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BLOCKCHAIN ENFORCEMENT IN EMPLOYEE DATA MANAGEMENT TO INCREASE TRANSPARENCY AND SECURITY

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Abstract - *Blockchain technology has grown rapidly and is now being applied in various sectors, including human resource management (HR). The application of blockchain in employee data management offers great potential to increase transparency and security. Blockchain can provide an effective solution to protect sensitive employee information with a decentralized and encrypted system. This article discusses how blockchain technology can be applied in HR management to ensure data security and accuracy. Challenges related to cost, training, and applicable regulations are also a major concern in implementing this technology. The application of blockchain is expected to reduce the potential for data misuse, improve the efficiency of HR management, and create a fairer and more trustworthy system. However, a careful approach is needed to overcome the obstacles that may arise, so that this technology can provide optimal results for companies and employees.*

Keywords: blockchain, HR management, data security, transparency, employee data, digital technology, data protection.

INTRODUCTION

Blockchain technology has transformed various industry sectors, with growing applications, especially in the field of human resource management (HRM). One of the key benefits of blockchain is its ability to provide a transparent and secure system. Blockchain allows employee data to be stored in a decentralized database, where any changes are permanently recorded and traceable by all authorized parties, without being manipulated (Zalte & Kamat, 2021). This creates an extra layer of security that protects employees' personal data, such as salary information, employment contracts, and work history, from the risk of unauthorized access or data manipulation (Kumar et al., 2022; Aisyah, 2023).

The adoption of blockchain in HR management can improve efficiency in employee administration processes, such as managing recruitment and background verification. By utilizing this technology, companies can reduce the time needed to verify employee data, such as the validity of diplomas and work experience, and minimize the possibility of errors or fraud. Through a blockchain-based system, any information can be updated in real-time and accessed by authorized parties at any time, without the need for time-consuming and error-prone manual processes (Lai, 2020).

However, while blockchain technology offers many benefits, its implementation in HR management faces challenges. Organizations need to assess the readiness of their existing systems and infrastructure to support blockchain implementation. Awareness and understanding of how this technology works is still limited, both among HR managers and employees themselves. This change requires investments that include not only technology, but also human resource training to ensure a smooth and effective transition (Chillakuri & Attili, 2021).

One of the major issues faced in the implementation of blockchain in HR management is the uncertainty in terms of cost and investment required. Blockchain implementation requires sophisticated technological infrastructure and trained human resources, which can increase an organization's operational costs, especially for small and medium-sized enterprises. There is limited awareness of the potential of blockchain technology among HR managers. Many are still skeptical of the immediate benefits that blockchain can bring to employee data management, which can hamper its adoption (Salah et al., 2020). Another related issue is the unclear regulations and policies regarding the use of blockchain in personal data management. Some countries or regions still do not have clear rules on how employee data managed with blockchain technology should be treated. This can raise concerns regarding the protection of personal data, especially if blockchain is used to store sensitive information. These immature policies may hinder the adoption of this technology, given that many organizations avoid new technologies that may not be fully compliant with applicable regulations (Nurhasanah et al., 2020).

Given the importance of personal data in the world of work, as well as the need to protect it from potential misuse, this research is important to see how blockchain technology can offer a more secure and transparent solution in the management of employee data (Abdullah et al., 2021). As the world of work becomes increasingly reliant on digitization, the adoption of blockchain technology in HR management could accelerate the transition to a more efficient, secure, and sustainable system. Therefore, assessing the potential and challenges will be highly relevant for decision-making in organizations looking to leverage this technology.

The purpose of this study is to analyze how blockchain technology can be applied in human resource management to improve the transparency and security of employee data. Through a deeper understanding of the application of this technology, this study aims to provide insights into how organizations can manage employee data more efficiently and securely, as well as identify challenges that may be faced in the blockchain implementation process.

RESEARCH METHODS

In applying the literature study approach to explore the influence of blockchain technology in human resource management (HRM), the first step was to identify and collect relevant literature sources related to this topic. This method focuses on reviewing existing theories and previous findings in the field of blockchain technology and its use in employee data management. The literature review provides a comprehensive overview of how this technology is being applied, as well as the challenges and opportunities that could arise from the use of blockchain in HR management. A number of previous studies have shown that blockchain can provide an effective solution for improving data transparency and security (Tapscott & Tapscott, 2017). The search for relevant sources involved journals, articles, and books that address aspects such as data privacy, the implementation of technology in the HR sector, and how companies can respond to these technological developments.

Next, the literature analysis focused on understanding how blockchain can be implemented to improve data management processes in organizations. Various scholarly articles have reviewed the application of blockchain in the financial and logistics sectors, but in the HR space, the application of this technology is still relatively new. Therefore, the literature review also included sources that discussed the potential adoption of blockchain technology in employee management processes, from recruitment to employee data management (Dujmovic & Cukusic, 2020). This method also allowed for the identification of gaps in existing research and provided room to further develop an understanding of blockchain's influence on other aspects of HR management, such as contract and salary management.

The literature review approach also provided an opportunity to explore issues related to the challenges of implementing blockchain in HR management. Some literature suggests that while the technology offers great potential, there are many obstacles, such as regulatory uncertainty and high implementation costs, that could pose barriers to the widespread adoption of blockchain technology in HR management. Therefore, by studying the existing literature, researchers can gain deeper insights into the factors that companies need to consider before implementing blockchain effectively (Tsolakis & Mantas, 2020). Overall, this literature review approach enables the collection of relevant information, provides in-depth analysis, and identifies areas that require further research in the application of blockchain technology in the workplace.

RESULT AND DISCUSSION

Along with the development of digital technology, the world of human resource management (HRM) continues to undergo major changes. One innovation that is starting to attract attention is blockchain technology, which was previously widely known in cryptocurrency. However, blockchain is now being applied in various sectors, including employee data management in the corporate world. Blockchain offers key advantages in terms of transparency, security, and efficiency in the management of sensitive information that companies desperately need. The application of blockchain can open up new potential in increasing trust and integrity in HR management, which has been a big challenge for many organizations (Sharma et al, 2023).

Employee data management includes various important information that requires high protection, such as work history, salary, and other personal data. The main problem often faced is the risk of data misuse or leakage, as well as inaccuracies in verifying information (Arifin & Darmawan, 2021). This is where blockchain technology can offer an effective solution with records that cannot be manipulated and are decentralized. With its transparent and secure nature, blockchain can be the new foundation for a more efficient and trustworthy HR data management system. Furthermore, blockchain allows for full control over the data being managed, making employees more trusting of the organization's processes and systems (Tyagi et al., 2022). The application of blockchain technology in HR has a direct positive effect on the efficiency of data verification and validation and transparency in talent management. Furthermore, the efficiency of data verification and validation contributes significantly to transparency in talent management (Darodjat, & Arapah, 2024).

However, the application of blockchain in employee data management is not without its challenges. To be able to make the most of this technology, organizations must think about several important factors such as costs, training, and applicable regulations (Anaam et al., 2023). Careful planning is needed so that the implementation of this technology can run smoothly and provide optimal results. Thus, understanding the potential of blockchain as well as the challenges that must be faced is an important first step to ensure its successful implementation in HR management.

Blockchain technology has become one of the most important innovations that can change various aspects of data management, including human resource management. Blockchain offers a decentralized, secure, and transparent record-keeping system, which is particularly suitable for the management of sensitive employee data. Using blockchain, recorded data cannot be altered or falsified once added, which makes it particularly useful in ensuring the integrity of employee information such as employment history, salary, and educational qualifications (Narayanan et al., 2016). Therefore, the application of this technology can reduce the risk of data misuse and increase trust between employees and employers.

One of the main applications of blockchain in employee data management is the digital recording and verification of employment history. In many organizations, background verification is often a time-consuming and error-prone process. With blockchain, companies can create a system where every job done by an employee is recorded in a secure digital ledger. Every time an employee joins a new company or is promoted, the data can be updated on the blockchain, which makes verification of employment history faster, safer, and more trustworthy (Tapscott & Tapscott, 2017). This security and transparency is crucial, especially to avoid misuse of information or data irregularities that could harm the parties involved. Blockchain transparency further allows employees to independently verify their compensation records, reducing disputes and fostering trust. Moreover, by storing employee records on the blockchain, companies can maintain an easily accessible and tamper-proof data repository, simplifying administrative tasks such as onboarding, record keeping, and compliance management (Gunawan, 2022).

Blockchain can be applied in the management of salary and benefits information. In some organizations, managing employee salaries often requires a lot of manual processes, which can be at risk of errors or data manipulation. With blockchain technology, salary and benefit payments can be automatically recorded in a system that cannot be modified. This not only increases transparency, but also provides employees with accountable proof of transactions without third-party interference (Catalini & Gans, 2016). Such a system allows organizations to reduce the potential for error or fraud in the management of employee earnings, ultimately contributing to the creation of a more fair and transparent work environment.

Another advantage of blockchain in HR management is the ability to increase control over employee personal data (Gardi & Eddine, 2023). In many cases, employee personal data such as contact information, ID numbers, and employment status are often stored in centralized databases and are vulnerable to attacks or data leaks. With blockchain, this data can be stored decentralized and encrypted with a highly secure cryptographic system, which can only be accessed by parties with special permissions (Issalillah & Hardyansah, 2024). Blockchain allows employees to have more control over who can access their data, which provides a greater sense of security in terms of privacy (Zohar & Mavridis, 2019). In this case, the implementation of blockchain overcomes the problems that often arise regarding the protection of personal data in HR management.

Transaction security and data access are also more guaranteed thanks to the implementation of smart contracts integrated into the blockchain. Smart contracts are programs that automatically execute the terms of a contract when certain conditions are met, without the need for third-party intervention. In HR, smart contracts can be used to manage recruitment, payroll, and performance evaluation processes, ensuring that all requirements are met automatically and transparently. This also allows to minimize the possibility of fraud or deception in the HR management process (Szmigiera, 2020). The implementation of smart contracts in employee data management provides much higher efficiency and security compared to traditional systems that still rely on third parties. Therefore, the application of blockchain technology in human resources (HR) facilitates a profitable transformation in data management and operational efficiency, especially in the context of a more complex and interconnected global work environment (Komariyah, 2023).

However, despite the many benefits that can be obtained, the main challenge in implementing blockchain in HR management is the cost and complexity of its implementation. In addition to offering high initial costs, lack of experts, and technological complexity are major obstacles, especially for small and medium-sized companies (Idris, & Bahasoan, 2024). To adopt this technology effectively, companies must invest resources to develop adequate blockchain infrastructure. This process requires specialized technical skills and a deep understanding of how blockchain works, which many organizations may not have (Tapscott & Tapscott, 2017). Companies must also consider changes in internal policies, employee training, and compliance with existing regulations regarding personal data protection and privacy.

In addition to cost and complexity, there are also challenges related to the scalability of blockchain technology (Darmawan et al., 2025). Although blockchain offers many advantages in terms of security and transparency, managing very large data in organizations with thousands of employees can be difficult. Although solutions such as consortium-based blockchain can alleviate some of the scalability constraints, there are limitations in terms of transaction speed and processing costs (Narayanan et al., 2016). Therefore, organizations need to consider whether blockchain can be used effectively in HR management at scale or whether they need to develop other solutions that better suit their needs.

The implementation of blockchain technology also faces challenges in terms of employee adoption. Many employees are not yet familiar with this new technology, so companies need to conduct training and education to improve their understanding and readiness to use the blockchain system. Employee ignorance or discomfort with this new technology can be an obstacle to its implementation, although blockchain technology can provide many benefits in HR data management (Catalini & Gans, 2016). Therefore, organizations must plan appropriate communication and training strategies so that the adoption of this technology can run smoothly.

Another challenge is the regulatory uncertainty associated with the use of blockchain in employee data management. Although blockchain technology can provide a very secure solution for personal data management, laws and regulations governing personal data protection can vary from country to country. Organizations need to comply with various laws and regulations related to data privacy and the protection of individual rights, which can be more complicated

in the implementation of blockchain. Therefore, before implementing blockchain, companies must fully understand the legal obligations that apply in their operational areas (Zohar & Mavridis, 2019).

However, despite the challenges that must be faced, blockchain offers great potential in creating a more secure, transparent, and efficient employee data management. The implementation of blockchain can reduce the risk of errors, fraud, and misuse of data in organizations, which in turn increases trust between employees and the company. The high security and transparency provided by Blockchain helps reduce the risk of fraud, non-transparency, and cyber threats in HR management (Suhariyanto et al., 2024). By adopting this technology, companies can ensure that employee personal data is managed in a more secure and reliable manner. In addition, with a decentralized and transparent system, blockchain can help reduce operational costs associated with employee data management and increase the speed and efficiency of administrative processes (Szmigiera, 2020).

To ensure that the implementation of blockchain in HR management can run smoothly, organizations must plan carefully and involve various stakeholders in the process of adopting this technology (Hegadekatti, 2018). Collaboration between technology developers, HR experts, and regulators is essential so that blockchain implementation can comply with applicable legal standards and provide maximum benefits for organizations and employees. Thus, blockchain can be a very useful tool in improving the quality and efficiency of HR management in the future.

Blockchain as a solution for employee data management presents great opportunities in increasing data transparency and security (Tyagi et al., 2022). Although there are currently a number of challenges that must be overcome, such as high costs, operational scale, and employee adoption, this technology still offers tremendous potential. The use of blockchain in HR management is not only limited to recording employment history or salaries, but can also include various other aspects related to the protection of employee personal data. In the long term, the application of this technology can form a fairer, more efficient, and more trustworthy HR management system.

However, to achieve this goal, companies need to take several strategic steps. One of them is preparing a comprehensive training system for employees so that they can adapt to this new technology. Companies must also maintain compliance with applicable regulations to protect the privacy of personal data. By considering these aspects, blockchain can be an effective tool in creating a more transparent and secure work environment, increasing trust between employees and the company, and ensuring the continuity and development of the organization.

While blockchain adoption in HR management can offer many benefits, its success largely depends on the readiness of the organization to handle the various challenges that exist. Careful planning, effective training, and attention to applicable regulations are needed for this technology to be accepted and provide optimal results. With the right steps, blockchain has the potential to redefine the way employee data is managed in the future, leading the HR world into a safer, more efficient, and more transparent era.

CONCLUSION

The application of blockchain technology in HR management offers several significant benefits, especially in increasing transparency and security of employee data management. With its decentralized and encrypted nature, blockchain can help prevent data leaks or manipulation that often occur in traditional systems. Blockchain ensures that information related to employees can be clearly accounted for, providing more trust to employees and management. However, the implementation of this technology requires a significant investment, both in terms of infrastructure and human resource training in order to operate the new system efficiently.

To optimize the use of blockchain in HR management, companies need to pay attention to several important aspects, such as readiness in terms of budget, employee training, and compliance with applicable regulations. Companies need to identify potential challenges that may arise in the implementation process and create appropriate solutions to overcome these problems. With the right steps, blockchain technology can bring positive changes to the employee data management system and become the foundation for more transparent and reliable human resource management in the future.

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