E-Voting in Indonesia Election: Challenges and Opportunities

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Abstract

The process of General Election cannot be separated from the country which adheres to the principles of democracy in its political life. The acceleration of advances in technology and information has led to a new trend in democracy called digital democracy. This democratic model is referred to as digital democracy which is defined as the use of communication technology to advance public participation in democracy. Through the internet, it is possible for the public to carry out various experiments and communication design innovations when faced with their political representatives regarding the policies being implemented. The development of technology and information has encouraged most election management institutions / bodies in the world to adapt to new technologies with the aim of enhancing a more credible electoral process, one of which is voting through e-voting. This article examines the opportunities and challenges in implementing e-voting in elections in Indonesia. The method used is descriptive with data collection techniques utilizing secondary data through literature review. From the results of the analysis conducted, it can be concluded that the challenges that may arise from implementing an e-voting system are the large initial costs, human resources, community culture, and issues regarding the security of this system. Meanwhile, the benefits obtained include overcoming the problems that always arise in every Election in Indonesia. In addition, the benefits that can be obtained include saving costs for implementation, a fast and accurate calculation process and is expected to increase public participation in choosing

Introduction

General elections are one of the complementary practices of democracy in Indonesia (Iliev, 2021). The implementation of elections is basically the people's sovereignty to elect the president, regional heads and members of the people's representatives. Elections are also a means of convincing or updating people's agreement, educating rulers to rely more on agreement rather than coercion to maintain their legitimacy (Waluyo, Nurjaya, Suryokumoro, & Hadiyantina, 2021). Democracy and elections are like two sides of a coin that are closely related, the implementation of elections which are the people's passion, characterizes the still upholding of a democratic system in a country. The principle of democracy from the people, by the people, and for the people can be seen in general election activities. The general election procession as a manifestation of the means of political life for citizens which is the second pillar of the democratic system (Maciel, 2021).

At present, elections are considered a symbol, as well as a measure of democracy in countries that embrace democracy. The results of elections held in an atmosphere of openness with freedom of opinion and freedom of association are considered to reflect somewhat accurately the participation and aspirations of the people. It is expected to produce representatives of the people who are able to understand the aspirations of the people, especially in the process of formulating public policies with a system of rotation of power. (Gorodnichenko & Roland, 2021).

So far, the electoral system in Indonesia has undergone many changes, especially after the reformation. The election system in Indonesia currently consists of legislative elections, presidential elections, and provincial / regency / city head elections.(Shrotriya & Pachauri, 2021). The dynamics of the electoral system are also part of the dynamics of democracy in Indonesia. The dynamics of democracy also cannot be separated from the development of technology and information which has led to new terms in democracy such as e-democracy, cyberdemocracy, and e- election or e-voting.

The acceleration of advances in technology and information has led to new communication trends in the realm of new media users. New media provide new space in democracy. This democratic model is referred to as digital democracy which is defined as the use of communication technology to advance public participation in democracy. Through the internet, it is possible for the public to carry out various experiments and communication design innovations when faced with their political representatives regarding the policies being implemented (Duile, 2021).

The journey of digital democracy in Indonesia is quite long, starting from the New Order era. The journey of digital democracy in Indonesia cannot be separated from the existence of the press and its long road, the presence of the Information and Electronic Transaction Law and the massive expansion of the internet. Digital democracy in Indonesia in practical politics can be seen clearly in the 2014 election with the presence of kawalpemilu.org.

The e-counting-based kawalpemilu.org site became phenomenal in the 2014 elections because it succeeded in guarding public votes and controlling the performance of the General Election Commission. With crowd sourcing and big data approaches, the site collects the initiative and intention of citizens to oversee and control the course of elections facilitated by the Internet (Khozen, Saptono, & Ningsih, 2021).

The development of technology and information has encouraged most of the EMBs in the world to adapt to new technologies with the aim of enhancing a more credible electoral process. Technology can be applied in almost all aspects of the management of the electoral stage process, of the 106 countries using electoral technology recorded by International IDEA, 60% of whom use technology for tabulation of votes, 55% for voter registration, 35% for biometrics (fingerprints, retina), etc.) voter registration, 25% for biometrics in voter verification, and 20% for e-voting. Not all countries implement technology fully in the entire electoral process, there is still a combination of manual and modern processes that are appropriate to the conditions in their country (Asmar et al., 2021). From the data, the use of e-voting technology is still very limited.

Technology-based voting, such as e-voting, has not been conducted globally due to limited technology, security, and very high credibility. Even in developed countries in the world, it is not easily accepted and implemented and works well. It is not uncommon that what happens is even better, namely receiving rejection from the community or political elites and or experiencing failure in its implementation so that it is not trusted by the wider community (Shankar, Pandiaraja, Sumathi, Stephan, & Sharma, 2021). One of the failures of e- voting occurred in the 2000 US

Presidential election in the heavily criticized state of Florida. Developed countries like the United States are not immune from failures. What are the challenges and opportunities for using e-voting in elections in Indonesia?

Literature Review

Democracy and Digital Democracy

Literally, democracy means government by the people, and government by the people. This means that the government acts according to the will of the people. An ideal democratic government must work properly in accordance with the aspirations and needs of its people (Savirani, Al Akbar, Jamson, & Asworo, 2021). Many countries adopt democracy because they believe that democracy provides protection of human rights rather than authoritarian. Stability and solid democracy have a close relationship with the creation of an appreciation for human rights. Meanwhile, in other fields that are not related to political freedom, democracy promises the creation of a political framework in which development and fulfillment of human rights are better (Savirani et al., 2021). The following are some of the reasons why many countries choose democracy (Deligiaouri & Suiter, 2021):

1.   Democracy helps prevent the development of ruthless governments and cunning religious circles
2.   Democracy guarantees citizens with human rights standards that non-democratic systems cannot afford
3.   Democracy ensures greater individual freedom for its citizens than any other alternative
4.   Democracy helps people protect their interests
5.   Only a democratic government is able to provide a great opportunity for its people, to exercise their freedom of choice, for example to live by the rules they choose
6.   Only a democratic government is able to provide the greatest opportunity to relinquish moral responsibility;
7.   Democracy helps build humanity in its entirety;
8.   Only democratic governments can develop relatively strong political equality;
9. Modern   countries   that   adopt   representative democracies are not at odds with one another;
10. Countries with democratic governments tend to be more affluent than countries that are not In politics, democracy is a method of institutional arrangement to arrive at political decisions in which individuals gain power to make decisions through competitive struggles to gain votes. The competitive process must remain framed by normative ethics which leads to social equilibrium (Ouaissa, Pannewick, & Strohmaier, 2021).
Democracy is founded on the principle of equality that every citizen has equal rights and positions in Government. Every citizen actually has the same power to rule. This people's power is the source of legitimacy and legality of state power. (Gorodnichenko & Roland, 2021).
The development of the democratic transition in Indonesia has progressed very rapidly after the amendment of the 1945 Constitution. One of the developments referred to is marked by the strengthening of participatory democracy by the people in the succession of the national leadership through the means of organizing the General Election of the President and Vice President which is held directly (Rajagukguk, Aripin, & Wahyudi, 2021). This direct election strengthens the pillars of democracy in Indonesia.
The development of technology and information has changed the way of democracy. Internet encourages people to be more active and critical in questioning democratic life. Various models of communicative democracy supported by virtual or digital means have emerged today, ranging from party web portals, online campaigns to e-voting. Regardless of its form, digital democracy provides access to information in various ways, provides public space, and adequate interaction between citizens and the government, as well as between fellow citizens. (Fatanti, 2018).
Digital democracy or e-democracy is literally the use of information and communication technology (ICT) and computer-mediated communication (CMC) in democratic practices (Lindner & Aichholzer, 2020). The use of ICT and CMC in various electronic media such as the

internet, interactive broadcasting, and social media, has made the practice of democracy knows no boundaries of space, time, and physical conditions. Digital democracy ultimately aims to increase political democracy and community participation (Fuchs, 2021). E-democracy has become one of the topics that have attracted the attention of many researchers in the world since the internet has influenced people in social Interaction (Abu-Shanab, 2015). Digital democracy combines participatory democracy with representative democracy which qualitatively transfers people's power into ICT. Digital democracy actually explores the rapid development of interactions between cyberspace and social policies (Ulyana & Riyansyah, 2021). Digital democracy is a leading system in the political, economic and socio-cultural context It's a framework in which the information society runs, represents a higher level than liberal democracy, raises a symbiosis of electronic technology and the development of communication and information technology with humans and the State. Digital democracy interacts with humans, human groups, government, local business communities and social networks. Digital democracy is a dialectical interaction between society and technology.

In Indonesia itself, the implementation of e-democracy or digital democracy is still problematic. Research conducted (Saud & Margono, 2021), there are three points that cause the implementation of digital democracy is still problematic, namely;

a. e-democracy is only a facility to achieve the objectives of state administration through information and communication technology. However, in fact, e- democracy has become an end in itself, so that in the end the objectives of state governance are often neglected. Internet-based public service provision is considered more important because of the various interests in it. At the same time, the principle of e- democracy as a facility runs counter to practice.
b. it is difficult to distinguish between the objectives and the means, which has an impact on the uncertainty of the foothold for implementing e-democracy in Indonesia.
c. Although it is still in a transitional period, the increasing number of internet users and the emergence of various forums in cyberspace have generated optimism in the electronic democracy space. Meanwhile, on the other hand, the internet is not only a means of voicing political aspirations, but various discourses overlap in it.

E-voting

E-voting or electronic voting according BPPT (Haryadi, Nurmandi, Muallidin, & Kurniawan, 2021) is a method of voting and counting votes in an election using an electronic device. In detail and operationally, BPPT defines the e-voting system as a system that utilizes electronic devices and processes digital information to create ballots, cast votes, calculate votes, send vote results, broadcast vote counts, maintain and generate an audit trail. From the same research, e-voting is a combination of technology with a democratic process so that voting is more efficient and convenient for voters.

In principle, there are two types of e-voting systems that can be applied, namely (Figueroa et al., 2021);

1. E-voting at the pooling booth: e-voting is carried out at
certain predetermined places and voters come to that place to determine their choice.
2. E-voting online: e-voting is conducted online so that voters do not need to visit predetermined places but can vote anywhere as long as there are online facilities so that the voting process runs in real time online.
In Indonesia, there have been many studies that have tried to develop various e-voting methods at various levels of election, such as the election of the Student Council Chair, the Student Executive Board Chair, the Village Head, to the Regional Head. The choice of technology used in the implementation of e-voting also varies, such as using a smart card for voter authentication, using the internet as a voting system, using a touch screen instead of a sound card, and there are still many variations of technology used. (Zhu, Azizah, & Hsiao, 2021).
Elections in a small scope such as the election of the student council president use SMS-based e-voting as is done by Aswale et al. (2021) and (Putra, Darusalam, & Sari, 2021). This method, the system and its implementation is able to produce a voting result processing system precisely and quickly. In addition, the hardware requirements, this application has a relatively low cost because it uses a simple hardware configuration. This application is considered fast and accurate because this application can automatically calculate the results of voting.

Security is an important issue in this e-voting election. Public trust in e-voting is still low. This is due to the public's fear of manipulating the results of each candidate. For this reason, it is necessary to develop a system that can guarantee the accuracy of e-voting results, data integrity when sending voting results from voters to the system, and validating the real voters in receiving voting results. In the study (Schultz, 2021), the authors applied RSA security methods such as public and private keys to verify. The e-voting application is built with the PHP programming language, and utilizes the MySQLi database as a database server. From the results of the tests carried out, it can be concluded that the system can work well, can validate voters and verify the results of the voting whether changes during delivery.

The use of fingerprints is also carried out in the prototype of e-voting elections. It is believed that the development of a fingerprint-based election system prototype can help in overcoming election fraud (Willysandro, Setiawan, & Sulaiman, 2021).

An e-voting system design using the Two Central Facilities protocol can also be an alternative. Research conducted (Gupta, Gupta, Pandya, Bhatt, & Mehta, 2021) built an e-voting system for the regional head election of Tasikmalaya City using the Two Central Facilities Protocol, which consists of the Central Legitimization Agency (CLA) for voter validation and the Central Tabulating Facility (CTF) for vote counting, which can realize an e-system. voting is safe, effective, and efficient.

Another study to build an e-voting system in regional head elections was also carried out (Zhu et al., 2021). This research has successfully implemented an e-voting system consisting of a registration system, validation and voter activation, login / entry to the system, the voting system, and the vote counting system. The application is in the form of a computer simulation built using the PHP programming language and run through a web browser.

Another model in the regional head election system by e- voting has been carried out in this study (Aulia, Dora, & Mega, 2021). In this research, the e-Voting system can be used from voting data collection, voter registration, voting to voting results calculations. In the voter data collection phase, this system can be connected to the National Population System to select eligible voters. Then the General Election Commissions prints the voter cards and invitations used to vote. Voters can vote at the nearest polling station. If the voter card has been used to vote previously, the system will reject the card. The application is built very simply and is designed as minimal as possible to make it easier for users to operate the e-voting application.

Research Methods

The research method used is descriptive with data collection techniques utilizing secondary data through literature review. Meanwhile, data analysis uses content analysis, which critically examines the data obtained and concludes and provides recommendations or suggestions as needed...

Discussion

The quality of general elections in Indonesia is currently experiencing a significant increase compared to previous years. For example, in 2014, the government began applying technology to the election registration system to simplify and streamline the process. The list of Indonesian voters has also changed from a list compiled manually, to a data-based list that is computerized, centralized, and easily accessible to various parties. This does not rule out the possibility that in the future the electronic election process (e-voting) will be a consideration for Indonesia to be able to resolve violations that occur in general elections.

Based on the fact the number of users and the use of new media has increased. Almost all activities can be completed through various easy-to-get internet access, such as e- commerce, online transportation, e-tolls, e-learning, and various contributions to the development of internet sophistication that is used in everyday life. Looking at the data that shows that Indonesia is ranked the sixth largest internet user in the world.

Looking at the description of the implementation of the Indonesian election and related to the number of internet users in Indonesia, as well as reflecting on several countries such as India, Brazil, which have successfully implemented an e-voting system, as a country Indonesia or India are democracies that have a challenging, diverse population landscape. coupled with logistical

challenges. Seeing the strengths and weaknesses of e- voting, it can be said that it is feasible and possible to be implemented in Indonesia. However, there are still many regions that need special attention from the government in terms of facilities and infrastructure to support this e-voting system, for example in terms of electricity, internet networks, experts for e-voting systems, people who are not computer literate. However, with all the limitations, e-voting through the initiation of BPPT has attempted to contribute concretely and significantly to the development of the e-voting system. This is based on BPPT RI data from 2013 to 2017, e-voting has been applied to 683 village head elections in 12 districts (Haryadi et al., 2021), one of which is the election of the Village Head in Musi Rawas South Sumatra (Darmawan & Nurhandjati, 2016).

One of the challenges in implementing e-voting in Indonesia is the geographical and infrastructure conditions. Geographicalism of Indonesia, which consists of thousands of islands and many people living in remote areas, is the main challenge for the implementation of e-voting. Apart from difficult access, public knowledge and touch of information technology are still very limited.

Indonesia must initiate e-voting at every level of government election. Based on this research, it is possible to apply electronic voting in remote areas with some problems in remote areas. Indonesia with around seventy thousand villages in it can initiate e-voting in each village and this is the starting point for implementing electronic voting at the district level to the national level. Because Indonesia is a large country with a large area and a large population, e-voting can reduce Indonesia's election budget (Ramadhan, Fitriani, Suharto, & Hendrastiti, 2018). On the other hand, this research also still finds loopholes in fraud committed through computer systems.

The implementation of e-voting in Indonesia is expected to solve five main problems that always arise in the implementation of elections such as;

a.   Permanent Voter List (PVL) issue. Every Election, PVL is a problem that always arises. Even though there was always updating of data, the sense of public awareness regarding updating data to become PVL was still lacking which indirectly had a negative impact on the real number of voters who should have been entitled. Ironically, behind this case is the fact that a number of residents have multiple ID cards. This is actually used by the elements to inflate the voice.

b.   Invalid ballots tend to continue to increase at every implementation of democratic parties and this is also followed by an increase in the number of non-voters. This occurs due to voters' lack of understanding in the process of determining the choice at the predetermined voting booth. Even though there is intensive socialization by the GEC-RGEC, the rules on the validity of ballots that can change at any time tend to confuse potential voters. At least, this case was often encountered in the last election when the rules were changed from voting to voting. With the existence of e- voting, the rules for valid and invalid votes are very clear and it is hoped that the reduction of invalid votes will be reduced.

c. Geographical conditions and location indirectly hampered the speed of collecting and of course also related to the counting of votes. The range of time and distance allows the addition and or subtraction of sound. This fact has not yet been added to the cases of intimidation that also often occur in a number of polling stations in various regions. The e-voting system will remove this obstacle because the recapitulation of votes can be known immediately after the election time ends. This e-voting system will also eliminate the problem of time and distance.

d. Weak technological infrastructure is also an obstacle to the implementation of the democratic party so that the determination of results cannot be simultaneously and this is getting worse when determining the results of manual counting is the best and the most correct option. Therefore, it is very logical that the time span for the announcement of the winner of the election could reach more than a month, even though the results of the quick count or quick count may have been read in the afternoon on the day of the election.

e.   The number of non-voters tends to increase every time a democratic party is held.

Apart from that, some of the benefits obtained from the implementation of e-voting are

a. Eliminating the possibility of invalid and doubtful votes, which in many cases are the root cause of controversy in elections;

b.   Makes the counting process much faster than conventional systems;

c.   Reducing the amount of paper used thus saving a lot of trees which makes the process environmentally friendly;

d.   Reduces printing costs to almost zero as only one sheet of ballot paper is required for each

Poll.

The advantages of using this e-voting system are that it speeds up vote counting, results in a more accurate vote count, saves on the cost of printing and distributing ballot papers, provides access to more information about voting / candidate choices, provides better access for people with physical limitations (disabilities), Providing access for people who have limited time to go to the voting place, and can control parties who are not entitled to vote, for example those who are aged.

Behind the potential benefits and advantages of the e-voting system above, this system also comes with its own weaknesses and challenges. The first challenge is human resources. If election officials do not have sufficient knowledge about e- voting, the implementation of e-voting fails. It is worrying that if the e-voting technology fails, it will reduce the legitimacy of the election. The second challenge is the culture of the people. Not all people can like a system that uses high technology, especially for older voters. The third is about guaranteeing confidentiality, freedom and security. The factor of using technology in an e-voting system (for example using a machine) is it able to guarantee confidentiality, security and freedom in voting and the electoral process.

The high initial upfront investment costs pose a challenge in itself as they are prone to fraud and corruption. Similar to the e-ID project, the project to implement this e-voting system will incur large initial costs and is very prone to corruption. Strict supervision is an absolute must accompany the process of implementing this e-voting system.

Conclusion

In general, it can be concluded that the e-voting system in elections in Indonesia can be carried out in stages starting from the regional head election as the initiation of the broad implementation of the e-voting system to the election of the president and legislative members. Challenges that may arise from implementing an e-voting system are the large initial costs, human resources, community culture, and issues regarding the security of this system. On the other hand, the potential benefits to be obtained are very large compared to the current election. The potential benefits include saving on running costs, a fast and accurate calculation process and hopefully increasing public participation in voting.

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