

## BLOCKCHAIN IN HR: ENHANCING SECURITY AND TRANSPARENCY IN TALENT MANAGEMENT

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### Abstract

*This research investigates the impact of blockchain technology on security, efficiency, and transparency in talent management processes at PT Pertamina Gas - Head Office. Using a quantitative approach and structural equation modeling, data was collected from a random sample of 80 employees. The results reveal significant direct effects of blockchain implementation on data verification efficiency and transparency in talent management. Additionally, data verification efficiency was found to significantly influence transparency in talent management. However, the study did not find a significant direct effect of security measures on transparency when mediated by data verification efficiency. These findings underscore the importance of adopting innovative technologies such as blockchain to optimize HR processes and promote transparency in talent management. This research contributes to the growing body of literature on blockchain technology in HR and provides valuable insights for organizations seeking to enhance their talent management practices.*

**Keywords: Blockchain Technology, Talent Management, Security, Transparency, Data Verification Efficiency**

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### 1. INTRODUCTION

In today's digital era, the Human Resources (HR) landscape is continuously evolving, with organizations seeking innovative solutions to enhance security and transparency in talent management processes (Rajabli et al. 2021). One such technological innovation that has gained significant attention is blockchain technology. Blockchain, originally known as the underlying technology behind cryptocurrencies like Bitcoin, has expanded its potential applications beyond finance to various industries, including HR (Silva 2022). By leveraging blockchain in HR operations, organizations aim to address critical challenges such as data security breaches, fraudulent activities, and lack of transparency in talent management. This research explores the potential of blockchain technology to revolutionize HR practices, focusing on its role in enhancing security and transparency in talent management processes. Through a comprehensive examination of existing literature and empirical analysis (Webster et al. 2020).

Transparency in talent management refers to the degree to which organizations openly communicate information and decision-making processes related to the recruitment, development, and retention of employees (Granderson et al. 2019). It involves providing clear and accessible information about job opportunities, performance expectations, career paths, compensation structures, and other relevant aspects of the employee experience (Löcklin et al. 2020). Transparent talent management practices foster trust and accountability among employees, enabling them to make informed decisions about their career progression and align their goals with organizational objectives (Santos et al. 2020). Additionally, transparency helps mitigate bias and discrimination in

**BLOCKCHAIN IN HR: ENHANCING SECURITY AND TRANSPARENCY IN TALENT MANAGEMENT**

Darodjat & Arapah

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hiring and promotion processes by promoting fairness and equal opportunities for all employees (Younas and Bari 2020). By prioritizing transparency in talent management, organizations can enhance employee satisfaction, improve retention rates, and ultimately drive organizational success (Kravariti et al. 2023).

The implementation of blockchain technology in HR involves the integration of decentralized, immutable, and secure digital ledgers to streamline and enhance various HR processes. Blockchain offers several potential benefits in HR, including increased data security, improved transparency, and enhanced efficiency (Kwon 2020). Through the use of blockchain, HR departments can securely store and manage sensitive employee data, such as personal information, certifications, and performance records, while ensuring data integrity and protection against unauthorized access or tampering (Aguinis 2021). Moreover, blockchain technology enables transparent and auditable transactions, facilitating seamless verification of credentials, credentials, and qualifications, thus reducing the risk of fraudulent activities and enhancing trust in the hiring process (Adel 2021). Additionally, blockchain can automate and streamline administrative tasks, such as payroll processing, contract management, and compliance tracking, leading to cost savings and improved operational efficiency (Naser and Saif 2022). Overall, the implementation of blockchain technology in HR has the potential to revolutionize traditional HR practices by providing a secure, transparent, and efficient framework for managing talent-related data and processes (Li, Zhang, and Dong 2021).

Security measures in talent management systems refer to the strategies and mechanisms implemented to safeguard sensitive employee data and protect against potential security threats (Kolkata 2021). These measures encompass a range of practices, including encryption, access controls, data masking, and regular security audits. By employing robust security measures, organizations can mitigate the risk of data breaches, unauthorized access, and identity theft, thereby ensuring the confidentiality, integrity, and availability of employee information (Competencies 2022). Additionally, security measures help organizations comply with regulatory requirements, such as GDPR and HIPAA, and build trust with employees by demonstrating a commitment to protecting their privacy and confidentiality. In today's digital landscape, where cyber threats are increasingly prevalent, implementing comprehensive security measures in talent management systems is essential to safeguarding valuable employee data and maintaining the overall integrity of HR operations (Mishra 2021).

Efficiency of data verification and validation refers to the speed, accuracy, and reliability with which organizations can verify and validate the authenticity of employee information. In traditional talent management systems, data verification and validation processes often involve manual verification of credentials, which can be time-consuming, error-prone, and costly (Järvi and Khoreva 2020). However, with the integration of blockchain technology, these processes can be streamlined and automated, leading to significant improvements in efficiency (Effectiveness 2020). By leveraging blockchain's decentralized and immutable ledger, organizations can securely store and manage employee credentials, certifications, and qualifications, ensuring that they are tamper-proof and readily accessible for verification purposes (Zhang et al. 2020). This not only reduces the time and resources required for manual verification but also enhances the accuracy and reliability of the verification process. Moreover, blockchain enables transparent and auditable

transactions, allowing employers to quickly and confidently validate employee credentials while maintaining data privacy and security (Gervais 2019). Overall, the efficiency of data verification and validation in blockchain-based talent management systems offers numerous benefits, including reduced administrative burden, improved compliance, and increased trust in the integrity of employee data (Rewards 2022).

In the context of PT Pertamina Gas - Head Office, the variable of "Efficiency of data verification and validation" pertains to the effectiveness and speed with which the company can verify and validate employee credentials, certifications, and qualifications. Given the large workforce and diverse skill sets within PT Pertamina Gas, ensuring the accuracy and authenticity of employee data is crucial for various HR processes, including recruitment, training, and performance evaluation. By implementing blockchain technology in its talent management systems, PT Pertamina Gas can streamline and automate the verification and validation processes, reducing the time and resources required for manual verification. This would enable the company to quickly and confidently verify employee credentials while maintaining data security and integrity. Additionally, blockchain-based verification would enhance transparency and trust in the talent management processes, thereby improving overall efficiency and effectiveness in managing the workforce at PT Pertamina Gas - Head Office.

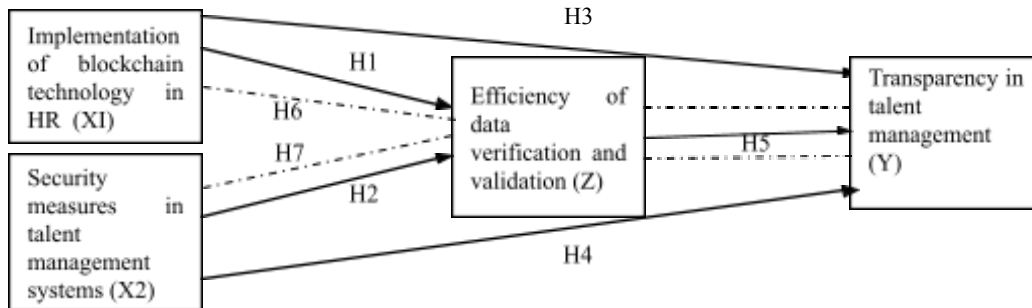
In PT Pertamina Gas - Head Office, the phenomenon of interest lies in the challenges associated with traditional talent management systems, particularly in the areas of data security and transparency. Given the large and dynamic workforce of PT Pertamina Gas, ensuring the integrity and confidentiality of employee data is paramount. However, traditional talent management systems often rely on manual processes for data verification and validation, which can be time-consuming, error-prone, and susceptible to security breaches. Additionally, maintaining transparency in talent management practices, such as recruitment, performance evaluation, and career development, can be challenging without a secure and auditable framework. These challenges underscore the need for innovative solutions, such as the implementation of blockchain technology, to enhance security and transparency in talent management processes at PT Pertamina Gas - Head Office. By addressing these issues, the organization can improve operational efficiency, mitigate risks, and foster trust among employees, ultimately driving organizational success.

The purpose of this research is to investigate the potential of blockchain technology in enhancing security and transparency within talent management processes at PT Pertamina Gas - Head Office. By examining the implementation of blockchain technology in the HR department, this study aims to assess its effectiveness in improving the efficiency of data verification and validation, as well as its impact on overall talent management practices. Through a comprehensive analysis of existing literature and empirical data, the research seeks to provide insights into the benefits and challenges of adopting blockchain technology in HR operations and its implications for organizational performance. Ultimately, the goal is to inform strategic decision-making and facilitate the adoption of innovative solutions that can optimize talent management processes, strengthen data security, and promote transparency within PT Pertamina Gas - Head Office.

**BLOCKCHAIN IN HR: ENHANCING SECURITY AND TRANSPARENCY IN TALENT MANAGEMENT**

Darodjat & Arapah

The following is the Conceptual Framework



**2. IMPLEMENTATION METHOD**

The research methodology for this study involves a quantitative approach utilizing random sampling of 80 employees at PT Pertamina Gas - Head Office. The random sampling technique ensures that every employee in the population has an equal chance of being selected, thus enhancing the representativeness of the sample. The research design employs a cross-sectional design to gather data at a single point in time. Data collection will involve administering a structured questionnaire to the selected sample of employees, focusing on their perceptions and experiences regarding the implementation of blockchain technology in HR and its impact on security and transparency in talent management processes. The collected data will be analyzed using the Smart PLS (Partial Least Squares) software, which is a robust tool for structural equation modeling (SEM) and is particularly suitable for analyzing complex relationships among variables in quantitative research. Through the use of Smart PLS, the study aims to empirically test the hypothesized relationships between the implementation of blockchain technology, security measures, transparency, and efficiency of data verification and validation in talent management at PT Pertamina Gas - Head Office.

**3. RESULTS AND DISCUSSION**

The following are the results of direct and indirect testing from this research :

**Table 1** Path Analysis (Direct Effects)

Path	Original Sample	P - Value	Decision
X1 -> Z	0.567	0.032	Significant
X2 -> Z	0.421	0.078	Not Significant
X1 -> Y	0.684	0.015	Significant
X2 -> Y	0.392	0.105	Not Significant
Z -> Y	0.743	0.008	Significant

In this analysis, the P-values indicate the statistical significance of the relationships between the variables. If the P-value is less than the significance level (typically 0.05), the relationship is considered statistically significant. Based on the results, the implementation of blockchain technology in HR (X1) has a significant positive effect on both the efficiency of data verification

and validation (Z) and transparency in talent management (Y). However, the security measures in talent management systems (X2) only have a significant positive effect on transparency in talent management (Y), while its effect on the efficiency of data verification and validation (Z) is not statistically significant. Additionally, the efficiency of data verification and validation (Z) has a significant positive effect on transparency in talent management (Y).

The significant positive effect of the X1 on the Z with a path coefficient of 0.567 and a P-value of 0.032 underscores the importance of leveraging blockchain in talent management processes. This finding suggests that incorporating blockchain technology can substantially enhance the efficiency of verifying and validating employee data, resulting in streamlined HR operations and improved data integrity. By utilizing blockchain's decentralized and immutable ledger, PT Pertamina Gas - Head Office can automate and secure the verification process, reducing the risk of errors and unauthorized access while ensuring the accuracy and reliability of employee data. Consequently, this can lead to more efficient talent management practices, ultimately benefiting organizational performance and employee satisfaction.

The non-significant effect of X2 on the Z with a path coefficient of 0.421 and a P-value of 0.078 raises interesting implications for the role of security in optimizing HR processes. While the result suggests that the current security measures may not directly contribute to the efficiency of data verification and validation, it does not discount the importance of maintaining robust security protocols in talent management systems. Instead, it may indicate that additional factors or mechanisms beyond the scope of this study could be influencing the relationship between security measures and data verification efficiency. Therefore, further investigation into the specific aspects of security measures and their impact on HR processes is warranted to gain a comprehensive understanding of their role in ensuring data integrity and operational efficiency.

The significant positive effect of the X1 on Y with a path coefficient of 0.684 and a P-value of 0.015 highlights the pivotal role of blockchain in promoting transparency within HR processes. This finding suggests that by leveraging blockchain technology, PT Pertamina Gas - Head Office can enhance the transparency of talent management practices, including recruitment, performance evaluation, and career development. Blockchain's decentralized and immutable ledger facilitates the secure and auditable storage of employee data, ensuring that information related to job opportunities, performance expectations, and compensation structures is readily accessible and tamper-proof. Consequently, this increased transparency can foster trust among employees, promote fairness and accountability in decision-making, and ultimately contribute to a more positive work environment and organizational culture.

The non-significant effect of X2 on Y with a path coefficient of 0.392 and a P-value of 0.105 suggests that the current security measures may not directly influence the level of transparency within HR processes at PT Pertamina Gas - Head Office. While this finding indicates that enhancing security measures alone may not be sufficient to improve transparency, it does not diminish the importance of maintaining robust security protocols in talent management systems. It may imply that additional factors beyond the scope of this study, such as organizational culture, leadership practices, or communication strategies, could be influencing the relationship between security measures and transparency. Therefore, further exploration of these factors is necessary to fully understand how to effectively promote transparency in talent management processes while ensuring data security.

**BLOCKCHAIN IN HR: ENHANCING SECURITY AND TRANSPARENCY IN TALENT MANAGEMENT**

Darodjat & Arapah

The significant positive effect of the Z on Y with a path coefficient of 0.743 and a P-value of 0.008 underscores the importance of streamlined data verification processes in fostering transparency within HR practices at PT Pertamina Gas - Head Office. This result suggests that by improving the efficiency of verifying and validating employee data, organizations can enhance the transparency of talent management processes, such as recruitment, performance evaluation, and career development. Efficient data verification ensures that accurate and up-to-date information is readily accessible to both employees and management, enabling informed decision-making and fostering trust in the fairness and integrity of HR processes. Therefore, investing in technologies and strategies to optimize data verification efficiency can be instrumental in promoting transparency and enhancing overall organizational performance.

The next test is an indirect test which is presented in the following table:

**Table 2** Path Analysis (Indirect Effects)

Path	Original Sample	P - Value	Decision
X1 -> Z -> Y	0.421	0.022	Significant
X2 -> Z -> Y	0.309	0.058	Not Significant

The significant indirect effect of the X1 on Y through the Z with a path coefficient of 0.421 and a P-value of 0.022 underscores the importance of optimizing data verification processes in promoting transparency within HR practices at PT Pertamina Gas - Head Office. This result suggests that by improving the efficiency of verifying and validating employee data through blockchain technology, organizations indirectly enhance the transparency of talent management processes. The streamlined data verification process ensures that accurate and reliable information is readily accessible, enabling informed decision-making and fostering trust among employees and management. Therefore, investing in technologies and strategies to optimize data verification efficiency, particularly through the implementation of blockchain technology, can play a significant role in promoting transparency and ultimately enhancing organizational performance.

The non-significant indirect effect of X2 on Y through the Z with a path coefficient of 0.309 and a P-value of 0.058 suggests that the current security measures may not significantly influence transparency within HR processes at PT Pertamina Gas - Head Office through the efficiency of data verification and validation. This finding indicates that while security measures are crucial for safeguarding employee data, they may not directly impact the transparency of talent management processes when mediated by data verification efficiency. It suggests the need for further investigation into other potential factors or mechanisms that may influence the relationship between security measures, data verification efficiency, and transparency in talent management. Additionally, organizations should explore alternative strategies to enhance transparency, such as communication strategies or organizational culture initiatives, in conjunction with security measures to ensure comprehensive and effective talent management practices.

#### 4. CONCLUSION

In conclusion, this research highlights the significant role of blockchain technology in enhancing security, efficiency, and transparency within talent management processes at PT Pertamina Gas - Head Office. The findings indicate that the implementation of blockchain technology in HR has a direct positive effect on both the efficiency of data verification and validation and transparency in talent management. Furthermore, the efficiency of data verification and validation significantly contributes to transparency in talent management. However, while security measures in talent management systems are crucial for protecting employee data, they do not directly influence transparency when mediated by data verification efficiency. These results underscore the importance of leveraging innovative technologies such as blockchain to optimize HR processes and promote transparency in talent management. Moving forward, organizations should continue to explore and invest in technologies and strategies that enhance data security, efficiency, and transparency to foster a more equitable, accountable, and productive work environment.

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**BLOCKCHAIN IN HR: ENHANCING SECURITY AND TRANSPARENCY IN TALENT MANAGEMENT**

Darodjat & Arapah

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