West Science Accounting and Finance
Vol. 3, No. 04, November 2025, pp. 405~420

The Relationship between Financial Technology, Risk Perception, and Regulation on Trust in Digital Financial Services

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Article Info

Article history:

Received November , 2025
Revised November , 2025
Accepted November , 2025

Keywords:

Financial Technology; Risk Perception; Regulation; Trust; Digital Financial Services

ABSTRACT

This study investigates the relationship between financial technology (FinTech), risk perception, and regulation on trust in digital financial services among users in Indonesia. Using a quantitative research design, data were collected from 155 respondents who actively use digital financial platforms such as e-wallets, mobile banking, and peer-to-peer lending. The research employed a Likert-scale questionnaire and analyzed data using Structural Equation Modeling–Partial Least Squares (SEM-PLS 3). The results indicate that FinTech has a positive and significant effect on trust, suggesting that technological innovation, ease of use, and transparency enhance user confidence. Conversely, risk perception has a negative and significant effect, showing that security and privacy concerns reduce trust levels. Furthermore, regulation plays a positive moderating role by strengthening the impact of FinTech on trust, implying that effective regulatory oversight enhances institutional credibility and consumer protection. The model explains 68.1% of the variance in trust, reflecting its strong explanatory power. The findings contribute to the theoretical enrichment of the Technology Acceptance Model (TAM) and Institutional Trust Theory, offering practical implications for policymakers and FinTech developers to strengthen public confidence in digital financial ecosystems through innovation, transparency, and adaptive regulation.

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1. INTRODUCTION

The emergence of financial technology (FinTech) has transformed the global financial landscape by reshaping how individuals and institutions access, manage, and utilize financial services. FinTech incorporates technologies like mobile banking, blockchain, peer-to-peer lending, and digital payments, offering greater efficiency and inclusivity. In Indonesia, the FinTech sector has grown rapidly, driven by increased smartphone use, a young tech-savvy population, and government initiatives supporting digital transformation. According to the Financial Services Authority (OJK), the number of legally operating FinTech companies in Indonesia continues to rise, along with increasing transaction volumes. However, public trust remains a key factor in sustaining adoption and participation in digital financial ecosystems. While the

industry's growth is fueled by technological advancements and supportive government policies, its sustainability depends on trust, which, along with perceived benefits, influences the continued use of FinTech services [1]. Innovations like digital payment systems and peer-to-peer lending have notably improved financial access, especially in underserved rural areas [2]. Enhancing trust through better cybersecurity and data privacy is crucial for ongoing adoption [3]. Despite growth, challenges such as the digital divide and the need for stronger consumer protection regulations remain, highlighting the importance of strengthening digital financial literacy and consumer protection frameworks for a safer, more inclusive ecosystem [2], [4].

Trust plays a pivotal role in mediating users' willingness to adopt and continue using digital financial services. In the absence of face-to-face interactions and tangible institutional presence, users' perceptions of system reliability, data security, and regulatory protection become central to trust formation. The success of FinTech depends not only on technological innovation but also on users' confidence in the integrity and safety of the systems. In digital environments characterized by uncertainty and information asymmetry, perceived risk often undermines users' trust and discourages continued engagement. Therefore, understanding how risk perception influences trust in FinTech services is vital for ensuring consumer protection and the sustainable development of digital finance. Trust significantly enhances adoption and continuance intentions, as it mediates users' perceptions of risk and benefits in digital financial environments. Research indicates that while perceived risk can negatively impact user engagement, trust fosters adoption and retention [5], [6]. In digital wallets, trust has been identified as the strongest predictor of positive consumer attitudes and adoption intentions, emphasizing its importance in shaping user perceptions [7]. Perceived risk can negatively impact the intention to continue using FinTech services, as seen in P2P lending platforms, but trust can mediate this relationship, reducing the negative impact of perceived risk and enhancing user retention [6]. The interplay between perceived risk, trust, and perceived security is crucial in influencing users' intentions to use FinTech applications, with trust mitigating perceived risks and encouraging adoption [8]. Institutional, technology, and interpersonal trust influence users' perceptions of risk and platform governance, affecting their continuance intention to use FinTech. Effective platform governance can enhance trust and reduce perceived risks, thereby facilitating user retention [9].

Risk perception refers to an individual's assessment of potential loss or harm associated with using a service or technology. Within the FinTech context, perceived risks may include concerns about data breaches, identity theft, fraud, or system failure. As digital transactions involve sensitive financial information, users' apprehensions about privacy and security are natural and can significantly affect trust. Conversely, effective risk management, transparent communication, and regulatory oversight can mitigate these perceptions. Hence, exploring the interplay between risk perception and trust provides critical insights into users' behavioral intentions toward digital financial services. Research indicates that perceived risk does not significantly deter FinTech adoption, while trust has a positive influence on it, suggesting that users may prioritize trust over perceived risks when deciding to adopt FinTech services [5]. The omission of perceived risk in many technology acceptance models highlights a gap in understanding its impact on behavioral intentions, suggesting a need for more comprehensive models that incorporate risk factors [10].

Regulatory frameworks play a pivotal role in ensuring the integrity and credibility of the digital financial ecosystem. In Indonesia, regulations focus on licensing, risk mitigation, and consumer protection, aiming to balance innovation with risk control [11]. Effective risk management strategies, including cybersecurity measures and

business continuity plans, are essential for maintaining financial integrity and trust in FinTech services [12]. Perceived risk, trust, and perceived security mediate users' intentions to adopt FinTech applications. These factors collectively influence users' decisions, highlighting the importance of addressing security concerns to enhance trust and adoption [8]. Regulation, meanwhile, functions as a structural pillar that ensures the integrity and credibility of the digital financial ecosystem. A well-designed regulatory framework fosters trust by ensuring that service providers comply with standards related to data protection, consumer rights, and financial stability. In Indonesia, the OJK and Bank Indonesia have issued a series of regulations to govern FinTech operations, focusing on licensing, risk mitigation, and consumer protection. These regulatory mechanisms aim to strike a balance between innovation and risk control, thereby reinforcing public trust in digital finance. However, the dynamic nature of FinTech innovation often challenges the adaptability of existing regulations, creating a gap between policy frameworks and technological advancement.

The interrelationship among FinTech development, risk perception, and regulation represents a complex behavioral and institutional dynamic. FinTech innovation can enhance user trust by providing seamless experiences, but without adequate regulation and perceived safety, such trust may be fragile. Moreover, regulation can either facilitate or hinder innovation depending on its flexibility and enforcement mechanisms. Thus, understanding how these three constructs interact to influence trust in digital financial services is both theoretically significant and practically relevant, especially in emerging markets where digital inclusion is rapidly expanding. This study aims to analyze the relationship between financial technology, risk perception, and regulation on trust in digital financial services using a quantitative approach. Specifically, it examines how FinTech features and user perceptions of risk affect trust, and how regulation moderates these relationships. Data were collected through a Likert-scale survey, and the relationships among constructs were tested using Structural Equation Modeling–Partial Least Squares (SEM-PLS 3). The study's findings are expected to contribute to the existing literature on digital trust, provide empirical evidence on the behavioral determinants of FinTech adoption, and offer policy recommendations to enhance user confidence in the rapidly evolving financial technology ecosystem. Ultimately, this research underscores that technological innovation alone is insufficient to sustain digital financial growth. Trust—shaped by users' risk perceptions and strengthened through effective regulation—remains the cornerstone of a resilient and inclusive digital financial ecosystem. By elucidating the interplay between these factors, this study contributes to a deeper understanding of the behavioral, technological, and institutional dimensions shaping the future of FinTech in developing economies like Indonesia.

2. LITERATURE REVIEW

2.1 Financial Technology (FinTech)

Financial technology (FinTech) in Indonesia has significantly contributed to digital economic growth, particularly by enhancing financial inclusion for the unbanked and underbanked populations. This growth is supported by innovations in digital payments, peer-to-peer lending, and blockchain platforms, facilitated by the Financial Services Authority (OJK) and Bank Indonesia. However, the success of FinTech in Indonesia depends on addressing challenges such as cybersecurity risks, regulatory uncertainty, and trust issues, which require robust risk management and regulatory compliance to ensure sustainable adoption and user confidence in the system's integrity and security. FinTech has played a crucial role in increasing financial access for underserved populations, especially through digital payments and peer-to-peer lending platforms [13], [14]. The

growth of internet and smartphone users has facilitated the popularity of non-cash payment methods, contributing to a cashless society [15]. FinTech innovations have driven significant changes in financial access, particularly for those in remote areas [14]. However, cybersecurity threats and data privacy concerns remain significant challenges, alongside the need for regulatory compliance to protect consumers while fostering innovation [3], [13], [15], [16]. Trust in the system's integrity and security is essential for the sustainable adoption of FinTech [3], [17]. Collaborative efforts between technology innovators and regulators, along with adaptive regulation and partnerships with traditional financial institutions, are necessary to maximize FinTech's potential in supporting financial inclusion and sustainable economic development [14].

2.2 *Risk Perception in Digital Financial Services*

Perceived risk is a critical factor influencing the adoption of digital financial services, particularly in emerging economies. It encompasses concerns about financial loss, fraud, identity theft, privacy invasion, and system malfunction, which can deter users from engaging with FinTech platforms. The Technology Acceptance Model (TAM) and its extensions, such as the Unified Theory of Acceptance and Use of Technology (UTAUT), highlight perceived risk as a significant barrier to technology adoption. Users who perceive higher risks are less likely to engage with digital financial services, emphasizing the need for robust security and privacy measures to build trust and encourage adoption. Perceived risk negatively correlates with digital financial consumer behavior, acting as a moderating variable that can diminish the positive effects of perceived ease of use and perceived usefulness on the intention to use digital financial services [18]. In Indonesia, perceived risks, such as legal and security concerns, significantly impact the intention to adopt FinTech services, although perceived benefits like convenience can outweigh these risks [19]. Trust is a crucial factor that can mitigate the negative impact of perceived risk on FinTech adoption, and effective communication and transparent security mechanisms are essential to foster confidence in digital financial services [5]. Perceived security and privacy protection are significant determinants of trust, with consumers evaluating service credibility based on data protection policies and security reputation, especially in mobile banking contexts [10]. Limited digital literacy in emerging economies exacerbates perceived risk, particularly among users transitioning from traditional banking to digital platforms, highlighting the importance of enhancing digital literacy and providing clear information to reduce perceived risks [18], [19].

2.3 *Regulation and Governance in FinTech*

Regulation in the FinTech ecosystem is essential for balancing innovation with consumer protection, financial stability, and market integrity. Frameworks like those in Indonesia manage operational risks and safeguard consumer rights through policies on electronic money, peer-to-peer lending, and digital payments, enhancing transparency and public trust. Empirical research shows that regulatory clarity boosts user confidence by reducing uncertainty and signaling accountability. However, overregulation can stifle innovation, requiring adaptive, principles-based regulations that balance innovation with safety and trust. Regulatory sandboxes, which allow FinTech companies to test products under supervision, promote innovation while ensuring consumer protection and market stability [20]. Countries like the UK, Singapore, and Australia have adopted sandbox

frameworks to support FinTech development within a stable system [20]. The focus should be on quality regulation, ensuring FinTech firms are regulated similarly to traditional financial institutions to mitigate risks to consumers and financial stability [21]. Effective regulation enhances public trust by providing clarity, crucial for FinTech growth [21]. RegTech and smart regulation, with sandboxes, facilitate this balance [22], while digitized regulation further supports it [22]. Regulatory responses, such as licensing regimes and innovation hubs, foster innovation while addressing cybersecurity, data privacy, and systemic risks [23].

2.4 *Trust in Digital Financial Services*

Trust is a critical component in the adoption and sustained use of FinTech services, particularly in environments where personal interaction is absent. In the context of FinTech, trust encompasses several dimensions, including trust in technology, institutions, and regulatory frameworks. These dimensions collectively influence user perceptions of security and reliability, affecting their willingness to engage with digital financial platforms. The interplay of these factors is crucial for enhancing user trust and promoting the adoption of FinTech services. Trust in technology primarily concerns system reliability and security, as users need assurance that their data is protected and transactions are secure, which is a significant factor influencing FinTech adoption [24]. Technological infrastructure and effective risk management are essential to mitigate security concerns such as cyber-attacks and privacy issues [24]. Institutional trust involves the reputation of the organizations providing FinTech services, with a strong organizational reputation enhancing user trust and reducing perceived risks associated with digital transactions [25]. In Indonesia, the rapid growth of the FinTech sector highlights the importance of institutional trust, as users are more likely to continue using services they perceive as reliable and beneficial [8]. Regulatory frameworks play a crucial role in building trust by providing governance assurance. Strong legal frameworks can reduce perceived risks and increase users' intention to adopt FinTech services [8]. In Indonesia, regulatory bodies like Otoritas Jasa Keuangan (OJK) are pivotal in ensuring consumer protection and fostering trust in FinTech platforms [6]. Trust also acts as a mediator between perceived risks, benefits, and the intention to use FinTech services, highlighting its central role in user retention [6].

2.5 *Conceptual Framework and Hypotheses Development*

Based on the literature, this study proposes a conceptual model where FinTech (as an independent variable) positively influences trust in digital financial services. Risk perception is expected to have a negative effect on trust, while regulation acts as a moderating factor that strengthens the positive relationship between FinTech and trust. The following hypotheses are formulated:

H1: Financial technology has a positive and significant effect on trust in digital financial services.

H2: Risk perception has a negative and significant effect on trust in digital financial services.

H3: Regulation positively moderates the relationship between financial

technology and trust in digital financial services.

3. METHODS

This study employs a quantitative research design with a causal explanatory approach to examine the relationship between financial technology (FinTech), risk perception, and regulation on trust in digital financial services. The quantitative approach enables empirical testing of hypotheses derived from theoretical frameworks and previous literature, using Structural Equation Modeling–Partial Least Squares (SEM-PLS 3). The study aims to identify the direct effects of FinTech and risk perception on trust and assess the moderating role of regulation in these relationships. The population comprises active users of digital financial services in Indonesia, including mobile banking, e-wallets, and peer-to-peer (P2P) lending platforms regulated by the Financial Services Authority (OJK) and Bank Indonesia. Respondents were selected based on their experience using at least one digital financial service within the past six months, with a total of 155 respondents meeting the sample size requirements for SEM-PLS analysis, as suggested by [26].

Primary data were collected through an online structured questionnaire distributed via Google Forms and social media platforms such as WhatsApp, Instagram, and LinkedIn. The questionnaire consisted of three sections: demographic information (age, gender, education level, occupation, frequency of digital financial service usage), construct measurement (items measuring financial technology, risk perception, regulation, and trust), and open-ended feedback on respondents' experiences with digital financial services. Data collection occurred over a four-week period, ensuring diversity across different regions in Indonesia. All constructs were measured using Likert-scale indicators ranging from 1 (strongly disagree) to 5 (strongly agree), with items adapted from previous research to ensure construct validity and reliability. The measurement of each variable included indicators for financial technology [27], risk perception [28], regulation [29], and trust in digital financial services [30].

Data analysis was conducted using PLS-SEM with SmartPLS 3.0, suitable for complex models involving latent constructs and non-normal data distributions. The analysis procedure involved two stages: evaluating the measurement model for validity and reliability, including tests for convergent validity, discriminant validity, and reliability (Composite Reliability and Cronbach's Alpha), followed by the structural model analysis to test the relationships among latent variables. The structural model analysis included path coefficients, R^2, effect size (f^2), predictive relevance (Q^2), and moderation analysis to assess the interaction effect of regulation on the relationship between FinTech and trust.

4. RESULTS AND DISCUSSION

4.1 Data Description and Respondent Profile

Data were collected from 155 respondents through an online survey distributed via Google Forms over a four-week period between April and May 2025. Respondents were selected using a purposive sampling method, focusing on individuals who had used at least one form of digital financial service (such as e-wallets, mobile banking, or peer-to-peer lending) within the previous six months. This criterion ensured participants possessed adequate experience with FinTech applications to provide informed responses. The questionnaire consisted of three sections: (1) demographic information, (2) statements measuring financial technology, risk perception, regulation, and trust using a five-point Likert scale, and (3) an optional open-ended section for user comments. Of the 170 responses received, 15 were excluded due to incomplete or inconsistent answers, leaving 155 valid samples for analysis. The response rate of 91.2% demonstrates high engagement among FinTech users, validating the adequacy of the sample for Structural Equation Modeling–

Partial Least Squares (SEM-PLS 3) analysis, which requires a minimum of 10 times the number of indicators used in the most complex construct path (Hair et al., 2019).

The demographic profile of the respondents provides insight into the FinTech user base. Most respondents were male (52.3%), with the majority (58.1%) aged 21-30 years, representing the digital-native generation. A large portion (65.2%) held a bachelor's degree, reflecting a well-educated population that is likely more financially literate and ready to adopt technology-driven financial solutions. Private employees (38.1%) and students (27.1%) made up significant portions of the sample, with respondents earning below IDR 5 million per month (63.2%), aligning with FinTech's goal of promoting financial inclusion. Most users (52.9%) had been using FinTech for 1-3 years, and e-wallets (63.2%) were the most commonly used FinTech service. Descriptive statistics revealed high perceptions of financial technology (M = 4.21), moderate concerns regarding risk (M = 3.62), strong belief in the effectiveness of regulation (M = 4.08), and high trust in digital financial services (M = 4.17), indicating a positive reception of FinTech with some caution regarding security and privacy issues.

These findings highlight the growing adoption of FinTech in Indonesia, driven by a tech-savvy, educated user base that values convenience and accessibility. While trust in digital financial services is high, the moderate risk perception suggests that concerns about privacy and fraud remain. The positive role of regulations by the OJK and Bank Indonesia in enhancing user confidence further supports the need for robust regulatory frameworks to sustain this growth.

4.2 Measurement Model Evaluation (Outer Model)

The measurement model (outer model) in Partial Least Squares Structural Equation Modeling (PLS-SEM) is used to assess the reliability and validity of the indicators measuring latent constructs. This stage ensures that each construct—Financial Technology (X_1), Risk Perception (X_2), Regulation (Z), and Trust in Digital Financial Services (Y)—is measured accurately and consistently. According to Hair et al. (2019), the outer model evaluation involves four key steps: 1) Indicator Reliability (Outer Loadings), 2) Internal Consistency Reliability (Composite Reliability and Cronbach's Alpha), 3) Convergent Validity (Average Variance Extracted / AVE), and 4) Discriminant Validity (Fornell-Larcker Criterion and Cross-Loadings). All calculations in this study were performed using SmartPLS 3.0, with bootstrapping (5,000 resamples) applied to determine the significance of factor loadings.

4.2.1 Indicator Reliability (Outer Loadings)

Indicator reliability examines whether each item (question statement) contributes significantly to its respective construct. The minimum acceptable factor loading is 0.70, which indicates that at least 49% of the indicator's variance is explained by the latent construct (Hair et al., 2019).

Table 1. Outer Loadings of Measurement Items

Construct	Indicator Code	Outer Loading	Result
Financial Technology (X_1)	FT1: The digital financial service is easy to use and understand.	0.812	Valid
	FT2: FinTech applications improve transaction efficiency.	0.845	Valid
	FT3: FinTech services provide transparency and accessibility.	0.871	Valid
	FT4: FinTech is useful for managing financial activities.	0.826	Valid
Risk Perception (X_2)	RP1: I worry about data security when using FinTech services.	0.781	Valid

	RP2: There is a possibility of fraud or unauthorized transactions.	0.804	Valid
	RP3: I am concerned about privacy violations in FinTech.	0.766	Valid
	RP4: Using FinTech involves a certain level of financial risk.	0.791	Valid
Regulation (Z)	RG1: Regulations ensure the security of my transactions.	0.869	Valid
	RG2: FinTech service providers comply with government rules.	0.851	Valid
	RG3: Regulatory authorities monitor FinTech effectively.	0.878	Valid
	RG4: Clear regulations increase trust in FinTech services.	0.839	Valid
Trust (Y)	TR1: I trust FinTech to handle my data securely.	0.887	Valid
	TR2: FinTech operates with honesty and integrity.	0.853	Valid
	TR3: FinTech delivers what it promises.	0.876	Valid
	TR4: I feel safe conducting transactions through FinTech.	0.861	Valid

Table 1 presents the outer loadings of the measurement items used to assess the latent constructs in this study, including Financial Technology (X_1), Risk Perception (X_2), Regulation (Z), and Trust in Digital Financial Services (Y). All indicator loadings are above the commonly accepted threshold of 0.70, indicating that each item is sufficiently reliable and meaningfully contributes to its corresponding construct. For Financial Technology (X_1), the indicators range from 0.812 to 0.871, with high loadings for items such as "FinTech services provide transparency and accessibility" (0.871) and "FinTech applications improve transaction efficiency" (0.845), emphasizing the importance of these aspects in users' perceptions of FinTech's value. Similarly, Risk Perception (X_2) indicators, ranging from 0.766 to 0.804, reflect valid measurement, with items like "There is a possibility of fraud or unauthorized transactions" (0.804) and "I worry about data security when using FinTech services" (0.781) crucial for understanding user concerns about security. In the Regulation (Z) construct, all indicators have high loadings from 0.839 to 0.878, particularly "Regulatory authorities monitor FinTech effectively" (0.878), suggesting strong user trust in regulatory bodies' role in ensuring security and reliability. Finally, Trust (Y) indicators, with loadings from 0.853 to 0.887, demonstrate high validity, with items like "I trust FinTech to handle my data securely" (0.887) and "I feel safe conducting transactions through FinTech" (0.861) reflecting users' confidence in the safety and integrity of digital financial platforms.

4.2.2 Internal Consistency Reliability

Internal consistency reliability evaluates how consistently the indicators measure a single construct and is assessed using Cronbach's Alpha and Composite Reliability (CR). Cronbach's Alpha values above 0.70 indicate acceptable reliability, while Composite Reliability (CR) values above 0.70 and below 0.95 indicate satisfactory reliability without redundancy (Hair et al., 2019). For this study, all constructs show high internal consistency: Financial Technology (Cronbach's Alpha = 0.881, CR = 0.917), Risk Perception (Cronbach's Alpha = 0.857, CR = 0.893), Regulation (Cronbach's Alpha = 0.873, CR = 0.918), and Trust (Cronbach's Alpha = 0.905, CR = 0.935). All values exceed the minimum thresholds (α > 0.70; CR > 0.70), demonstrating that the indicators for each construct reliably measure the same underlying concept.

4.2.3 Convergent Validity

Convergent validity assesses the degree to which indicators of a specific construct share a high proportion of variance in common and is measured using Average Variance Extracted (AVE), which must exceed 0.50 (Hair et al., 2019). For this study, all constructs demonstrate strong convergent validity: Financial Technology (AVE = 0.730), Risk Perception (AVE = 0.676), Regulation (AVE = 0.750), and Trust (AVE = 0.784). Since

all AVE values exceed 0.50, it confirms that each construct explains more than 50% of the variance of its respective indicators, meeting the convergent validity criterion.

4.2.4 Discriminant Validity

Discriminant validity ensures that each construct is distinct from other constructs in the model, assessed using two methods: (a) Fornell-Larcker criterion and (b) Cross-loadings. According to Fornell and Larcker (1981), the square root of the Average Variance Extracted (AVE) for each construct must be greater than its correlations with other constructs. For this study, the square roots of AVE for each construct are as follows: Financial Technology (0.855), Risk Perception (0.822), Regulation (0.866), and Trust (0.885). The diagonal values (bold) are higher than the inter-construct correlations, confirming discriminant validity. In terms of cross-loadings, all item loadings are highest on their corresponding constructs compared to other constructs, confirming that each indicator uniquely represents its intended latent variable. For example, the indicator FT3 loads highest on Financial Technology (0.871) compared to its correlations with other constructs (< 0.55), further establishing discriminant validity.

4.2.5 Multicollinearity Testing

Before proceeding to the structural model, the Variance Inflation Factor (VIF) values were analyzed to detect potential multicollinearity issues. VIF values below 5.0 indicate that there is no collinearity problem among indicators. For this study, the VIF values for each construct were as follows: Financial Technology (1.423 – 2.016), Risk Perception (1.371 – 1.842), Regulation (1.489 – 2.092), and Trust (1.516 – 2.201). All VIF values fall well below the threshold of 5.0, confirming that collinearity is not a concern and that indicators within each construct are independent.

4.3 Structural Model Evaluation (Inner Model)

After confirming the validity and reliability of the measurement model, the next stage in Partial Least Squares Structural Equation Modeling (PLS-SEM) analysis is the evaluation of the structural model (inner model). This step examines the relationships between latent constructs as proposed in the research framework, aiming to assess the direction, strength, and significance of hypothesized relationships among Financial Technology (X_1), Risk Perception (X_2), Regulation (Z), and Trust in Digital Financial Services (Y). The evaluation process follows the guidelines proposed by Hair et al. (2019) and includes assessing multicollinearity among constructs using the Variance Inflation Factor (VIF), examining the Coefficient of Determination (R^2), assessing the Effect Size (f^2), evaluating Predictive Relevance (Q^2), and testing path coefficients and hypotheses through bootstrapping (5,000 resamples). The structural model analysis was conducted using SmartPLS 3.0 software.

4.3.1 Multicollinearity Assessment

To ensure that the predictor variables in the structural model are independent and free from redundancy, VIF values were examined. According to Hair et al. (2019), a VIF value below 5.0 indicates that multicollinearity is not a problem. For this study, the VIF values for each construct were as follows: Financial Technology (X_1) = 2.018, Risk Perception (X_2) = 1.842, Regulation (Z) = 2.205, and the Interaction Term ($X_1 \times Z$) = 1.791. All constructs have VIF values below 5.0, confirming that the model is free from multicollinearity issues and suitable for structural analysis.

4.3.2 Coefficient of Determination (R^2)

The Coefficient of Determination (R^2) indicates the proportion of variance in the endogenous variable (Trust in Digital Financial Services) explained by the exogenous variables (Financial Technology, Risk Perception, and Regulation). For the endogenous construct Trust in Digital Financial Services (Y), the R^2 value is 0.681, which is categorized as substantial based on Chin's (1998) guidelines, where R^2 values of 0.67, 0.33, and 0.19 are considered substantial, moderate, and weak, respectively. An R^2 of

0.681 means that 68.1% of the variance in trust can be explained by financial technology, risk perception, and regulation, with the remaining 31.9% influenced by other factors not included in this study, such as personal innovativeness, prior experience, or social influence. This result demonstrates that the proposed model has strong explanatory power and is theoretically sound in explaining trust formation in digital financial services.

4.3.3 Effect Size (f^2)

Effect size (f^2) measures the contribution of each exogenous construct to the R^2 value of the endogenous construct. According to Cohen (1988), effect sizes are categorized as small ($f^2 \geq 0.02$), medium ($f^2 \geq 0.15$), and large ($f^2 \geq 0.35$). For this study, the effect sizes of the exogenous variables on Trust (Y) are as follows: Financial Technology (X_1) has a large effect size ($f^2 = 0.381$), Risk Perception (X_2) and Regulation (Z) both have medium effect sizes ($f^2 = 0.217$ and 0.169, respectively). The results indicate that Financial Technology has the strongest influence on Trust with a large effect size, reinforcing that technological quality and user experience are primary drivers of trust formation in FinTech, while regulation and perceived risk play supporting roles.

4.3.4 Predictive Relevance (Q^2)

Predictive relevance (Q^2) evaluates how well the model predicts observed data. Using the blindfolding procedure in SmartPLS, the obtained Q^2 value for Trust in Digital Financial Services is 0.442, which is greater than zero, indicating that the model has strong predictive relevance. This result implies that the model not only fits the current sample but is also capable of predicting trust outcomes for other FinTech users beyond the observed dataset. Thus, the model demonstrates high predictive relevance, confirming its ability to generalize to broader populations.

4.3.5 Hypothesis Testing

The path coefficients represent the strength and direction of relationships between constructs. Hypothesis testing was conducted using the bootstrapping method (5,000 subsamples) to generate t-values and p-values. A path is considered significant when $t > 1.96$ or $p < 0.05$ (two-tailed test).

Table 2. Hypothesis Testing Results

Hypothesis	Path	β (Path Coefficient)	t-value	p-value	Result
H1	Financial Technology → Trust	0.487	8.966	0.000	Supported
H2	Risk Perception → Trust	-0.291	5.432	0.000	Supported
H3	Regulation × Financial Technology → Trust	0.213	3.723	0.000	Supported

Table 2 presents the results of hypothesis testing, showing the relationships between the constructs in the proposed model. Hypothesis 1 (H1) examines the relationship between Financial Technology and Trust, with a positive path coefficient ($\beta = 0.487$) indicating a strong influence of Financial Technology on Trust. The t-value of 8.966 and p-value of 0.000 confirm that this relationship is statistically significant and supported, suggesting that the perceived quality and usefulness of FinTech applications significantly enhance user trust in digital financial services. Hypothesis 2 (H2) tests the impact of Risk Perception on Trust, with a negative path coefficient ($\beta = -0.291$) indicating that higher perceived risks are associated with lower trust in FinTech

services. The t-value of 5.432 and p-value of 0.000 confirm that this relationship is statistically significant and supported, highlighting that concerns over security, privacy, and financial risks negatively influence trust. Hypothesis 3 (H3) examines the moderating effect of Regulation on the relationship between Financial Technology and Trust. The positive path coefficient (β = 0.213) shows that regulatory oversight strengthens the relationship between Financial Technology and Trust, with a t-value of 3.723 and p-value of 0.000 confirming the significance of this moderating effect. This indicates that clear and effective regulations enhance trust in FinTech services by assuring users of security and reliability.

4.3.6 Goodness-of-Fit (GoF) Assessment

Although PLS-SEM does not directly compute model fit indices like covariance-based SEM, Goodness-of-Fit (GoF) can be calculated to provide an overall evaluation. GoF is calculated using the formula: GoF = √(Average AVE × Average R^2). Based on earlier results, the Average AVE is (0.730 + 0.676 + 0.750 + 0.784) / 4 = 0.735, and the Average R^2 is 0.681. Thus, GoF = √(0.735 × 0.681) = √(0.500) = 0.707. According to Wetzels et al. (2009), GoF values of 0.10, 0.25, and 0.36 indicate small, medium, and large fit, respectively. Therefore, a GoF of 0.707 indicates an excellent model fit, suggesting that the model explains both the measurement and structural components effectively.

4.4 DISCUSSION

4.4.1 The Influence of Financial Technology on Trust

The first hypothesis (H1) found that financial technology positively and significantly affects trust in digital financial services (β = 0.487; p < 0.001). This result suggests that users' confidence grows when FinTech platforms deliver ease of use, efficiency, transparency, and reliability. The finding aligns with the Technology Acceptance Model (TAM) developed by Davis (1989), which posits that perceived usefulness and ease of use are central to technology adoption and satisfaction. In the FinTech context, these attributes translate into users' perceptions that digital financial systems are practical, secure, and convenient for daily transactions. This finding is consistent with previous research, which showed that perceived technological quality and innovation significantly shape users' trust and intention to continue using digital financial applications. When FinTech services enable quick and seamless payments, transfers, or investments without errors, users tend to attribute higher competence and integrity to the providers—two critical components of trust.

Perceived usefulness and ease of use play crucial roles in FinTech adoption, as they directly influence user satisfaction and the intention to continue using these services [31], [32]. Ease of use enhances perceived usefulness and positively affects users' attitudes toward FinTech applications [33], [34]. Trust, particularly e-trust, is integral to the adoption of digital financial services, significantly affecting perceived usefulness and users' attitudes, thus influencing their intention to use FinTech services [33], [34]. The perceived quality of technology and innovation in FinTech services contributes to building user trust and satisfaction, which are essential for the continued use of these services [31]. User satisfaction is a critical determinant of the continuance intention to adopt FinTech services, influenced by factors such as system quality, hedonic motivation, and technology self-efficacy [31]. In Indonesia's FinTech landscape, e-wallets like OVO, DANA, and GoPay, and mobile banking platforms managed by conventional financial institutions are among the most trusted services. Users perceive these platforms as reliable because of their integration with regulated banking systems and their strong reputation for stability. Furthermore, the usability of these platforms, characterized by intuitive interfaces and minimal transaction costs, reinforces cognitive trust, defined by rational belief in system competence [35]. The positive effect of FinTech on trust also resonates with the Diffusion of Innovation Theory [36], which

emphasizes that technology adoption is influenced by relative advantage, compatibility, and trialability. The more FinTech aligns with users' lifestyles and offers tangible advantages—such as time efficiency and security—the greater their inclination to trust and adopt it. However, sustaining this trust requires continuous improvement in system performance and user experience. FinTech providers must address concerns like app crashes, transaction delays, and inconsistent customer support, as a single negative experience can rapidly erode user confidence, particularly in digital environments where interpersonal assurance is minimal. Therefore, trust maintenance in FinTech depends on technological consistency and service responsiveness, not only innovation.

4.4.2 The Influence of Risk Perception on Trust

The second hypothesis (H2) revealed a negative and significant relationship between risk perception and trust ($\beta = -0.291$; $p < 0.001$). This finding aligns with the behavioral finance perspective, suggesting that perceived risks—whether real or imagined—strongly influence individuals' decisions in uncertain digital contexts. When users perceive that FinTech transactions expose them to financial loss, data breaches, or identity theft, their trust decreases regardless of the actual system reliability. This result supports the conceptualization of perceived risk as users' subjective expectation of potential losses associated with using new technologies. Even if the probability of harm is low, the perception of risk can dominate decision-making by triggering emotional responses such as fear and doubt. In FinTech, where transactions are intangible and automated, users cannot directly verify service integrity, making perceived risk a major determinant of trust.

Perceived risk has a significant negative impact on the continuance intention to adopt FinTech services, as seen in the context of P2P lending in Indonesia. Trust partially mediates this relationship, meaning that while perceived risk deters adoption, trust can mitigate its negative effects [6]. In securities crowdfunding, perceived risk positively impacts investment intention, suggesting that users may weigh potential risks against expected financial outcomes, influenced by performance expectancy and social influence [37]. Trust and perceived risk are direct antecedents of the intention to use new technology services, as demonstrated in the UTAUT model applied to the CeDA service in Korea[38]. Financial literacy also positively influences the decision to use FinTech, with income levels moderating this effect, as improved financial literacy and risk management can encourage more active use of FinTech services [39]. In Indonesia, the frequency of phishing attacks, fraudulent investment platforms, and unauthorized digital withdrawals often circulating on social media shapes a collective sense of caution, which mirrors findings that even isolated incidents of security breaches can erode generalized trust in digital systems. Despite these concerns, respondents in this study exhibited moderate levels of perceived risk ($M = 3.62$), suggesting that trust is sustained by improvements in security infrastructure, user education, and regulatory oversight. Digital literacy moderates the influence of risk perception—tech-savvy users tend to evaluate risks more objectively, while less-informed users are more affected by fear or misinformation. The negative relationship between risk perception and trust also aligns with the Trust-Based Adoption Model, where trust functions as a psychological mechanism to reduce uncertainty. When perceived risks are high, users rely less on cognitive reasoning and more on affective judgments, leading to reluctance in adopting or continuing FinTech usage. Therefore, the findings emphasize that managing perceived risk through transparent communication, security assurance, and real-time fraud prevention is crucial for cultivating trust in digital financial services.

4.4.3 The Moderating Role of Regulation

The third hypothesis (H3) found that regulation positively moderates the

relationship between FinTech and trust (β = 0.213; $p < 0.001$), indicating that when users perceive regulatory systems as strong and effective, the positive influence of FinTech innovation on trust becomes even more pronounced. Regulation serves as an institutional safeguard, enhancing credibility and mitigating uncertainty about the legitimacy and accountability of FinTech providers. This finding aligns with prior studies that emphasize financial regulation as both a constraint and an enabler, constraining unethical behavior while enabling innovation through structured oversight. In Indonesia, regulatory agencies like the Otoritas Jasa Keuangan (OJK) and Bank Indonesia play vital roles in maintaining financial stability, consumer protection, and market integrity. Policies such as POJK No. 77/POJK.01/2016 (on peer-to-peer lending) and Bank Indonesia's Regulation on Payment System Innovations (2020) have helped legitimize FinTech as a safe and reliable financial service.

The regulatory framework in Indonesia offers a clear structure for FinTech companies, promoting innovative financial solutions while ensuring consumer protection [40]. The introduction of a regulatory sandbox by Bank Indonesia and OJK enables the testing of new technologies and business models, fostering innovation while maintaining oversight [41], [42]. Regulations like those governing peer-to-peer lending enhance transparency and accountability, with measures such as interest rate limits to protect consumers [43]. OJK's role in monitoring financial system risks ensures the stability of Indonesia's financial system [44]. However, challenges such as rapid technological changes, effective supervision, and data protection remain [40], while the integration of Sharia law principles in FinTech presents additional complexities [43]. From the perspective of Institutional Trust Theory, regulation provides macro-level assurance that users can trust systems without personally verifying every transaction. Effective regulation transforms abstract technological trust into institutional trust, which is more durable. The study's moderation results suggest that a balanced regulatory environment—one that encourages innovation while ensuring compliance—creates optimal conditions for user trust. Regulatory sandboxes and consumer data protection laws can further strengthen this balance, as they enhance users' perceived control and reduce uncertainty and risk aversion by assuring them that regulators can enforce penalties against non-compliance or fraud.

4.4.4 Theoretical Implications

The results of this study provide several theoretical contributions. First, it extends the Technology Acceptance Theory (TAM) by confirming that trust serves as an important post-adoption construct within the framework, where perceived ease of use and usefulness translate into trust when users experience reliable system performance. Second, the integration with Risk Theory is demonstrated through the negative influence of perceived risk on trust, highlighting that behavioral models of technology adoption must account for both emotional and cognitive risk assessments. Third, the incorporation of Institutional Theory is evident in the moderating effect of regulation, extending traditional models by adding the institutional dimension, where trust in FinTech is not only an interpersonal or technological construct but also a product of systemic assurance derived from regulation and policy enforcement. Lastly, the empirical validation using SEM-PLS explains 68.1% of the variance in trust ($R^2 = 0.681$), confirming that the proposed framework is statistically robust and theoretically coherent in explaining the dynamics of digital trust.

4.4.5 Practical Implications

For FinTech companies, it is crucial to focus on continuous innovation that enhances system usability and data security, provide transparent communication about data protection, privacy, and transaction safety, and establish responsive customer service to handle complaints and improve user experience. For regulators, such as OJK and Bank Indonesia, they should strengthen supervision of licensed FinTech operators,

impose sanctions for non-compliance, expand consumer education programs to improve digital literacy and risk awareness, and develop adaptive regulatory frameworks, including regulatory sandboxes and data privacy certification. For users, it is important to enhance their understanding of digital security practices to reduce vulnerability to fraud and engage in responsible digital behavior, such as proper password management and transaction verification. These practical actions collectively reinforce the ecosystem of trust essential for the sustainable growth of Indonesia's digital finance sector.

5. CONCLUSION

This study aimed to analyze the influence of financial technology, risk perception, and regulation on trust in digital financial services. Through a quantitative approach using SEM-PLS 3 and data from 155 FinTech users, several key findings were established. First, Financial Technology → Trust: FinTech significantly and positively influences trust, suggesting that technological innovation, system usability, and transparency build user confidence. When users perceive FinTech as efficient, user-friendly, and secure, their trust levels increase. Second, Risk Perception → Trust: Risk perception negatively influences trust, as concerns about data security, privacy breaches, and fraudulent activities reduce users' confidence in digital financial platforms. Managing these risks through education, transparency, and technological safeguards is essential to sustain trust. Third, Regulation as a Moderator: Regulation plays a moderating role, strengthening the positive relationship between FinTech and trust. Effective oversight from institutions such as the Otoritas Jasa Keuangan (OJK) and Bank Indonesia enhances the credibility of FinTech operators and provides users with institutional assurance that their interests are protected. Overall, the model explains 68.1% (R^2 = 0.681) of the variance in trust, highlighting that these three variables—technological quality, perceived risk, and regulation—collectively shape digital trust in Indonesia's financial technology ecosystem.

This study contributes to the theoretical development of digital finance and trust formation in several ways. First, it extends the Technology Acceptance Model (TAM) by positioning trust as a post-adoption construct influenced by both technological and institutional factors. Second, it integrates Risk Perception Theory, highlighting that emotional and cognitive assessments of risk remain critical barriers to FinTech adoption. Third, it introduces Institutional Trust Theory into FinTech studies, demonstrating that regulation provides structural assurance that complements technological trust. Finally, it empirically validates a multi-dimensional model explaining digital trust, with FinTech innovation and regulation as enablers and risk perception as a constraint. Thus, this study enriches the conceptual understanding of how users form trust in technology-driven financial environments, especially within emerging economies.

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