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# ANALYSIS OF THE INFLUENCE OF BLOCKCHAIN AND REGULATION ON CRYPTOCURRENCY TRANSACTIONS THROUGH FINANCIAL LITERACY IN SOUTH SULAWESI

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**Abstract**

This study aims to analyze the influence of Teacher Certification and Transformational Leadership on Teacher Performance with Work Motivation as a mediating variable in Private Elementary School Teachers (MIS) in Serang Regency. The study used a quantitative approach involving 294 respondents. Data analysis was conducted using Structural Equation Modeling based on Partial Least Squares (SEM-PLS) with the help of SmartPLS 4. Tests were conducted on the direct influence of Teacher Certification and Transformational Leadership on Teacher Performance, the influence of both on Work Motivation, the influence of Work Motivation on Teacher Performance, and the indirect influence through Work Motivation. The results of the analysis show that Teacher Certification has a positive and significant effect on Teacher Performance with a path coefficient of 0.263, while Transformational Leadership has a positive and significant effect with a coefficient of 0.321. Teacher Certification has a positive and significant effect on Work Motivation of 0.347, while Transformational Leadership has an effect of 0.456. Work Motivation has a positive and significant effect on Teacher Performance of 0.384. Work motivation was also shown to mediate the effect of teacher certification on teacher performance by 0.133 and transformational leadership on teacher performance by 0.175. Thus, improved teacher performance is supported by certification, transformational leadership, and work motivation.
**Keywords:** Teacher Certification, Transformational Leadership, Work Motivation, Teacher Performance.

## INTRODUCTION

Management is the process of planning, organizing, directing, and controlling various resources to achieve organizational goals effectively and efficiently. In the era of digital transformation, management practices have undergone significant changes through the use of information technology, including in the management of financial systems and digital transactions. One rapidly developing innovation is blockchain technology, which has become the main foundation of the cryptocurrency ecosystem. This technology enables transparent, secure, and decentralized transactions, making it increasingly used as an alternative for digital transactions and investments (Gunawan et al., 2024).

Cryptocurrency transactions in Indonesia are showing dynamic development. According to data from the Commodity Futures Trading Regulatory Agency (BAPPEBTI), crypto asset transaction values experienced significant fluctuations during the 2020-2024 period, but still show significant growth potential. This situation demonstrates that public interest in digital assets remains high, despite being influenced by various economic, technological, and regulatory factors.

South Sulawesi was chosen as the research location because it is one of the centers of economic growth in Eastern Indonesia, with a steadily increasing adoption of digital technology. People, especially the younger generation, are beginning to utilize various digital financial services, including crypto asset investments. However, public understanding of blockchain technology, regulations, and the risks of cryptocurrency transactions remains diverse, potentially influencing transaction decisions.

People's decisions regarding cryptocurrency transactions are thought to be influenced by several key factors, namely blockchain technology, regulation, and financial literacy. Blockchain guarantees transaction security and transparency, while regulation plays a role in creating legal certainty and investor protection. Furthermore, financial literacy is a crucial skill that helps individuals understand the risks, benefits, and mechanisms of digital asset investments, enabling them to make rational decisions (Munandar et al., 2025; Fahira et al., 2024).

A preliminary survey based on BAPPEBTI and OJK data shows that while public interest in crypto assets continues to grow, national financial literacy remains suboptimal, leading many investors to make transactions based on market trends and social media information without fully understanding investment risks. The fear of missing out (FOMO), high price volatility, and regulatory changes also influence people's transaction behavior.

This phenomenon indicates several issues, including the diverse public understanding of blockchain technology, suboptimal understanding of crypto asset regulations, low financial literacy among some investors, and limited research integrating the influence of blockchain and regulations on cryptocurrency transactions through financial literacy as a mediating variable in South Sulawesi. Therefore, this study is crucial to provide empirical evidence regarding the influence of blockchain and regulations on cryptocurrency transactions through financial literacy in South Sulawesi, thus contributing to the development of digital finance policies and literature.

Studies show that cryptocurrency transactions are influenced by a combination of technological, regulatory, and financial literacy factors. Gunawan et al. (2024) explain that blockchain adoption increases user confidence in transaction security, while Fahira et al. (2024) emphasize the importance of regulation in creating legal certainty for investors. Jones et al. (2024) found a positive relationship between crypto literacy and financial literacy, while Rijanto and Utami (2024) demonstrated that financial literacy strengthens the quality of crypto asset investment decisions. Furthermore, AlQudah and Bariviera (2025) revealed that the integration of technological and regulatory aspects remains a research gap that requires further development.

Based on various studies, several gaps remain that require further study. Most studies only partially examine the influence of blockchain, regulation, or financial literacy on investment decisions and cryptocurrency transactions. Research integrating these three variables into a single empirical model is still relatively limited, particularly those that utilize financial literacy as a mediating variable. Furthermore, studies focusing on the South Sulawesi community are still very limited, resulting in a lack of comprehensive regional characteristics in crypto asset transaction behavior (Gunawan et al., 2024; Fahira et al., 2024; Jones et al., 2024; Weidener & Lukács, 2025; Hayashi & Routh, 2025).

The novelty of this research lies in the development of a model that integrates the influence of blockchain and regulation on cryptocurrency transactions through financial literacy as a mediating variable in the context of South Sulawesi society. This approach provides a more comprehensive perspective than previous research, which tends to examine direct relationships between variables. In addition to generating empirical evidence in Eastern Indonesia, this research is expected to contribute to the development of digital finance theory and provide input for regulators in formulating policies that can improve transaction security and public financial literacy.

## LITERATURE REVIEW

### Blockchain

Blockchain explains that distributed ledger technology enables decentralized, transparent, secure, and difficult-to-manipulate transaction recording. These characteristics increase user trust in digital transaction systems because each transaction is verified by the network without the need for a third party. In the context of cryptocurrency, the quality of blockchain technology is a factor influencing individual interest and decisions in conducting digital asset transactions. Therefore, the better the perception of blockchain security and transparency, the higher the likelihood of someone conducting cryptocurrency transactions (Gunawan et al., 2024; Weidener & Lukács, 2025).

### Regulation

Regulation explains that the existence of legal rules serves to create certainty, protection, and trust in economic activity. In cryptocurrency transactions, regulation is a crucial instrument for reducing the risk of fraud, misuse of digital assets, and legal uncertainty. Clear regulations can increase investor confidence in transactions, while suboptimal regulations can raise doubts in investment decision-making. Therefore, the effectiveness of regulations plays a role in shaping public transaction behavior regarding crypto assets (AlQudah & Bariviera, 2025; Hambali et al., 2025).

### Financial Literacy

Financial literacy states that an individual's ability to understand financial concepts, risks, returns, and investment management will influence the quality of financial decisions. In cryptocurrency investing, financial literacy helps investors evaluate the risks of price volatility and avoid decisions based on speculation or short-term trends. Individuals with high levels of financial literacy tend to be more rational in choosing investment instruments, so financial literacy can serve as a mechanism that strengthens the relationship between technology, regulation, and cryptocurrency transaction decisions (Jones et al., 2024; Balutel et al., 2024).

### Investment Decisions

Investment decisions explain that an individual's decision to invest is influenced by available information, perceived risk, and level of trust in the market. In cryptocurrency transactions, investment decisions are influenced not only by potential profits but also by the security of blockchain technology, regulatory certainty, and the investor's ability to understand the characteristics of digital assets. The combination of these three factors determines investor behavior in conducting rational and sustainable transactions in the crypto asset market (Jones et al., 2024; Norton, 2024).

**Framework of thinking**

**Blockchain Technology Impacts Cryptocurrency Transactions**

Blockchain technology provides security, transparency, efficiency, and decentralization in every digital asset transaction, thereby increasing public trust in cryptocurrency transactions. According to the Technology Acceptance Model (TAM), perceptions of the technology's benefits and ease of use will drive user acceptance. The better the quality of blockchain technology perceived by the public, the higher the likelihood of conducting cryptocurrency transactions. This relationship is supported by research by Gunawan et al. (2024) and Munandar et al. (2025).

$H_1$ : It is suspected that blockchain technology has a positive and significant impact on cryptocurrency transactions.

**Regulations Affect Cryptocurrency Transactions**

Clear regulations provide legal certainty, investor protection, and increase the legitimacy of cryptocurrency use. According to the Grand Theory of Financial Management, regulatory certainty can reduce investment risks, thereby increasing public confidence in transactions. With effective regulatory oversight, the public is more confident in conducting crypto asset transactions. This relationship is reinforced by research by Fahira et al. (2024) and Kim and Lee (2023), which shows that regulations increase investor confidence in cryptocurrency.

$H_2$ : It is suspected that regulations have a positive and significant impact on cryptocurrency transactions.

**Blockchain Technology Impacts Financial Literacy**

The development of blockchain technology is encouraging people to understand the concept of digital finance, transaction security, and crypto asset investment mechanisms. The greater the understanding of this technology, the greater the need for individuals to improve their knowledge and skills in managing digital finance. Thus, blockchain is becoming not only a transaction technology but also a medium for learning about digital finance. This relationship is supported by the OECD/INFE (2023) and research by An et al. (2023).

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$H_3$ : It is suspected that blockchain technology has a positive and significant impact on people's financial literacy.

**Regulations Affect Financial Literacy**

Regulation serves as an educational instrument, providing information on the legality, benefits, risks, and protection of digital asset investments. The better the policies and regulatory dissemination implemented, the greater the public's understanding of digital financial products. Therefore, regulation is expected to improve public financial literacy in understanding cryptocurrency transactions. This relationship is supported by the OECD/INFE (2023) and the OJK's SNLIK (2024).

$H_4$: It is suspected that regulations have a positive and significant influence on literacy public finances

**Financial Literacy Affects Cryptocurrency Transactions**

Financial literacy reflects an individual's ability to understand financial information, manage risk, and make rational investment decisions. Individuals with high financial literacy are better able to assess the benefits and risks of cryptocurrency investments, resulting in more informed transaction decisions. The higher a person's financial literacy, the greater their tendency to conduct rational transactions. This relationship is supported by research by Abdul Khalik et al. (2024) and Setianingrum et al. (2026).

$H_5$ : Allegedly **Financial literacy has a positive and significant impact on**cryptocurrency transactions

**Financial Literacy Mediates the Influence of Blockchain Technology on Cryptocurrency Transactions**

The influence of blockchain technology on cryptocurrency transactions is expected to be even stronger if the public possesses good financial literacy. Blockchain provides a secure and transparent transaction system, but these benefits can only be maximized if users understand the characteristics, opportunities, and risks of digital assets. Therefore, financial literacy acts as a mechanism that bridges the influence of blockchain on transaction decisions. This relationship is supported by Gunawan et al. (2024) and Abdul Khalik et al. (2024).

$H_6$ : It is suspected that Financial Literacy mediates the influence of Blockchain Technology on Cryptocurrency Transactions.

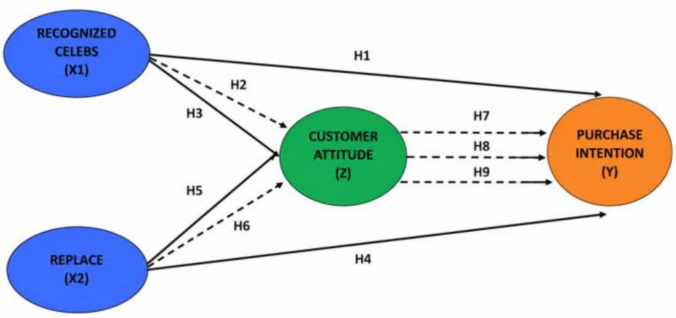


Figure 1. Research Conceptual Framework

**Financial Literacy Mediates the Influence of Regulation on Cryptocurrency Transactions**

Clear regulations will be more effective in increasing cryptocurrency transactions if the public has an adequate level of financial literacy. Individuals who understand the substance of regulations will be better able to assess legal protection, risks, and investment benefits, thus increasing confidence in conducting crypto asset transactions. Thus, financial literacy strengthens the influence of regulations on cryptocurrency transaction decisions. This relationship is supported by Abdul Khalik et al. (2024) and Fahira et al. (2024).

$H_7$ : AllegedlyFinancial Literacy Mediates the Influence of Regulation on Cryptocurrency Transactions

**METHOD**

Research methods are scientific steps used to systematically obtain data to answer research questions and test hypotheses. This study employed a quantitative approach to analyze the causal relationship between blockchain technology, regulation, financial literacy, and cryptocurrency transactions. This approach allows for objective measurement of variables through statistical analysis, thus enhancing the validity, reliability, and generalizability of the research results (Creswell & Creswell, 2023; Hair et al., 2023).

**Research Design**

This study employed an explanatory research design with a quantitative approach. This design aimed to examine the influence of blockchain technology and regulations on cryptocurrency transactions through financial literacy as a mediating variable. Data collection was conducted using a structured questionnaire with a five-point Likert scale. Furthermore, the data were statistically analyzed using a Partial Least Squares-based Structural Equation Modeling (PLS-SEM) approach to test the relationships between variables according to the research hypothesis (Creswell & Creswell, 2023; Hair et al., 2023).

### Time and Place of Research

This research was conducted from January to April 2026 in South Sulawesi Province. The location was selected based on the growing use of digital financial technology and increasing public interest in crypto asset investment. The study respondents were individuals who had previously engaged in cryptocurrency transactions. Data collection was conducted both in person and through online questionnaires to obtain a more diverse sample of respondents, consistent with the research characteristics (Jones et al., 2024; Rijanto & Utami, 2024).

### Population and Sample

The study population comprised all residents in South Sulawesi Province who had ever conducted cryptocurrency transactions. Because the exact population size was unknown, the sampling technique used purposive sampling, with the criteria being respondents aged at least 17 years, knowledgeable about crypto assets, and having conducted transactions. The sample size was determined based on the recommendations of Hair et al. (2023) to meet the requirements of PLS-SEM analysis and produce accurate model estimates.

### Data Collection Techniques

The research data consisted of primary and secondary data. Primary data were obtained by distributing questionnaires to respondents using a five-point Likert scale, ranging from strongly disagree to strongly agree. The research instrument was designed based on indicators of blockchain technology, regulation, financial literacy, and cryptocurrency transactions. Before use, the instrument was tested for validity and reliability. Secondary data were obtained from publications from the Financial Services Authority (OJK), Statistics Indonesia (BPS), and BAPPEBTI (Indonesian Commodity Futures Trading Regulatory Agency), as well as scientific articles related to the development of crypto assets and financial literacy in Indonesia to support the analysis of the research results (Jones et al., 2024; Danurwenda & Suhartini, 2024).

### Data analysis

Data analysis was performed using SmartPLS 4 in two stages: outer model evaluation and inner model evaluation. The outer model evaluation included testing convergent validity, discriminant validity, and construct reliability using loading factor values, AVE, Composite Reliability, and Cronbach's Alpha. Furthermore, the inner model was evaluated using R-Square, Effect Size ($f^2$), Predictive Relevance ($Q^2$), and Bootstrapping to test the hypothesis. The mediating effect of financial literacy was analyzed using the indirect effect test with a significance level of p-value $<0.05$, thus being able to explain the direct and indirect effects between research variables (Hair et al., 2023; Sarstedt et al., 2023).

## RESEARCH RESULTS AND DISCUSSION

### Research result

The results of this study present analytical findings on the relationship between Teacher Certification, Transformational Leadership, Work Motivation, and Teacher Performance at Private Elementary Madrasahs in Serang Regency. The analysis was conducted on 294 respondents using SEM-PLS through SmartPLS 4. The presentation of the results includes data characteristics, evaluation of the measurement model, validity, reliability, and testing of direct and indirect relationships between variables.

### Data Overview

The research data was obtained from 294 teachers at private Islamic elementary schools in Serang Regency. Each construct was measured using 10 indicators on a five-level Likert scale. Descriptively, all variables showed a tendency towards good or high ratings. Teacher Certification obtained an average score of 41.89, Transformational Leadership 42.36, Work Motivation 42.81, and Teacher Performance 41.82. This condition indicates that respondents gave relatively positive assessments of all analyzed constructs. The descriptive data also showed a relatively controlled distribution of scores, making them suitable for use in the next stage of model evaluation.

Table 1. Descriptive Statistics of Research Variables

| Variables | N | Minimum | Maximum | Mean | Median | Modus | SD |
|---|---|---|---|---|---|---|---|
| Teacher Certification ($X_1$) | 294 | 28 | 50 | 41,89 | 42 | 43 | 4,72 |
| Transformational Leadership ($X_2$) | 294 | 29 | 50 | 42,36 | 43 | 43 | 4,05 |
| Work Motivation (Z) | 294 | 30 | 50 | 42,81 | 43 | 44 | 3,89 |
| Teacher Performance (Y) | 294 | 28 | 50 | 41,82 | 42 | 43 | 4,18 |

Source: Primary data processed by researchers, 2026.

Based on Table 1, Work Motivation has the highest average value of 42.81, while Teacher Performance has an average of 41.82. These values indicate that teachers generally have high work motivation and performance. Transformational Leadership also obtained an average of 42.36, indicating a positive perception of the madrasah principal's ability to provide inspiration, support, and direction. Teacher Certification had an average of 41.89, so it is generally perceived to have made a positive contribution to teacher professionalism. The relatively small standard deviation compared to the average value indicates that the variation in respondents' answers is relatively controlled.

### Convergent Validity Test

Convergent validity testing was conducted by examining the outer loading value. The criterion used was an outer loading value greater than 0.70. All indicators in the model had values above this limit. The lowest value was 0.812 and the highest was 0.883, so no indicators needed to be eliminated.

Table 2. Results of Convergent Validity Test of All Variables

| Variables | Indicator | Outer Loading Range | Information |
|---|---|---|---|

| | | | |
|---|---|---|---|
| Teacher Certification ($X_1$) | X1.1-X1.10 | 0,812-0,864 | Valid |
| Transformational Leadership ($X_2$) | X2.1-X2.10 | 0,826-0,874 | Valid |
| Work Motivation (Z) | Z1-Z10 | 0,824-0,879 | Valid |
| Teacher Performance (Y) | Y1-Y10 | 0,829-0,883 | Valid |

Source: SmartPLS 4 output, processed by researchers (2026).

Based on Table 2, all indicators have outer loading values above 0.70. For Teacher Certification, the outer loading values range from 0.812 to 0.864; for Transformational Leadership 0.826 to 0.874; for Work Motivation 0.824 to 0.879; and for Teacher Performance 0.829 to 0.883. The highest values are found in indicators Z5 and Y5, while all indicators remain in the valid category. These results indicate that each indicator is able to represent the construct it measures well. Thus, all 40 indicators can be retained in the measurement model and used for further analysis.

**Discriminant Validity Test**

Discriminant validity is used to ensure that different constructs truly have distinct measurement characteristics. Evaluation within the reference is performed using the Average Variance Extracted (AVE) value, with a limit greater than 0.50.

Table 3. Results of Discriminant Validity Test

| Variables | AVE | Information |
|---|---|---|
| Teacher Certification ($X_1$) | 0,709 | Fulfil |
| Transformational Leadership ($X_2$) | 0,726 | Fulfil |
| Work Motivation (Z) | 0,734 | Fulfil |
| Teacher Performance (Y) | 0,741 | Fulfil |

Source: SmartPLS 4 output, processed by researchers (2026).

Based on Table 3, all constructs have AVE values above 0.50. The AVE value for Teacher Certification is 0.709, Transformational Leadership is 0.726, Work Motivation is 0.734, and Teacher Performance is 0.741. These values indicate that each construct is able to explain more than half of the variance in its indicators. Thus, the constructs in the model have adequate discrimination ability and can be distinguished from one another. These results also strengthen the feasibility of the measurement model before testing the structural relationships between variables.

**Construct Reliability Test**

Construct reliability was evaluated using Cronbach's Alpha and Composite Reliability. Test results showed that all values were well above the minimum required limit, indicating that all constructs had good internal consistency.

Table 4. Results of Construct Reliability Test

| Variables | Cronbach's Alpha | Composite Reliability | Information |
|---|---|---|---|
| Teacher Certification ($X_1$) | 0,911 | 0,927 | Reliable |
| Transformational Leadership ($X_2$) | 0,946 | 0,954 | Reliable |
| Work Motivation (Z) | 0,918 | 0,933 | Reliable |
| Teacher Performance (Y) | 0,923 | 0,937 | Reliable |

Source: SmartPLS 4 output, processed by researchers (2026).

Table 4 shows that all Cronbach's Alpha values are greater than 0.70, and all Composite Reliability values are also at a high level. Transformational Leadership has the highest reliability value, with a Cronbach's Alpha of 0.946 and a Composite Reliability of 0.954. Meanwhile, Teacher Certification has a Cronbach's Alpha value of 0.911 and a Composite Reliability of 0.927. These results indicate that the instrument has strong internal consistency. Therefore, all constructs are declared reliable and suitable for use in testing the structural model.

**Direct Connection Testing**

Direct relationship testing is carried out through the bootstrapping procedure in SmartPLS 4. The hypothesis is declared significant if the T Statistics value is greater than 1.96 and the P Values are less than 0.05.

Table 5. Results of Direct Relationship Testing

| Hypothesis | Connection | Path Coefficient | T Statistics | P Values | Results |
|---|---|---|---|---|---|
| H1 | $X_1 \rightarrow Y$ | 0,263 | 3,845 | 0,000 | Accepted |
| H2 | $X_2 \rightarrow Y$ | 0,321 | 4,962 | 0,000 | Accepted |
| H3 | $X_1 \rightarrow Z$ | 0,347 | 5,684 | 0,000 | Accepted |
| H4 | $X_2 \rightarrow Z$ | 0,456 | 7,238 | 0,000 | Accepted |
| H5 | $Z \rightarrow Y$ | 0,384 | 6,176 | 0,000 | Accepted |

Source: SmartPLS 4 output, processed by researchers (2026).

Based on Table 5, all direct relationships are positive and significant. The largest influence is found in Transformational Leadership on Work Motivation with a coefficient of 0.456 and T Statistics of 7.238. Furthermore, Work Motivation on Teacher Performance has a coefficient of 0.384. Transformational Leadership on Teacher Performance is 0.321, Teacher Certification on Work Motivation is 0.347, and Teacher Certification on Teacher Performance is 0.263. All P Values are 0.000 indicating that all five hypotheses are directly accepted.

**Indirect Influence**

An indirect effect test was conducted to determine the role of Work Motivation as a mediating variable. The test results showed that both mediation pathways had T-statistics values greater than 1.96 and P-values less than 0.05.

Table 6. Results of Indirect Effect Testing

| Hypothesis | Mediation Path | Indirect Effect | T Statistics | P Values | Results |
|---|---|---|---|---|---|
| H6 | $X_1 \rightarrow Z \rightarrow Y$ | 0,133 | 3,584 | 0,000 | Accepted |
| H7 | $X_2 \rightarrow Z \rightarrow Y$ | 0,175 | 4,827 | 0,000 | Accepted |

Source: SmartPLS 4 output, processed by researchers (2026).

Table 6 shows that Work Motivation is proven to mediate the influence of Teacher Certification and Transformational Leadership on Teacher Performance. The indirect effect of Teacher

Certification through Work Motivation is 0.133 with T Statistics 3.584. Meanwhile, the indirect effect of Transformational Leadership through Work Motivation is 0.175 with T Statistics 4.827. Both paths have a probability value of 0.000. These results indicate that Work Motivation is an important mechanism that continues the influence of both exogenous variables on Teacher Performance.

**Hypothesis Testing**

Table 7. Decision of Seven Hypotheses

| Hypothesis | Statement | Results |
|---|---|---|
| H1 | Teacher Certification → Teacher Performance | Accepted |
| H2 | Transformational Leadership → Teacher Performance | Accepted |
| H3 | Teacher Certification → Work Motivation | Accepted |
| H4 | Transformational Leadership → Work Motivation | Accepted |
| H5 | Work Motivation → Teacher Performance | Accepted |
| H6 | Teacher Certification → Work Motivation → Teacher Performance | Accepted |
| H7 | Transformational Leadership → Work Motivation → Teacher Performance | Accepted |

Source: SmartPLS 4 data processing results, 2026.

Table 7 shows that all seven hypotheses were accepted. Five direct relationship hypotheses proved significant, as did two mediation hypotheses. These findings demonstrate a consistent relationship pattern: Teacher Certification and Transformational Leadership contribute to increased Work Motivation, while Work Motivation, in turn, contributes to Teacher Performance. At the same time, Teacher Certification and Transformational Leadership also have a direct influence on Teacher Performance. This pattern indicates that performance improvement occurs through both direct and motivational mechanisms.

**Model Results**

Table 8. Magnitude of Influence in the Model

| Track | Coefficient | T Statistics | Significance |
|---|---|---|---|
| Teacher Certification → Teacher Performance | 0,263 | 3,845 | Significant |
| Transformational Leadership → Teacher Performance | 0,321 | 4,962 | Significant |
| Teacher Certification → Work Motivation | 0,347 | 5,684 | Significant |
| Transformational Leadership → Work Motivation | 0,456 | 7,238 | Significant |
| Work Motivation → Teacher Performance | 0,384 | 6,176 | Significant |
| Teacher Certification → Work Motivation → Teacher Performance | 0,133 | 3,584 | Significant |
| Transformational Leadership → Work Motivation → Teacher Performance | 0,175 | 4,827 | Significant |

Source: SmartPLS 4 output, processed by researchers (2026).

Table 8 shows that the Transformational Leadership pathway to Work Motivation has the largest coefficient, at 0.456. This finding demonstrates the strategic position of madrasah principal leadership in building teacher motivation. Meanwhile, the influence of Work Motivation on Teacher Performance of 0.384 indicates that motivation is a crucial factor in driving the quality of teacher task implementation. In the mediation pathway, the influence of Transformational Leadership through Work Motivation, at 0.175, is greater than the influence of Teacher Certification through Work Motivation, at 0.133.

**Discussion**

The following discussion interprets seven hypotheses based on the SEM-PLS test results and relates them to theory and previous findings. Each hypothesis is discussed based on the direction and magnitude of the coefficient, the level of significance, and the significance of the relationship between the variables. The results show that all hypotheses are accepted, both the direct relationship and the indirect relationship through Work Motivation as a mediating variable.

1. The Impact of Teacher Certification on Teacher Performance

   The test results show that Teacher Certification has a positive and significant effect on Teacher Performance with a coefficient of 0.263 and a T-Statistics of 3.845. This means that the better the certification and professionalism of teachers, the better their performance will be. Certification provides recognition of professional competence while encouraging teachers to carry out their duties in a more focused manner. This finding aligns with UNESCO (2023) which places professional development as a crucial instrument for improving teacher quality. The World Bank (2024) also emphasized that professional development programs accompanied by ongoing coaching can strengthen the quality of learning. These results reinforce previous findings that improved teacher professionalism is associated with improved quality of educational task implementation.

2. The Influence of Transformational Leadership on Teacher Performance

   Transformational Leadership has been shown to have a positive and significant effect on Teacher Performance with a coefficient of 0.321 and T Statistics of 4.962. These results indicate that a madrasah principal who is able to provide inspiration, intellectual stimulation, individual attention, and encouragement to teachers can create conditions that support improved performance. Leadership not only functions as a directive mechanism but also builds teacher confidence and involvement in carrying out tasks. This finding is in line with Solihun and Wiyani (2025) and Andarin, Hariri, Sari, and Handoko (2025). These results are also consistent with Mu'imamah and Setiadi (2026) and Sianipar and Putri (2024), which show a significant relationship between transformational leadership and improved teacher performance.

3. The Influence of Teacher Certification on Work Motivation

   Teacher certification has a positive and significant effect on work motivation, with a coefficient of 0.347 and a T-statistic of 5.684. These findings indicate that professional recognition obtained through certification can increase teachers' confidence in their competence and encourage enthusiasm for carrying out their duties. From the perspective of Self-Determination Theory, recognition of competence is one factor that can strengthen an individual's internal drive. Gagné (2022) also explains that motivation can develop when individuals receive professional recognition and opportunities to develop competence. Thus, certification is not only related to professional status but can also create a psychological drive to improve the quality of work.

4. The Influence of Transformational Leadership on Work Motivation

Transformational Leadership has a positive and significant influence on Work Motivation with the largest coefficient in the direct relationship, namely 0.456, with T Statistics 7.238. This finding indicates that the behavior of the madrasah principal plays an important role in building teacher enthusiasm and engagement. When the madrasah principal provides a clear vision, appreciation, open communication, empowerment, and individual attention, teachers are more motivated to carry out their duties with enthusiasm. This finding is consistent with Rahmalita et al. (2025), Firmansyah, Dermawan, and Yusuf (2026), Warsita, Maliki, and Komarudin (2026), and Dewiyani and Arnyana (2026), who found a positive influence of transformational leadership on teacher work motivation.

5. The Influence of Work Motivation on Teacher Performance

Work motivation has been shown to have a positive and significant effect on teacher performance, with a coefficient of 0.384 and a T-statistic of 6.176. These results indicate that teachers with high work drive tend to be more active, responsible, creative, and consistent in carrying out their professional duties. Motivation provides psychological energy that drives teachers not only to fulfill formal obligations but also to strive to produce better learning. Gagné (2022) explains that intrinsic motivation is related to commitment, creativity, and better productivity. This finding is also in line with the OECD (2024), which places teacher motivation as a crucial factor in the successful implementation of education policies and improving the quality of learning.

6. The Influence of Teacher Certification on Teacher Performance through Work Motivation

The test results show that Work Motivation mediates the influence of Teacher Certification on Teacher Performance with an indirect effect of 0.133 and a T Statistics of 3.584. This means that the benefits of certification on performance arise not only through direct improvements in professionalism, but also through increased teacher motivation. Certification can strengthen perceptions of competence, self-confidence, and professional appreciation, which then encourage teachers to work more optimally. This finding supports the World Bank's (2024) view that professional development policies will provide better results if they are able to increase work motivation continuously. Thus, motivation becomes a psychological mechanism that transmits some of the benefits of certification to teacher performance.

7. The Influence of Transformational Leadership on Teacher Performance through Work Motivation

Transformational Leadership has been shown to have an indirect effect on Teacher Performance through Work Motivation with a coefficient of 0.175 and T Statistics of 4.827. This value is greater than the indirect effect of Teacher Certification through Work Motivation of 0.133. This indicates that transformational leadership has a strong ability to build motivation which then translates into improved performance. These findings are consistent with Sarinah et al. (2024), Ompusunggu et al. (2025), and a number of studies in 2026 which show that transformational leadership can improve performance through psychological mechanisms such as motivation, job satisfaction, and organizational commitment. Thus, motivation is an important pathway that explains how madrasah principal leadership results in better teacher performance.

## CONCLUSION

Based on the results of the analysis and discussion regarding the influence of Teacher Certification and Transformational Leadership on Teacher Performance through Work Motivation at Private Elementary Madrasahs in Serang Regency, it can be concluded that all proposed hypotheses are proven to be accepted. Teacher Certification has a positive and significant effect on Teacher Performance, which shows that the better the teacher's professionalism through certification, the better the performance in carrying out educational tasks. Transformational Leadership also has a positive and significant effect on Teacher Performance, so that the ability of the madrasah principal to provide inspiration, motivation, intellectual stimulation, and individual attention plays a role in improving teacher performance.

Teacher certification has a positive and significant effect on work motivation. Transformational leadership has also been shown to have a positive and significant effect on work motivation, even having the largest direct correlation coefficient in the model. Work motivation has a positive and significant effect on teacher performance, indicating that high work motivation can improve teachers' commitment and quality of task performance.

The results of the mediation test indicate that work motivation mediates the influence of teacher certification and transformational leadership on teacher performance. Thus, teacher performance improvement can occur through direct influence or through increased work motivation. Overall, the model indicates that teacher professionalism, transformational leadership, and work motivation are important elements in supporting teacher performance improvement.

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