



# Exploring how blockchain transparency and bullion business synergy foster trust in Islamic gold tokenization among digitally literate urban Muslims in Indonesia

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Received Date: February 10, 2026

Revised Date: May 19, 2026

Accepted Date: July 9, 2026

## ABSTRACT

**Background:** Background: The rapid development of blockchain technology has encouraged the emergence of Islamic gold tokenization as an innovative Sharia-compliant digital financial instrument. However, public trust in blockchain-based Islamic financial products remains a critical challenge, particularly among urban Muslim investors in emerging markets such as Indonesia. **Methods:** This study investigates the effects of blockchain transparency and bullion business synergy on trust in Islamic gold tokenization, with digital literacy acting as a moderating variable. The research adopts a quantitative explanatory design grounded in the Technology Acceptance Model (TAM) and Trust-Based Adoption Theory. Data were collected through online surveys from 376 urban Muslim respondents in Indonesia and analyzed using Partial Least Squares Structural Equation Modeling (PLS-SEM). **Findings:** The results demonstrate that blockchain transparency, bullion business legitimacy, and digital literacy each have positive and significant effects on trust in Islamic gold tokenization. In addition, digital literacy significantly strengthens the relationships between blockchain transparency and trust, as well as between bullion business legitimacy and trust. These findings indicate that digitally literate investors tend to place greater trust in blockchain-based Islamic financial products supported by tangible gold assets. **Conclusion:** The study concludes that trust in Islamic gold tokenization is shaped not only by technological transparency and asset-backed legitimacy but also by the level of users' digital literacy. Strengthening digital literacy can therefore enhance public confidence in Sharia-compliant fintech ecosystems. **Novelty/Originality of this article:** This study contributes to the Islamic fintech literature by empirically examining digital literacy as a moderating variable in the relationship between blockchain transparency, bullion business legitimacy, and trust in Islamic gold tokenization. The study also provides a contextual contribution by focusing on urban Muslim investors in Indonesia and the integration of blockchain transparency with bullion-backed Islamic digital finance.

**KEYWORDS:** blockchain; bullion business; Islamic gold tokenization.

## 1. Introduction

The rapid digital transformation in global finance has introduced innovative mechanisms to enhance transparency, efficiency, and accessibility in asset management. One of the most promising developments is blockchain technology, which offers immutable, transparent, and decentralized record-keeping systems that reshape the way trust is

### Cite This Article:

Sumar'in, & Basri, M. (2026). Exploring how blockchain transparency and bullion business synergy foster trust in Islamic gold tokenization among digitally literate urban Muslims in Indonesia. *Economic Military and Geographically Business Review*, 4(1), 37–52. <https://doi.org/10.61511/emagrap.v4i1.2026.3362>

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established between financial institutions and customers (Mohemed et al., 2017; Wang et al., 2025). Within the Islamic financial framework, which emphasizes ethical transactions and asset-backed value creation, blockchain applications present an opportunity to reinforce Sharia principles of justice, transparency, and risk-sharing (Khaliq, 2025). Consequently, the integration of blockchain in Islamic finance is seen not only as a technological innovation but also as a moral alignment with Islamic ethical values.

In parallel, the bullion business representing tangible, asset-backed value through gold trading remains central to Islamic financial systems (Hassan et al., 2022). Gold has historically been considered a stable and Sharia-compliant asset that safeguards wealth against uncertainty and inflation (Maghyreh et al., 2018; Zakir et al., 2023). The synergy between blockchain technology and bullion-based finance has given rise to gold tokenization, a process that converts physical gold into digital tokens while maintaining full backing by real bullion reserves. This approach allows Islamic investors to engage in secure, transparent, and asset-backed investments that align with religious and ethical considerations (Khaliq, 2025).

However, while the technological and economic potential of Islamic gold tokenization is considerable, trust remains a critical determinant of adoption particularly among urban Muslim communities, who represent a digitally connected yet religiously conscious demographic (Alsaghir, 2025; Baita & Lukito, 2024). The implementation of blockchain transparency and the integration of bullion business legitimacy are expected to foster consumer confidence (Vazquez Melendez et al., 2024). Yet, the degree to which individuals understand and evaluate such technologies shaped by their digital literacy may significantly influence this trust formation. As such, the moderating role of digital literacy becomes essential in bridging the technological and cultural dimensions of financial trust in Islamic contexts.

Existing literature has explored the role of transparency and trust in blockchain adoption (Boukis, 2020), as well as the significance of asset backing in Islamic finance (Iqbal & Mirakhor, 2017). Nonetheless, there remains a knowledge gap concerning how blockchain transparency and bullion business synergy jointly influence Muslim trust in tokenized gold products, especially within emerging economies such as Indonesia (Baita & Lukito, 2024; Mokodompis et al., 2024). Moreover, the intersection between digital literacy and Islamic financial ethics in shaping these trust dynamics has received limited empirical attention.

Indonesia, as the world's largest Muslim-majority nation, offers a dynamic environment for studying the intersection between Islamic finance, technological innovation, and public trust. With over 230 million Muslims and a rapidly growing digital economy, the country has become one of Southeast Asia's most active hubs for Islamic financial technology (Islamic FinTech). National initiatives, such as the Master Plan for Indonesian Sharia Economy/*Master Plan Ekonomi Syariah Indonesia* (MEKSI) and the National Islamic Financial Literacy Movement, reflect the government's commitment to integrating Sharia principles with digital transformation. These developments provide fertile ground for exploring how technology and faith converge in shaping financial behavior among Indonesian Muslims.

Within this ecosystem, Pegadaian GIDR, a subsidiary of the state-owned PT Pegadaian (Persero), has emerged as a leading case of Sharia-compliant gold tokenization. By integrating blockchain transparency with bullion business operations, Pegadaian bridges traditional gold-based investment with blockchain-enabled verification. This innovation allows Muslim investors to engage in digital gold investment without violating Islamic prohibitions on *riba* (interest) and *gharar* (uncertainty) (Risman et al., 2024; Zakir et al., 2023). As such, Pegadaian GIDR represents a distinctive institutional model where technological innovation operates within the moral and regulatory framework of Islamic finance.

Despite these advancements, trust remains a critical barrier to broader adoption of Islamic digital finance in Indonesia. Studies such as Hasan et al. (2026) and Saputra (2025) reveal that while urban Muslim millennials are receptive to Islamic FinTech,

skepticism persists regarding Sharia authenticity, technological reliability, and institutional credibility. Many potential users still question whether digital tokens are truly backed by physical gold or merely symbolic representations. This trust deficit highlights a theoretical and practical gap in understanding how technological transparency, business legitimacy, and user literacy collectively shape investor confidence.

Therefore, this study aims to examine how blockchain transparency and bullion business synergy influence trust in Islamic gold tokenization, and how digital literacy moderates these relationships among urban Muslim communities in Indonesia. By integrating Technology Acceptance Theory and Trust-Based Adoption Theory within the framework of Islamic finance, this research seeks to clarify how technological, behavioral, and ethical factors interact to foster trust in Sharia-compliant digital assets. Based on the identified research gaps, this study seeks to examine how blockchain transparency and bullion business legitimacy influence trust in Islamic gold tokenization among urban Muslim investors in Indonesia. In addition, this study investigates the moderating role of digital literacy in strengthening the relationship between technological transparency, bullion-backed legitimacy, and trust formation within Sharia-compliant fintech systems.

Accordingly, this study addresses several research questions. First, it examines whether blockchain transparency significantly influences trust in Islamic gold tokenization. Second, it investigates whether the legitimacy of the bullion business significantly affects trust in Islamic gold tokenization. Third, it explores the effect of digital literacy on trust in Islamic gold tokenization. Furthermore, the study analyzes whether digital literacy strengthens the relationship between blockchain transparency and trust, as well as whether digital literacy enhances the relationship between bullion business legitimacy and trust in Islamic gold tokenization.

To answer these research questions, this study develops a conceptual framework grounded in the Technology Acceptance Model (TAM) and Trust-Based Adoption Theory. The framework explains how technological transparency and the legitimacy of asset-backed bullion businesses contribute to the formation of trust in blockchain-based Islamic financial products. Based on this theoretical foundation and supported by prior empirical findings, the study proposes five hypotheses. It is hypothesized that blockchain transparency has a positive and significant effect on trust in Islamic gold tokenization (H1), while bullion business legitimacy also has a positive and significant effect on trust (H2). Furthermore, digital literacy is expected to positively and significantly influence trust in Islamic gold tokenization (H3). In addition, digital literacy is hypothesized to positively moderate the relationship between blockchain transparency and trust (H4), as well as the relationship between bullion business legitimacy and trust in Islamic gold tokenization (H5).

The novelty of this study lies in its multidimensional approach that combines technological transparency, behavioral competence, and religious values into a unified conceptual framework for Islamic FinTech. While previous research has treated these aspects separately, this study conceptualizes trust as an emergent construct shaped by the interplay between technology, ethics, and user capability. The findings are expected to contribute theoretically to the understanding of trust formation in Islamic financial technology and practically to the sustainable design of transparent, ethical, and inclusive Sharia-compliant digital finance ecosystems in Indonesia.

## 2. Methods

This study employed a quantitative explanatory research design to investigate the causal relationships among blockchain transparency, bullion business integration, digital literacy, and trust in Islamic gold tokenization among urban Muslim investors in Indonesia. The research approach was designed to test a conceptual framework grounded in the Technology Acceptance Model (TAM) and Trust-Based Adoption Theory, integrating Islamic financial principles that emphasize transparency, justice, and asset backing. The study adopted a cross-sectional survey method using structured questionnaires distributed

online through Islamic financial communities, fintech user groups, and Pegadaian GIDR's customer network.

Recent studies on blockchain-based Islamic finance have increasingly emphasized the importance of transparency, asset-backed legitimacy, and user technological capability in shaping trust toward digital financial systems (Han et al., 2024). In this context, blockchain transparency is considered a critical factor that reduces information asymmetry and enhances accountability within Sharia-compliant digital transactions (Faizi et al., 2025). Meanwhile, bullion business legitimacy strengthens investor confidence by ensuring that digital gold tokens are supported by tangible underlying assets in accordance with Islamic financial principles. In addition, digital literacy has emerged as an important cognitive factor influencing users' ability to understand, evaluate, and adopt fintech innovations responsibly.

To strengthen the theoretical clarity of this study, the Technology Acceptance Model (TAM) and Trust-Based Adoption Theory are explicitly integrated into a structured conceptual framework (Lippert & Davis, 2006; Nguyen et al., 2025). TAM explains how perceptions of transparency and technological reliability influence user acceptance, while Trust-Based Adoption Theory emphasizes the role of institutional credibility and perceived security in trust formation (Tajuddin & Jaiyeoba, 2026). Based on these theoretical foundations, this study proposes that blockchain transparency and bullion business legitimacy positively influence trust in Islamic gold tokenization, with digital literacy acting as a moderating variable that strengthens these relationships (Aman et al., 2026). Therefore, a conceptual framework figure is included to visually illustrate the relationships among constructs and their corresponding hypotheses.

The research was conducted in major Indonesian urban centers Jakarta, Pontianak, Banjarmasin, Surabaya, Bandung, and Medan representing regions with high adoption rates of digital financial services and significant Muslim populations. The population consisted of Muslim adults (aged 20–60) who are active users or potential adopters of Islamic digital investment platforms, particularly those familiar with gold or blockchain-based financial products. A purposive sampling technique was used to ensure that respondents met key criteria (1) being Muslim and residing in an urban area; (2) having at least basic experience in using digital financial services; (3) understanding or having awareness of Pegadaian's gold investment or digital tokenization services.

Table 1. Variables and their indicators

| Variables                              | Operational Definition                                                                                                                                                     | Indicators                                                                                                                   |
|----------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------|
| Blockchain Transparency ( $X_1$ )      | The degree to which blockchain systems provide visible, verifiable, and tamper-proof transaction records enhancing accountability in Islamic finance. (Laili et al., 2024) | Traceability of gold transactions; Perceived data integrity; Clarity of transaction history.                                 |
| Bullion Business Integration ( $X_2$ ) | The extent to which the digital tokenization system is supported by real, physical gold reserves and trusted gold trading mechanisms. (Nieto, 2025)                        | Trust in gold storage institutions; Perceived backing of physical gold; Transparency in gold auditing.                       |
| Digital Literacy (M)                   | The capability of users to understand, evaluate, and utilize blockchain-based digital platforms effectively. (Li & Chen, 2024)                                             | Ability to use fintech platforms; Understanding blockchain-based transactions; Confidence in using digital investment tools. |
| Trust in Islamic Gold Tokenization (Y) | The degree of confidence and perceived reliability that Muslim users have toward Sharia-compliant tokenized gold systems. (Jailani & Muneeza, 2023)                        | Perceived fairness and security; Confidence in compliance with Sharia; Willingness to invest.                                |

The research model in this study is developed based on several key variables that reflect the conceptual framework of Islamic financial technology and trust in gold tokenization. Each variable is defined theoretically and operationalized through

measurable indicators adapted from previous literature and adjusted to the context of Islamic economics. These variables consist of independent variables (Blockchain Transparency and Bullion Business Integration), a moderating variable (Digital Literacy), and a dependent variable (Trust in Islamic Gold Tokenization). The following section explains the definitions and measurement indicators used for each construct.

Primary data were obtained through self-administered online questionnaires distributed via Google Forms between 3<sup>th</sup> November and 24<sup>th</sup> December 2025. To ensure content validity, the instrument was reviewed by three experts in Islamic finance, digital economics, and blockchain systems. A pilot test involving 30 respondents was conducted to evaluate reliability and clarity before full deployment. A total of 376 respondents participated in this study. The sample size was determined based on the requirements of Partial Least Squares Structural Equation Modeling (PLS-SEM), which recommends a minimum number of cases greater than ten times the maximum number of structural paths directed at a particular construct. Therefore, 376 samples were deemed sufficient to achieve robust and reliable estimation results.

Ethical considerations were maintained by ensuring informed consent, voluntary participation, and anonymity of all respondents. This study was reviewed and approved by the Research Ethics Committee of Universitas Sultan Muhammad Syafiuddin Sambas, under Approval Number: 191/Kep-LP2M/11/2025, issued on November 6<sup>th</sup>, 2025. The ethical approval ensured that all research procedures adhered to national and international standards for research involving human participants. This research relies on primary data collected directly from respondents through an online survey. The tool used for data collection is an online questionnaire (Google Form). The questionnaire used a 5-point Likert scale, ranging from "Disagree" to "Strongly Agree". This scale, developed by Rensis Likert, is widely recognized in social research for its ease of interpretation and its ability to capture the nuances of attitudes more accurately.

Data analysis was conducted using a two-stage approach based on Partial Least Squares Structural Equation Modeling (PLS-SEM) with SmartPLS 4.0 software. The first stage involved evaluating the measurement model (outer model) by assessing construct reliability through Cronbach's alpha and Composite Reliability, convergent validity using the Average Variance Extracted (AVE) threshold of greater than 0.50, and discriminant validity based on the Fornell-Larcker criterion. The second stage focused on evaluating the structural model by examining the significance and direction of the hypothesized relationships through the bootstrapping procedure with 5,000 resamples. Additionally, demographic variables (age, Gender and education) were used as control variables to ensure robustness of the model. Hypotheses were evaluated at a 95% confidence level ( $p < 0.05$ ).

The chosen quantitative approach allows for precise measurement of trust and behavioral constructs within a large, heterogeneous Muslim urban population. The SEM-PLS technique is suitable due to its ability to handle complex models with latent variables and moderate sample sizes while focusing on prediction-oriented analysis. By incorporating both blockchain and bullion-related dimensions, this study provides a more holistic view of trust formation in Islamic financial technology a dimension still underexplored in existing literature.

### 3. Results and Discussion

#### 3.1 Demographic profile of the respondents

This data displays some characteristics of respondents in statistical form. The description of respondent data provides concise information about the respondents in this study. The demographic characteristics of the respondents reveal that the sample consisted of 376 participants, of which 56.65% were female and 43.35% were male, indicating a slightly higher representation of female respondents. In terms of age distribution, the majority were within the 31–40 age group (33.51%), followed by those aged 20–30

(31.64%), 41–50 (25.54%), and 51–60 (9.31%). Regarding educational attainment, nearly half of the respondents held a bachelor's degree (49.43%), while others possessed a diploma (20.47%), high school qualification (17.29%), master's degree (16.50%), and a small proportion held a doctorate (5.32%). These findings suggest that the respondent pool was predominantly composed of well-educated individuals in the early to mid-career age range, providing a balanced demographic representation for the study.

Table 2. Respondent data

| Criteria        | Description               | Frequency | Percent (%) |
|-----------------|---------------------------|-----------|-------------|
| Gender          | Male                      | 163       | 43.35 %     |
|                 | Female                    | 213       | 56.65 %     |
| Age             | 20-30 age                 | 119       | 31.64       |
|                 | 31-40 age                 | 126       | 33.51       |
|                 | 41-50 age                 | 96        | 25.54       |
|                 | 51-60 age                 | 35        | 9.31        |
|                 | 51-60 age                 | 35        | 9.31        |
| Education Level | High school or equivalent | 65        | 17.29       |
|                 | Diploma                   | 77        | 20.47       |
|                 | Bachelor (S1)             | 152       | 49.43       |
|                 | Master (S2)               | 62        | 16.50       |
|                 | Doctorate (S3)            | 20        | 5.32        |

### 3.2 Evaluation model

Construct validity and reliability were verified to ensure the robustness of the measurement model. Convergent validity was assessed through the Average Variance Extracted (AVE), with a threshold value above 0.50 indicating acceptable validity. Reliability was evaluated using Composite Reliability (CR) and Cronbach's Alpha, both of which should exceed 0.70 as recommended by Hair et al. (2019). The data were analyzed using the Structural Equation Modeling (SEM) approach based on the Partial Least Squares (PLS) technique. The structural model evaluation involved examining the R-square values of the endogenous constructs and conducting significance tests to determine the strength and significance of the hypothesized paths among exogenous, mediating, and endogenous variables. The model was deemed valid as all AVE values were greater than 0.50 and all CR values exceeded 0.70.

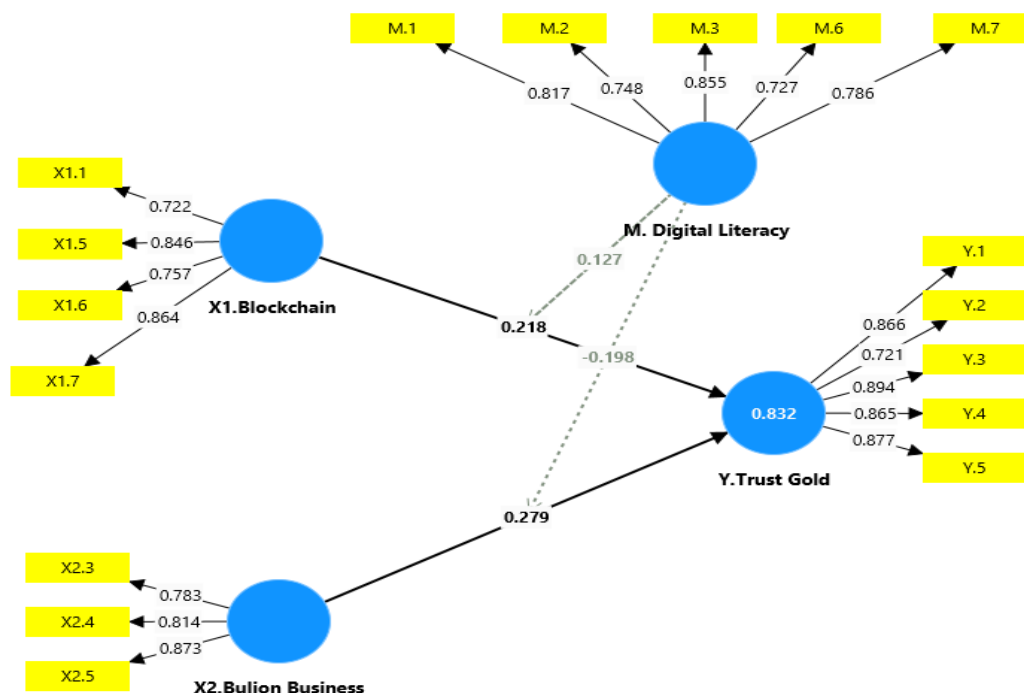


Fig. 1. Path diagram

Indicators associated with latent constructs through the  $\lambda$  (loading factor) parameter represent the strength of the relationship between each indicator and its corresponding latent construct, where higher  $\lambda$  values denote stronger representation. The  $\gamma$  parameter illustrates the structural relationships between exogenous (independent) and endogenous (dependent) latent constructs, indicating the extent to which the independent constructs influence the dependent ones. In contrast, the  $\beta$  parameter captures the interrelationships among endogenous latent constructs within the structural model. Figure 1 presents the path diagram that visualizes all hypothesized direct and indirect effect pathways examined in this study.

The SEM-PLS analysis conducted using SmartPLS 4.0 was employed to examine the complex relationships among latent variables by assessing the validity and reliability of the measurement model. The evaluation followed the recommended threshold criteria proposed by Hair et al. (2019) and supported by relevant literature. The results, as presented in the table below, include factor loadings, T-statistics, and p-values, where factor loadings exceeding 0.70 indicate satisfactory convergent validity. The evaluation of the structural model focused on determining the relationships among blockchain transparency, bullion business synergy, digital literacy, and trust in Islamic gold tokenization.

Table 3. Outer loading

|      | M. Digital Literacy | X1.Blockchain | X2.Bulion Business | Y.Trust Gold |
|------|---------------------|---------------|--------------------|--------------|
| M.1  | 0.817               |               |                    |              |
| M.2  | 0.748               |               |                    |              |
| M.3  | 0.855               |               |                    |              |
| M.6  | 0.727               |               |                    |              |
| M.7  | 0.786               |               |                    |              |
| X1.1 |                     | 0.722         |                    |              |
| X1.5 |                     | 0.846         |                    |              |
| X1.6 |                     | 0.757         |                    |              |
| X1.7 |                     | 0.864         |                    |              |
| X2.3 |                     |               | 0.783              |              |
| X2.4 |                     |               | 0.814              |              |
| X2.5 |                     |               | 0.873              |              |
| Y.1  |                     |               |                    | 0.866        |
| Y.2  |                     |               |                    | 0.721        |
| Y.3  |                     |               |                    | 0.894        |
| Y.4  |                     |               |                    | 0.865        |
| Y.5  |                     |               |                    | 0.877        |

The results of the factor loading analysis, as presented in the table, demonstrate that all indicator items for each construct exceeded the recommended threshold value of 0.70, indicating satisfactory convergent validity. For the Digital Literacy (M) construct, factor loadings ranged from 0.727 to 0.855, suggesting that all indicators effectively represented the construct. The Blockchain (X1) construct showed loadings between 0.722 and 0.864, confirming the strong contribution of each indicator. Similarly, the Bullion Business (X2) construct exhibited loadings from 0.783 to 0.873, demonstrating good internal consistency among the indicators. Finally, the Trust in Gold (Y) construct achieved the highest factor loadings, ranging from 0.721 to 0.894, indicating that all items were valid measures of the construct. Overall, these results confirm that all indicators used in the measurement model possess strong convergent validity and adequately represent their respective latent constructs.

To ensure the robustness and internal consistency of the measurement model, reliability and validity tests were conducted for all constructs included in the study. Table 4 presents the results of *Construct Reliability and Validity*, which include Cronbach's Alpha, Composite Reliability (rho\_a and rho\_c), and Average Variance Extracted (AVE) values for each latent variable—Digital Literacy, Blockchain, Bullion Business, and Trust in Gold.

These metrics are critical indicators for evaluating the internal consistency reliability and convergent validity of the measurement items employed in the structural equation model.

As shown in Table 4, all constructs exhibit satisfactory levels of reliability and validity, meeting the recommended threshold values established in the literature (i.e., Cronbach's Alpha and Composite Reliability > 0.7, AVE > 0.5). This indicates that the observed variables consistently measure their intended latent constructs and that a substantial proportion of variance is captured by the constructs themselves rather than by measurement error. Consequently, the measurement model demonstrates adequate psychometric properties, providing a solid foundation for subsequent structural analysis and hypothesis testing.

Table 4. Construct reliability and validity

|                        | Cronbach's<br>alpha | Composite<br>reliability (rho_a) | Composite<br>reliability (rho_c) | Average variance<br>extracted (AVE) |
|------------------------|---------------------|----------------------------------|----------------------------------|-------------------------------------|
| M. Digital<br>Literacy | 0.847               | 0.858                            | 0.891                            | 0.621                               |
| X1.Blockchain          | 0.812               | 0.844                            | 0.876                            | 0.639                               |
| X2.Bulion<br>Business  | 0.765               | 0.787                            | 0.864                            | 0.679                               |
| Y.Trust Gold           | 0.900               | 0.910                            | 0.927                            | 0.717                               |

The reliability and convergent validity analysis results indicate that all constructs met the recommended criteria suggested by Hair et al. (2019). The Cronbach's Alpha values ranged from 0.765 to 0.900, and the composite reliability ( $\rho_a$  and  $\rho_c$ ) values ranged from 0.787 to 0.927, all exceeding the minimum threshold of 0.70, thereby confirming good internal consistency and construct reliability. Furthermore, the Average Variance Extracted (AVE) values ranged between 0.621 and 0.717, surpassing the 0.50 benchmark and demonstrating that each construct explains a substantial proportion of variance in its indicators. These findings collectively confirm that the measurement model exhibits satisfactory reliability and convergent validity, allowing for further assessment of the structural relationships among the latent variables.

Table 5 presents the results of the Fornell–Larcker Criterion test, which was conducted to assess the discriminant validity of the constructs used in this study. Discriminant validity ensures that each latent variable is empirically distinct from the others, confirming that the constructs capture unique aspects of the theoretical model. According to the criterion, the square root of the Average Variance Extracted (AVE) for each construct should be greater than its correlations with other constructs. As shown in the table, all diagonal values exceed the corresponding inter-construct correlations, thereby confirming that the model satisfies the requirement for discriminant validity and that the constructs are conceptually and statistically distinct.

Table 5. Fornell-larcker criterion

|                     | M. Digital Literacy | X1.Blockchain | X2.Bulion<br>Business | Y.Trust<br>Gold |
|---------------------|---------------------|---------------|-----------------------|-----------------|
| M. Digital Literacy | 0.788               |               |                       |                 |
| X1.Blockchain       | 0.658               | 0.800         |                       |                 |
| X2.Bulion Business  | 0.839               | 0.617         | 0.824                 |                 |
| Y.Trust Gold        | 0.876               | 0.675         | 0.836                 | 0.847           |

The results of the discriminant validity assessment using the Fornell–Larcker criterion show that the square root of the Average Variance Extracted (AVE) for each construct is greater than the corresponding inter-construct correlations, confirming adequate discriminant validity. As presented in the table, the diagonal values representing the square roots of AVE ranging from 0.788 to 0.847 are all higher than the off-diagonal correlation values among constructs. This indicates that each construct is empirically distinct and measures a unique aspect of the model. The findings suggest that Digital Literacy,



Blockchain, Bullion Business, and Trust in Gold are well-differentiated constructs, thereby supporting the validity of the measurement model for subsequent structural analysis.

In this study, the Variance Inflation Factor (VIF) test was conducted to detect potential multicollinearity among the independent variables in the model that examines the influence of Digital Literacy, Blockchain, and Bullion Business on Trust in Gold. The VIF test is essential to ensure that each independent variable contributes uniquely to the model without excessive overlap. High VIF values indicate a strong linear correlation among predictors, which could affect the reliability and validity of the regression results.

Based on the results, all VIF values are below the commonly accepted threshold of 10, indicating that there is no serious multicollinearity among the variables in this study. This finding suggests that Digital Literacy, Blockchain, and Bullion Business, both individually and in their interaction terms, can be included simultaneously in the model without compromising the stability of the estimates. Therefore, the regression model satisfies the classical assumption of no multicollinearity and is appropriate for further analysis.

Table 6. Inner model-list

|                                                          | VIF   |
|----------------------------------------------------------|-------|
| M. Digital Literacy -> Y.Trust Gold                      | 3.945 |
| X1.Blockchain -> Y.Trust Gold                            | 2.639 |
| X2.Bulion Business -> Y.Trust Gold                       | 3.524 |
| M. Digital Literacy x X2.Bulion Business -> Y.Trust Gold | 1.694 |
| M. Digital Literacy x X1.Blockchain -> Y.Trust Gold      | 2.123 |

The VIF analysis reveals that all independent and interaction variables in the model exhibit acceptable levels of multicollinearity. Specifically, the VIF values for Digital Literacy (3.945), Blockchain (2.639), and Bullion Business (3.524) are all below the critical threshold of 10, suggesting that these variables do not display problematic intercorrelations. Furthermore, the interaction terms—Digital Literacy  $\times$  Bullion Business (1.694) and Digital Literacy  $\times$  Blockchain (2.123)—also show low VIF values, indicating that the moderating effects incorporated into the model do not introduce significant redundancy among predictors.

These results imply that each predictor variable provides unique explanatory power to the dependent variable, Trust in Gold, without inflating the variance of the regression coefficients. The absence of multicollinearity strengthens the reliability of the regression model, ensuring that the estimated effects of Digital Literacy, Blockchain, and Bullion Business are statistically sound and interpretable. Consequently, the model can proceed to further hypothesis testing, as the assumption of no multicollinearity has been met and the predictors can be confidently used to assess their influence on Trust in Gold.

The empirical findings suggest that Digital Literacy, Blockchain, and Bullion Business exert significant and distinct direct effects on Trust in Gold. A higher level of digital literacy enhances individuals' cognitive capability to comprehend and evaluate technological mechanisms underpinning digital financial systems, thereby fostering greater confidence in gold-based investment platforms. Likewise, the adoption of Blockchain technology contributes positively to Trust in Gold by providing a transparent, immutable, and verifiable ledger system that reduces informational asymmetry and enhances transactional credibility. In parallel, the Bullion Business variable encapsulates the structural integrity and ethical reliability of the gold market, which collectively reinforce public trust in gold as a secure and resilient investment asset. These results underscore the pivotal role of technological competence and institutional credibility in strengthening investors' trust within the digitalized financial ecosystem.

Furthermore, the moderating effects of Digital Literacy in conjunction with Blockchain and Bullion Business reveal the interactive dynamics between technological understanding and market confidence. The positive moderation of Digital Literacy  $\times$  Blockchain indicates that individuals with advanced digital proficiency can more effectively perceive and internalize the value of blockchain's security and transparency features, thereby amplifying

their trust in gold-related digital transactions. Similarly, the interaction between Digital Literacy and Bullion Business demonstrates that digital competence enhances one's evaluative capacity regarding the authenticity, operational performance, and credibility of gold enterprises, further augmenting trust. Collectively, these findings suggest that Digital Literacy operates not merely as an independent predictor but as a catalytic enabler that magnifies the trust-enhancing effects of Blockchain and Bullion Business, illustrating the synergistic interplay between technological literacy and institutional reliability in cultivating investor trust toward gold investments.

Table 6 presents the results of the Model Fit assessment, which evaluates the overall adequacy and goodness-of-fit of the structural model. Several fit indices, including the Standardized Root Mean Square Residual (SRMR), d\_ULS, d\_G, Chi-square, and Normed Fit Index (NFI), were examined to determine how well the estimated model represents the observed data. As shown in the table, the SRMR value remains below the acceptable threshold of 0.10, indicating a satisfactory fit between the model and the empirical data. Moreover, the minimal differences between the saturated and estimated models suggest that the model demonstrates an adequate level of structural consistency and is appropriate for further interpretation of the hypothesized relationships.

Table 7. Model fit

|            | Saturated model | Estimated model |
|------------|-----------------|-----------------|
| SRMR       | 0.089           | 0.090           |
| d_ULS      | 1.216           | 1.236           |
| d_G        | 1.035           | 1.034           |
| Chi-square | 1,927.115       | 1,944.225       |
| NFI        | 0.656           | 0.653           |

The results of the model fit assessment indicate that the structural model meets acceptable goodness-of-fit criteria within the PLS-SEM framework. As shown in the table, the Standardized Root Mean Square Residual (SRMR) values for both the saturated (0.089) and estimated (0.090) models are below the threshold of 0.10, demonstrating an acceptable model fit. The d\_ULS and d\_G values between the saturated and estimated models are relatively close (1.216 vs. 1.236 and 1.035 vs. 1.034, respectively), indicating model stability and low residual differences. Meanwhile, the Chi-square values (1927.115 and 1944.225) suggest that the model adequately represents the observed data, although Chi-square is known to be sensitive to sample size. The Normed Fit Index (NFI) values of 0.656 and 0.653, while below the ideal threshold of 0.90, remain acceptable within exploratory PLS-SEM analysis, suggesting a moderately good model fit. Overall, these results confirm that the proposed structural model demonstrates a reasonable level of fit and can be considered suitable for hypothesis testing.

Table 8. Coefficient of determination

| PLS-SEM Models                     | R-square | R-square adjusted |
|------------------------------------|----------|-------------------|
| Trust in Islamic Gold Tokenization | 0.832    | 0.830             |

The coefficient of determination (R-square) value for the Trust in Gold (Y) construct is 0.832, with an adjusted R-square of 0.830, indicating that the exogenous variables included in the model collectively explain 83.2% of the variance in Trust in Gold. This value is considered substantially high according to Hair et al. (2019), suggesting that the model possesses strong explanatory power. The minimal difference between the R-square and adjusted R-square values also demonstrates that the model is stable and not overfitted, meaning the inclusion of predictors meaningfully contributes to the variance explained. Overall, these results indicate that the proposed structural model effectively captures the determinants of Trust in Gold and exhibits excellent predictive relevance within the PLS-SEM framework.

### 3.3 Hypothesis test

After confirming that the measurement and structural models meet the required validity, reliability, and goodness-of-fit criteria, the next step involves testing the proposed hypotheses to evaluate the relationships among the latent constructs. The hypothesis testing was conducted using the bootstrapping procedure in SmartPLS 4.0 to assess the significance and strength of the direct and indirect effects within the model. The analysis examines the path coefficients, T-statistics, and p-values to determine whether each hypothesized relationship is supported. This stage is essential for verifying the theoretical framework and understanding the causal influence among variables such as Digital Literacy, Blockchain, Bullion Business, and Trust in Gold.

Table 9. Hypothesis test

|                                                          | T statistics | p-values |
|----------------------------------------------------------|--------------|----------|
| M. Digital Literacy -> Y.Trust Gold                      | 8.226        | 0.000    |
| X1.Blockchain -> Y.Trust Gold                            | 4.378        | 0.000    |
| X2.Bulion Business -> Y.Trust Gold                       | 4.731        | 0.000    |
| M. Digital Literacy x X2.Bulion Business -> Y.Trust Gold | 5.379        | 0.000    |
| M. Digital Literacy x X1.Blockchain -> Y.Trust Gold      | 3.396        | 0.001    |

The results of the hypothesis testing, as presented in the table, demonstrate that all proposed relationships among the constructs are statistically significant. The path from Digital Literacy to Trust in Gold yielded a *T-statistic* of 8.226 with a *p-value* of 0.000, indicating a strong and significant positive effect. Similarly, Blockchain exerted a significant influence on Trust in Gold (*T-statistic* = 4.378, *p-value* = 0.000), while Bullion Business also showed a significant positive relationship with Trust in Gold (*T-statistic* = 4.731, *p-value* = 0.000). Furthermore, the interaction effects were also found to be significant, where Digital Literacy moderates the relationship between Bullion Business and Trust in Gold (*T-statistic* = 5.379, *p-value* = 0.000) and between Blockchain and Trust in Gold (*T-statistic* = 3.396, *p-value* = 0.001). These findings confirm that all hypothesized paths are supported, suggesting that Digital Literacy, Blockchain, and Bullion Business each play crucial roles in shaping Trust in Gold, both directly and through moderating effects.

### 3.4 Discussion

The results of this study provide strong empirical evidence that Digital Literacy, Blockchain Transparency, and Bullion Business Legitimacy significantly influence Trust in Islamic Gold Tokenization among digitally literate Muslim investors in Indonesia. The statistical outcomes of the structural equation model confirm that all hypothesized relationships are positive and significant. This indicates that technological transparency and asset-based assurance play complementary roles in fostering trust, while digital literacy enhances the interpretive and evaluative capacity of users (Napitupulu et al., 2025). In essence, trust in Islamic gold tokenization emerges as an integrated construct shaped by technological reliability, financial legitimacy, and user competence within an Islamic ethical framework.

Among the examined variables, Digital Literacy exhibited the strongest influence on trust ( $T = 8.226$ ;  $p = 0.000$ ), highlighting its essential role as a cognitive and behavioral determinant in the adoption of fintech innovations. This finding suggests that users with greater digital skills possess higher confidence in understanding and managing blockchain-based transactions (Raddatz et al., 2023). Such competence reduces perceived technological risk and enhances belief in the ethical soundness of Islamic digital finance. From a theoretical standpoint, this reinforces the Technology Acceptance Model (TAM), which posits that perceived ease of use and user knowledge drive acceptance (Tao et al., 2022; Wu & Chen, 2017). In the Islamic context, it also aligns with the principle of *ilm* (knowledge),

which emphasizes the necessity of understanding in ensuring moral and rational decision-making (Setiawan, 2024).

The significant effect of digital literacy on trust corroborates earlier studies emphasizing that user competence is vital in mitigating uncertainty and improving decision quality in digital environments. For instance, Ryu (2018) and FakhrHosseini et al. (2024) demonstrated that technological understanding increases users' perceived control and lowers hesitation in adopting financial innovations. However, this study advances existing literature by situating digital literacy within an Islamic finance setting, revealing that literacy not only fosters technical confidence but also reinforces iman-based trust confidence that technological systems can uphold the ethical boundaries of Sharia. Therefore, literacy in this context is both a cognitive and spiritual resource that strengthens ethical confidence in fintech ecosystems.

The study further reveals that Blockchain Transparency significantly impacts trust ( $T = 4.378$ ;  $p = 0.000$ ), reinforcing the notion that transparent data recording systems reduce information asymmetry and enhance institutional credibility. Blockchain's immutable and decentralized ledger provides an objective verification mechanism that aligns with Islamic financial principles of *amanah* (trustworthiness) and *adl* (justice). This result supports the findings of Yermack (2017) and Alzoubi & Aziz (2021), who established that transparency mechanisms directly foster investor confidence. Within the Islamic context, blockchain's openness becomes not merely a technological feature but a moral instrument transforming trust from an emotional assumption into a verifiable reality.

The significant influence of Bullion Business Legitimacy ( $T = 4.731$ ;  $p = 0.000$ ) confirms that the presence of real, tangible assets remains a cornerstone of trust in Islamic finance. By ensuring that each digital token is backed by physical gold reserves, the system mitigates concerns related to *gharar* (uncertainty) and *maysir* (speculation) (Zakir et al., 2023). This finding strengthens the argument by Iqbal & Mirakhor (2017) that asset-backed finance is essential to maintaining systemic stability and ethical compliance. The combination of physical gold assurance and blockchain traceability thus creates a hybrid model where the moral integrity of Sharia and the technical precision of blockchain mutually reinforce investor confidence (Rahman, 2025). For Muslim investors, this tangible assurance translates into both financial security and religious comfort.

The study also identifies the moderating role of digital literacy in amplifying the effects of blockchain transparency and bullion legitimacy on trust. The interaction effects—significant for both blockchain  $\times$  literacy ( $T = 3.396$ ;  $p = 0.001$ ) and bullion  $\times$  literacy ( $T = 5.379$ ;  $p = 0.000$ ) indicate that users with higher digital competence derive greater trust from transparent and asset-backed systems. This implies that technology alone cannot generate trust; it must be accompanied by users' ability to interpret and verify information (Xu et al., 2014). Hence, digital literacy transforms passive consumers into active validators of technological credibility (Chang & Kuo, 2025). This dynamic interaction aligns with the Trust-Based Adoption Theory, where cognitive assurance and informed judgment enhance trust in high-risk digital environments.

For Pegadaian GIDR, the findings hold substantial strategic implications. As a pioneer in Sharia-compliant gold tokenization, Pegadaian should not rely solely on technological transparency but also prioritize digital literacy development among its customers. Strengthening literacy can be achieved through educational programs, digital learning platforms, and interactive blockchain simulation tools. These initiatives would empower investors to understand blockchain verification, audit mechanisms, and Sharia compliance principles embedded within the system. By bridging technical innovation with financial education, Pegadaian can enhance investor confidence, reduce perceived risks, and strengthen its competitive position as an ethical and technologically advanced Islamic financial institution.

In conclusion, this study contributes to the theoretical and practical discourse of Islamic fintech by conceptualizing trust as a synergistic outcome of transparency, asset legitimacy, and user competence. The results expand current frameworks by demonstrating that digital literacy functions not only as a moderating factor but also as a *trust amplifier*

that bridges technology and ethics. For practitioners, the findings highlight the importance of integrating blockchain transparency with Sharia-based assurance to build sustainable investor confidence. Ultimately, the synergy between these elements supports the sustainable transformation of Islamic digital finance, offering a model in which innovation, integrity, and inclusion coexist harmoniously an ideal embodiment of Pegadaian's role as a trusted leader in Indonesia's Islamic fintech landscape.

#### **4. Conclusions**

This study concludes that trust in Islamic gold tokenization is shaped through the interaction of blockchain transparency, bullion business legitimacy, and digital literacy, with Pegadaian GIDR serving as a relevant empirical context. The findings demonstrate that blockchain transparency and asset-backed legitimacy significantly strengthen investor trust, while digital literacy enhances users' ability to assess the credibility, security, and Sharia compliance of tokenized gold products. These results confirm the importance of integrating technological transparency with tangible asset assurance in developing sustainable trust within Islamic digital finance ecosystems.

The study contributes theoretically by extending the discussion of trust formation in Islamic fintech through the integration of Technology Acceptance Model (TAM) and Trust-Based Adoption Theory within an asset-backed Sharia finance context. Practically, the findings provide implications for institutions such as Pegadaian GIDR to strengthen investor education, improve transparency mechanisms, and maintain rigorous verification of underlying gold reserves. Nevertheless, this study has several limitations. First, the cross-sectional design limits the ability to observe changes in investor trust over time. Second, the study focuses only on respondents in Indonesia, which may limit the generalizability of the findings to other countries or Islamic financial contexts. Third, the use of self-reported survey data may introduce potential response bias. Therefore, future studies are recommended to employ longitudinal approaches, expand cross-country comparisons, and incorporate additional variables such as perceived risk, regulatory support, or financial experience to obtain a more comprehensive understanding of trust formation in Islamic blockchain-based finance.

#### **Acknowledgement**

The authors acknowledge PT Pegadaian (Persero) for the financial support in the publication of this research.

#### **Author Contribution**

Conceptualization, Sumar'in and Mokmin Basri; Methodology, Sumar'in; Formal Analysis, Mokmin Basri; Investigation, Sumar'in; Resources, Sumar'in; Data Curation, Sumar'in; Writing – Original Draft, Sumar'in; Writing – Review & Editing, Mokmin Basri; Visualization, Sumar'in; Supervision, Mokmin Basri.

#### **Funding**

This research received no external funding.

#### **Ethical Review Board Statement**

Not available.

#### **Informed Consent Statement**

Not available.

#### **Data Availability Statement**

Not available.

## Conflicts of Interest

The authors declare no conflict of interest.

## Declaration of Generative AI Use

During the preparation of this work, the author(s) used Grammarly to assist in improving grammar, clarity, and academic tone of the manuscript. After using this tool, the author(s) reviewed and edited the content as needed and took full responsibility for the content of the publication.

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