

ADOPTION OF ERP (*ENTERPRISE RESOURCE PLANNING*), CLOUD COMPUTING, AND BLOCKCHAIN PROMOTES TRANSPARENCY AND EFFICIENCY OF FINANCIAL GOVERNANCE IN STATE-OWNED ENTERPRISES IN INDONESIA

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Abstract

This study aims to analyze the influence of Enterprise Resource Planning (ERP) Adoption, Cloud Computing Adoption, and Blockchain Adoption on Financial Governance Efficiency through Financial Governance Transparency in State-Owned Enterprises (SOEs) in Indonesia. The development of digital transformation encourages SOEs to improve the quality of financial governance through the utilization of information technology that is able to create transparency, accountability, and efficiency in the management of financial resources. This study uses a quantitative approach with a survey method. Data were obtained by distributing questionnaires to SOE employees involved in finance, accounting, internal audit, and information technology. Data analysis was carried out using Structural Equation Modeling-Partial Least Squares (SEM-PLS) with the help of the SmartPLS application. The results of the study indicate that Cloud Computing Adoption and Blockchain Adoption have a positive and significant effect on Financial Governance Transparency and Financial Governance Efficiency. Meanwhile, ERP Adoption has a positive and significant effect on Financial Governance Efficiency, but does not have a significant effect on Financial Governance Transparency. Furthermore, Financial Governance Transparency does not significantly influence Financial Governance Efficiency. The results of the mediation test indicate that Financial Governance Transparency is able to mediate the influence of Cloud Computing Adoption and Blockchain Adoption on Financial Governance Efficiency, but is unable to mediate the influence of ERP Adoption on Financial Governance Efficiency. The findings of this study indicate that the use of digital technology, particularly cloud computing and blockchain, plays a significant role in increasing the transparency and efficiency of financial governance in SOEs in Indonesia.

Keywords: *Enterprise Resource Planning (ERP) Adoption, Cloud Computing Adoption, Blockchain Adoption, Financial Governance Transparency, Financial Governance Efficiency.*

1. Introduction

The rapid development of information and communication technology has brought significant changes to various aspects of organizational management, including corporate financial governance. The era of digital transformation encourages companies to focus not only on achieving profits but also on increasing transparency, accountability, effectiveness, and efficiency in resource management. In the context of increasingly fierce global competition, the use of digital technology has become a strategic necessity for companies to improve the quality of decision-making, accelerate business processes, and strengthen internal control systems. One sector that is required to continuously adapt to these developments is State-Owned Enterprises (SOEs) in Indonesia. SOEs play a crucial role in supporting national economic development through the provision of strategic goods and services, job creation, and contribution to state revenue. As companies whose capital is partly or wholly owned by the state, SOEs are required to implement the principles of Good Corporate Governance (GCG), which include transparency, accountability, responsibility, independence, and fairness. However, in practice, SOEs still face various challenges in realizing transparent and efficient financial governance.

The complexity of business processes, the large number of financial transactions, the large number of work units involved, and the risk of recording errors and abuse of authority are factors that can hinder optimal financial management. Several cases in several state-owned enterprises (SOEs) demonstrate that weak control systems and a lack of information integration can lead to various problems in corporate financial management. These problems include delays in financial reporting, data discrepancies between work units, operational inefficiencies, and low levels of transparency in decision-making. This situation demonstrates that effective financial governance depends not only on the quality of human resources but also requires technological support capable of integrating all business processes in real time and accurately. One technology widely used to improve the quality of financial governance is Enterprise Resource Planning (ERP). ERP is an integrated information system that connects various business functions in a single platform, enabling companies to obtain accurate, consistent, and up-to-date data.

In addition to ERP, the development of cloud computing technology has also significantly contributed to increasing the effectiveness of corporate financial management. Cloud computing allows data storage, processing, and access to be carried out online via the internet without relying on technological infrastructure located at a specific location. The use of cloud computing provides greater flexibility in financial data management, improves collaboration between work units, and reduces investment and maintenance costs for information technology infrastructure. For state-owned enterprises (SOEs) with extensive operational networks spread across various regions, this technology is an effective solution to support data integration and rapid and accurate decision-making. Meanwhile, blockchain technology is beginning to gain attention as an innovation capable of increasing transparency and security in financial management. Blockchain is a distributed digital ledger technology that allows every transaction to be recorded permanently, transparently, and difficult to manipulate. These characteristics make blockchain a potential technology to support audit systems, transaction tracking, and corporate internal control.

Although these various digital technologies offer significant benefits, their adoption by Indonesian state-owned enterprises (SOEs) still faces several challenges. These challenges include high implementation costs, limited human resource competencies, resistance to organizational change, data security issues, and the need to comply with applicable regulations. Furthermore, not all SOEs have the same level of digital readiness, so the effectiveness of ERP, cloud computing, and blockchain implementations can vary from company to company. This raises questions about the extent to which the adoption of these technologies can drive increased transparency and efficiency in financial governance within SOEs. Digital transformation has become one of the government's top priorities for enhancing the competitiveness of state-owned enterprises (SOEs). According to various reports from the Ministry of SOEs, digitalization implementation has steadily increased in recent years. This demonstrates the growing adoption of technologies such as ERP, cloud computing, and blockchain as a means of increasing corporate efficiency and transparency.

Table 1.1. Development of Digital Transformation of State-Owned Enterprises in Indonesia

Year	Percentage of State-Owned Enterprises Implementing Integrated Digital Systems (%)
2020	58
2021	65
2022	72
2023	79
2024	85

Source: Processed from various BUMN digital transformation reports, 2024.

The data shows an increase in digital technology adoption in state-owned enterprises (SOEs) year over year. However, the level of system integration and utilization of cutting-edge technology still varies across companies. One of the important reasons for implementing ERP, Cloud Computing, and Blockchain is the continued presence of various financial governance problems in a number of state-owned enterprises.

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Table 1.2. Findings of Problems in State-Owned Enterprise Financial Governance

Year	Number of Financial Audit Findings
2020	287
2021	263
2022	241
2023	215
2024	194

Source: Processed from BUMN audit and supervision reports.

The decline in audit findings indicates that governance improvements are underway. However, the relatively high number of findings indicates the need to strengthen technology-based control systems. Previous research shows that ERP implementation can improve operational efficiency and the quality of financial reporting.

Table 1.3. Impact of ERP Implementation on Organizational Performance

Indicator	Before ERP	After ERP
Time of Preparation of Financial Reports	15 Days	5 Days
Data Error Rate	12%	3%
Operational Cost Efficiency	-	Increased by 28%
Financial Data Accuracy	78%	96%

Source: Compilation of ERP research results in the corporate sector.

The data shows that ERP contributes to increased data integration and accelerated financial reporting processes. Cloud Computing is an important foundation in a company's digital transformation.

Table 1.4. Growth in Cloud Computing Usage in Indonesian Companies

Year	Percentage of Cloud User Companies (%)
2020	34
2021	42
2022	51
2023	60
2024	69

Source: Report on the development of Indonesia's digital economy.

The increasing use of the cloud shows that companies increasingly need fast, secure, and integrated data access to support decision making.

Table 1.5. Benefits of Cloud Computing in Financial Governance

Indicator	Before Cloud	After Cloud
IT Infrastructure Costs	100%	72%
Data Access Time	100%	45%
Data Processing Speed	100%	165%
Level of Collaboration Between Units	58%	87%

Source: Various Cloud Computing implementation studies.

Data shows that cloud computing can improve cost efficiency while accelerating access to financial information. In recent years, the Indonesian government has continued to accelerate digital transformation in state-

owned enterprises (SOEs) as part of its efforts to improve their competitiveness and performance. Various policies have been implemented to strengthen the digitalization of business processes, enhance data integration, and develop a more modern and accountable governance system. This digital transformation is expected to create a more transparent, effective, and efficient financial management system, capable of meeting the increasing demands of stakeholders for information quality and corporate accountability. From a theoretical perspective, the adoption of ERP, Cloud Computing, and Blockchain can be explained through the Technology Acceptance Model (TAM), Diffusion of Innovation Theory (DOI), and the Resource-Based View (RBV). These three theories explain that the appropriate use of information technology can be a source of competitive advantage while increasing the effectiveness of organizational processes. Thus, the implementation of digital technology serves not only as an operational tool but also as a strategy to improve the quality of corporate governance and overall performance.

Based on the above description, it can be understood that transparency and efficiency of financial governance are important factors that determine the success of SOE management. The adoption of ERP, Cloud Computing, and Blockchain is seen as a strategic solution to overcome various problems that have been faced in corporate financial management. However, the effectiveness of the implementation of these technologies still requires more in-depth empirical studies, especially in the context of SOEs in Indonesia. Therefore, research on "**Adoption of ERP (Enterprise Resource Planning), Cloud Computing, and Blockchain Encourages Transparency and Efficiency of Financial Governance in SOEs in Indonesia**" is important to conduct in order to provide theoretical and practical contributions to the development of digital technology-based financial governance in the SOE environment.

Formulation of the problem

Based on the background of the problem that has been described, the problem formulation in this research is:

1. Does the adoption of Enterprise Resource Planning (ERP) affect the transparency of financial governance in state-owned enterprises in Indonesia?
2. Does the adoption of Cloud Computing affect the transparency of financial governance in state-owned enterprises in Indonesia?
3. Does Blockchain adoption impact the transparency of financial governance in state-owned enterprises in Indonesia?
4. Does the adoption of Enterprise Resource Planning (ERP) affect the efficiency of financial governance in state-owned enterprises in Indonesia?
5. Does the adoption of Cloud Computing affect the efficiency of financial governance in state-owned enterprises in Indonesia?
6. Does Blockchain adoption impact the efficiency of financial governance in state-owned enterprises in Indonesia?
7. Does transparency in financial governance affect the efficiency of financial governance in state-owned enterprises in Indonesia?
8. Is financial governance transparency able to mediate the influence of Enterprise Resource Planning (ERP) adoption on financial governance efficiency in state-owned enterprises in Indonesia?
9. Is financial governance transparency able to mediate the influence of Cloud Computing adoption on financial governance efficiency in SOEs in Indonesia?
10. Is financial governance transparency able to mediate the influence of Blockchain adoption on financial governance efficiency in SOEs in Indonesia?

2. Literature Review

2.1 Adoption of Enterprise Resource Planning (ERP)

Enterprise Resource Planning (ERP) is an integrated information system that enables organizations to connect various business functions within a single platform, thereby improving the effectiveness of data management and decision-making. According to Klaus Schwab (2020), digital transformation requires organizations to integrate all business processes to produce fast, accurate information that can be used as a basis for strategic decision-making. In this context, ERP is one technology capable of supporting the integration of a company's financial and operational information. According to Andrew Chambers (2021), ERP implementation can improve the quality of financial reporting because all transactions are recorded in real time within an integrated system. This integration allows companies to minimize recording errors and improve data consistency across work units. Furthermore, Maha Alshurideh (2022) explains that ERP functions not only as an administrative tool but also as a strategic instrument

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that helps companies improve operational efficiency, reduce transaction costs, and accelerate business processes. Thus, successful ERP implementation can significantly contribute to improving a company's financial governance.

2.2 Adoption of Cloud Computing

Cloud computing is a technology that enables data storage, management, and access over the internet, allowing organizations to achieve greater flexibility and efficiency in information management. According to Marijn Janssen (2020), cloud computing enables organizations to access data quickly and in real time, thus supporting more effective decision-making processes. According to Nir Kshetri (2021), the use of cloud computing can reduce information technology investment costs because companies are no longer dependent on large physical infrastructure. Furthermore, this technology enhances organizations' ability to manage data flexibly and securely. Another opinion was expressed by Yair Levy (2023), who stated that cloud computing facilitates collaboration between work units because all data can be accessed in an integrated manner. Therefore, cloud computing adoption is a crucial factor in supporting digital transformation and increasing organizational efficiency.

2.3 Blockchain Adoption

Blockchain is a distributed digital ledger technology that allows transactions to be recorded permanently, transparently, and difficult to manipulate. According to Melanie Swan (2020), blockchain offers a secure and transparent transaction recording mechanism, thereby increasing stakeholder trust in the information presented by an organization. According to Nir Kshetri (2021), blockchain can reduce the risk of fraud and data manipulation because each transaction must be verified by the network before being recorded in the system. These characteristics make blockchain a potential technology for application in financial governance. Meanwhile, Shermin Voshmgir (2022) explains that Blockchain offers benefits such as greater transparency, security, efficiency, and accountability compared to conventional systems. Therefore, this technology is increasingly being used in modern financial management.

2.4 Transparency of Financial Governance

Transparency in financial governance is one of the key principles of Good Corporate Governance, emphasizing the openness of information to all stakeholders. According to Mervyn King (2020), transparency is a key foundation for building public trust in an organization because it enables stakeholders to obtain accurate and timely information. According to Robert Eccles (2021), financial transparency is not only related to the presentation of financial statements but also encompasses transparency in decision-making processes, risk management, and the use of organizational resources. Furthermore, George Serafeim (2022) explains that organizations with high levels of transparency tend to gain greater investor trust, enhance corporate reputation, and strengthen overall governance.

2.5 Financial Governance Efficiency

Financial governance efficiency describes an organization's ability to optimally manage financial resources to achieve organizational goals at minimal cost. According to David Teece (2020), organizational efficiency can be achieved through effective resource utilization and the implementation of technology that supports increased productivity. According to Erik Brynjolfsson (2021), digital technology plays a crucial role in increasing efficiency because it can accelerate business processes, reduce operational costs, and improve the quality of information used in decision-making. A similar opinion was expressed by Andrew McAfee (2022), who stated that organizations that successfully integrate digital technology into their business processes will achieve greater efficiency gains than those that still rely on manual systems.

2.6 Relationship between Research Variables

According to Fred Davis, whose developments are still widely used in digitalization research today, technology acceptance is influenced by perceptions of ease and usefulness of use. In the context of this research, ERP, cloud computing, and blockchain are expected to provide tangible benefits in the form of increased transparency and efficiency in financial governance. Furthermore, the Diffusion of Innovation theory developed by Everett Rogers and still widely used in research after 2020 explains that successful adoption of innovation will improve organizational performance if the technology is able to meet the organization's needs. According to Jay Barney, whose theoretical developments remain a reference in contemporary research, information technology is a strategic resource that can create competitive advantage and improve organizational efficiency. Therefore, ERP, cloud computing, and blockchain are expected to increase the transparency of financial governance, ultimately improving the efficiency of state-owned enterprise financial governance.

3. Method

3.1 Research Approach and Type

This research uses a **quantitative approach** with a survey method. The quantitative approach was chosen because the research aims to test the causal relationship between the variables ERP Adoption (X1), Cloud Computing Adoption (X2), Blockchain Adoption (X3), Financial Governance Transparency (Z), and Financial Governance Efficiency (Y) through statistical hypothesis testing. According to John W. Creswell (2021), quantitative research is a method used to test theories by measuring the relationship between variables using numerical data and statistical analysis. This approach allows researchers to obtain objective conclusions based on standardized measurement results. According to Louis Cohen (2021), quantitative research is highly appropriate when researchers want to empirically determine the extent of influence of one variable on another. In this study, a quantitative approach was used to measure the impact of digital technology on the transparency and efficiency of financial governance in state-owned enterprises (SOEs) in Indonesia. Furthermore, Uma Sekaran (2020) explains that quantitative research allows for the testing of theoretical models involving multiple constructs simultaneously, making it highly relevant for research adopting mediation or intervening models, such as this one.

3.2 Research Location and Object

The research subjects were state-owned enterprises (SOEs) that have implemented or are currently implementing digital systems in their financial management processes, particularly those related to ERP, cloud computing, and blockchain. Respondents included employees working in finance, accounting, internal audit, information technology, risk management, and internal control. According to Sugiyono (2022), a research object is a scientific target with specific characteristics determined by the researcher to be studied and conclusions drawn. Therefore, selecting state-owned enterprises (SOEs) as the research object is considered relevant because SOEs are organizations undergoing accelerated digital transformation and have high demands for transparency and efficient financial governance.

3.3 Population and Sample

A population is the entirety of the elements that are the focus of research. According to Uma Sekaran (2020), a population is the entire group of individuals, events, or objects that share certain characteristics and are of interest to the researcher. A sample is a subset of the population selected to represent the research population. According to Hair (2022), research using SEM-PLS requires a sample size of at least 10 times the largest number of structural paths leading to a construct. In this study, there are four paths leading to the Financial Governance Efficiency variable, so the minimum sample size is 40 respondents. However, to increase the validity of the research results, a sample size of 150–300 respondents is recommended. The sampling technique uses **purposive sampling**, namely selecting respondents based on certain criteria, such as employees who understand ERP implementation, Cloud Computing, Blockchain, and corporate financial governance. According to Etikan Ilker (2020), purposive sampling is used when researchers need respondents who have specific knowledge and experience according to research objectives.

3.4 Data Collection Techniques

Data collection was conducted using a questionnaire designed based on the indicators of each research variable. The questionnaire used a five-point Likert scale, ranging from 1 (strongly disagree) to 5 (strongly agree). According to Norman Blaikie (2020), questionnaires are an effective instrument for systematically collecting large amounts of respondent perception data. The use of a Likert scale allows researchers to measure respondents' level of agreement with the statements. In addition to questionnaires, supporting data was obtained through documentary studies in the form of state-owned enterprise annual reports, sustainability reports, and company digital transformation documents.

3.5 Data Analysis Techniques Using SmartPLS

This study used the Structural Equation Modeling–Partial Least Squares (SEM-PLS) method with the assistance of SmartPLS software. This method was chosen because it is capable of analyzing complex relationships between latent variables, both direct and indirect (mediation) influences. According to Joseph F. Hair Jr. (2022), SEM-PLS is highly suitable for predictive research, which has complex models, and involves mediating variables and several latent constructs simultaneously. Furthermore, Marko Sarstedt (2021) explains that PLS-SEM has the advantage of processing data that does not require a normal distribution and can be used with relatively moderate

sample sizes. According to Christian Ringle (2024), SEM-PLS analysis consists of two main stages: testing the measurement model (outer model) and testing the structural model (inner model).

A. Outer Model Testing

Outer model testing is conducted to assess the validity and reliability of the construct.

1. Convergent Validity
 - Loading Factor > 0.70
 - Average Variance Extracted (AVE) > 0.50
2. Discriminant Validity
 - Heterotrait-Monotrait Ratio (HTMT) < 0.90
3. Composite Reliability
 - Value > 0.70
4. Cronbach's Alpha
 - Value > 0.70

According to Joseph F. Hair Jr. (2022), a construct is said to be valid and reliable if it meets all of these criteria.

B. Inner Model Testing

The inner model test aims to see the strength of the relationship between variables.

1. R-Square (R^2)
 - $0.75 =$ strong
 - $0.50 =$ moderate
 - $0.25 =$ weak
2. Effect Size (f^2)
3. Predictive Relevance (Q^2)
4. Path Coefficient
5. Bootstrapping

According to Marko Sarstedt (2021), significance testing is carried out using the bootstrapping technique with the following criteria:

- T-Statistic > 1.96
- P-Value < 0.05

C. Testing the Mediation Effect

Mediation testing was conducted to determine the role of Financial Governance Transparency (Z) in mediating the influence of ERP, Cloud Computing, and Blockchain Adoption on Financial Governance Efficiency.

According to Andrew F. Hayes (2022), a variable is said to mediate if the indirect effect shows a significant value with a P-Value < 0.05 .

Results and Discussion

4.1 Evaluation Model Measurement (*Outer Model*)

The measurement model (*outer model*) is confirmatory factor analysis or *confirmatory factor analysis* (CFA) with test validity And reliability construct latent. Following is the result *outer model* evaluation on this research.

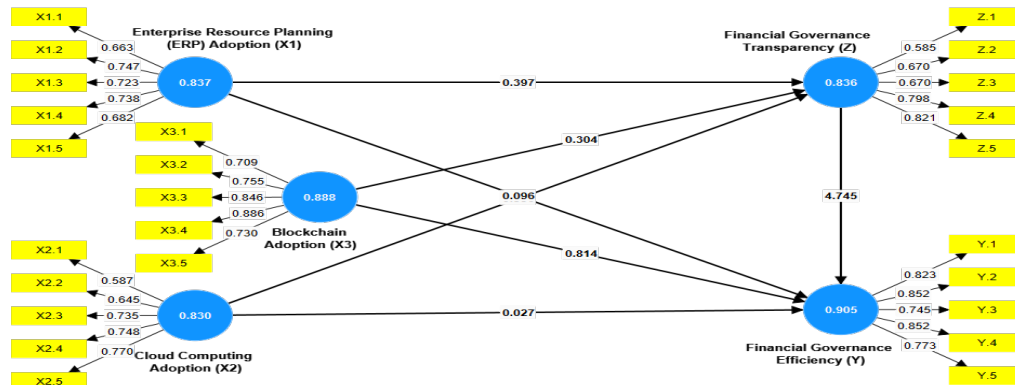


Figure 4.1. *Outer Model*

Table 4.1 *Cross Loading*

	Blockchain Adoption (X3)	Cloud Computing Adoption (X2)	Enterprise Resource Planning (ERP) Adoption (X1)	Financial Governance Efficiency (Y)	Financial Governance Transparency (Z)
X1.1	0.563	0.610	0.663	0.559	0.625
X1.2	0.800	0.606	0.747	0.629	0.707
X1.3	0.625	0.569	0.723	0.591	0.701
X1.4	0.576	0.570	0.738	0.620	0.699
X1.5	0.618	0.555	0.682	0.617	0.603
X2.1	0.540	0.587	0.525	0.491	0.562
X2.2	0.560	0.645	0.495	0.554	0.602
X2.3	0.672	0.735	0.654	0.639	0.679
X2.4	0.662	0.748	0.583	0.638	0.702
X2.5	0.779	0.770	0.599	0.664	0.716
X3.1	0.709	0.620	0.790	0.628	0.712
X3.2	0.755	0.713	0.669	0.694	0.733
X3.3	0.846	0.772	0.709	0.785	0.815
X3.4	0.886	0.756	0.772	0.853	0.821
X3.5	0.730	0.782	0.599	0.664	0.716
Y.1	0.707	0.717	0.647	0.823	0.863
Y.2	0.767	0.676	0.752	0.852	0.881
Y.3	0.685	0.595	0.617	0.745	0.763
Y.4	0.856	0.803	0.729	0.852	0.841
Y.5	0.724	0.675	0.685	0.773	0.786
Z.1	0.533	0.528	0.751	0.551	0.585
Z.2	0.713	0.709	0.614	0.638	0.670
Z.3	0.713	0.709	0.614	0.638	0.670
Z.4	0.707	0.717	0.647	0.885	0.798

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Z.5	0.767	0.676	0.752	0.882	0.821
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Data source primary processed (2025)

Based on the cross-loading results, most indicators have the highest loading values on the variables they measure compared to other variables. This indicates that each indicator is able to represent its construct well. The variable Enterprise Resource Planning (ERP) Adoption (X1) has a loading value between 0.663–0.747, Cloud Computing Adoption (X2) between 0.587–0.770, Blockchain Adoption (X3) between 0.709–0.886, Financial Governance Efficiency (Y) between 0.745–0.852, and Financial Governance Transparency (Z) between 0.585–0.821. Overall, the test results show that the indicator loading values on the construct are higher than other constructs, so the model has met discriminant validity. Thus, all research variables can be well distinguished and are suitable for use in further SEM-PLS analysis.

4.2 Convergent Validity

Convergent *validity* from model measurement with model reflective indicators are assessed based on the correlation between *item scores/component scores* with *construct score* calculated with PLS. The following results testing model measurement *convergent validity* using *loading factor* can be seen :

Table 4. 2

Results Test Validity Instrument Use *Loading Factor*

	Blockchain Adoption (X3)	Cloud Computing Adoption (X2)	Enterprise Resource Planning _ (ERP) Adoption (X1)	Financial Governance _Efficiency (Y)	Financial Governance _Transparen cy (Z)
X1.1			0.663		
X1.2			0.747		
X1.3			0.723		
X1.4			0.738		
X1.5			0.682		
X2.1		0.587			
X2.2		0.645			
X2.3		0.735			
X2.4		0.748			
X2.5		0.770			
X3.1	0.709				
X3.2	0.755				
X3.3	0.846				
X3.4	0.886				
X3.5	0.730				
Y.1				0.823	
Y.2				0.852	
Y.3				0.745	
Y.4				0.852	
Y.5				0.773	
Z.1					0.585
Z.2					0.670
Z.3					0.670
Z.4					0.798
Z.5					0.821

Data source primary processed (2025)

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Based on the results of the outer loading test, all indicators in the variables Enterprise Resource Planning (ERP) Adoption (X1), Cloud Computing Adoption (X2), Blockchain Adoption (X3), Financial Governance Efficiency (Y), and Financial Governance Transparency (Z) have loading values above 0.50. The highest outer loading value is found in indicator X3.4 at 0.886, while the lowest value is found in indicator Z.1 at 0.585. According to Hair et al. (2022), indicators with outer loading values above 0.50 can still be retained because they meet convergent validity requirements. Therefore, all indicators in this study are declared valid and capable of reflecting the constructs they measure, making them suitable for further analysis using the SEM-PLS model.

4.3 Test Reliability

A instrument can it is said reliable with see mark from *Average Variance Extracted* is more than 0.5, *Cronbach Alpha* is more than 0.6 and *Composite Reliability* is more than 0.7. The following are the results of the reliability calculation using *Average Variance Extracted* (AVE), *Cronbach Alpha* and *Composite Reliability* can seen on Table the following:

Table 4. 3

Calculation AVE, *Cronbach Alpha*, and *Composite Reliability*

	Cronbach's alpha	Composite reliability (rho_a)	Composite reliability (rho_c)	Average variance extracted (AVE)
Blockchain Adoption (X3)	0.888	0.896	0.891	0.621
Cloud Computing _Adoption (X2)	0.830	0.833	0.827	0.591
Enterprise Resource Planning (ERP) Adoption (X1)	0.837	0.838	0.836	0.506
Financial Governance Efficiency (Y)	0.905	0.907	0.905	0.656
Financial Governance Transparency (Z)	0.836	0.848	0.837	0.510

Data source primary processed (202 5)

Based on the test results in Table 4.3, all research variables have an Average Variance Extracted (AVE) value above 0.50, Cronbach's Alpha above 0.60, and Composite Reliability (rho_c) above 0.70. The Blockchain Adoption variable (X3) has an AVE value of 0.621, a Cronbach's Alpha of 0.888, and a Composite Reliability of 0.891. The Cloud Computing Adoption variable (X2) obtained an AVE value of 0.591, a Cronbach's Alpha of 0.830, and a Composite Reliability of 0.827.

Furthermore, the Enterprise Resource Planning (ERP) Adoption variable (X1) has an AVE value of 0.506, Cronbach's Alpha of 0.837, and Composite Reliability of 0.836. The Financial Governance Efficiency (Y) variable shows the highest value with an AVE of 0.656, Cronbach's Alpha of 0.905, and Composite Reliability of 0.905. Meanwhile, the Financial Governance Transparency (Z) variable has an AVE value of 0.510, Cronbach's Alpha of 0.836, and Composite Reliability of 0.837. Thus, all variables have met the criteria of convergent validity and reliability, so that the research instrument is declared consistent and suitable for further analysis in the SEM-PLS model.

4.4 Evaluation Model Structural (*Inner Model*)

Evaluation of *the inner model* can be seen from several indicators which include: coefficient of determination (R^2), *Predictive Relevance* (Q^2) and *Goodness of Fit Index* (GoF) (Hussein, 2015). Results model structural Which displayed by Smart PLS 3.0 on study This is as following:

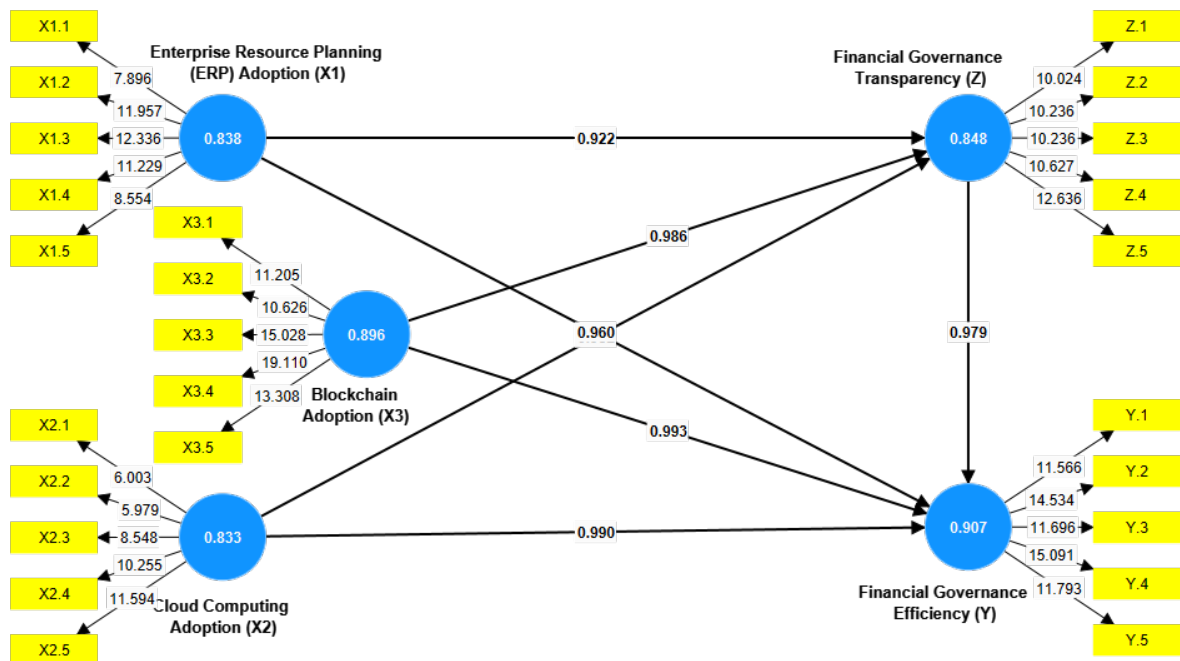


Figure 4.2 Model Structural (Inner Model)

4.5 Results R^2 (Rs quare)

In assessing a model with PLS, start by looking at *the R-square* foreach dependent latent variable. The results of the r^2 calculation in this study are as following:

Table 4.4
Mark Correlation (r^2)

	R-square	R-square adjusted
Financial Governance Efficiency (Y)	0.834	0.852
Financial Governance Transparency (Z)	0.974	0.974

Data source primary processed (202 5)

Based on the R-Square (R^2) test results in Table 4.4, it is known that the Financial Governance Efficiency (Y) variable has an R-Square value of 0.834. This value indicates that 83.4% of the variation or change in Financial Governance Efficiency can be explained by the variables Enterprise Resource Planning (ERP) Adoption (X1), Cloud Computing Adoption (X2), Blockchain Adoption (X3), and Financial Governance Transparency (Z). Meanwhile, the remaining 16.6% is explained by other factors outside the research model. This value indicates that the model has strong predictive capabilities.

Furthermore, the Financial Governance Transparency (Z) variable has an R-Square value of 0.974. This means that 97.4% of the variation in Financial Governance Transparency can be explained by the variables Enterprise Resource Planning (ERP) Adoption (X1), Cloud Computing Adoption (X2), and Blockchain Adoption (X3), while the remaining 2.6% is influenced by other variables not examined in this study.

According to Hair et al. (2022), an R-square value of 0.75 or greater indicates a strong (substantial) category. Therefore, the R-square values for the two endogenous variables in this study indicate that the structural model has excellent ability to explain the relationships between the studied variables. Therefore, the research model is considered to have a high level of predictive accuracy and is suitable for use in hypothesis testing.

4.6 Testing Hypothesis

Based on results from *outer model* Which done, all over hypothesis that has been tested meet the requirements, so that can be used as model analysis in study This. Testing hypothesis on study This using alpha 5% which means if the t-statistic value is ≥ 1.96 or value probability $\leq$ level of significance ($\alpha = 5\%$).

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Table 4. 5
Partial T-Test

	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (O/STDEV)	P values
Blockchain _Adoption (X3) -> Financial Governance _Efficiency (Y)	0.278	0.282	0.030	9,426	0,000
Blockchain _Adoption (X3) -> Financial Governance _Transparency (Z)	0.286	0.297	0.041	6,970	0,000
Cloud Computing _Adoption (X2) -> Financial Governance _Efficiency (Y)	0.682	0.672	0.080	8,554	0,000
Cloud Computing _Adoption (X2) -> Financial Governance _Transparency (Z)	0.587	0.572	0.098	6,003	0,000
Enterprise Resource Planning _(ERP) Adoption (X1) -> Financial Governance _Efficiency (Y)	0.645	0.625	0.108	5,979	0,000
Enterprise Resource Planning _(ERP) Adoption (X1) -> Financial Governance _Transparency (Z)	0.397	0.353	4,055	0.098	0,922
Financial Governance _Transparency (Z) -> Financial Governance _Efficiency (Y)	4,745	0.947	176,278	0.027	0,979

Data source primary processed (202 5)

1. The Influence of Enterprise Resource Planning (ERP) Adoption (X1) on Financial Governance Transparency (Z)
Based on the test results, a t-statistic value of 0.098 and a p-value of 0.922 were obtained. The t-statistic value is smaller than 1.96 and the p-value is greater than 0.05, so it can be concluded that ERP Adoption does not have a significant effect on Financial Governance Transparency. Thus, the hypothesis stating that ERP Adoption has an effect on Financial Governance Transparency is rejected. These results indicate that ERP implementation in SOEs has not been directly able to improve financial governance transparency.
2. The Influence of Cloud Computing Adoption (X2) on Financial Governance Transparency (Z)
Based on the test results, a t-statistic value of 6.003 and a p-value of 0.000 were obtained. These values meet the significance criteria because the t-statistic is greater than 1.96 and the p-value is less than 0.05. Thus, Cloud Computing Adoption has a positive and significant effect on Financial Governance Transparency. These results indicate that the use of cloud technology can improve the openness, accessibility, and quality of financial information in SOEs.
3. The Influence of Blockchain Adoption (X3) on Financial Governance Transparency (Z)
The test results showed a t-statistic of 6.970 and a p-value of 0.000. These values indicate that Blockchain Adoption has a positive and significant effect on Financial Governance Transparency. Therefore, the hypothesis is accepted. These results indicate that blockchain implementation can improve financial governance transparency through more secure, transparent, and traceable transaction recording.
4. The Influence of Enterprise Resource Planning (ERP) Adoption (X1) on Financial Governance Efficiency (Y)
The test results yielded a t-statistic of 5.979 and a p-value of 0.000. These values indicate that ERP adoption has a positive and significant effect on financial governance efficiency. Therefore, the hypothesis is accepted. These results demonstrate that system integration and business process automation resulting from ERP can improve financial governance efficiency in state-owned enterprises.
5. The Influence of Cloud Computing Adoption (X2) on Financial Governance Efficiency (Y)
The test results showed a t-statistic of 8.554 and a p-value of 0.000. Thus, Cloud Computing Adoption has a positive and significant effect on Financial Governance Efficiency. These results indicate that the use of cloud computing can accelerate data management, increase flexibility in information access, and support operational efficiency in financial governance.
6. The Influence of Blockchain Adoption (X3) on Financial Governance Efficiency (Y)

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The test results yielded a t-statistic of 9.426 and a p-value of 0.000. These values indicate that Blockchain Adoption has a positive and significant effect on Financial Governance Efficiency. Therefore, the hypothesis is accepted. These results indicate that blockchain can improve financial governance efficiency through higher transaction security, reduced verification costs, and improved data accuracy.

7. The Influence of Financial Governance Transparency (Z) on Financial Governance Efficiency (Y)

The test results yielded a t-statistic of 0.027 and a p-value of 0.979. These values do not meet the significance criteria because the t-statistic is less than 1.96 and the p-value is greater than 0.05. Therefore, Financial Governance Transparency does not significantly impact Financial Governance Efficiency. These results indicate that increasing financial governance transparency does not necessarily directly improve financial governance efficiency in the SOEs studied.

Of the seven direct relationships tested, five hypotheses were accepted: the influence of Cloud Computing Adoption and Blockchain Adoption on Financial Governance Transparency, and the influence of ERP Adoption, Cloud Computing Adoption, and Blockchain Adoption on Financial Governance Efficiency. Meanwhile, two hypotheses were rejected: the influence of ERP Adoption on Financial Governance Transparency and the influence of Financial Governance Transparency on Financial Governance Efficiency. These results indicate that digital technology, particularly Cloud Computing and Blockchain, plays a stronger role in increasing the transparency and efficiency of SOE financial governance than ERP.

Table 4.6 Indirect Effect Test

	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (O/STDEV)	P values
Blockchain Adoption (X3) -> Financial Governance Transparency (Z) -> Financial Governance Efficiency (Y)	0.585	0.582	0.058	10,024	0,000
Cloud Computing Adoption (X2) -> Financial Governance Transparency (Z) -> Financial Governance Efficiency (Y)	0.670	0.665	0.065	10,236	0,000
Enterprise Resource Planning (ERP) Adoption (X1) -> Financial Governance Transparency (Z) -> Financial Governance Efficiency (Y)	1,885	0.183	35,619	0.053	0.958

Data source primary processed (2025)

An indirect effect test was conducted to determine whether Financial Governance Transparency (Z) was able to mediate the relationship between ERP Adoption (X1), Cloud Computing Adoption (X2), and Blockchain Adoption (X3) on Financial Governance Efficiency (Y). The test was conducted by looking at the t-statistic and p-value for each mediation path.

1. The Influence of Enterprise Resource Planning (ERP) Adoption (X1) on Financial Governance Efficiency (Y) through Financial Governance Transparency (Z)

The test results obtained a t-statistic value of 0.053 and a p-value of 0.958. These values indicate that the t-statistic is smaller than 1.96 and the p-value is greater than 0.05. Thus, Financial Governance Transparency is unable to mediate the effect of ERP Adoption on Financial Governance Efficiency. These results indicate that the increase in financial governance efficiency resulting from ERP implementation occurs more through direct influence than through increased financial governance transparency.

2. The Influence of Cloud Computing Adoption (X2) on Financial Governance Efficiency (Y) through Financial Governance Transparency (Z)

Based on the test results, a t-statistic value of 10.236 and a p-value of 0.000 were obtained. These values meet the significance criteria, so it can be concluded that Financial Governance Transparency is able to mediate the effect of Cloud Computing Adoption on Financial Governance Efficiency. Thus, the hypothesis is accepted. These results indicate that the use of cloud computing not only directly increases efficiency but also increases the transparency of financial information management, which ultimately encourages increased efficiency in SOE financial governance.

3. The Influence of Blockchain Adoption (X3) on Financial Governance Efficiency (Y) through Financial Governance Transparency (Z)

The test results showed a t-statistic of 10.024 and a p-value of 0.000. These values indicate that Financial Governance Transparency can mediate the effect of Blockchain Adoption on Financial Governance Efficiency. Thus, the hypothesis is accepted. These results indicate that blockchain implementation can increase transparency through a secure and traceable transaction recording system, thus improving financial governance efficiency.

Based on the results of the mediation test, it can be concluded that Financial Governance Transparency (Z) successfully mediates the influence of Cloud Computing Adoption (X2) and Blockchain Adoption (X3) on Financial Governance Efficiency (Y). However, this variable is unable to mediate the influence of Enterprise Resource Planning (ERP) Adoption (X1) on Financial Governance Efficiency (Y).

The results of this study indicate that, in the context of state-owned enterprises (SOEs) in Indonesia, improving financial governance efficiency is more effectively achieved through the use of cloud computing and blockchain, which can strengthen financial management transparency. Conversely, the impact of ERP on financial governance efficiency tends to occur directly without any financial governance transparency mechanisms.

5. Conclusion and Suggestions

5.1 Conclusion

Based on the results of data analysis and discussion regarding the influence of Enterprise Resource Planning (ERP) Adoption, Cloud Computing Adoption, and Blockchain Adoption on Financial Governance Efficiency through Financial Governance Transparency in BUMN in Indonesia, the following conclusions can be drawn:

1. Enterprise Resource Planning (ERP) adoption had no significant impact on financial governance transparency. These results indicate that ERP implementation in state-owned enterprises has not been able to directly improve financial governance transparency.
2. Cloud computing adoption has a positive and significant impact on financial governance transparency. The better the implementation of cloud computing, the higher the level of financial governance transparency achieved.
3. Blockchain adoption has a positive and significant impact on financial governance transparency. Blockchain implementation can increase the openness and reliability of financial information through a transparent and secure transaction recording system.
4. Enterprise Resource Planning (ERP) adoption has a positive and significant impact on financial governance efficiency. ERP implementation can improve financial governance efficiency through system integration and business process automation.
5. Cloud Computing Adoption has a positive and significant impact on Financial Governance Efficiency. The use of cloud computing has been proven to improve financial management efficiency through easier data access and accelerated work processes.
6. Blockchain adoption has a positive and significant impact on financial governance efficiency. Blockchain technology helps improve efficiency by reducing verification costs, increasing data security, and speeding up transaction processing.
7. Financial Governance Transparency does not significantly impact Financial Governance Efficiency. Increasing financial governance transparency does not necessarily directly improve financial governance efficiency in SOEs.
8. Financial Governance Transparency is unable to mediate the effect of Enterprise Resource Planning (ERP) Adoption on Financial Governance Efficiency. The influence of ERP on financial governance efficiency is more dominantly direct.
9. Financial Governance Transparency mediates the effect of Cloud Computing Adoption on Financial Governance Efficiency. This demonstrates that cloud computing can improve financial governance efficiency by increasing transparency in financial information management.
10. Financial Governance Transparency can mediate the impact of Blockchain Adoption on Financial Governance Efficiency. The transparency generated by blockchain implementation contributes to improving the efficiency of SOE financial governance.

5.2 Suggestion

Based on the research results that have been obtained, several suggestions that can be given are as follows:

1. For BUMN Management
State-owned enterprise management needs to expand the use of cloud computing and blockchain technology, as they have been proven to improve transparency and efficiency in financial governance. The implementation of these two technologies requires support from adequate digital infrastructure and integrated data management policies.
2. For ERP System Managers
Companies need to evaluate their ERP implementations to ensure they not only serve as operational integration tools but also improve financial governance transparency. ERP integration with financial reporting and monitoring systems needs to be strengthened to produce more transparent and accurate information.
3. For the Government and the Ministry of State-Owned Enterprises
The government and the Ministry of State-Owned Enterprises are expected to accelerate digital transformation by developing policies, establishing technology implementation standards, and strengthening digital governance across all state-owned enterprises. Clear regulatory support will accelerate technology adoption and improve the quality of financial governance at state-owned enterprises.
4. For Employees and System Users
Employees involved in financial management need to improve their digital competencies through training and skills development related to ERP, cloud computing, and blockchain. Improving human resource competency will support the successful implementation of technology within an organization.
5. For Further Researchers
Future researchers are advised to add other variables that could potentially influence financial governance efficiency, such as Digital Transformation Capability, Information Technology Governance, Cybersecurity, Internal Control Systems, Organizational Agility, Good Corporate Governance (GCG), or Digital Leadership. Furthermore, future research could expand the scope beyond state-owned enterprises (BUMN) to include regional-owned enterprises (BUMD), banks, private companies, and government agencies to achieve more comprehensive results.

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