral Integrity," *Election Law Journal: Rules, Politics, and Policy* 19, no. 2 (June 1, 2020): 111–26, https://doi.org/10.1089/elj.2020.0633.

[24] M. Herzegovin Laxamana and Sunny Ummul Firdaus, "'Optimizing Election Integrity: Strengthening the Role and Function of GAKKUMDU in One Part of the Election Supervisory Body (BAWASLU) in Indonesia,'" 2023, 259–65, https://doi.org/10.2991/978-2-38476-148-7_21.

[25] Susilawati Muharram, Nikmatullah Nur, and Alamsyah Agit, "Legal Position of BAWASLU in Monitoring and Preventing Money Politics Practice in Election Process," *Formosa Journal of Applied Sciences* 2, no. 7 (July 15, 2023): 1589–1560, https://doi.org/10.55927/fjas.v2i7.5051.

governing the use of social media in campaigns are still inadequate. This makes it difficult for Bawaslu to monitor content that is manipulative or spreads false information.[26] Therefore, cooperation with technology companies and social media platform providers is an important step to strengthen supervision.

In addition to technical challenges, legal aspects are also a major concern in digital election supervision. Law Number 7 of 2017 concerning Elections has not fully accommodated technology-based supervision mechanisms. This legal gap can be a loophole for violators to avoid sanctions. Therefore, a revision of the election regulations that include specific provisions on digital supervision is urgently needed to strengthen legal legitimacy and clarify Bawaslu's authority in handling digital violations.[27] Technology-based supervision must also pay attention to the principles of transparency and accountability. The supervision system implemented must be accessible to the public to ensure that the supervision process runs fairly and openly. Bawaslu must also provide periodic reports containing the results of supervision and follow-up to reports of violations received. This transparency will strengthen public trust in election supervision and increase community participation.

Legal Challenges and Solutions in Digital Elections

Digital transformation in the implementation of elections offers various opportunities to increase transparency and efficiency. However, the application of technology in elections also poses legal challenges that need to be overcome to ensure the legitimacy and integrity of the electoral process.[28] One of the main challenges faced is the legal vacuum related to the legitimacy of digitalization of elections. Law Number 7 of 2017 concerning Elections, which is the legal basis for the implementation of elections in Indonesia, does not specifically regulate technology-based election mechanisms, including e-voting, e-recap, and other digital information systems. This legal vacuum creates uncertainty in the application of technology, especially in terms of legal recognition of election results processed through digital systems. Without clear regulations, technology-based election results are vulnerable to lawsuits that have the potential to create political instability. Furthermore, the absence of adequate regulations also hampers technological innovation, because election organizers are reluctant to adopt digital systems without adequate legal protection.

Another challenge is the limited regulation in dealing with the spread of disinformation and cybercrime. In the digital era, false information (hoaxes) and black campaigns can

[26] Arie Purwanto, Anneke Zuiderwijk, and Marijn Janssen, "Citizen Engagement with Open Government Data: Lessons Learned from Indonesia's Presidential Election," *Transforming Government: People, Process and Policy* 14, no. 1 (January 22, 2020): 1–30, https://doi.org/10.1108/TG-06-2019-0051.
[27] M. Syahrul Borman et al., "Model for Resolving Election Violations through Indonesian Election Body and Constitutional Court," *Legality : Jurnal Ilmiah Hukum* 32, no. 2 (July 27, 2024): 238–62, https://doi.org/10.22219/ljih.v32i2.33711.
[28] Patricia Baudier et al., "Peace Engineering: The Contribution of Blockchain Systems to the e-Voting Process," *Technological Forecasting and Social Change* 162 (January 2021): 120397, https://doi.org/10.1016/j.techfore.2020.120397.

easily spread through social media and other online platforms,[29] damaging the reputation of candidates and unfairly influencing public opinion.[30] Furthermore, cyberattacks targeting digital election systems, such as voter database hacking or election result manipulation, pose serious risks to election integrity. Unfortunately, current regulations are not yet able to cover the various cybercrime modus operandi that continue to develop. Personal data protection is also a crucial issue in digital elections. Election systems that collect and store sensitive data require strict legal regulations to prevent data misuse by irresponsible parties. In Indonesia, personal data protection has been regulated in the recently passed Personal Data Protection Law (UU PDP).[31] However, its application in the context of digital elections still requires harmonization with election laws to ensure comprehensive protection.

To overcome these challenges, recommendations are needed to strengthen laws that are adaptive to technology. First, a revision to Law Number 7 of 2017 must be carried out immediately to include provisions governing the use of technology in all stages of the election. This regulation must cover technical aspects, such as system security standards, audit procedures and certification of election technology, and mechanisms for resolving disputes over technology-based election results. Second, strengthening laws related to combating disinformation and cybercrime must be a priority. More specific regulations need to be implemented to regulate digital content during election campaigns, including monitoring mechanisms for social media platforms.[32] Cooperation between election organizers, law enforcement agencies, and technology companies must be strengthened to monitor and take action against the spread of false information and hate speech that undermine the democratic process.

Third, legal regulations that strengthen the protection of personal data in digital elections must be harmonized with the PDP Law. This includes regulations on how voter data is collected, stored, and used, as well as strict monitoring and sanction mechanisms for data protection violations. Fourth, regulations regarding cybersecurity audits must be implemented to ensure the integrity of the digital election system. High security standards, including data encryption, software certification, and periodic system testing, must be regulated by law. Furthermore, independent supervision is needed that is able to audit and oversee the election system transparently.[33] Fifth, strengthening the capacity of institutions such as the KPU and Bawaslu in managing digital technology also requires legal support.

[29] Muhammad Iqbal Samsudin, "AI Exploitation in Social-Media Against Public Figure: Indonesian Legal Perspectives," *E-Justice: Journal of Law and Technology* 1, no. 1 (2024): 47–67.
[30] Priyanka Meel and Dinesh Kumar Vishwakarma, "Fake News, Rumor, Information Pollution in Social Media and Web: A Contemporary Survey of State-of-the-Arts, Challenges and Opportunities," *Expert Systems with Applications* 153 (September 2020): 112986, https://doi.org/10.1016/j.eswa.2019.112986.
[31] Andi Rifky Maulana Efendy, "Towards Enhanced Personal Data Protection: A Novel Approach to Regulation and Practice in Indonesia," *E-Justice: Journal of Law and Technology* 1, no. 1 (2024): 1–15.
[32] Alex Rochefort, "Regulating Social Media Platforms: A Comparative Policy Analysis," *Communication Law and Policy* 25, no. 2 (April 2, 2020): 225–60, https://doi.org/10.1080/10811680.2020.1735194.
[33] Firman Noor and Lina Marlina, "Establishing Elections With Integrity In Indonesia: Purposes, Problems, and Solutions," 2023, 223–41, https://doi.org/10.2991/978-2-38476-148-7_19.

Regulations must ensure that these institutions have human resources trained in technology and cybersecurity. In addition, community involvement in digital election supervision must also be regulated to increase transparency and accountability. Another recommendation is to introduce a faster and more effective complaint and dispute resolution mechanism to handle cases involving election technology. This procedure should be designed to accommodate digital evidence-based resolution processes and forensic audits that can uncover manipulation or interference with technology.

Conclusion

Digital transformation in the implementation and supervision of elections presents a great opportunity to increase transparency, effectiveness, and accountability in the democratic process. The application of technologies such as e-voting, e-recap, and logistics information systems offer more efficient and modern solutions in election management. However, the implementation of this technology also brings complex challenges, especially related to legal gaps, cybersecurity, and limited human resources. Election supervision in the digital era implemented through systems such as Siwaslu and the Gowaslu application has paved the way for more participatory and responsive supervision. This supervision model allows the public to be directly involved in monitoring the election process and reporting violations quickly.

However, challenges such as low digital literacy, data security, and limited infrastructure in several regions still need to be overcome to ensure the effectiveness of technology-based supervision. From a legal perspective, the lack of regulations related to the digitalization of elections is a crucial issue that must be addressed immediately. Law Number 7 of 2017 concerning Elections has not fully accommodated technology in every stage of the election, thus creating legal uncertainty and potential disputes. In addition, protection of personal data and regulations dealing with disinformation and cybercrime require strengthening through revision and harmonization with relevant laws.

To overcome these challenges, strategic steps are needed such as revising election regulations, strengthening cybersecurity systems, developing institutional capacity, and increasing digital literacy among the public and election organizers. Cooperation between the government, election organizers, and the private sector is also key to creating a safe and reliable election system. Digital elections offer great potential to strengthen democracy in Indonesia, but require an adaptive legal framework, secure technology, and broad public support. By addressing existing challenges through strengthening regulations and infrastructure, digital elections in Indonesia can become a model of modern democracy that is efficient, transparent, and credible.

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Conflict of Interest

The authors state that there is no conflict of interest in the publication of this article.

Author(s) Contribution

Author contribution : Author 1: initiated the research ideas, instrument construction, data collection, analysis, and draft writing; Author 2: revised the research ideas, literature review, data presentation and analysis, and the final draft.

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