

THE EFFECT OF BLOCKCHAIN TECHNOLOGY, SYSTEM RELIABILITY, AND DATA SECURITY ON FINANCIAL STATEMENT TRANSPARENCY IN MANUFACTURING COMPANIES

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Abstrak

Penelitian ini melihat bagaimana teknologi blockchain, keandalan sistem, dan keamanan data berdampak pada transparansi laporan keuangan perusahaan manufaktur yang terdaftar di Bursa Efek Indonesia (BEI). Penelitian ini dimulai dengan pesatnya kemajuan teknologi informasi, khususnya penggunaan blockchain dalam akuntansi, yang dianggap meningkatkan akurasi, keamanan, dan transparansi informasi keuangan. Data yang digunakan berasal dari laporan keuangan tahunan perusahaan manufaktur dari tahun 2020 hingga 2024; sampelnya terdiri dari lima puluh perusahaan yang dipilih secara purposive. Hasil penelitian menunjukkan bahwa teknologi blockchain meningkatkan transparansi laporan keuangan secara signifikan. Analisis dilakukan menggunakan regresi linier berganda dan analisis regresi moderat (MRA) menggunakan SPSS. Sementara keamanan data berdampak positif tetapi tidak signifikan, keandalan sistem juga berdampak positif besar. Uji moderasi menunjukkan bahwa akuntabilitas meningkatkan keandalan sistem terhadap transparansi laporan keuangan, tetapi tidak memoderasi hubungan antara transparansi dan teknologi blockchain atau keamanan data. Hasilnya menunjukkan bahwa menerapkan blockchain dan meningkatkan keandalan sistem adalah cara yang bagus untuk meningkatkan keterbukaan laporan keuangan, dan akuntabilitas adalah komponen penting dalam memaksimalkan keandalan sistem. Pentingnya mengintegrasikan blockchain, meningkatkan keandalan sistem akuntansi, dan meningkatkan budaya akuntabilitas untuk meningkatkan transparansi pelaporan keuangan.

Kata Kunci: Teknologi *Blockchain*, Keandalan Sistem, Keamanan Data, Transparansi Laporan Keuangan, Akuntabilitas

Abstract

Using accountability as a moderating variable, this study looks at how blockchain technology, system dependability, and data security affect the financial statement transparency of manufacturing companies listed on the Indonesia Stock Exchange (IDX). The quick advancement of information technology, especially the use of blockchain in accounting, which is thought to improve accuracy, security, and transparency of financial data, is what spurred the study. The

study use purposive selection to choose a sample of 50 manufacturing companies and uses secondary data from their yearly financial statements for the 2020–2024 timeframe. Multiple linear regression and moderated regression analysis (MRA) with SPSS were used to analyze the data. The findings show that financial statement transparency is significantly improved by blockchain technology. While data security has a favorable but not statistically significant influence, system reliability also exhibits a large beneficial impact. Accountability, according to moderation tests, increases the impact of system dependability on transparency but has no effect on the relationship between data security or blockchain technology and transparency. These results imply that increasing system dependability and implementing blockchain are useful tactics for boosting financial transparency, whereas accountability is essential for maximizing system reliability. In order to achieve greater transparency in financial reporting, businesses are urged to practically incorporate blockchain, improve the dependability of accounting systems, and cultivate an accountability culture.

Keywords: *Blockchain Technology, System Reliability, Data Security, Financial Report Transparency, Accountability.*

A. INTRODUCTION

Financial statement transparency is a fundamental principle that strongly influences business sustainability and stakeholder trust. Transparent financial reporting serves not only as a means of managerial accountability but also as a basis for investors, creditors, and regulators to make strategic decisions (Jones, 2019). In practice, however, the level of transparency in Indonesia, particularly in the manufacturing sector, still faces various challenges. Limited utilization of information technology, vulnerability to manipulation, and weak accountability are the main factors that hinder transparency.

Empirical evidence indicates that challenges to financial transparency remain significant. Prasetyo (2021) reported that 35% of manufacturing companies have not yet implemented an integrated and secure financial information system. Additionally, (Yusuf, 2022) demonstrated that the adoption of blockchain technology can enhance financial statement transparency by up to 42%. These findings underscore the critical importance of technological integration and accountability in improving the quality of financial reporting. Blockchain operates as a distributed ledger technology that is resistant to manipulation, thereby enhancing data reliability. System reliability enables management to present accurate and timely reports, while data security ensures the

confidentiality and integrity of information. Furthermore, (Putri & Haryanto, 2022) found that 40% of manufacturing companies have not optimally implemented data security measures. Lestari & Ramadhan (2023) also confirmed that companies utilizing blockchain exhibit 30% higher financial statement transparency compared to those that do not.

This phenomenon highlights a significant gap between the demand for transparency and technological readiness in the manufacturing sector. The integration of blockchain, reliable information systems, and data security constitutes a crucial element in producing credible financial statements. The implementation of blockchain offers substantial opportunities to enhance data reliability and accountability (Nakamoto, 2008) and (Tapscott, & Tapscott, 2016), as each transaction recorded on the blockchain can be verified by multiple parties, thereby minimizing fraud. Meanwhile, reliable information systems ensure the accuracy of data processing (Gupta *et al.*, 2020) and data security safeguards the integrity and availability of information against potential cyber threats (Dhillon et al., 2017) and (Wardani, 2023). However, technology alone does not guarantee transparency without a culture of accountability. Accountability serves as a link between systems, information, and stakeholders, ensuring that the data produced is presented openly and accurately (Schillemans, 2013) and (Brown, 2021).

Previous studies have confirmed the influence of blockchain, system reliability, and data security on financial transparency (Yusuf, 2022) and (Lestari & Ramadhan, 2023). However, few studies have examined the role of accountability as a moderating variable in this relationship (Halim & Sari, 2021). Therefore, this study is urgent in providing empirical contributions to both the literature and practice, particularly for Indonesian manufacturing companies that are still lagging in technology implementation. In addition to offering scientific evidence, this research is expected to encourage companies and regulators to strengthen technological infrastructure, improve governance, and foster a stronger culture of accountability. Consequently, the study's findings are not only academically relevant but also practically significant for enhancing the quality of financial reporting in Indonesia.

THEORETICAL REVIEW AND HYPOTHESIS DEVELOPMENT

Agency Theory

Agency theory explains the relationship between owners and managers, who may have differing interests that can potentially lead to conflicts (Fitriani & Pratiwi, 2020). Information asymmetry can be minimized through financial statement transparency, while accountability plays a role in strengthening oversight over the actions of agents (Putra & Prasetyo, 2021). Therefore, the implementation of blockchain, reliable systems, and data security is believed to enhance trust, transparency, and accountability in financial reporting.

Systems Theory

Systems theory views an organization as an open system consisting of interrelated subsystems. In the context of accounting, the reliability and security of information systems are crucial factors, as unreliability can negatively affect the quality of financial reports (Al, 2025). Therefore, a stable, trustworthy, and secure system is required to ensure that accurate and transparent data remain protected (Purwanti, 2025).

Information Technology

Theory This theory explains that technology adoption influences organizational efficiency. In financial reporting, blockchain as an innovation enables permanent, transparent, and tamper-resistant transaction recording, thereby enhancing report integrity (Susanto & Wijianto, 2020). The level of blockchain adoption has also been shown to correlate with increased accountability, transparency, and stakeholder trust in financial statements (Fauzi & Handayani, 2022).

Blockchain Technology

Blockchain is a decentralized technology that records transactions in a transparent, secure, and encrypted manner (Judijanto *et al.*, 2024). In financial reporting, blockchain reduces the risk of fraud, improves data accuracy, and strengthens transparency. Its immutable transaction records increase stakeholder trust and expedite the audit process.

System Reliability

System reliability refers to the ability of an information system to produce accurate, consistent, and timely data, supporting financial statement transparency (Novita & Gunawan, 2020). Reliable systems reduce errors, enhance data integrity, and strengthen user confidence (Wibowo, 2019). In this study, system reliability refers to the ability of manufacturing companies' financial information systems to provide valid and timely information.

Data Security

Data security involves protecting information from unauthorized access, use, or damage. In financial reporting, data security ensures the confidentiality and integrity of information, increasing stakeholder trust and preventing leaks. This study focuses on safeguarding sensitive financial information in manufacturing companies' systems, with key components including access control, encryption, and data protection policies.

Financial Statement Transparency

Financial statement transparency refers to the extent to which financial information is presented clearly, accurately, and is accessible to stakeholders (Susanto & Prasetyo, 2021). High transparency can reduce capital costs, increase firm value, and strengthen investor confidence (Mulyani & Siregar, 2021). In manufacturing companies, transparency is influenced by information system quality, data reliability, and disclosure policies, with technologies like blockchain enhancing openness through immutable and auditable records.

Accountability

Accountability is the company's obligation to provide accurate, timely, and reliable information to stakeholders (Fitriani *et al.*, 2023). A high level of accountability can strengthen the relationship between financial statement transparency and the implementation of technologies such as blockchain.

Hypothesis Development

Based on the theoretical review, the following hypotheses are proposed :

H1 : Blockchain has a significant effect on financial statement transparency.

H2 : System reliability has a significant effect on financial statement transparency.

H3 : Data security has a significant effect on financial statement transparency.

H4 : Accountability moderates the effect of blockchain on financial statement transparency.

H5 : Accountability moderates the effect of system reliability on financial statement transparency.

H6 : Accountability moderates the effect of data security on financial statement transparency.

B. METHOD

Population and Sample

The 500 manufacturing companies that were listed on the Indonesia Stock Exchange (IDX) between 2020 and 2023 make up the study's population. Purposive sampling was used to select the sample based on a number of criteria, including the use of digital accounting systems, the availability of sustainability and annual reports, the consistency of listing throughout the study period, the completeness of audited financial statements, and the availability of information about the use of blockchain technology. 250 businesses were chosen as the study sample after meeting the requirements based on these criteria. The information utilized comes from sustainability and annual reports that were viewed on the official IDX website as well as the websites of the individual companies.

C. RESULTS AND DISCUSSIONS

1. Descriptive Statistics

To give a summary of the study variables blockchain technology, system dependability, data security, financial statement transparency, and accountability descriptive analysis was carried out. The mean, standard deviation, minimum, and maximum values for each variable are displayed in the data analyzed with IBM SPSS Statistics. The variable means are appropriate for multiple linear regression and moderated regression analysis (MRA) since they show generally positive findings with comparatively uniform data fluctuation. The following table displays the findings of the descriptive statistical analysis:

Tabel 1. Descriptive Statistics Results

	N	Descriptive Statistics			
		Minimum	Maximum	Mean	Std. Deviation
Blockchain Technology	250	0,99	4,31	2,4940	0,59470
System Reliability	250	0,80	3,94	2,5080	0,63706
Data Security	250	0,94	4,30	2,5510	0,60862
Financial Statement Transparency	250	1,25	4,00	2,4930	0,55807
Accountability	250	1,00	4,00	2,4450	0,59678
Valid N (listwise)	250				

Source: Processed Data, 2025

The blockchain technology variable (X1) has a mean of 2.4940, a standard deviation of 0.59470, a minimum value of 0.99, and a maximum value of 4.31, as shown in the above table. The system reliability variable (X2) has a mean of 2.5080, a standard deviation of 0.63706, a minimum value of 0.80, and a maximum value of 3.94. Additionally, the data security variable (X3) displays a mean of 2.5510, a standard deviation of 0.60862, a minimum value of 0.94, and a maximum value of 4.30. The financial statement transparency variable (Y) has a mean of 2.4930, a standard deviation of 0.55807, a minimum value of 1.25, and a maximum value of 4.00. Meanwhile, the accountability variable (Z) has a minimum value of 1.00, a maximum value of 4.00, a mean of 2.4450, and a standard deviation of 0.59678.

2. Results of Classical Assumption Tests

a. Normality Test Results

Table: Normality Test Results		
One-Sample Kolmogorov-Smirnov Test		
		Unstandardized Residual
N		250
Normal	Mean	0.0000000
Parameters ^{a,b}	Std. Deviation	0,41932743
Most Extreme	Absolute	0,036
Differences	Positive	0,036
	Negative	-0,027
Test Statistic		0,036
Asymp. Sig. (2-tailed)		.200 ^{c,d}

Source: Processed Data, 2025

The Asymp. Sig. (2-tailed) value, as seen in the above table, is 0.200, which is higher than 0.05. This satisfies the traditional assumption needed to do regression analysis by showing that the residual data are regularly distributed.

3. Results of Multiple Linear Regression Test

Table: Results of Multiple Linear Regression Test

Model	Coefficients ^a		Standardized coefficient Beta
	Unstandardized Coefficients B	Std. Error	
(Constant)	4.706	0,163	
Blockchain Technology	-0,305	0,046	-0,325
System Reliability	-0,256	0,044	-0,292
Data Security	-0,318	0,046	-0,347

a. Dependent Variable: Financial Statement Transparency

Source: Processed Data, 2025

Based on the table above, the results of the multiple linear regression analysis can generally be formulated as follows:

$$Y = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \epsilon$$

$$\text{Financial Statement Transparency} = 4.706 - 0.305 (\text{Blockchain Technology}) - 0.256 (\text{System Reliability}) - 0.318 (\text{Data Security}) + \epsilon$$

It has been established that the factors of data security, system dependability, and blockchain technology have a detrimental impact on financial statement transparency. With a beta value of -0.318, data security has the most impact among them, followed by blockchain technology (-0.305) and system reliability (-0.256). According to this research, industrial companies listed on the Indonesia Stock Exchange (IDX) between 2020 and 2024 have lower levels of financial statement openness when each of these variables rises.

4. Results of the Simultaneous Test (F-test)

Table. Results of the Simultaneous Test (F-test)

		ANOVA ^a			
Model		Sum of Squares	Df	Mean Square	F
1	Regression	33,767	3	11,256	63,242
	Residual	43,783	246	0,178	
	Total	77,550	249		

Source: Processed Data, 2025

Based on the ANOVA table above, the test results indicate an F-value of 63.242 with a significance level of 0.000 (<0.05). This finding demonstrates that the independent variables collectively exert a significant influence on the dependent variable.

5. Results of Partial Test (t-test)

Table. Results of Partial Test (t-test)

Coefficients ^a			
Model	Standardized Coefficients	T	Sig.
	Beta		
(Constant)		28, 879	0, 000
Blockchain Technology	-0, 325	-6, 574	0, 000
System Reliability	-0, 347	-5, 880	0, 000
Data Security	-0, 272	-6, 959	0, 000

Source: Processed Data, 2025

The partial test (t-test) findings indicate that every independent variable has a substantial impact on the dependent variable, as indicated by the coefficients table above. Each variable's significance value (Blockchain Technology = 0.000; System Reliability = 0.000; Data Security = 0.000) is less than 0.05, which supports this. Consequently, it may be said that the dependent variable is significantly influenced by these three factors to a partial extent.

6. Results of Moderated Regression Analysis (MRA)

Table. Results of Moderated Regression Analysis (MRA)

Coefficients ^a			
Model	Standardized Coefficients	T	Sig.
	Beta		
(Constant)		8, 408	0, 000
Blockchain Technology*Accountability	0, 161	0, 596	0, 552
System Reliability*Accountability	0.081	0, 315	0, 753
Data Security*Accountability	0, 291	0, 967	0, 334

Source: Processed Data, 2025

The interaction between blockchain technology and the moderating variable accountability has a significance value of 0.552, which is higher than 0.05, according to the MRA test results. This suggests that the impact of blockchain technology on the openness of financial statements is not mitigated by accountability. Additionally,

accountability is unable to moderate the relationship between system reliability and financial statement transparency, as evidenced by the significant value of 0.753 obtained from the interaction between system reliability and accountability, which is greater than 0.05. Accountability does not operate as a moderating variable in the relationship between data security and financial statement transparency, as evidenced by the interaction between data security and accountability, which yields a significance value of 0.334, which is likewise higher than 0.05.

D. CONCLUSIONS

According to the research findings, manufacturing companies listed on the Indonesia Stock Exchange (IDX) between 2020 and 2024 will see a negative and significant impact on the transparency of their financial statements due to blockchain technology, system reliability, and data security. Furthermore, it has not been demonstrated that accountability can mitigate the impact of blockchain technology, system dependability, or data security on these organizations' financial statement transparency.

E. SUGGESTIONS

Based on the above results, manufacturing companies are advised to increase investment in blockchain technology, strengthen data security systems through encryption and access control, and apply the principle of accountability in every stage of financial reporting. Meanwhile, future researchers are encouraged to broaden the scope of research to other sectors and include additional moderating variables, such as organizational culture or digital leadership, while employing more advanced analytical methods to obtain more comprehensive findings.

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