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E-GOVERNMENT AND INFORMATION TECHNOLOGY: CHALLENGES AND OPPORTUNITIES IN MANAGING INDONESIAN ELECTION

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Abstract
Elections, as a key pillar of democracy, require a transparent, accountable, and efficient election management system. In this context, the use of information technology is a crucial element in supporting the modernization in the management of Indonesian elections as a manifestation of e-government implementation. This article aims to examine the extent to which information technology has been implemented by the General Elections Commission (KPU) in various election stages and to identify challenges and opportunities. This research uses qualitative methods with an exploratory-descriptive design and was conducted at KPU of Kuningan Regency. The findings indicate that the information systems used during the election process have enhanced the efficiency, transparency, and accessibility of information to the public. However, the implementation of information technology still faces significant challenges, including digital infrastructure readiness, cybersecurity threats, and low digital literacy. On the other hand, strategic opportunities such as increased voter participation, accelerated electoral processes, and the potential adoption of e-voting for the future demonstrate that information technology plays a crucial role in response to contemporary developments.

Keywords: *Elections, Information Technology, E-Government, Challenges, Opportunities.*

INTRODUCTION

Today, democracy is widely considered the most ideal system of government. Various countries claim to be democracies, albeit under different names. Indonesia is one of many countries in the world that use democracy as a system of government. In 1863, at Gettysburg, the 16th President of the United States, Abraham Lincoln, explained the meaning of democracy in his speech as "government of the people, by the people, and for the people." Goldman (2015) states that democracy is a political system in which the people have equal political power (*to elect and to be elected*). This implies that democracy is a system of government in which sovereignty rests with the people, or universally referred to as a government of, by, and for the people.

According to Prayitno & Prayugo (2023), one of the main indicators of a democratic country is the transition process of changing power through free and fair elections. The quality of a democracy is largely determined by the active involvement of all elements of society.Diamond & Morlino (2004) state that an ideal democracy aims to achieve three main things: civil and political freedom, popular sovereignty in controlling public policy and policymakers, and equality in political rights and power. These goals can only be achieved through implementingfree and fair elections, because elections are the main foundation of a democratic system. Thesuccessful of an election can be measured by integrity, transparency, and efficiency at every stage of the implementation. There are four main actors that maintain this democratic system, such as the public, the government, political parties, and electoral management bodies. In Indonesia, elections are administered by three institutions: the General Elections Commission (KPU), the Election Supervisory Board (BAWASLU), and the Election Organizers Ethics Council (DKPP).

In Indonesia, general elections are held every five years involving political parties, independent candidates, and candidate pairs as stipulated in Article 22E of the 1945 Constitution and Law Number 07 of 2017. Elections serve as the primary instrument in realizing popular sovereignty and enabling the public to directly elect their representatives in legislative and executive institutions. In response to growing demands for transparency and accountability, Indonesia's electoral system has undergone significant transformation through the use of information technology (IT) in various stages of election management. This innovation has been implemented gradually since the 2014 Election and it was developed widely in the 2019 and 2024 elections. Asimakopoulos et al., (2025)explained that the use of IT in elections significantly contributes to increased efficiency, effectiveness, transparency, accountability, and public participation.

With the rapid development of technology, the use of IT in electoral management in Indonesia is seen as a crucial strategy for improving the quality of democracy(Huda et al., 2023). The integration of information systems, from the digitization of voter lists to the electronic vote recapitulation, offers significant opportunities to accelerate election stages, minimize the potential for fraud, and strengthen public trust in the election process. IT also plays a role in preventing election disputes by reducing human error and providing accurate and consistent data recording. Furthermore, this technology supports the strengthening of the foundations of democracy(Wasiu & Chukwudi, 2023) and increases the accessibility and transparency of public information(Khumayah, 2025). In its implementation, five key principles must be used as a reference: relevance, responsiveness, integrity, effectiveness, and sustainability, to maintain election legitimacy and public trust (EC & UNDP, 2012).

The use of IT in electoral management is an integral part of the development of e-government in the digital era. E-government, defined as the use of IT by government institutions to improve the quality of public services and governance, has become a crucial approach to increasing transparency, efficiency, and public participation (Heeks, 2006). In elections, IT is used to digitize various processes, such as voter registration, identity verification, campaign information dissemination, and vote recapitulation. The use of IT in the electoral process not only accelerates administrative processes but also increases accountability and public trust in election results. The e-recapitulation system, for example, enables faster and more accurate vote counting while reducing the potential for manual manipulation(Abdala et al., 2025). This aligns with the principles of good governance that underpin e-government development: transparency, participation, and accountability(Sutrisno et al., 2025).

Furthermore, the integration of IT in elections is a manifestation of digital transformation within the public bureaucracy. Technology enables governments to reach citizens broadly and efficiently, particularly in delivering electoral information, voter education, and online reporting of violations. As Norris (2015) points out, the use of digital platforms in election management can increase inclusivity and accessibility, thus supporting more democratic and representative elections. However, the use of technology in elections must be accompanied by guarantees of cybersecurity and personal data protection. The success of e-government in the elections depends heavily on public trust in the digital systems used. According to(Luo et al., 2024), digital trust is a key element in the success of e-government because without trust, public participation in digital platforms, including within electoral processes, will remain limited.

Elections, as a key pillar of democracy, are not only a space for political participation but also a rapidly growing object of multidisciplinary study. Studies on elections in Indonesia show that this topic has been examined from various perspectives, including: a) law, election governance and institutions(Nazriyah, 2011), b) political sociology and voter

participation(Nazriyah, 2011), c) political communication and campaigns(Adnan & Mona, 2024), d) political finance and campaign fund transparency(TII, 2025), e) gender and political inclusion(Umagapi, 2020), f) election ethics and integrity(Suranto et al., 2020). Although the use of IT in elections continues to increase in various countries, including Indonesia, academic studies specifically examining digital elections are still relatively limited and fragmented. Most research still focuses on the technical aspects of e-voting or cybersecurity, while broader studies on the challenges and opportunities of IT in electoral management to achieve transparency, voter participation, accountability of election organizers, and public trust in election results have not been widely developed. This indicates a significant research gap, particularly in integrating technological, institutional, and political behavior perspectives.

Building on this background, this study proposes two research questions: (1) To what extent has information technology been implemented in electoral management in Indonesia? And (2) What are the challenges and opportunities arising from the use of this technology in the election? By answering these two questions, this study is expected to fill the gap in the literature regarding the integration of information technology in the Indonesian election system. Furthermore, this study offers an analytical approach that not only highlights technical aspects but also considers institutional, regulatory, and public trust dimensions. In doing so, it seeks to contributesignificantly to the development of transparent, efficient, and accountable election governance in the digital era.

LITERATURE REVIEW

Elections represent a fundamental pillar of a modern democratic system, providing a space for the people to directly and legitimately elect their leadership. According toSchumpeter (2003),democracy can be understood as an institutional mechanism in which individuals achieve power through a competitive process to win the people's votes. Elections are clearly defined as a means of popular sovereignty to elect a leader directly, publicly, freely, secretly, honestly, and fairly (Law of the Republic of Indonesia Number 7 of 2017). In Indonesia, the electoral system is divided into two main categories: general elections and regional head elections, which are regulated respectively by Law of the Republic of Indonesia Number 7 of 2017 on General Elections and Law of the Republic of Indonesia Number 1 of 2015 on the Stipulation of Government Regulation in Lieu of Law Number 1 of 2014 on the Election of Governors, Regents, and Mayors into Law. Through this mechanism, Indonesian citizens are granted the right to elect the President and Vice President, the House of Representatives (DPR), the Regional Representatives Council (DPD), and the Regional House of Representatives (DPRD), as well as regional heads at the provincial and regency/city levels.

Elections serve as a means for the people to grant their representatives a political mandate to run the government. Huntington (1991) stated that elections are a basic requirement of a democratic system, in which leaders are periodically elected through free, honest, and fair competition. Furthermore, O'donnell et al., (1991) emphasized that elections are an essential element in the transition to democracy because they provide a space for the people to determine their leaders directly and transparently. Consequently, the quality of electoral administration is directly proportional to the quality of democracy itself. Elections are not merely procedural but also serve as a primary instrument in upholding the principle of popular sovereignty and establishing accountability mechanisms within the government. Therefore, elections that are held in a quality manner not only reflect the formal existence of democracy but also serve as a substantive medium for realizing a government that is politically legitimate, accountable, and publicly responsive governance.

Historically, the first election in Indonesia with a multiparty system took place on September 29, 1955, and was recorded as being orderly and successful(Aziz, 1955). After the 1998 Reformation era, the electoral process underwent a significant transformation towards a more democratic and open system, marked by the implementation of direct presidential elections starting in 2004. Post-reformation elections also demonstrated the strengthening role of electoral management bodies and the increasing involvement of civil society in the process of electoral monitoring and participation, along with the beginning of the use of IT to support the electoral management process. In the current digital context, IT has become a crucial component in the implementation of elections. Technological advances not only influence communication patterns and public access to information but also bring fundamental changes in the democratic system, including in electoral management. Williams & Sawyer (2015)define IT as the integration of computing and high-speed communication networks capable of transmitting data, voice, and video. The use of IT in the public services contributes to increasing efficiency, accountability, and speed of service. Therefore, in the context of Indonesian elections, IT has shifted from being a mere tool to a strategic element influencing the overall quality of election governance.

Advances in IT have triggered significant changes in various sectors of life, including the political sphere. The use of IT by electoral management bodies, such as KPU, is a manifestation of efforts to increase efficiency, transparency, and accountability across all stages of the electoral process. In Indonesia, the challenges of vast geography, the large number of voters, and the complexity of local political dynamics make conventional election management less than optimal. Therefore, the integrated application of technology in every stage of the election is seen as a strategic step to overcome various administrative obstacles and expedite the vote counting and recapitulation process(Haque & Carroll, 2020;Alvarez & Hall, 2008). IT has become a crucial instrument in supporting political communication, voter data management, campaign monitoring, and vote counting.

The use of IT in election administration has become an essential component in the transformation of election governance in Indonesia, particularly since the reform era. Amidst the development of the digital era, the role of IT is no longer limited to merely administrative aspects but has evolved into a strategic instrument in realizing the basic principles of democratic elections: direct, public, free, secret, honest, and fair. Technology plays a crucial role in improving operational efficiency, data accuracy, and transparency at every stage of the election process, from updating voter lists to the vote recapitulation process. The capacity of technology to deliver results quickly and transparently is believed to reduce the potential for electoral conflict while strengthening public legitimacy of election results(Adeleke, 2025; Callen et al., 2016). Thus, IT is expected to be an effective bridge between the state and citizens in building participatory, credible, and inclusive elections.

Castells (2010) argues that the power of digital networks has given rise to an information society that demands acceleration and openness in the political process. In this context, IT plays a crucial role in shaping a more modern and responsive election system. IT also functions not only as an administrative tool, but also as a key instrument in the democratization process. The concept of digital democracy reflects the integration of participatory principles with advances in communication technology, where the implementation of democratic elections requires a reliable and widely accessible technological infrastructure. Norris (2014) emphasized that the use of technology in elections can strengthen electoral integrity, provided it is designed and implemented with principles of transparency, inclusiveness, and accountability. When technology is used appropriately and transparently, it has the potential to strengthen democratic mechanisms, such as an accurate

vote recapitulation system, transparency in the distribution of election logistics, and openness to public data.

The use of IT in electoral management in Indonesia is a concrete manifestation of the implementation of e-government,which aims to encourage more open, inclusive, and accountable democratic governance. KPU's initiatives in developing information systems reflect the four-stage e-Government model proposed by Layne & Lee (2001), which consists of: (1) cataloging; the initial foundation for digitizing government services by presenting information online and in a one-way information dissemination; (2) transactions; a stage that becomes a form of interactive or two-way public service between the government and the public; (3) vertical integration; the integration of services or systems across hierarchical levels of government; and (4) horizontal integration; the digital integration of information systems across agencies or institutions within the same level of government.

This system not only functions to accelerate internal administrative processes but also contributes to expanding the reach and public access to electoral information through digital platforms. This aligns with the findings of the UN E-Government Survey 2024, which highlights the importance of accelerating digital transformation as an integral part of the sustainable development agenda (UN, 2024), including in strengthening the institutional capacity of electoral management bodies. Myeong et al., (2014) emphasized that the success of e-government is influenced by the interaction between digital trust, the gap in technology access, and the level of public participation. Therefore, institutional readiness, the ability to integrate systems between institutions, and political support are important prerequisites for the effective use of digital systems in the electoral process. Therefore, IT integration in elections is not merely a technical innovation, but an integral part of a digital democracy governance strategy that strengthens the substance of e-government in the electoral sector.

METHOD

This research uses a qualitative approach with an exploratory-descriptive design to conduct an in-depth analysis of the use of IT in electoral management in Indonesia. This research employs two interrelated designs in investigating the phenomenon under study, whose context cannot be strictly separated. According toCreswell & Creswell (2023), a descriptive design emphasizes the researcher's closeness to the data, using a limited theoretical framework, minimal interpretation, and systematically grouping information into key themes. Stebbins (2001) emphasizes exploration as a systematic and open-ended scientific approach to discovering generalizations for a deeper understanding of social or psychological life. Therefore, this research combines characteristics of both approaches, focusing on active researcher involvement, limited use of initial theory, and open-ended but purposeful interpretation to identify important patterns in the data and gain a comprehensive understanding of the reality under study.

This research was conducted at the KPU of Kuningan Regency, with data collected through in-depth interviews and document analysis. Interviews were conducted semi-structured with purposively selected informants, specifically those with direct knowledge and experience related to election administration, such as KPU staff and (former) KPU commissioners. Purposive sampling is considered appropriate in qualitative research because it allows researchers to select informants based on relevance and depth of information(Palinkas et al., 2013). In addition, official documents, such as activity reports, regulations, digital archives, and technical guides, were analyzed to complement and verify the interview data.

In terms of data analysis, this study employed the interactive model approach fromMiles et al., (2014) which encompasses three main processes: data reduction, data

presentation, and drawing/verifying conclusions. The analysis process was conducted simultaneously from the initial data collection stage to the final stage, ensuring that data interpretation was reflective and in-depth. This approach enabled researchers to identify thematic patterns that explain how IT is used and the challenges and opportunities encountered during its use.

To ensure the credibility and validity of the data, researchers employed source triangulation techniques, which compare data from various informants and supporting documents. This technique aims to increase trustworthiness in qualitative research, as proposed byCreswell & Poth (2024), who emphasize the importance of confirmation and diversity of sources in producing reliable findings. Furthermore, member checking is conducted to ensure that the researcher's interpretation of the data aligns with the informants' understanding and experiences.

RESULTS AND DISCUSSION

The Use of Information Technology in Electoral Management in Indonesia

The conduct of elections in Indonesia is a complex democratic process that requires effective management to ensure transparency, accountability, and public participation. In today's digital era, the use of IT is a necessity to improve the efficiency and reliability of election management systems, reflecting the implementation of e-government. Based on the result of the interview, it is found that KPU has adopted various information systems in electoral management, Sidalih(Voter Data Information System), Silon (Nomination Information System), Sirekap (the Recapitulation Information System), Sipol (Political Party Information System), Sidapil (Electoral District Information System), Sikadeka (Campaign and Campaign Fund Information System), Silog (Logistics Information System), and Siakba (KPU Member Information System and the KPU Ad Hoc Agency).

To analyze the extent to which information technology is used by the KPU in managing elections in Indonesia, the author uses the e-Government development theory proposed by Layne & Lee (2001), which consists of four dimensions: 1) cataloging, 2) transactions, 3) vertical integration, and 4) horizontal integration:

1) Cataloging

Cataloging represents an early phase in the implementation ofe-government where the government, in this context the KPU, provides information-based digital services in a one-way interaction to the public. The findings indicate that the KPU has adopted this phase by disseminating types of electoral information on digital platforms. The official KPU website, along with several election-related portals, has integrated crucial data, including the electoral process schedule, profiles of candidates and political parties, laws and regulations, and the results of the vote recapitulation. This information is delivered in a one-way format, structured in design and publicly accessible. This reflects the KPU's commitment to promoting transparency, accountability, and public participation through the use of basic information technology. These digital channels also facilitate voter access to official information without requiring physical interaction with electoral institutions.

2) Transaction

The transaction stage within the e-government framework is characterized by dynamic electronic-based interactions (two-way digital interaction) between KPU and both election participants and the public. This stage is reflected in the use of information systems such as Silon, Sikadeka, and Siakba. Through Silon, political parties and individual candidates can register online by uploading required documents, completing their candidacy data, and directly monitoring the document verification process by KPU. This interaction is no longer a

one-way informational process, but includes the digital exchange of valid legal and administrative documents.

Similarly, the Sikadeka system allows election participants to submit campaign finance reports, including records of income and expenditure and campaign activity schedules. This system supports transparency and serves as a tool for supervisory institutions to conduct electronic audits. According to Afriani et al., (2023), the presence of IT in the financial sector has a positive impact on financial governance. Meanwhile, Siakba is used in the open and transparent recruitment and registration process for KPU members and ad hoc bodies, with public participation encouraged through the opportunity to submit feedback on candidates.These three systems demonstrate that digital transactions in elections have been running actively and in a structured manner, accelerating services and improving accountability.

3) Vertical Integration

The concept of vertical integration in electoral management is clearly reflected through the use of digital systems such as Silog and Sirekap. Vertical integration refers to the integration of systems between the central and regional governments within a single, structured and hierarchical data communication channel. In this regard, Silog plays a crucial role in ensuring the distribution of election logistics, such as ballots, ballot boxes, and forms, can be monitored in real time from the central level to the polling stations (TPS). Logistics data entered by regency/city KPU officers can be directly accessed by Central KPU, facilitating supervision, distribution control, and early detection of potential obstacles in the field.

Meanwhile, Sirekap serves as the primary instrument in the digital vote recapitulation process from the polling stations to the national level. Election officials in the field simply photograph the C-Results form and upload it via the app, which will then automatically integrate it into the central system. This process speeds up the vote counting process and strengthens public accountability, as the results can be directly monitored by the public. Through this vertical integration, election data flows are no longer siloed between administrative levels but are instead interconnected within a single, efficient national system.

4) Horizontal Integration

The application of horizontal integration in election management in Indonesia is clearly evident in the process of compiling the Final Voter List (DPT) through the Sidalih (Voter Data Information System). Horizontal integration refers to cross-institutional integration at the same level of government, where various agencies share and utilize data within a single digital ecosystem. In this case, KPU does not operate in isolation but collaborates with the Ministry of Home Affairs through the Directorate General of Civil Registration (Dukcapil), to match valid and up-to-date population data with the list of potential voters.

This integration process allows for more accurate voter data updates, avoiding duplicate data, fictitious voters, or ineligible voters. Through Sidalih, the voter data synchronization process is carried out systematically and computerized, allowing data from various regions to be accessed and verified simultaneously by the central and regional KPUs. The collaboration between institutions such as the KPU, Bawaslu, and Dukcapil within this system reflects the implementation of horizontal integration, which strengthens the validity and transparency of the voter list.

Challenges and Opportunities in Implementing Information Technology in Electoral Management in Indonesia

The development of IT has brought significant changes to various aspects of life, including the management of general elections. In Indonesia, the use of IT by KPU

demonstrates its commitment to achieving more transparent, fast, and accurate election governance. Various information systems are used as crucial instruments to support data verification, vote recapitulation, and public participation. However, the use of IT in elections also presents a number of challenges, such as the potential for cyberattacks, the digital divide between regions, and issues of public trust in electronic systems. Therefore, a thorough understanding of the challenges and opportunities of IT in the context of elections is a strategic step in developing a sustainable digital democracy that adapts to technological changes in Indonesia.

The following are findings related to the challenges of using IT in electoral management in Indonesia:

1) Digital Infrastructure Readiness

Digital infrastructure readiness is a key prerequisite for supporting the smooth use of IT in elections, particularly to ensure the stability of the information systems operated by the KPU. Disruptions to servers or data centers can hamper the recapitulation process, vote counting, and the real-time public information delivery. System like Sirekapis designed to support transparency and accountability in the election process, but several incidents have shown that this systemis not fully resilient to operational pressures(Putri et al., 2025). It is confirmed by the findings of this research that disruption to the server is one of the problems in operating Sirekap. The use of Sirekap is based on General Elections Commission (KPU) Decree Number 66 of 2024. This system serves as a means of publishing vote count results and the vote count recapitulation process, as well as a tool for implementing the recapitulation process. Server disruptions are a serious concern in technology-based election administration. This is not merely a technical issue, but also an indicator of less than optimal institutional readiness and IT planning by election organizers.

2) Cybersecurity and Threats

In the digital era, cybersecurity is a fundamental aspect of IT-based electoral management. The information systems used by the KPU store and manage voter data, vote results, and sensitive and strategic candidacy information. Therefore, these systems are highly vulnerable to cyber threats, such as hacking, distributed denial-of-service (DDoS), data manipulation, and malware attacks. According to Brady et al., (2023), election administration falls into the category of critical information infrastructure, where any disruption can threaten democratic stability and national security. The use of various information systems naturally demands security from cyber threats that can emerge at any time (Febriansyah & Husnayanti, 2024). Therefore, strengthening cybersecurity is an absolute necessity to ensure the integrity, confidentiality, and availability of electoral data, and to sustain public trust in the digital democratic process.

3) Low Digital Literacy

Low digital literacy among election administrators and the public is one of the main challenges in implementing IT within electoral processes. Unpreparedness in understanding, operating, or monitoring digital systems can open the door to technical errors and manipulation. Election officials who do not fully understand IT systems are at risk of operational errors, such as data input errors(Nurkamiden, 2024), system failures, or the inability to respond to technical disruptions in a timely manner. For voters, low digital literacy hinders active participation in digital elections, for example, in accessing information, verifying data, or reviewing electronic recapitulation results. Moreover, limited public understanding of digital systems increases susceptibility to misinformation and hoaxes circulating online during the election period. This can cloud the political climate and undermine public trust in the election results.

Despite these various challenges in the implementation of IT in elections, there are various strategic opportunities that can foster a more transparent, efficient, and participatory democratic process. The following are opportunities for utilizing IT in electoral management in Indonesia:

1) Efficiency and Accelerationof the Election Process

The use of IT accelerates the election workflow, from data input and digital logistics distribution to the delivery of results, allowing election stages to be completed more quickly than with conventional manual methods. This also minimizes complex and time-consuming manual procedures, allowing election organizers to manage each stage more systematically, efficiently, and cost-effectively(Fauziah et al., 2023). Thus, the implementation of IT in elections not only accelerates processes and increases work efficiency but also serves as a crucial foundation for modernizing the election system to be more responsive and adaptive to the challenges of the digital era.

2) Increased Transparency and Accountability

The use of IT in elections has had a significant impact on increasing transparency and accountability in the election process at various stages. Information systems such as Sirekap, Silon, or the final voter list enable the public to access electoral data in real time and openly. Sirekap is one of the important information systems in electoral management because it is used to recapitulate the votes. One of the key informants in this research explained that the use of Sirekap is very transparent because the public can directly observe and monitor the recapitulation process in the polling stations. This transparency not only increases public trust in election organizers but also promotes accountability because every process can be tracked, verified, and audited digitally by various parties. According toPurnama et al., (2025), the use of digital technology in elections significantly strengthens the principles of openness and public accountability by enabling the public and independent observers to monitor election stages directly and data-driven. Thus, IT plays a crucial role in promoting clean, honest, and fair elections.

3) Facilitating Participation and Accessibility

The implementation of IT in the administration of elections in Indonesia has made a significant contribution to increasing ease of participation and accessibility for the public. Through various information systems used by KPU, the portal https://infopemilu.kpu.go.id/, or other platforms, voters can now more easily access information regarding their voting status, polling station locations, and legislative candidate profiles. This convenience encourages active participation, especially among young voters and those in urban areas familiar with digital technology(Setyasih, 2023). According to Cahyaningsih et al., (2019), the digitalization of elections not only accelerates the flow of information but also expands public access to electoral processes and data in an inclusive manner. Furthermore, this system also enables public monitoring and provides citizens in remote areas with access to information that was previously difficult to obtain. Thus, IT is a crucial catalyst in strengthening citizens' political participation rights equitably and efficiently.

4) E-Voting

The implementation of e-voting, or electronic voting, in Indonesia represents a form of innovation in utilizing IT to increase efficiency and modernize the election system. Countries that have implemented e-voting include Brazil, the Philippines, Canada, and Estonia. In Indonesian, although e-voting has not been implemented at the national level,it has been piloted in several local elections for example during the village head election in Babakan, Ciseeng Subdistrict, Bogor Regency in 2017, The trial demonstrated increased time efficiency, reduced potential for electoral fraud, and vote recapitulation. According to

Djumadin (2022), the use of e-voting has shown significant potential for achieving faster, more transparent, and accountable elections. Furthermore, a study by Agbesi et al., (2024) emphasized that e-voting can also strengthen public trust in election results if the system is designed with principles of transparency, independent verification, and guaranteed digital data security. However, the widespread implementation of e-voting in Indonesia still faces challenges, particularly related to digital infrastructure, voter literacy, and the readiness of national regulations, which do not yet fully support the system's comprehensive integration. Nevertheless, e-voting remains a strategic opportunity for realizing a more modern and participatory election governance in the future.

CONCLUSION

The use of IT in electoral management in Indonesia, viewed from the four-stage model of e-government development (cataloging, transactions, vertical integration, and horizontal integration), shows significant progress in strengthening democratic governance to be more transparent, efficient, and accountable. Through the development and utilization of various digital systems such as Sidalih, Silon, Sirekap, Sipol, Sidapil, Sikadeka, Silog, and Siakba, KPU has successfully integrated technology into various stages of the electoral process, from voter registration to vote recapitulation. This use of technology not only accelerates administrative processes but also strengthens information accessibility, increases public trust, and supports community participation in the democratic process. Thus, IT has become a strategic instrument in modernizing the electoral system and strengthening digital democracy in Indonesia.

However, the effectiveness of IT implementation in elections still faces serious challenges, such as 1) digital infrastructure readiness, 2) cybersecurity threats, and 3) low levels of digital literacy. This disparity in digital access and capacity can undermine public trust and open up opportunities for disinformation and technical errors. Despite these challenges, the opportunities offered by IT remain substantial, particularly in 1) process efficiency, 2) enhancing accountability, 3) facilitating citizen participation, and 4) enabling the future adoption of e-voting. Therefore, the success of digital transformation in elections requires synergy between strengthening regulations, increasing human resource capacity, ensuring data security, and active public involvement to ensure more inclusive, credible, and democratic elections.

REFERENCES

Abdala, M. B., Plescia, C., Boyer, M. M., & Brunetti, A. L. (2025). Trust in Government or in Technology? What Really Drives Internet Voting. *Political Research Quarterly*, *78*(2), 783–796. https://doi.org/10.1177/10659129251321424

Adeleke, F. (2025). Reinstating Trust in Elections in The Era of Artificial Intelligence and Emerging Technologies. *Data & Policy*, *7*. https://doi.org/10.1017/dap.2025.14

Adnan, M., & Mona, N. (2024). Strategi Komunikasi Politik melalui Media Sosial oleh Calon Presiden Indonesia 2024. *Politika: Jurnal Ilmu Politik*, *15*(1), 1–20. https://doi.org/10.14710/politika.15.1.2024.1-20

Afriani, L., Permana, I., Muliasari, D., & Khasanah, U. (2023). The Role of The Use of Information Technology in Orderly Financial Administration and Tax Compliance in Digital Business. *IJESS International Journal of Education and Social Science*, *4*(2), 105–113. https://doi.org/10.56371/ijess.v4i2.184

Agbesi, S., Budurushi, J., Dalela, A., & Kulyk, O. (2024). Investigating Transparency Dimensions for Internet Voting. *EJournal of EDemocracy and Open Government*, *16*(3), 1–28. https://doi.org/10.29379/jedem.v16i3.916

Alvarez, R. M., & Hall, T. E. (2008). *Electronic Elections: The Perils and Promises of Digital Democracy*. Princeton University Press.

Asimakopoulos, G., Antonopoulou, H., Giotopoulos, K., & Halkiopoulos, C. (2025). Impact of Information and Communication Technologies on Democratic Processes and Citizen Participation. *Societies*, *15*(2), 40. https://doi.org/10.3390/soc15020040

Aziz, Q. (1955). Indonesia's First General Elections. *Pakistan Institute of International Affairs*, *8*(3), 400–405.

Brady, M., Howell, G., & Franklin, J. M. (2023). *Cybersecurity Framework Election Infrastructure Profile*. https://doi.org/https://doi.org/10.6028/NIST.VTS.200-1

Cahyaningsih, A., Wijayadi, H., & Kautsar, R. (2019). Penetrasi Teknologi Informasi dalam Pemilihan Kepala Daerah Serentak 2018. *Jurnal PolGov*, *1*(1), 1–34.

Callen, M., Gibson, C. C., Jung, D. F., & Long, J. D. (2016). Improving Electoral Integrity with Information and Communications Technology. *Journal of Experimental Political Science*, *3*(1), 4–17. https://doi.org/10.1017/XPS.2015.14

Castells, M. (2010). *The Rise of the Network Society* (2nd ed.). Wiley-Blackwell. https://doi.org/10.1002/9781444319514

Creswell, J. W., & Creswell, J. D. (2023). *Research Design: Qualitative, Quantitative, and Mixed Methods Approaches*. SAGE Publications Inc.

Creswell, J. W., & Poth, C. B. (2024). *Qualitative Inquiry and Research Design - Choosing among Five Approaches* (4th ed.). SAGE Publications, Inc.

Diamond, L., & Morlino, L. (2004). The Quality of Democracy: An Overview. *Journal of Democracy*, *15*(4), 20–31. https://doi.org/10.1353/jod.2004.0060

Djumadin, Z. (2022). Implementation of E-Voting: Increasing Community Participation for quality Elections. *Economic Journal*, *11*(03), 2151–2155. http://ejournal.seaninstitute.or.id/index.php/Ekonomi

EC, & UNDP. (2012). *Information Technology and Elections Management: Informed Decisions for Sustainable Outcomes*. https://www.undp.org/publications/information-technology-and-elections-management

Fauziah, A. R., Bimantara, C. S., Bahrenina, K. A., & Pertiwi, Y. E. (2023). Meningkatkan Kualitas Pemilu Serentak Tahun 2024 Melalui Pemanfaatan Teknologi Digital. *Jurnal Kajian Konstitusi*, *3*(1), 51–57. https://doi.org/10.19184/j.kk.v3i1.39022

Febriansyah, R., & Husnayanti, A. (2024). Keamanan Sistem Informasi Pemilu Melalui Computer Security Incident Response Team (Csirt) Pemilu Serentak 2024. *JIPOSSTER: Jurnal Ilmu Politik Dan Studi Sosial Terapan*, *3*(4). https://jurnal.polstac.or.id/index.php/jiposster

Goldman, A. I. (2015). What Is Democracy (and What Is Its Raison D'Etre)? *Journal of the American Philosophical Association*, *1*(2), 233–256. https://doi.org/10.1017/apa.2014.30

Haque, Z., & Carroll, D. (2020). Assessing the Impact of Information and Communication Technologies on Electoral Integrity. *Election Law Journal: Rules, Politics, and Policy*, *19*(2), 127–148. https://doi.org/10.1089/elj.2019.0558

Heeks, R. (2006). *Implementing and Managing eGovernment An International Text*. SAGE Publications Ltd.

Huda, D., Winarto, A. E., & Lestariningsih, L. (2023). Analysis of 2024 General Election Digitalization System as An Effort to Improve The Quality of Democracy in Indonesia. *Journal of Development Research*, *7*(2), 272–282. https://doi.org/10.28926/jdr.v7i2.313

Huntington, S. P. . (1991). *The Third Wave : Democratization in the Late Twentieth Century*. University of Oklahoma Press.

Khumayah, S. (2025). Public Information Policy in the Digital Era and Indonesian Research Trends in the Last Decade. *Journal of Governance*, *10*(2), 414–429.

Layne, K., & Lee, J. (2001). Developing Fully Functional E-Government: A Four Stage Model. *Government Information Quarterly*, *18*, 122–136.

Luo, C., Hasan, N. A. M., & Zamri bin Ahmad, A. M. (2024). Exploring Satisfaction and Trust as Key Drivers of e-Government Continuance Intention: Evidence from China for Sustainable Digital Governance. *Sustainability*, *16*(24), 11068. https://doi.org/10.3390/su162411068

Miles, M. B., Huberman, A. M., & Saldaña, J. (2014). *Qualitative Data Analysis: A Methods Sourcebook* (3rd ed.). SAGE Publications, Inc.

Myeong, S., Kwon, Y., & Seo, H. (2014). Sustainable E-Governance: The Relationship among Trust, Digital Divide, and E-Government. *Sustainability*, *6*(9), 6049–6069. https://doi.org/10.3390/su6096049

Nazriyah, R. (2011). Kemandirian Penyelenggara Pemilihan Umum (Kajian terhadap Putusan Mahkamah Konstitusi No. 81/PUU-IX/2011). *JURNAL HUKUM*, *18*, 107–126. https://journal.uii.ac.id/IUSTUM/article/download/7235/6395/12850

Norris, P. (2014). *Why Electoral Integrity Matters*. Cambridge University Press. https://doi.org/10.1017/CBO9781107280861

Norris, P. (2015). *Why Elections Fail*. Cambridge University Press. https://doi.org/10.1017/CBO9781107280908

Nurkamiden, M. (2024). SiRekap : Tantangan dan Potensi Kekeliruan Proses Rekapitulasi Pemilu Serentak di Indonesia SiRekap: Challenges and Potential Errors in the Recapitulation Process of Simultaneous Elections in Indonesia. *SOSIOLOGI: Jurnal Penelitian Dan Pengabdian Kepada Masyarakat*, *1*(2), 101–110.

O'donnell, G., Schmitter, P. C., & Whitehead, L. (1991). *Transitions from Authoritarian Rule: Comparative Perspectives*. The Johns Hopkins University Press.

Palinkas, L. A., Horwitz, S. M., Green, C. A., Wisdom, J. P., Duan, N., & Hoagwood, K. (2013). Purposeful Sampling for Qualitative Data Collection and Analysis in Mixed Method Implementation Research. *Administration and Policy in Mental Health and Mental Health Services Research*, *42*(5), 533–544. https://doi.org/10.1007/s10488-013-0528-y

Prayitno, R. B., & Prayugo, A. (2023). *Teori Demokrasi Memahami Teori dan Praktik*. Deepublish.

Purnama, T. Y., Catur, R., Dewi, K., & Haryani, A. T. (2025). Peran Teknologi Digital Dalam Pemilihan Umum Demi Mewujudkan Pemilihan Umum Berintegritas. *Jurnal Serambi Hukum*, *18*(2), 197–205.

Putri, J. A., Sari, N. Y., Rahayuningtyas, F. D., Cahyono, A. S., & Purnawati, L. (2025). Efektivitas Penggunaan Aplikasi Sirekap (Sistem Informasi Rekapitulasi) Dalam Pemilu 2024. *Journal of Governance and Public Administration*, *2*(2), 351–360. https://journal.ppmi.web.id/index.php/jogapa/index

Schumpeter, J. A. (2003). *Capitalism, Socialism and Democracy*. Routledge.

Setyasih, E. T. (2023). Democracy in the Digital Era as a Challenge and Opportunity for Public Participation. *Jurnal Pemikiran Administrasi Negara*, *15*(1), 28–39.

Stebbins, R. A. (2001). *Exploratory Research in The Social Sciences*. SAGE Publications Inc.

Suranto, S., Nasrullah, N., & Lailam, T. (2020). Model Rekrutmen Penyelenggara Pemilu yang Independen dan Berintegritas di Daerah Istimewa Yogyakarta. *Jurnal Konstitusi*, *17*(1), 054. https://doi.org/10.31078/jk1713

Sutrisno, E., Costa, B., & Silva, P. (2025). Effectiveness of Implementing General Principles of Good Government (AUPB) in Public Services. *Rechtsnormen: Journal of Law*, *3*(2), 113–123. https://doi.org/10.70177/rjl.v3i2.2093

TII. (2025). *A Report on Financial Transparency Gaps in Indonesia's 2024 Gubernatorial*

Elections. https://ti.or.id/

Umagapi, J. L. (2020). Representasi Perempuan Di Parlemen Hasil Pemilu 2019: Tantangan Dan Peluang. *Kajian DPR RI*, *25*(1), 19–34.

UN. (2024). *United Nations E-Government Survey 2024: Accelerating Digital Transformation for Sustainable Development - With the addendum on Artificial Intelligence*. United Nations. https://doi.org/10.18356/9789211067286

Wasiu, B., & Chukwudi, C. E. (2023). Technology and Conduct of Election in Developing Countries: A Study of Nigeria's Fourth Republic. *Journal of Propulsion Technology*, *44*(6), 6947–6958.

Williams, B. K., & Sawyer, S. C. (2015). *Using Information Technology: Practical Introduction to Computers & Communications* (5th ed.). McGraw-Hill Education.