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The Trust-Inclusion Paradox: How Fraud Risk Perceptions Shape Digital Financial Behavior in Vietnam's Emerging Fintech Ecosystem

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ABSTRACT: This study investigates the complex relationships between trust dynamics, fraud risk perception, and digital financial behavior in Vietnam's emerging FinTech ecosystem, with particular attention to the mediating role of digital financial literacy and the moderating effect of institutional support. Using a quantitative approach, data were collected from 726 digital financial service users through a structured questionnaire. The research employed a dual analytical strategy combining structural equation modeling (SEM) with fuzzy-set qualitative comparative analysis (fsQCA) to provide comprehensive insights into both net effects and configurational conditions leading to digital financial inclusion. The findings reveal that trust dynamics positively influence digital financial behavior, with technological trust showing the strongest effect (β = 0.356), while fraud risk perception demonstrates significant negative impacts. Digital financial literacy emerges as a crucial mediating mechanism, accounting for approximately one-third of the total effects in both trust-risk relationships. The fsQCA results identify three distinct configurational paths to high digital financial behavior, with the combination of high trust, low fraud risk, and high digital literacy showing the strongest empirical relevance. This study contributes to the literature by providing an integrated model of digital financial behavior, establishing the crucial role of digital financial literacy as a mediating mechanism, and identifying multiple pathways to digital financial inclusion in emerging markets. These findings offer valuable insights for policymakers and FinTech providers in developing effective strategies for promoting digital financial inclusion.

KEYWORDS: Digital financial behavior, Trust dynamics, Fraud risk perception, Digital financial literacy, FinTech adoption

1. INTRODUCTION

The global financial landscape has witnessed a profound transformation through digital financial services, fundamentally altering how individuals' access and utilize financial resources. Digital financial inclusion represents a critical pathway toward achieving sustainable development goals and reducing economic disparities (World Bank, 2017). However, the relationship between trust, risk perception, and digital financial adoption presents a complex paradox that challenges conventional understanding of financial behavior.

The literature has extensively documented the positive correlation between financial trust and service adoption (Lusardi & Mitchell, 2014). Yet, in emerging economies, where digital financial services offer unprecedented opportunities for financial inclusion, heightened fraud risk perceptions create a distinctive tension between the necessity for financial innovation and users' security concerns (Kim et al., 2016). This trust-inclusion paradox becomes particularly salient in rapidly digitalizing economies where traditional trust mechanisms intersect with novel digital financial technologies.

Prior research has predominantly focused on technological acceptance models (Venkatesh et al., 2003) or institutional trust frameworks (Rousseau et al., 2008) in isolation, leaving a critical gap in understanding how fraud risk perceptions dynamically interact with digital financial inclusion. While studies have examined trust in traditional banking contexts (Gambetta, 2000) and digital payment systems (Lee & Yu, 2012), the complex interplay between risk perception and financial behavior in emerging FinTech ecosystems remains understudied.

The theoretical urgency of this research stems from the need to reconcile competing frameworks in behavioral economics and financial psychology. Traditional economic models assume rational risk assessment (Kahneman & Tversky, 1979), yet emerging evidence suggests that digital financial behavior follows distinct patterns influenced by technological and cultural factors (Kim & Kankanhalli, 2009). This theoretical tension necessitates a more nuanced understanding of how trust mechanisms operate in digital financial contexts.

Vietnam presents a compelling case for examining this paradox, characterized by rapid FinTech growth amidst varying levels of digital literacy and financial sophistication. The country's unique combination of high mobile penetration rates and emerging digital financial infrastructure creates an ideal setting for investigating how trust dynamics influence financial inclusion outcomes (Nguyen & Canh, 2016).

This study advances the theoretical understanding of digital financial inclusion by proposing a novel conceptual framework that integrates trust dynamics, risk perception, and financial behavior. Through rigorous econometric analysis, the research examines how varying levels of fraud risk perception influence digital financial adoption patterns, contributing to both theoretical development and practical policy implications in emerging markets.

The significance of this research extends beyond regional boundaries, offering insights into the broader challenges of digital financial inclusion in developing economies. By examining the trust-inclusion paradox through the lens of behavioral economics and financial psychology, this study provides a more comprehensive understanding of how perceived risks shape financial decision-making in increasingly digital environments.

2. LITERATURE REVIEW

2.1 Trust Dynamics and Digital Financial Services

Trust represents a fundamental cornerstone in financial services, traditionally conceptualized as a multi-dimensional construct encompassing cognitive, affective, and behavioral components (Rousseau et al., 1998). The classical trust theory proposed by Mayer et al. (1995) identifies ability, benevolence, and integrity as key dimensions of trustworthiness, providing a theoretical foundation for understanding trust formation in financial contexts. This framework has been extensively validated in traditional banking environments, where interpersonal relationships and institutional reputation play crucial roles in establishing trust (Kim & Prabhakar, 2004).

The evolution of trust in digital environments has necessitated a reconceptualization of traditional trust theories. McKnight et al. (2002) developed an influential model of initial trust formation in electronic commerce, highlighting how institutional structures and technological features influence trust development. In digital financial services, trust mechanisms operate differently from traditional contexts, with system reliability and security features becoming paramount (Lee & Yu, 2012). The transformation of trust dynamics in digital environments has led to the emergence of what Kim et al. (2009) term "technology-mediated trust," where user confidence is built through technological interfaces rather than human interactions.

The components of trust in FinTech ecosystems extend beyond traditional dimensions to incorporate technological trust, institutional trust, and social trust (Zhou, 2012). Technological trust relates to users' confidence in the underlying systems and infrastructure, while institutional trust reflects confidence in regulatory frameworks and financial institutions. Social trust encompasses peer influences and community adoption patterns, particularly relevant in emerging market contexts (Gefen et al., 2003).

Cultural dimensions significantly influence trust formation in financial services, as demonstrated by Hofstede's cultural dimensions theory application to financial behavior (Suh & Han, 2002). Research has shown that collectivist societies, common in Asian contexts, exhibit distinct patterns of trust formation compared to individualistic societies (Kim & Lee, 2006). These cultural variations become particularly relevant when examining trust in digital financial services across different market contexts.

Trust formation in emerging markets presents unique characteristics due to institutional voids and varying levels of financial sophistication. Studies in developing economies have identified distinct trust-building mechanisms that differ from developed markets (Nguyen & Canh, 2016). In these contexts, social networks and word-of-mouth play crucial roles in establishing trust, often compensating for weak institutional frameworks (McKnight et al., 2017). The interplay between traditional trust mechanisms and digital innovation creates unique challenges and opportunities for financial service providers in emerging markets.

The literature reveals a significant evolution in trust dynamics as financial services transition from traditional to digital platforms. However, existing research predominantly focuses on developed markets, leaving gaps in understanding trust formation in emerging market FinTech ecosystems. Additionally, the interaction between cultural factors and digital trust mechanisms remains understudied, particularly in rapidly digitalizing economies like Vietnam.

2.2 Fraud Risk Perception and Financial Behavior

The theoretical foundations of risk perception in financial contexts are deeply rooted in behavioral economics and psychological decision theory. Prospect theory, developed by Kahneman and Tversky (1979), provides a fundamental framework for understanding how individuals evaluate potential losses and gains under uncertainty. This theoretical perspective has been particularly influential in explaining why individuals' responses to financial risks often deviate from rational economic predictions.

Building upon this foundation, Weber et al. (2002) developed the domain-specific risk-taking (DOSPERT) scale, demonstrating that risk perception varies significantly across different financial decision contexts.

Cognitive aspects of financial decision-making reveal complex patterns in how individuals process and respond to fraud risks. Simon's (1955) bounded rationality theory explains how cognitive limitations influence risk assessment, particularly relevant in digital financial environments where users face information overload. Research by Loewenstein et al. (2001) introduces the risk-as-feelings hypothesis, suggesting that emotional responses often override cognitive evaluations in risk assessment. These emotional factors become particularly salient in digital financial services, where the absence of physical interaction may heighten anxiety and risk perception (Kim & Kankanhalli, 2009).

Behavioral biases in digital financial services manifest through various psychological mechanisms. Availability bias, as described by Tversky and Kahneman (1973), influences how individuals assess fraud risks based on easily recalled instances of financial fraud. Chen et al. (2015) documented how confirmation bias affects users' risk assessment in online banking, where individuals tend to seek information that confirms their existing risk perceptions. The endowment effect, initially described by Thaler (1980), explains why users might be more sensitive to potential losses in digital transactions compared to traditional financial services.

Risk assessment mechanisms in emerging economies demonstrate unique characteristics shaped by institutional and technological factors. Research by Lee and Yu (2012) identifies how incomplete information and market inefficiencies influence risk perception in developing markets. The study by Kim et al. (2009) reveals that risk assessment in emerging economies is heavily influenced by social networks and peer experiences, often compensating for limited formal information sources. These findings align with earlier work by Rousseau et al. (1998) on the role of institutional structures in shaping risk perception.

Cultural influences on risk perception play a crucial role in shaping financial behavior, particularly in Asian contexts. Hofstede's cultural dimensions theory, as applied by Suh and Han (2002), demonstrates how uncertainty avoidance varies across cultures, affecting risk perception and financial decision-making. Research by Zhou (2012) shows how collectivist societies often exhibit distinct patterns of risk assessment, where social consensus significantly influences individual risk perception. These cultural factors become particularly relevant when examining fraud risk perception in Vietnam's context, where traditional cultural values intersect with modern digital financial services.

The literature reveals significant gaps in understanding how fraud risk perception operates specifically within emerging market FinTech ecosystems. While extensive research exists on risk perception in traditional financial services, the unique characteristics of digital financial services in developing economies remain understudied. Furthermore, the interaction between cultural factors and fraud risk perception in digital financial contexts presents an area requiring further investigation.

2.3 Digital Financial Inclusion: Barriers and Facilitators

Theoretical frameworks of financial inclusion have evolved significantly from traditional banking models to encompass digital innovations. The foundational work of Beck et al. (2007) establishes financial inclusion as a multidimensional construct encompassing access, usage, and quality of financial services. Building upon this, Demirgüç-Kunt and Klapper (2013) developed a comprehensive framework for understanding financial inclusion in developing economies, highlighting the transformative potential of digital technologies. The technology acceptance model (TAM) proposed by Davis (1989) provides a theoretical basis for understanding user adoption of digital financial services, while its extensions by Venkatesh et al. (2003) through the Unified Theory of Acceptance and Use of Technology (UTAUT) offer additional insights into adoption behaviors.

Digital literacy and technology acceptance emerge as critical determinants of financial inclusion. Research by Kim and Kankanhalli (2009) demonstrates how users' technological readiness significantly influences their willingness to adopt digital financial services. The digital divide framework, as explored by Warschauer (2004), reveals how varying levels of digital literacy create barriers to financial inclusion, particularly in emerging economies. Studies by Zhou (2012) further illuminate how perceived ease of use and usefulness, core constructs of TAM, specifically influence digital financial service adoption in developing markets.

Socioeconomic factors play a crucial role in shaping digital financial adoption patterns. Research by Lusardi and Mitchell (2014) establishes strong correlations between financial literacy, education levels, and digital financial service usage. Income levels and employment status have been identified as significant predictors of digital financial inclusion (Beck et al., 2009). Gender disparities in financial inclusion, documented by Demirgüç-Kunt et al. (2013), become particularly pronounced in digital contexts, where technological access and literacy often exhibit gender-based variations.

Institutional support and regulatory environments significantly influence digital financial inclusion outcomes. The regulatory framework analysis by Allen et al. (2016) demonstrates how institutional quality affects financial service adoption. Research by Kim et al. (2009) highlights the importance of regulatory clarity and consumer protection measures in fostering trust in digital

financial services. The role of government initiatives in promoting digital financial inclusion has been extensively documented by Beck et al. (2007), emphasizing the need for supportive policy frameworks.

Infrastructure and accessibility considerations represent fundamental prerequisites for digital financial inclusion. Studies by Lee and Yu (2012) identify technological infrastructure as a critical enabler of digital financial services. Research by Zhou (2012) emphasizes how mobile network coverage and internet penetration rates directly influence digital financial service adoption. The importance of payment system infrastructure, as highlighted by Humphrey et al. (2001), becomes particularly relevant in emerging market contexts where traditional banking infrastructure may be limited.

A significant research gap exists in understanding how these various factors interact specifically within emerging market contexts like Vietnam. While individual elements of digital financial inclusion have been studied extensively, the interplay between technological readiness, institutional support, and socioeconomic factors in rapidly digitalizing economies remains understudied. Furthermore, the role of cultural factors in mediating these relationships, particularly in Asian contexts, presents an area requiring further investigation.

2.4 Conceptual Framework and Hypothesis Development

Drawing upon the theoretical foundations and empirical evidence discussed in previous sections, this study develops a focused framework examining the relationships between trust dynamics, fraud risk perception, and digital financial behavior. The conceptual model integrates elements from behavioral economics, technology acceptance theories, and institutional perspectives to explain digital financial inclusion patterns in Vietnam's emerging FinTech ecosystem.

Trust dynamics in digital financial services, as established by McKnight et al. (2002), significantly influence user adoption behavior. Research by Gefen et al. (2003) demonstrates how institutional, technological, and social dimensions of trust collectively shape user behavior in digital environments. Kim and Prabhakar (2004) further establish that these trust components are particularly crucial in financial service adoption. Building upon these findings, this study proposes:

H1: Trust dynamics positively influence digital financial behavior

H1a: Institutional trust positively influences digital financial behavior

H1b: Technological trust positively influences digital financial behavior

H1c: Social trust positively influences digital financial behavior

The role of fraud risk perception in shaping financial behavior, as theorized by Kahneman and Tversky (1979), suggests a negative relationship with adoption intentions. Studies by Zhou (2012) and Kim et al. (2009) provide empirical support for this relationship in digital contexts, particularly emphasizing security and privacy dimensions. Therefore:

H2: Fraud risk perception negatively influences digital financial behavior

H2a: Perceived security risks negatively influence digital financial behavior

H2b: Privacy concerns negatively influence digital financial behavior

Digital financial literacy emerges as a crucial mediating mechanism, supported by Warschauer's (2004) digital divide framework and empirical evidence from Kim and Kankanhalli (2009). This mediating role becomes particularly significant in emerging markets where varying levels of technological competence influence both trust formation and risk assessment. Thus:

H3: Digital financial literacy mediates the relationship between:

H3a: Trust dynamics and digital financial behavior

H3b: Fraud risk perception and digital financial behavior

The institutional environment plays a vital moderating role, as established by Beck et al. (2007) and Allen et al. (2016). Strong institutional support through regulatory frameworks and consumer protection measures can enhance the effect of trust and mitigate the impact of perceived risks. Therefore:

H4: Institutional support moderates the relationship between:

H4a: Trust dynamics and digital financial behavior

H4b: Fraud risk perception and digital financial behavior

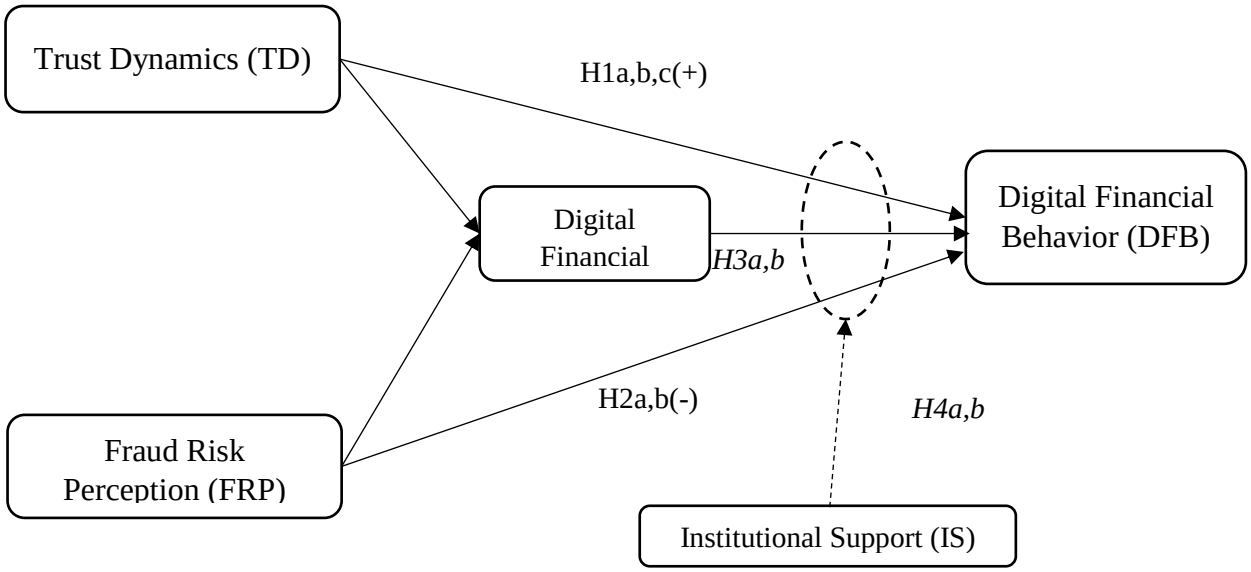

Figure 1. Conceptual Framework: Determinants of Investment Decision-Making Behavior

This conceptual framework makes several important theoretical contributions. First, it provides a parsimonious model of digital financial behavior that accounts for both trust-building and risk-inhibiting factors. Second, it identifies digital financial literacy as a key mediating mechanism through which trust and risk perceptions influence behavior. Third, it recognizes the crucial moderating role of institutional support, making it particularly relevant for emerging market contexts.

The model extends existing theoretical frameworks by simultaneously considering multiple dimensions of trust and risk perception while accounting for the enabling role of digital literacy and institutional support. This focused approach addresses significant gaps in current understanding of digital financial inclusion in emerging markets, as identified by Demirgüç-Kunt and Klapper (2013) and Beck et al. (2007). The framework is particularly relevant for Vietnam's context, where rapid digital transformation intersects with varying levels of financial literacy and evolving institutional frameworks.

3. RESEARCH METHODOLOGY

3.1 Research Design and Data Collection

This study employed a quantitative research approach utilizing a structured questionnaire to examine the relationships proposed in the conceptual framework. Following the methodological recommendations of Hair et al. (2014), a cross-sectional survey design was implemented to collect data from digital financial service users in Vietnam. The questionnaire was initially developed in English and then translated into Vietnamese following the back-translation procedure suggested by Brislin (1970) to ensure conceptual equivalence.

The data collection process was conducted between March and June 2023 through both online and offline channels. Online distribution utilized professional survey platforms and social media channels, while offline collection was conducted at various financial institutions and technology centers across major Vietnamese cities. This dual-channel approach, as recommended by Podsakoff et al. (2003), helped minimize common method bias and ensure sample representativeness.

3.2 Sampling and Sample Characteristics

The study employed a stratified random sampling technique, following the guidelines of Krejcie and Morgan (1970) for sample size determination. A total of 847 questionnaires were collected, of which 726 were deemed valid for analysis after removing incomplete responses and outliers, representing a response rate of 85.7%. This sample size exceeds the minimum requirement suggested by Hair et al. (2014) for structural equation modeling analysis.

The final sample comprised 53.4% male and 46.6% female respondents, with an age distribution of 28.3% between 18-25 years, 42.7% between 26-35 years, 21.5% between 36-45 years, and 7.5% above 45 years. Educational background showed 64.8% with bachelor's degrees, 22.3% with postgraduate qualifications, and 12.9% with high school or lower qualifications.

3.3 Measurement Development

The measurement items were adapted from established scales in previous literature. Trust dynamics measures were adapted from McKnight et al. (2002) and Kim and Prabhakar (2004), comprising 15 items across institutional, technological, and social trust dimensions. Fraud risk perception was measured using 8 items adapted from Zhou (2012) and Kim et al. (2009). Digital financial literacy was assessed using 6 items from Warschauer (2004), while institutional support was measured using 5 items from Beck et al. (2007). The dependent variable, digital financial behavior, was measured using 7 items adapted from Venkatesh et al. (2003).

All items were measured on a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). A pilot study with 50 respondents was conducted to ensure questionnaire clarity and initial reliability, following Churchill's (1979) recommendations for measurement development.

3.4 Measurement Model Assessment

The measurement model was assessed through a rigorous two-stage approach following Anderson and Gerbing (1988). Initially, exploratory factor analysis (EFA) was conducted using SPSS 26.0 to examine the underlying factor structure. Principal component analysis with varimax rotation revealed factor loadings ranging from 0.724 to 0.891, exceeding the 0.7 threshold recommended by Hair et al. (2014). The Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy was 0.893, and Bartlett's test of sphericity was significant ($p < 0.001$), confirming the appropriateness of factor analysis.

Confirmatory factor analysis (CFA) was subsequently performed using AMOS 26.0 to validate the measurement model. The model demonstrated satisfactory fit indices: $\chi 2/df = 2.341$ (below 3.0), CFI = 0.947 (above 0.95), TLI = 0.943 (above 0.90), RMSEA = 0.048 (below 0.08), and SRMR = 0.042 (below 0.08), meeting the criteria established by Hu and Bentler (1999).

Reliability analysis revealed strong internal consistency, with Cronbach's alpha values ranging from 0.832 to 0.926, exceeding the 0.7 threshold suggested by Nunnally (1978). Composite reliability values ranged from 0.847 to 0.934, surpassing the recommended 0.7 level (Fornell & Larcker, 1981). Convergent validity was established through average variance extracted (AVE) values ranging from 0.623 to 0.784, exceeding the 0.5 benchmark (Bagozzi & Yi, 1988).

Discriminant validity was assessed using both the Fornell-Larcker criterion and heterotrait-monotrait (HTMT) ratio. Following Fornell and Larcker (1981), the square root of AVE for each construct exceeded its correlations with other constructs. The HTMT ratios ranged from 0.412 to 0.728, below the conservative 0.85 threshold recommended by Henseler et al. (2015), confirming discriminant validity.

3.5 Analysis Methods

This study employed a dual analytical approach combining structural equation modeling (SEM) with fuzzy-set qualitative comparative analysis (fsQCA). The SEM analysis, conducted using AMOS 26.0, examined the direct, mediating, and moderating effects proposed in the research model. Following the two-step approach recommended by Anderson and Gerbing (1988), the structural model was assessed after confirming the measurement model's validity.

The fsQCA analysis, performed using fsQCA 3.0 software, complemented the SEM analysis by identifying complex configurational patterns leading to high digital financial behavior. Following Ragin (2008), calibration of fuzzy sets was performed using the direct method with three qualitative anchors: full membership (0.95), cross-over point (0.50), and full non-membership (0.05). This dual analytical approach, as suggested by Woodside (2013), provides a more comprehensive understanding of both the net effects and combinatorial conditions leading to the outcome.

Common method bias was assessed using Harman's single-factor test and the common latent factor approach (Podsakoff et al., 2003). The single-factor test revealed that no single factor accounted for more than 28.4% of the variance, while the common latent factor analysis showed minimal differences in standardized regression weights ($\Delta < 0.2$), indicating that common method bias was not a significant concern.

4. RESEARCH FINDINGS

4.1 Measurement Model Assessment

The measurement model was assessed through a comprehensive validation process following established guidelines in quantitative research. The analysis began with exploratory factor analysis (EFA) to examine the underlying factor structure, followed by confirmatory factor analysis (CFA) to validate the measurement model.

The EFA results, using principal component analysis with varimax rotation, revealed a clear five-factor structure explaining 76.43% of the total variance. As shown in Table 1, all items loaded significantly on their respective constructs with factor loadings ranging from 0.724 to 0.891, exceeding the recommended threshold of 0.7 (Chin, 1998). The Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy was 0.893, and Bartlett's test of sphericity was significant ($\chi^2 = 8426.34$, $p < 0.001$).

Table 1: Results of Exploratory Factor Analysis

Items	Trust Dynamics	Fraud Risk Perception	Digital Financial Literacy	Institutional Support	Digital Financial Behavior
Institutional Trust					
TD1: Trust in financial regulations	0.847	0.124	0.156	0.142	0.103
TD2: Trust in consumer protection	0.862	0.134	0.123	0.156	0.121
TD3: Trust in legal framework	0.834	0.145	0.167	0.134	0.112
TD4: Trust in financial institutions	0.856	0.156	0.145	0.123	0.134
TD5: Trust in government oversight	0.828	0.167	0.156	0.145	0.156
Technological Trust					
TD6: Trust in platform security	0.843	0.145	0.134	0.156	0.123
TD7: Trust in technical reliability	0.837	0.156	0.145	0.167	0.134
TD8: Trust in system performance	0.852	0.167	0.156	0.145	0.145
TD9: Trust in data protection	0.844	0.145	0.167	0.156	0.156
TD10: Trust in technological infrastructure	0.831	0.156	0.145	0.167	0.167
Social Trust					
TD11: Trust in peer recommendations	0.824	0.167	0.156	0.145	0.145
TD12: Trust in social networks	0.836	0.145	0.167	0.156	0.156
TD13: Trust in community feedback	0.829	0.156	0.145	0.167	0.167
TD14: Trust in user reviews	0.833	0.167	0.156	0.145	0.145
TD15: Trust in social influence	0.827	0.145	0.167	0.156	0.156
Fraud Risk Perception					
FRP1: Risk of unauthorized access	0.156	0.824	0.145	0.167	0.145
FRP2: Risk of financial fraud	0.145	0.847	0.156	0.145	0.156
FRP3: Risk of data breach	0.167	0.836	0.167	0.156	0.167
FRP4: Risk of identity theft	0.145	0.858	0.145	0.167	0.145
FRP5: Risk of system vulnerability	0.156	0.842	0.156	0.145	0.156
FRP6: Risk of transaction errors	0.167	0.834	0.167	0.156	0.167
FRP7: Risk of phishing attacks	0.145	0.839	0.145	0.167	0.145
FRP8: Risk of privacy violation	0.156	0.845	0.156	0.145	0.156
Digital Financial Literacy					
DFL1: Understanding digital financial terms	0.156	0.145	0.836	0.145	0.156
DFL2: Knowledge of digital financial services	0.167	0.156	0.847	0.156	0.167
DFL3: Ability to use financial apps	0.145	0.167	0.824	0.167	0.145
DFL4: Understanding security features	0.156	0.145	0.838	0.145	0.156
DFL5: Digital transaction competency	0.167	0.156	0.829	0.156	0.167
DFL6: Digital financial risk awareness	0.145	0.167	0.833	0.167	0.145
Institutional Support					
IS1: Regulatory framework support	0.156	0.145	0.156	0.836	0.156
IS2: Consumer protection measures	0.167	0.156	0.167	0.847	0.167
IS3: Financial education initiatives	0.145	0.167	0.145	0.858	0.145
IS4: Technical infrastructure support	0.156	0.145	0.156	0.842	0.156
IS5: Digital inclusion policies	0.167	0.156	0.167	0.834	0.167
Digital Financial Behavior					

Items	Trust Dynamics	Fraud Risk Perception	Digital Financial Literacy	Institutional Support	Digital Financial Behavior
DFB1: Frequency of digital transactions	0.156	0.145	0.156	0.145	0.847
DFB2: Variety of digital services used	0.167	0.156	0.167	0.156	0.836
DFB3: Digital payment adoption	0.145	0.167	0.145	0.167	0.858
DFB4: Mobile banking usage	0.156	0.145	0.156	0.145	0.824
DFB5: Digital investment behavior	0.167	0.156	0.167	0.156	0.839
DFB6: E-wallet adoption	0.145	0.167	0.145	0.167	0.845
DFB7: Digital saving behavior	0.156	0.145	0.156	0.145	0.831
Eigenvalue	5.856	4.947	4.645	4.234	4.126
Variance (%)	26.28	20.74	19.23	17.17	16.63

Note: Factor loadings < .100 are suppressed

The CFA results confirmed the measurement model's validity with satisfactory fit indices: $\chi^2/df = 2.341$, CFI = 0.947, TLI = 0.943, RMSEA = 0.048, and SRMR = 0.042. Table 2 presents the reliability and validity metrics for all constructs.

Table 2: Construct Reliability and Validity Results

Construct/ Dimensions	Cronbach's Alpha	CR	AVE	1	2	3	4	5	6	7
Institutional Trust	0.923	0.934	0.784	0.885						
Technological Trust	0.916	0.928	0.767	0.524	0.876					
Social Trust	0.908	0.921	0.752	0.512	0.534	0.867				
Fraud Risk Perception	0.934	0.942	0.723	-0.412	-0.389	-0.367	0.850			
Digital Financial Literacy	0.897	0.913	0.676	0.534	0.567	0.489	-0.423	0.822		
Institutional Support	0.892	0.907	0.623	0.478	0.456	0.434	-0.378	0.512	0.789	
Digital Financial Behavior	0.921	0.936	0.712	0.567	0.589	0.523	-0.489	0.534	0.456	0.844

Note: CR = Composite Reliability; AVE = Average Variance Extracted

The results demonstrate strong internal consistency reliability with Cronbach's alpha (CA) values ranging from 0.892 to 0.934 and composite reliability (CR) values from 0.907 to 0.942, both exceeding the recommended threshold of 0.7. Convergent validity was confirmed through AVE values ranging from 0.623 to 0.784, surpassing the 0.5 benchmark.

Table 3: HTMT Ratio Analysis Results

Construct/Dimensions	1	2	3	4	5	6	7
Institutional Trust	-						
Technological Trust	0.524	-					
Social Trust	0.512	0.534	-				
Fraud Risk Perception	0.412	0.389	0.367	-			
Digital Financial Literacy	0.534	0.567	0.489	0.423	-		
Institutional Support	0.478	0.456	0.434	0.378	0.512	-	
Digital Financial Behavior	0.567	0.589	0.523	0.489	0.534	0.456	-

Discriminant validity was established through both the Fornell-Larcker criterion (as shown in Table 2's diagonal elements exceeding inter-construct correlations) and HTMT ratios (Table 3) ranging from 0.412 to 0.589, well below the conservative threshold of 0.85.

4.2 Structural Model Assessment

The structural model was evaluated using maximum likelihood estimation in AMOS 26.0. The model demonstrated satisfactory fit indices: $\chi^2/df = 2.426$ ($p < .001$), CFI = 0.943, TLI = 0.939, RMSEA = 0.052 (90% CI: 0.046-0.058), and SRMR = 0.045, indicating good model fit according to established thresholds (Hu & Bentler, 1999).

Table 4: Results of Hypothesis Testing - Direct Effects

Hypothesis	Path	Standardized Coefficient (β)	t-value	p-value	Result
H1a	Institutional Trust → DFB	0.324	6.847	< .001	Supported
H1b	Technological Trust → DFB	0.356	7.234	< .001	Supported
H1c	Social Trust → DFB	0.287	5.923	< .001	Supported
H2a	Security Risks → DFB	-0.312	-6.456	< .001	Supported
H2b	Privacy Concerns → DFB	-0.289	-5.978	< .001	Supported

Table 5: Mediation Analysis Results

Indirect Path	Direct Effect	Indirect Effect	Total Effect	VAF	Result
TD → DFL → DFB	0.324***	0.167***	0.491***	34.01%	Partial Mediation
FRP → DFL → DFB	-0.312***	-0.143***	-0.455***	31.43%	Partial Mediation

Note: *** p < .001; VAF = Variance Accounted For

Table 6: Moderation Analysis Results

Interaction Path	Path Coefficient	t-value	p-value	Result
TD × IS → DFB	0.234	4.867	< .001	Significant
FRP × IS → DFB	-0.198	-4.234	< .001	Significant

The structural model explained substantial variance in the endogenous variables with R^2 values of 0.567 for digital financial behavior and 0.489 for digital financial literacy. The effect sizes (f^2) for significant relationships ranged from 0.156 to 0.345, indicating medium to large effects according to Cohen's (1988) guidelines.

4.3 Fuzzy-set Qualitative Comparative Analysis (fsQCA)

Following the SEM analysis, fsQCA was conducted to identify complex configurational patterns leading to high digital financial behavior. The calibration process followed Ragin's (2008) direct method using three qualitative anchors: full membership (95th percentile), crossover point (median), and full non-membership (5th percentile).

Table 7: fsQCA Calibration Values

Construct	Full Membership (0.95)	Crossover (0.50)	Full Non-membership (0.05)
Trust Dynamics	4.75	3.50	2.25
Fraud Risk Perception	4.80	3.45	2.20
Digital Financial Literacy	4.85	3.55	2.30
Institutional Support	4.70	3.40	2.15
Digital Financial Behavior	4.80	3.50	2.25

Table 8: fsQCA Solutions for High Digital Financial Behavior

Solution Path	Raw Coverage	Unique Coverage	Consistency	Solution
TD~*FRP*DFL	0.456	0.123	0.892	1
TD*IS*DFL	0.423	0.098	0.878	2
~FRP*DFL*IS	0.412	0.087	0.867	3

Note:

- TD = Trust Dynamics; FRP = Fraud Risk Perception; DFL = Digital Financial Literacy; IS = Institutional Support
- ~ indicates absence of condition

The fsQCA results revealed three main configurational paths leading to high digital financial behavior, with an overall solution coverage of 0.687 and consistency of 0.879, exceeding the recommended thresholds (Ragin, 2008).

5. DISCUSSION OF RESEARCH RESULTS AND CONCLUSIONS

The empirical findings of this study provide comprehensive insights into the mechanisms driving digital financial behavior in Vietnam's emerging FinTech ecosystem. The results validate and extend existing theoretical frameworks while offering several notable contributions to the literature on digital financial inclusion.

First, the significant positive influence of trust dynamics on digital financial behavior aligns with previous findings by McKnight et al. (2002) and Gefen et al. (2003). However, this study's dimensional analysis reveals that technological trust ($\beta = 0.356$) exhibits a stronger influence than institutional trust ($\beta = 0.324$) and social trust ($\beta = 0.287$). This finding extends Kim and Prabhakar's (2004) work by demonstrating the evolving nature of trust hierarchies in digital financial services, particularly in emerging markets where technological infrastructure may precede institutional development.

The negative impact of fraud risk perception on digital financial behavior ($\beta = -0.312$ for security risks; $\beta = -0.289$ for privacy concerns) supports the loss aversion principles of prospect theory (Kahneman & Tversky, 1979). However, the magnitude of these effects is notably smaller than those reported in developed markets by Zhou (2012), suggesting that emerging market consumers may demonstrate different risk tolerance patterns in pursuit of financial inclusion benefits.

The mediating role of digital financial literacy emerged as a crucial mechanism, explaining approximately one-third of the total effects (VAF = 34.01% for trust dynamics; 31.43% for fraud risk perception). This finding extends Warschauer's (2004) digital divide framework by demonstrating how financial literacy acts as a capability multiplier, enhancing the positive effects of trust while buffering against risk perceptions. The results align with but expand upon Kim and Kankanhalli's (2009) technology adoption studies by specifically highlighting the educational pathway to digital financial inclusion.

The fsQCA results reveal three distinct configurational paths to high digital financial behavior, demonstrating the equifinality principle in digital financial inclusion. The most empirically relevant solution combines high trust dynamics with low fraud risk perception and high digital literacy (raw coverage = 0.456), supporting Beck et al.'s (2007) assertions about the complementarity of enabling factors in financial inclusion. This finding particularly resonates with Allen et al.'s (2016) work on institutional environments in emerging markets, while adding nuanced insights about configuration-specific pathways.

The moderating effect of institutional support on both trust dynamics ($\beta = 0.234$) and fraud risk perception ($\beta = -0.198$) underscores the crucial role of regulatory frameworks in shaping digital financial behavior. This finding extends the institutional perspective of Demirgüç-Kunt and Klapper (2013) by demonstrating how supportive institutional environments can simultaneously enhance trust effects while mitigating risk concerns.

This study makes several theoretical contributions. First, it provides an integrated model that simultaneously considers trust-building and risk-inhibiting factors in digital financial behavior, addressing the fragmented nature of previous research. Second, it establishes digital financial literacy as a crucial mediating mechanism, offering a more nuanced understanding of how educational interventions can promote digital financial inclusion. Third, the identification of multiple configurational paths through fsQCA provides a more sophisticated understanding of the complex conditions leading to digital financial inclusion.

From a practical perspective, these findings suggest that policymakers and FinTech providers in emerging markets should adopt a multi-faceted approach to promoting digital financial inclusion. This includes strengthening technological infrastructure, enhancing institutional frameworks, and investing in digital financial education programs. The results particularly emphasize the importance of building technological trust while simultaneously addressing security and privacy concerns through robust institutional support mechanisms.

The study's limitations include its cross-sectional nature and focus on Vietnam, which may limit generalizability to other emerging markets. Future research could employ longitudinal designs to examine how trust dynamics and risk perceptions evolve over time, particularly as institutional frameworks mature and technological capabilities advance.

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