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# The Use of Blockchain to Prevent Vote Manipulation in E-Voting for Electronic General Meetings of Shareholders in Indonesia

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**ABSTRACT**
Digitalization in Indonesia continues to evolve. One of the many developments that will be discussed in this paper is the implementation of an electronic General Meeting of Shareholders (GMS). There is an institution that has been appointed by the Financial Services Authority (OJK), namely the Indonesian Central Securities Depository (KSEI) which has created a system called eASY.KSEI as the basis for implementing the GMS electronically. In its implementation, several weaknesses were found in this system, such as the absence of direct vote counting, lack of data transparency, and potential vote manipulation. This research was conducted to provide an understanding that efforts are needed to continuously update the existing system to prevent these things from happening. The use of Blockchain as a new e-voting system in electronic GMS is a worthy endeavor. This paper uses an exploratory research method. Existing data is obtained through literature studies in the form of books and current journals that are in accordance with the research topic. From the research conducted, it can be seen that the use of Blockchain is able to overcome the weaknesses in the eASY.KSEI system, such as a decentralized system, data immutability, and data transparency.

**Keywords:** Blockchain, Digitalization, E-Voting, GMS.

## INTRODUCTION

In the era of digitalization, renewal after renewal in various aspects of life continues to be carried out. The reforms are aimed at improving and keeping up with the times. One of the many reforms made is the possibility to conduct electronic voting (e-voting) in organizing the General Meeting of Shareholders (GMS) electronically or also known as e-RUPS (Brennan et al., 2024). As stipulated in Article 77 Paragraph (1) of Law Number 40 of 2007 concerning Limited Liability Companies, apart from being held in conventional form (conducted outside the network), the GMS of a public company can also be held online through various telecommunications media, electronic video, or other electronic media facilities (Putra et al., 2019). Article 4 of Financial Services Authority Regulation Number 16/POJK.04/2020 of 2020 concerning the Implementation of the General Meeting of Shareholders of Public Companies Electronically (POJK 16/2020)

regulates the implementation of GMS electronically in public companies (Nur Aini, 2024). The implementation of the GMS electronically can be carried out through an e-RUPS provided by an e-RUPS provider, namely a depository and settlement institution appointed by the Financial Services Authority (OJK) or other parties approved by the OJK or through a system provided by a public company (Rosdiana, 2021). This electronic voting can be done on the system provided by the public company since the date of the GMS invitation. Shareholders can also change their voting choices before the chairman of the GMS starts voting on the meeting agenda for decision making. However, this paper only discusses the implementation of the GMS electronically provided by the e-RUPS provider that has been appointed by OJK.

The use of Blockchain technology in e-voting for electronic GMS is essential due to its ability to address the fundamental challenges faced by traditional electronic systems (Stenbro, 2010). Blockchain offers a decentralized and immutable ledger that ensures the integrity of the voting process by preventing unauthorized alterations to data (Daraghmi et al., 2024). Each transaction, including voting actions, is cryptographically secured, making it resistant to hacking or manipulation. Moreover, Blockchain provides transparency and traceability, as every vote can be verified without compromising voter anonymity. This creates trust among shareholders, ensuring that their votes are accurately counted and safeguarded against fraudulent activities. By incorporating Blockchain, the electronic GMS can achieve higher levels of security, accountability, and efficiency, fostering greater shareholder confidence in the decision-making process.

In its implementation, there are difficulties that arise in the decision-making process through this e-voting mechanism. Some of the problems are the low level of security, indications of fraud in the form of vote manipulation, and the existence of anonymous voters who actually do not have voting rights but can vote (Rosasooria et al., 2020). These problems can be minimized by using Blockchain as a medium for e-voting. The use of Blockchain is considered to be able to overcome the existing problems because Blockchain consists of several data blocks that are connected to each other in a certain order (Navya et al., 2018). These interconnected blocks can be traced and the veracity of the activity can be verified, thus minimizing and even eliminating problems regarding security, fraud, and transparency in electronic voting.

Previous research on e-RUPS has primarily focused on the technical implementation of electronic systems or general regulatory compliance (Sadikin & Purwanto, 2018). However, these studies often overlook the specific vulnerabilities inherent in e-voting systems, such as security breaches, fraud, and transparency issues. Furthermore, while Blockchain technology has been extensively studied in various domains, its application in the context of e-RUPS, particularly in Indonesia, remains underexplored. The lack of a robust framework for integrating Blockchain into e-voting systems for GMS highlights a significant research gap.

This study offers a novel perspective by examining how Blockchain can be specifically applied to mitigate the vulnerabilities of e-voting in e-RUPS in Indonesia. Unlike previous studies, it provides a detailed analysis of Blockchain's potential to address vote manipulation, enhance

transparency, and improve overall system integrity. By focusing on the Indonesian regulatory and operational context, this research contributes original insights to the broader discourse on secure and efficient electronic voting systems.

Therefore, this research aims to discuss how the use of Blockchain can prevent vote manipulation in e-voting electronic GMS in Indonesia. This research is divided into several sections to achieve these objectives, namely the first section in the form of background for this research, the second section in the form of a description of the research method, the third section will contain results and discussion, namely a description of the implementation of the GMS electronically and an analysis of the use of Blockchain that can overcome the problems mentioned, and the last section will contain conclusions from the research that has been done.

## RESEARCH METHOD

This study uses an exploratory research method, which is intended to explore knowledge about a topic that is not yet widely understood or researched (Ishaq, 2017). The data for this research is obtained through a literature study of books, journals, and other scholarly articles related to the topic (Soekanto, 2015). These sources provide the foundation for analyzing the role of Blockchain technology in preventing vote manipulation in e-voting for electronic General Meetings of Shareholders (e-RUPS) in Indonesia.

The data analysis technique employed in this research is qualitative content analysis. This technique involves systematically reviewing and interpreting the collected literature to identify themes, patterns, and relationships relevant to the research objectives. Specifically, the analysis focuses on comparing the existing eASY.KSEI system with Blockchain-based solutions in terms of security, transparency, data integrity, and efficiency. The results are then contextualized within the Indonesian regulatory framework for e-RUPS to provide insights into the potential application of Blockchain technology in this domain.

## RESULT AND DISCUSSION

This section contains a description of how e-RUPS is organized in Indonesia, the legal basis that regulates it, and how to vote electronically. These matters will be related to Blockchain technology. The description of Blockchain will include a brief understanding of Blockchain and an explanation of the advantages of Blockchain. Finally, the discussion is closed with an analysis of the use of Blockchain as an effort to prevent vote manipulation in electronic GMS e-voting in Indonesia.

### Implementation of E-RUPS in Indonesia

The implementation of electronic GMS in Indonesia is regulated in POJK 16/2020. In Article 8 POJK 16/2020, it is stated that the implementation of the e-RUPS is not only carried out in electronic form, but must also be held in physical form which is at least attended by the chairman

of the GMS, 1 (one) member of the Board of Directors and / or 1 (one) member of the Board of Commissioners, and capital market support professionals who will assist in the implementation of the GMS. In addition, the place where the e-RUPS is held is the place where the physical GMS is held. However, there are restrictions on how many GMS participants can be physically present in accordance with the provisions set by the company. Shareholders who do not have the opportunity to attend physically can still participate in the GMS electronically because the place where the e-RUPS is held is the same as the place where the physical GMS is held. So, in terms of the calculation of the attendance quorum, shareholders who attend through the e-RUPS will still be taken into account. However, because POJK 16/2020 was born when the Covid-19 pandemic hit the whole world, then under certain conditions determined by the government or with the approval of the Financial Services Authority (OJK), the company can eliminate the holding of physical GMS.

As described at the beginning of this journal, this paper only discusses the implementation of e-RUPS by depository and settlement institutions appointed by the Financial Services Authority (OJK). PT Kustodian Sentral Efek Indonesia (KSEI) is a company that has been licensed by OJK as a depository and settlement institution. KSEI has a system to organize e-RUPS, namely the KSEI Electronic General Meeting System or also known as eASY.KSEI. In the eASY.KSEI Application Usage Guide issued by KSEI, it is stated that shareholders who will attend a GMS electronically through eASY.KSEI are required to submit a statement of attendance and electronic registration as well as voting options for each meeting agenda after the invitation to the GMS until before the date of the GMS. Then in the case of electronic voting, votes may be cast by the shareholder or by a person authorized by the actual shareholder. The proxy may cast his/her vote if he/she accepts the proxy without being accompanied by a voting option by the shareholder. However, if he/she receives a proxy with a minimum voting option, the proxy cannot change or revoke the voting option that has been received and submitted through eASY.KSEI and the proxy is deemed to cast the same vote as the majority of other shareholders in the event that the voting option has not been received for other GMS agendas.

**Blockchain Technology**

Blockchain technology is a system that is designed securely to record all transactions in a block and the data in the block is interconnected with each other (Faturahman et al., 2021). Existing blocks are connected by cryptographic links, so that every data or transaction made by users is recorded in a block that is interconnected in the form of an immutable chain (Surbakti, 2023). The essence of this technology is that once data is added to a block, it cannot be changed or deleted (Surbakti, 2023). The data is open and transparent, but also very secure. This is because the data has been cryptographed, so that although participating parties can see the data entered by other parties, the data cannot be manipulated by other parties. Here are some important features in the use of Blockchain:

1. Decentralization

The Blockchain network is not a centralized network. This causes every computer connected to the Blockchain (node) to have the same responsibility, so that if there is damage to a node, it does not affect the Blockchain ledger (Huang et al., 2021).

2. Decree

   In terms of decentralization, since every data is distributed to every user, there is very little chance of fraud. Unless there are more than 51% (fifty-one percent) of users who want the data changed. When a set of data is released by one node and accepted by most users, it will be entered into the Blockchain system, copied, and stored by every node connected to it. Because of this, data in the Blockchain is difficult to alter. This is the advantage of collective maintenance and oversight that ensures the authenticity of the data (Huang et al., 2021).

3. Undeniability

   Blockchain is known for two kinds of keys, namely private keys and public keys (Asang & Sembiring, 2017). Private keys are keys that are only owned by one person, while public keys are keys that can be shared with the public. When a user A makes a transaction, the user A must sign the transaction with his private key. The signature can be verified by user B with A's public key. Therefore, user A cannot deny not making a transaction because each private key and public key belonging to A is unique and paired with each other.

4. Transparency

   In Blockchain, all information is open, except information related to the user's personal data. Then, because every user has an equal position, every transaction made can be validated by other users as long as they are still connected in nodes with the same network.

5. Pseudonymity

   Blockchain can randomize the user's Blockchain address up to a certain limit. This is done so that Blockchain can still maintain the privacy of users. However, this pseudonymity cannot last forever. The user's identity may be traced after a few transactions.

6. Searchability

   As we all know, the data contained in the Blockchain is decentralized and stored in nodes. Therefore, every data can be traced in the Blockchain. This is because the number (transaction id) and timestamp when making a transaction are unique, allowing users to trace every transaction that has been made.

The advantages that have been outlined above make Blockchain a promising option in the event that voting is carried out electronically (Jafar et al., 2021). However, there are several things that need to be considered in the use of Blockchain, including:

1. Anonymity

   Every user of voting rights must be kept anonymous when casting his vote from start to finish so that it cannot be intervened by any party. Contrary to the advantages of Blockchain, namely transparency that allows users to know their activities in using voting rights, voters should still

be able to have anonymity in order to express their choices freely. This is the basic thing that should be done to maintain the privacy of voting rights users.

2. Auditable

   Blockchain does make it possible to audit every data that has been entered in a particular activity. However, it is important to remember that the privacy of voting rights users should not be ignored. Therefore, personal data belonging to voting rights users should not be audited for the sake of anonymity that must be maintained during the voting process.

**Use of Blockchain Technology to Prevent Vote Manipulation in Electronic GMS E-Voting in Indonesia**

In this section, the use of Blockchain technology in the GMS voting process will be described in Indonesia. The analysis is conducted with reference to relevant laws and regulations and scientific articles. Before going into the use of Blockchain technology, we will first describe how to conduct e-voting through the eASY.KSEI application currently used in Indonesia.

First, shareholders will log in via the www.akses.ksei.co.id page. Then, the shareholder will enter the registered e-mail address and password. After that, the shareholder can access eASY.KSEI by selecting the eASY.KSEI menu and eASY.KSEI login on the left side of the screen. Furthermore, to register attendance or authorize another person, shareholders can select the Operations for Shareholders menu, select the GMS of the issuer of securities to be attended, and click Select Attendance Type. Shareholders can choose in person if they will attend on behalf of themselves or choose my authorize representative will attend if the proxy of the shareholder who will attend represents them. After that, shareholders can vote electronically through the same page on the Vote Preference Declaration menu on each agenda item of the GMS. Shareholders can choose one of the three available options, namely accept if they agree to all meeting agenda items, reject if they reject all meeting agenda items, or abstain if they do not vote on all meeting agenda items. Finally, the shareholder will press the save button so that their vote can be saved. If the shareholder chooses the exit without saving menu, the voting options that have been selected will not be saved and the status becomes votes are not recorded or the shareholder is considered not to have used their voting rights. If the shareholder wants to see the results of the vote count after the GMS, the shareholder can select the vote result report menu and select the desired GMS. The bottom of the screen will automatically display in detail how many votes were in favor, against, or abstained in each agenda item of the GMS.

From the description above, it can be seen that the electronic vote count only shows the overall result. There are no indicators that can prove that there is no vote fraud/manipulation in the voting. Shareholders also cannot see the transparency of the vote count because the voting process is centralized at the securities issuer who may have personal interests. This will certainly be different if a company uses Blockchain technology as an e-voting medium. This is because in Blockchain there are blocks that are interconnected like a long chain and contain data on

activities. How can this system minimize data manipulation? The following will outline an analysis of the advantages of Blockchain in the voting process.

First, the system in Blockchain is decentralized, which means that each node can have access and activity history in the same network (Palawe, 2024). Unlike the centralized system, the Blockchain system allows every user in the same network to see and monitor the activities of other users. Thus, the potential for vote manipulation in a centralized system can be minimized. Second, immutability. If the voting system is only controlled by one or a few parties, it will be very easy to manipulate votes. However, because the Blockchain system is decentralized, it means that when someone or a certain party wants to change the vote data that has been entered in the Blockchain to benefit a certain party, that person or party must change most of the data that has been entered previously. This is certainly impossible to do because any data changes, especially those made by force, will be realized and will be notified to other users. Third, indefensibility. Any shareholder who has voted cannot deny that he has not or did not vote, because every activity is recorded in the system. Fourth, transparency. Shareholders no longer need to wait for the voting results to be announced by the securities issuer because the Blockchain system makes it possible to control and display the voting results directly (Sliusar et al., 2021). Fifth, pseudonymity. Blockchain systems can also maintain shareholder privacy by not displaying voter profiles directly.

The implementation of electronic GMS in Indonesia has been running quite well. The same applies to the voting process in the e-GMS agenda. KSEI as a depository and settlement institution appointed by OJK has created eASY.KSEI as a medium for conducting GMS electronically. Through this research, it is hoped that KSEI can be moved to further develop the eASY.KSEI application, so that in the future the e-voting process can be carried out through Blockchain technology.

## CONCLUSION

The conclusion in this research provides a proposal for the utilization of Blockchain technology as an effort to prevent vote manipulation in e-voting conducted at the General Meeting of Shareholders (GMS) electronically in Indonesia. Based on the results of the analysis, it can be concluded that the use of Blockchain has significant advantages over the existing eASY.KSEI system. These advantages include data transparency, more assured data security, and immutability, which effectively overcome the potential for vote manipulation, lack of transparency, and the weaknesses of centralized systems.

The future contributions of this research include various important aspects. First, this research can serve as a foundation for the development of a more efficient, transparent, and secure Blockchain-based e-voting system, both for corporations and other sectors. Second, the results of this research can support the formation of new policies and regulations by OJK and other policymakers to encourage the implementation of Blockchain technology in e-RUPS, including data protection and system integration. Third, this research opens up opportunities for

academics to further examine technical aspects such as consensus algorithms that suit Indonesia's needs, cost-benefit analysis, and their impact on corporate governance in the future..

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