



The Implementation of Blockchain in Taxation: Efficiency, Transparency, and Reducing Tax Avoidance

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Abstract. The implementation of blockchain technology in the tax system has significant potential to enhance efficiency, transparency, and security. In this regard, the Directorate General of Taxes (DJP) can utilize a licensed private blockchain, which allows full control over the network and trusted participation. By harnessing blockchain, the DJP can ensure data confidentiality, security, and prevent unauthorized access. The implementation of blockchain technology in the tax system has garnered significant attention in relevant literature. The research methodology employed in this study is a literature review analysis. In the process of literature analysis, we systematically explored and evaluated various sources, including scholarly articles, research reports, and official publications from tax authorities and related organizations. The primary objective of this literature analysis was to identify and summarize key findings that support the claims outlined in the previous statement. This literature review research has revealed that blockchain technology holds substantial potential for improving efficiency, transparency, and security within tax systems. Several sources in the literature highlight the benefits of utilizing blockchain in the context of taxation, such as cost reduction in tax administration, enhanced accuracy, and prevention of tax fraud. Moreover, we found that blockchain technology has been successfully employed in various tax initiatives across different countries. In conclusion, based on this literature review research, we can infer that the use of blockchain in taxation has the potential to significantly enhance the overall tax system, assuming that existing challenges can be overcome through collaborative efforts and appropriate regulations.

Keywords: Blockchain, Tax Avoidance .

1 Introduction

Since the emergence of the Bitcoin whitepaper in 2008, blockchain technology and Distributed Ledger Technology (DLT) have gained widespread recognition. The public sector has been at the forefront of exploring and actively experimenting with blockchain technology [1]. Several countries, such as Georgia and Ghana, have tested the use of blockchain for land registration [2]. The United Arab Emirates (UAE) has also successfully leveraged blockchain to transform 50% of government transactions into a blockchain platform since 2018, with the goal of saving 77 million work hours annually. One

example is the UAE Roads and Transportation Authority's initiative that uses blockchain to track vehicle ownership, sales, and accident history [3]. Additionally, Germany recently launched the Digital Health Passport, which utilises blockchain to record COVID-19 vaccination certificates and tests [4]. The development of blockchain technology has had a significant impact across various sectors, including taxation. Blockchain is a system that utilises a distributed network to record transactions transparently, securely, and immutably.

Once information is recorded in the blockchain database, it becomes extremely difficult to delete or alter the data [5], thus mitigating tax evasion fraud. The taxation sector needs to adapt to the era of the fourth industrial revolution to drive economic growth and societal well-being. According to the Organisation for Economic Cooperation and Development (OECD), rapid technological advancements, digitalization, and changes in business patterns have resulted in continuous transformation in taxation systems [6]. One tax that is relevant in the era of the fourth industrial revolution is the Goods and Services Tax (GST) or Value-Added Tax (VAT). These taxes make a significant contribution to national revenue as they are derived from the consumption activities of individuals and businesses. Data from the Indonesian Statistical Centre shows that the collection of Value-Added Tax (VAT) in Indonesia is relatively low compared to the country's Gross Domestic Product (GDP) during the period of 2014-2017. The highest VAT ratio in Indonesia during that period occurred in 2014, with a percentage of 3.87%, while the lowest ratio was recorded in 2016 with a percentage of 3.32%. This indicates that the potential revenue from VAT can still be increased to enhance its contribution to the national economy. One of the reasons for the low VAT collection rate is the absence of an efficient VAT administration system [7]. To address these challenges, the taxation sector must continue to innovate and adapt tax policies and procedures to the development of information technology. This will enable the government to optimise the efficient collection and management of tax data, enhance tax compliance, and drive overall growth in the digital and economic sectors. By harnessing the potential and opportunities offered by the era of the fourth industrial revolution, the taxation sector can play a pivotal role in advancing the economy and improving the welfare of the people.

In the context of taxation, the use of blockchain can enhance efficiency in reporting and collecting data within the VAT system. With a distributed system, tax data can be recorded in real-time and verified, reducing the risks of human error and data manipulation. Once transactions are completed, no party can alter the transaction records [8]. Transactions on the blockchain refer to direct and decentralised processes between two parties without the involvement of a third party. Its characteristics, such as autonomy, equality, and transparency, have the potential to detect both corruption and fraud [9]. The government can leverage blockchain technology to monitor tax transactions directly, thereby expediting the verification and processing processes. Furthermore, blockchain can enhance transparency in the tax system. The blockchain technology also provides benefits in terms of data accuracy, data security, and data interoperability [10]. Every transaction recorded on the blockchain can be viewed by all relevant parties, including the government and taxpayers. This can reduce the potential for corruption

and data manipulation while strengthening public trust in the taxation system. Another impact of using blockchain in taxation is the reduction in administrative costs. Automated and decentralised data processing reduces the need for labour-intensive resources and avoids significant infrastructure costs. Additionally, blockchain can facilitate direct tax payment processing, reducing costs and time required in the transaction process. The use of blockchain in taxation also provides benefits in terms of data security. Blockchain utilises strong cryptography and secure encryption systems to protect the integrity and confidentiality of tax data. Sensitive information such as taxpayer identities and transaction details can be securely stored in the distributed network, reducing the risks of data leakage and identity theft. Overall, the use of blockchain in taxation can enhance efficiency, transparency, security, and trust in a country's taxation system. With this technology, the process of tax reporting and data collection can become faster and more accurate, while the risks of fraud and data manipulation can be reduced. Additionally, the use of blockchain can reduce administrative costs and strengthen public trust in the government and existing taxation systems.

Blockchain has become a crucial topic in the context of taxation in many countries. Previous research has revealed that the use of blockchain technology can address several taxation-related challenges, such as transparency, accountability, and data security. Previous studies have shown that blockchain technology has been widely applied in various sectors, including government [11] and business [12]. The fields of accounting, finance, and auditing greatly benefit from blockchain technology [13]. The implementation of blockchain can enhance tax compliance through the use of smart contracts that can automatically verify and execute tax payments. Blockchain technology can also be applied to effective and efficient tax administration, such as in the context of VAT. The use of this technology provides a much more efficient mechanism for message transfer among various parties [14]. Blockchain can help prevent tax evasion practises by providing immutable and distributed transaction records. In this study, we utilise Indonesian data as the basis for analysis. However, this research focuses on the development of blockchain applications in the administration of Value-Added Tax (VAT) systems with the aim of preventing detrimental tax evasion practises. The findings of this research have the potential to be widely applied in other countries. The use of blockchain in taxation can facilitate easier cross-border information exchange between countries, strengthen international tax cooperation, and reduce administrative burdens. Overall, previous research has shown the significant potential of blockchain in addressing taxation issues in a country. These are two reasons why this technology holds promise for implementation in the VAT system in Saudi Arabia [15]. In achieving efficient and transparent taxation, blockchain can provide significant benefits, including increased compliance, administrative efficiency, and data reliability. However, the implementation of blockchain in the context of taxation also requires appropriate legal regulations and collaboration between the government, private sector, and other relevant stakeholders to achieve optimal results.

2 Methods

The research methodology used in this study is a literature review. This research will be conducted by searching and analysing relevant scientific literature from reputable international journals, articles, books, and related theoretical sources. The data obtained from this literature review will be systematically and critically analysed to explore information related to the use of Blockchain in accounting information systems. The literature review approach will be used to gain a deep understanding of emerging issues, evaluate previous research, identify knowledge gaps, and formulate new ideas that can contribute to the relevant research field. Through this method, the research will produce a comprehensive review of the problems and challenges faced in integrating Blockchain technology into accounting information systems, as well as a better understanding of developing effective solutions to address these issues.

3 Results and Discussion

The results of this analysis are presented in Figure 1. In the implementation of National Information and Systems Technology (TISN) using blockchain technology, a permitted private blockchain can be utilised. This type of blockchain allows the Directorate General of Taxes (DGT) to operate a private blockchain system, meaning only parties authorised by the DGT can be part of the network. The advantage of using a private blockchain is that the DGT can control access and participation within the network. The DGT can determine and authorise the parties that act as nodes in the blockchain network, such as government agencies, companies, or other entities involved in Value-Added Tax (VAT) administration. Additionally, the DGT can also regulate the extent of authority held by each party in the network.

By utilising a permitted private blockchain, the DGT can maintain data confidentiality and security, as well as prevent unauthorised access to sensitive information. This helps to enhance trust and reliability in the VAT administration system. Overall, the use of a permitted private blockchain in the TISN allows the DGT to have full control over the blockchain network, ensure trusted participation, and improve efficiency and security in VAT administration.

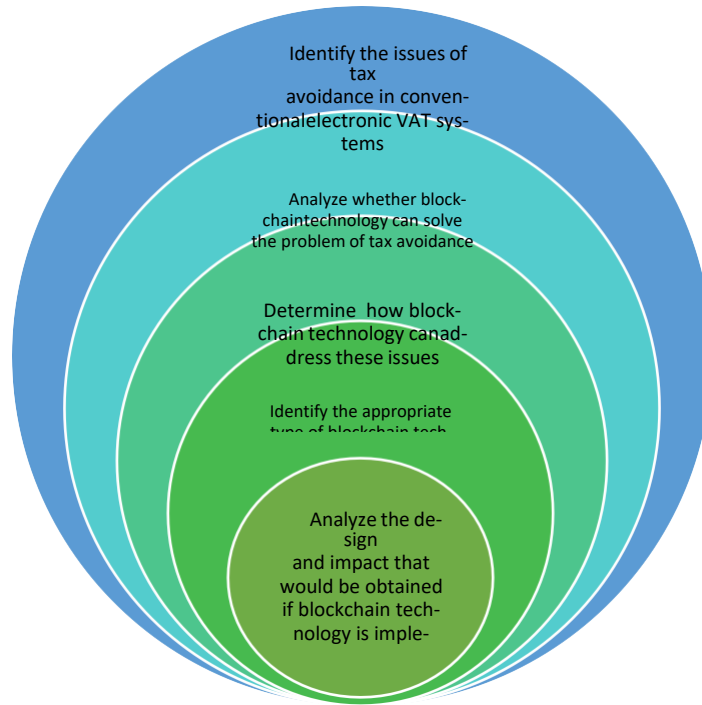


Fig. 1. Research Analysis Phases

Before implementing blockchain technology in the Value-Added Tax (VAT) system in Indonesia, the first step that needs to be taken is designing an implementation model in accordance with the standards of the Directorate General of Taxes (DGT). The DGT must have a deep understanding of how blockchain technology can be optimized in the context of the VAT system in Indonesia. Considering that blockchain technology has various types and implementation models, it is important for the DGT to adapt the use of this technology to prevent tax evasion practices. The design of the implementation model should consider the specific needs and challenges in VAT administration. The DGT needs to consider aspects such as data security, scalability, interoperability with existing systems, and the need to comply with applicable tax regulations and policies.

Additionally, the DGT also needs to conduct an in-depth study of the potential benefits that can be obtained from implementing blockchain technology in the VAT system. By comprehensively understanding how blockchain technology can help prevent tax evasion, the DGT can design an appropriate and effective implementation model. In the context of tax evasion, blockchain technology can provide advantages by recording transactions transparently and immutably. This can help prevent harmful tax evasion practices, as transaction records recorded in the blockchain cannot be easily manipulated or altered. By designing the right implementation model and deepening knowledge

about the potential of blockchain technology, the DGT can utilize it optimally to prevent tax evasion and improve efficiency in VAT administration in Indonesia. Figure 2 shows the steps taken by the researchers to conduct the analysis. As an initial step, an overview of how the conventional electronic VAT system is currently implemented is presented.



Fig. 2. Buyer and seller position scheme in the Indonesian VAT system.

In the sales and purchase scheme with VAT, the seller is obligated to collect VAT from the buyer. A tax invoice is issued as proof of the transaction, and the seller must remit the collected VAT amount to the Directorate General of Taxes (DGT). On the buyer's side, they must verify the tax invoices received from the seller and can use Input Tax as a tax credit. The DGT's online electronic system monitors transactions and validates the received tax invoices. This process is done to ensure the validity and accuracy of the transactions. Additionally, the DGT is responsible for issuing official invoices. However, to improve efficiency and enhance the existing electronic VAT system, it is necessary to identify potential issues that may arise. By identifying these issues, corrective measures can be taken to ensure the VAT system operates better and more effectively. In the conventional electronic VAT system, there are several problems that can contribute to tax evasion practices that harm the country. The following are details of these problems:

1. Suboptimal performance of the e-Nofa application: The e-Nofa application used for TISN applications often experiences performance degradation, and the system can become unresponsive when many taxpayers access it simultaneously. This hinders taxpayers from fulfilling their tax obligations.
2. Excessive stages to be completed: The conventional VAT administration process involves many complex stages, such as input and output tax validation and TISN applications. These stages take time and can slow down the tax administration process.
3. Fictitious tax invoices: Inefficiencies in the VAT system can lead to issues with fake or fictitious tax invoices. Unregistered taxpayers or non-existent transactions may issue fake tax invoices to reduce the amount of VAT that should be remitted to the government. This causes losses for the country.

To address the above-mentioned problems, blockchain technology can provide potential solutions. By utilising blockchain, the application's performance can be improved through a distributed network that efficiently manages TISN requests. The VAT administration process can be simplified using automated and distributed verification performed by the blockchain network nodes. Furthermore, the use of blockchain can address the issue of fictitious tax invoices by creating a secure and transparent system where each transaction is permanently recorded and difficult to manipulate. By harnessing blockchain technology, the electronic VAT system can overcome existing problems and prevent tax evasion practises that harm the country.

In the current system, as shown in Figure 3, all Place of Business (PoB) parties access the online server of the Directorate General of Taxes (DGT) simultaneously and at the same time. However, there is a discrepancy in roles between the DGT server and the PoB in this system, where the DGT acts as the client and the PoB as the user. This misalignment results in misalignment between the DGT server and the PoB. In situations where many PoB parties access the DGT server simultaneously, it often causes constraints for the DGT server. The server's performance may decrease or even experience errors in carrying out its tasks due to its inability to handle simultaneous access by multiple parties. In other words, when the DGT server is under pressure from multiple simultaneous requests, it can disrupt the server's function. This issue can affect the quality of service provided and impact the overall system performance

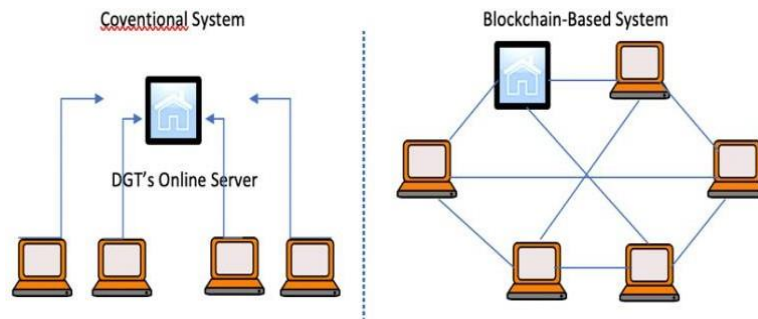


Fig. 3. Comparison of conventional and blockchain-based value-added tax (VAT) systems

However, when compared in the context of a blockchain-based system, each party connected to the network has an active role in the transaction and validation processes. This creates positional equality between the Directorate General of Taxes (DGT) and Place of Business (PoB), where both participate in the transaction process and data integrity maintenance through consensus and collective validation. Thus, blockchain technology introduces a new paradigm where the DGT and PoB have equal positions and work together in the network without any party acting as a dominant server or client.

The use of blockchain in the context of taxation in a country demonstrates significant potential for improving efficiency, transparency, and security in the tax system. The implementation of blockchain technology can provide various benefits, including

reducing processing errors, preventing fraud, and enhancing tax reporting monitoring. First, the use of blockchain can improve tax administration efficiency. Through blockchain, the tax filing and processing processes can be automated, reducing reliance on time-consuming manual processes and enabling faster processing. Additionally, blockchain can provide immutable and distributed transaction records, enabling automatic verification and higher transparency in tax reporting. Blockchain can also expedite transaction settlement, reduce fraud risk, enhance transaction auditability, and improve oversight effectiveness. Furthermore, blockchain can enhance

accountability in taxation. In traditional systems, data manipulation or fraud can occur. However, with blockchain, the recorded data cannot be altered, providing certainty and reliability in the reporting and payment of taxes.

Moreover, blockchain can help address tax avoidance and evasion issues. With distributed transaction records, blockchain can ensure that cross-border transactions comply with applicable tax regulations. Implementing blockchain in the tax system can facilitate transaction tracking and verification, reducing opportunities for harmful tax avoidance practises. However, in implementing blockchain in taxation, there are still several challenges to overcome. One of them is the need for appropriate regulations. Clear and detailed legal regulations are necessary to govern the use of blockchain in taxation, including data protection, privacy, and compliance with legal matters.

Fundamentally, blockchain technology can be applied to the delivery of Transaction and Implementation Systems (TISN) and tracking systems from the DGT to the PoB. Although taxpayer-related data is confidential and non-transparent, blockchain technology can be used in the delivery of TISN. In the conventional scheme, accessing the DGT server by PoB often encounters issues due to the misalignment of positions between the DGT and PoB. However, in a blockchain-based system, there is no positional difference between the DGT and PoB due to the decentralisation inherent in blockchain technology. Each party in the blockchain network has an equal position, and there is no central authority. Therefore, blockchain technology has the potential to be implemented in the delivery of TISN from the DGT to the PoB. This system would enable more efficient and transparent delivery where all involved parties could accurately monitor and track TISN. By utilising blockchain technology, the DGT can enhance security, integrity, and efficiency in delivering TISN to PoB, thereby reducing levels of harmful tax evasion practises that may negatively impact the country. In conclusion, the use of blockchain in taxation in a country offers significant potential to improve efficiency, transparency, and security in the tax system. By automating processes, reducing errors, and providing immutable transaction records, blockchain can help enhance accountability and prevent tax avoidance practises. However, clear regulatory frameworks and collaboration among the government, private sector, and other relevant stakeholders are needed to optimise the implementation of blockchain technology in the country's tax system.

4 Conclusion

The use of blockchain technology in taxation systems has significant potential to improve efficiency, transparency, and security. By implementing blockchain, the Directorate General of Taxes (DGT) can operate a private blockchain system that allows full control over the network and trusted participation. Authorised private blockchains enable the DGT to control access and participation in the network. The DGT can determine and authorise entities to act as nodes in the network, such as government agencies, companies, or other entities involved in value-added tax (VAT) administration. The use of authorised private blockchains allows the DGT to maintain data confidentiality and security while preventing unauthorised access to sensitive information. This helps enhance trust and reliability in the VAT administration system. Blockchain technology can help address issues in conventional tax systems, such as tax avoidance, fake invoices, and processing errors. With immutable and distributed transaction records, blockchain facilitates the detection and prevention of tax avoidance practises.

The use of blockchain in taxation can bring benefits such as improved administrative efficiency, accountability, and international cooperation in taxation matters. This can result in increased tax revenue and strengthen public finances. Although there are challenges to implementing blockchain in taxation, such as the need for appropriate regulations, government and private sector collaboration, and legal compliance, the potential of this technology remains significant in enhancing the tax system. Overall, the use of blockchain technology in taxation offers a solution to improve efficiency, transparency, and security. By leveraging blockchain, the DGT can enhance the VAT administration system, reduce tax avoidance, and strengthen public finances. Despite the need to overcome challenges, the use of blockchain in taxation can have a positive impact on building a more effective and equitable tax system.

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