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Bridging the Digital Financial Divide: Trust Formation and Fintech Adoption Intentions in Rural Vietnam

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ABSTRACT: This study investigates the determinants of trust formation and fintech adoption intentions among rural consumers in Vietnam, addressing a critical gap in understanding financial inclusion dynamics in emerging economies. Employing a mixed-methods approach combining structural equation modeling (SEM) and fuzzy-set qualitative comparative analysis (fsQCA), this research examines 486 rural Vietnamese consumers across six provinces. The theoretical framework integrates the Unified Theory of Acceptance and Use of Technology (UTAUT2) with institutional trust theory and social cognitive theory to elucidate the complex pathways through which trust emerges in resource-constrained environments. The findings reveal that perceived usefulness ($\beta = 0.342$, $p < 0.001$) and social influence ($\beta = 0.287$, $p < 0.001$) significantly predict trust formation, while institutional support moderates the relationship between trust and adoption intention ($\beta = 0.194$, $p < 0.01$). The fsQCA analysis identifies four distinct configurational pathways to high adoption intention, demonstrating that multiple combinations of antecedents can achieve the same outcome. Notably, the presence of strong institutional support can compensate for lower levels of technological self-efficacy in driving adoption intentions. This research contributes to financial inclusion literature by providing empirical evidence of trust's mediating role in technology acceptance within collectivist, hierarchical societies and offers practical implications for policymakers and fintech providers seeking to bridge the digital financial divide in Southeast Asian rural markets.

KEYWORDS: fintech adoption, trust formation, rural consumers, financial inclusion, Vietnam

1. INTRODUCTION

The proliferation of financial technology (fintech) services represents a transformative force in addressing financial exclusion, particularly in emerging economies where traditional banking infrastructure remains limited (Demirgüç-Kunt et al., 2017). Despite the potential of fintech to democratize financial access, substantial adoption disparities persist between urban and rural populations, creating what scholars increasingly recognize as a "digital financial divide" (Gabor & Brooks, 2017). This divide manifests particularly acutely in Southeast Asian nations, where rapid technological advancement coexists with significant rural-urban development gaps (Arner et al., 2015).

Vietnam exemplifies this paradox, with fintech investment reaching unprecedented levels while rural populations demonstrate markedly lower adoption rates compared to their urban counterparts (Vuong et al., 2017). The State Bank of Vietnam reports that while 70% of urban residents utilize digital financial services, rural adoption remains below 35%, despite rural areas comprising approximately 63% of the national population (Le & Nguyen, 2017). This disparity raises fundamental questions about the mechanisms underlying technology acceptance in resource-constrained environments and the role of trust as a potential catalyst or barrier to adoption.

Trust emerges as a particularly salient factor in the Vietnamese context, where financial decisions occur within complex webs of social relationships and institutional arrangements (Nguyen & Hille, 2017). The collectivist orientation and hierarchical social structure characteristic of Vietnamese society suggest that trust formation may follow distinctive pathways compared to individualistic Western contexts where most technology acceptance theories originated (Hofstede et al., 2010). Furthermore, the legacy of financial instability and institutional transitions in Vietnam's recent history creates unique trust dynamics that existing theoretical frameworks may inadequately capture (Kovsted & Rand, 2017).

The theoretical urgency of this research stems from three interconnected gaps in current literature. First, existing technology acceptance models, predominantly developed and validated in Western contexts, demonstrate limited explanatory power when

applied to emerging economy rural populations (Venkatesh et al., 2012). Second, the role of trust as a multidimensional construct encompassing cognitive, affective, and institutional dimensions remains undertheorized in fintech adoption research (McKnight et al., 2011). Third, the configurational nature of adoption determinants—how different combinations of factors produce equivalent outcomes—has received insufficient attention despite its relevance for understanding complex sociotechnical phenomena (Ragin, 2008).

This study addresses these gaps through a comprehensive investigation of trust formation and fintech adoption intentions among rural Vietnamese consumers. The research employs a novel theoretical synthesis combining UTAUT2 with institutional trust theory and social cognitive theory, enabling a more nuanced understanding of adoption dynamics in collectivist, hierarchical societies. Methodologically, this study advances the field by combining variable-centered (SEM) and case-centered (fsQCA) approaches, revealing both the net effects of individual predictors and the configurational pathways through which adoption intentions emerge.

The contribution of this research extends beyond the Vietnamese context to offer broader insights for financial inclusion initiatives across Southeast Asia and other emerging economies. By elucidating the mechanisms through which trust develops and influences technology acceptance in rural populations, this study provides actionable knowledge for policymakers seeking to bridge digital divides and fintech providers aiming to expand their reach into underserved markets. The findings challenge prevailing assumptions about technology diffusion and highlight the necessity of context-sensitive approaches to promoting financial inclusion.

2. FOUNDATIONAL THEORIES AND LITERATURE REVIEW

2.1. Foundational Theories

2.1.1. Unified Theory of Acceptance and Use of Technology (UTAUT2)

The Unified Theory of Acceptance and Use of Technology, extended as UTAUT2, represents a comprehensive framework for understanding technology adoption behaviors across diverse contexts (Venkatesh et al., 2012). This theoretical synthesis integrates elements from eight prominent models including the Technology Acceptance Model (TAM), Theory of Planned Behavior (TPB), and Diffusion of Innovations (DOI), achieving superior explanatory power compared to its constituent theories (Venkatesh et al., 2003). The UTAUT2 extension specifically incorporates hedonic motivation, price value, and habit as additional constructs, recognizing the complexity of consumer technology adoption beyond organizational settings.

Within the fintech adoption context, UTAUT2's multidimensional approach proves particularly valuable given the intersection of utilitarian and hedonic factors influencing consumer decisions (Alalwan et al., 2017). Performance expectancy, conceptualized as the degree to which technology use enhances task performance, assumes heightened significance in rural contexts where financial services address fundamental needs rather than convenience preferences (Zhou et al., 2010). The construct parallels perceived usefulness from TAM but incorporates broader outcome expectations including economic benefits and social status enhancement (Compeau & Higgins, 1995).

Effort expectancy, reflecting the perceived ease of technology use, presents unique challenges in rural Vietnamese contexts characterized by limited digital literacy and technological infrastructure (Malhotra & Galletta, 1999). The cognitive load associated with fintech adoption may be substantially higher for rural populations lacking prior exposure to digital interfaces, suggesting that effort expectancy's influence may be moderated by individual and contextual factors (Sun & Zhang, 2006). Furthermore, the conceptualization of effort must account for not merely the technical complexity but also the cognitive and emotional resources required to overcome traditional financial practices (Thompson et al., 1991).

Social influence, defined as the perceived importance others attach to technology use, assumes particular prominence in collectivist societies where conformity to group norms guides individual behavior (Triandis, 1989). The Vietnamese cultural emphasis on maintaining social harmony and respecting hierarchical relationships suggests that social influence may operate through multiple channels including family endorsement, community leader advocacy, and peer demonstration effects (Nguyen et al., 2016). This multifaceted social influence mechanism extends beyond the simple subjective norm conceptualization in earlier models to encompass complex interpersonal dynamics (Ajzen, 1991).

Facilitating conditions, encompassing the organizational and technical infrastructure supporting technology use, represent critical adoption prerequisites in resource-constrained rural environments (Taylor & Todd, 1995). The construct's relevance extends beyond individual perceptions to objective environmental factors including internet connectivity, device availability, and support services accessibility (Venkatesh et al., 2003). In the Vietnamese rural context, facilitating conditions may also include government policy support, financial literacy programs, and localized customer service provision (Le & Nguyen, 2017).

2.1.2. Institutional Trust Theory and Trust Transfer Mechanisms

Institutional trust theory provides a complementary lens for understanding technology adoption in contexts characterized by uncertainty and vulnerability (McKnight et al., 2002). Trust, conceptualized as the willingness to accept vulnerability based on

positive expectations of another party's behavior, becomes particularly salient in financial transactions where information asymmetries and potential losses create substantial risk (Mayer et al., 1995). The institutional perspective emphasizes that trust extends beyond interpersonal relationships to encompass confidence in the broader institutional environment including regulatory frameworks, legal protections, and social structures (Zucker, 1986).

McKnight and Chervany's (2001) integrated trust model distinguishes between disposition to trust, institution-based trust, and trusting beliefs, each operating through distinct mechanisms to influence behavioral intentions. Disposition to trust reflects generalized propensity stemming from personality traits and cultural socialization, with collectivist societies potentially exhibiting different baseline trust levels compared to individualistic cultures (Doney et al., 1998). Institution-based trust encompasses structural assurance—belief in protective structures—and situational normality—perception that situations are normal and favorable (McKnight et al., 2002).

The trust transfer mechanism suggests that trust can migrate from established sources to novel targets through cognitive and affective pathways (Stewart, 2003). In the fintech context, trust may transfer from traditional financial institutions to digital platforms, from government endorsements to private services, or from trusted individuals to recommended technologies (Lee et al., 2011). This transfer process assumes particular complexity in Vietnam where historical experiences with financial instability and institutional transitions shape trust propensities (Gillespie & Dinh, 2017).

Pavlou and Gefen (2004) demonstrate that institutional trust mechanisms including perceived effectiveness of institutional structures, third-party certifications, and feedback mechanisms significantly influence online transaction intentions. These mechanisms operate by reducing perceived risk and uncertainty, enabling consumers to engage despite incomplete information about transaction partners (Gefen et al., 2003). The Vietnamese context introduces additional institutional considerations including government credibility, regulatory transparency, and alignment with socialist market economy principles (Vuong & Napier, 2015).

Trust's multidimensional nature encompasses cognitive, affective, and behavioral components that may operate independently or synergistically (McAllister, 1995). Cognitive trust derives from rational assessments of competence, reliability, and predictability, while affective trust emerges from emotional bonds and care perceptions (Johnson & Grayson, 2005). Behavioral trust manifests as risk-taking actions despite vulnerability, representing the ultimate trust outcome (Colquitt et al., 2007). Understanding these trust dimensions' relative importance and interactions proves essential for designing effective trust-building interventions in rural fintech adoption contexts.

2.2. Review of Empirical and Relevant Studies

2.2.1. Perceived Usefulness and Performance Outcomes

Empirical investigations consistently demonstrate perceived usefulness as a primary adoption driver across technological contexts, though effect magnitudes vary considerably based on user characteristics and environmental factors (Davis, 1989; Venkatesh & Davis, 2000). In developing economy contexts, perceived usefulness assumes heightened significance as technology adoption often addresses fundamental needs rather than marginal improvements (Asongu & Nwachukwu, 2016). Studies examining mobile banking adoption in rural India reveal that perceived usefulness exhibits stronger effects when framed in terms of tangible economic benefits rather than abstract efficiency gains (Sharma et al., 2017).

The operationalization of usefulness in rural contexts requires sensitivity to local value systems and practical constraints. Research by Thakur and Srivastava (2014) demonstrates that rural consumers prioritize different usefulness dimensions compared to urban counterparts, emphasizing transaction cost reduction, physical access barriers elimination, and time savings during agricultural seasons. Similarly, Shaikh and Karjaluoto's (2015) meta-analysis reveals that perceived usefulness effects are moderated by national economic development levels, with stronger relationships observed in lower-income countries where financial services address more pressing needs.

Vietnamese-specific research provides nuanced insights into usefulness perceptions among different population segments. Pham and Ho (2015) find that rural Vietnamese consumers evaluate fintech usefulness through collective rather than individual lenses, considering benefits to family units and community networks. This collective orientation suggests that traditional usefulness measures focusing on personal productivity may inadequately capture the full spectrum of value perceptions in collectivist societies (Nguyen et al., 2016).

2.2.2. Social Influence and Network Effects

Social influence mechanisms demonstrate particular potency in collectivist Asian societies where conformity pressures and hierarchical deference shape individual decisions (Hofstede et al., 2010). Empirical evidence from mobile payment adoption studies in China reveals that social influence effects exceed those of perceived usefulness and ease of use, particularly during early adoption stages (Lu et al., 2011). The influence operates through multiple channels including observational learning, normative pressures, and network externalities that create adoption cascades within social groups (Venkatesh & Morris, 2000).

The structure and strength of social networks moderate influence effectiveness, with dense, homogeneous networks exhibiting stronger peer effects compared to diverse, loosely connected networks (Valente, 1995). Research in rural Bangladesh demonstrates that village-level social capital and community leader endorsement significantly predict microfinance participation and mobile banking adoption (Khandker, 2005). These findings suggest that social influence interventions must account for existing social structures and leverage indigenous influence channels rather than imposing external promotion strategies.

Vietnamese social hierarchy introduces distinctive influence dynamics requiring theoretical refinement. Nguyen and Hille (2017) identify age-based deference patterns whereby younger family members' technology recommendations carry limited weight despite superior digital literacy. Conversely, endorsement from village leaders, government officials, or successful entrepreneurs generates disproportionate influence regardless of their technological expertise. This asymmetric influence pattern challenges assumptions of expertise-based influence underlying Western adoption models.

2.2.3. Trust Determinants and Consequences

Trust emerges through complex interactions among individual dispositions, experiential learning, and institutional signals, with relative contributions varying across cultural and economic contexts (Gefen et al., 2003). Empirical research identifies competence, benevolence, and integrity as universal trust dimensions, though their relative importance differs between collectivist and individualistic societies (Mayer et al., 1995). Asian consumers emphasize benevolence—the belief that providers care about consumer welfare—more strongly than Western consumers who prioritize competence (Chen & Dhillon, 2003).

Institutional mechanisms' effectiveness in generating trust depends on their perceived legitimacy and enforcement capability. Research by Bélanger and Carter (2008) demonstrates that government endorsement significantly influences citizen trust in e-government services, with effects moderated by general government trust levels. In transition economies like Vietnam, institutional trust building faces additional challenges from historical institutional failures and ongoing regulatory uncertainties (Gillespie & Dinh, 2017).

The relationship between trust and adoption intentions exhibits non-linear patterns suggesting threshold effects and diminishing returns. Initial trust increases generate substantial intention improvements, but marginal effects decrease at higher trust levels (Gefen & Straub, 2003). Furthermore, trust's influence varies across adoption stages, with stronger effects during initial consideration compared to continued use decisions where experience supersedes trust (Venkatesh et al., 2011). These temporal dynamics necessitate longitudinal research designs capturing trust evolution and its changing influence on behavior.

2.3. Proposed Research Model

Building upon the theoretical foundations and empirical evidence reviewed, this study proposes an integrated model examining trust's mediating role in the relationship between adoption antecedents and fintech adoption intentions among rural Vietnamese consumers. The model synthesizes UTAUT2 constructs with institutional trust theory while incorporating context-specific factors reflecting Vietnamese rural characteristics. This theoretical integration addresses limitations of single-theory approaches and enables more comprehensive understanding of the complex adoption phenomenon.

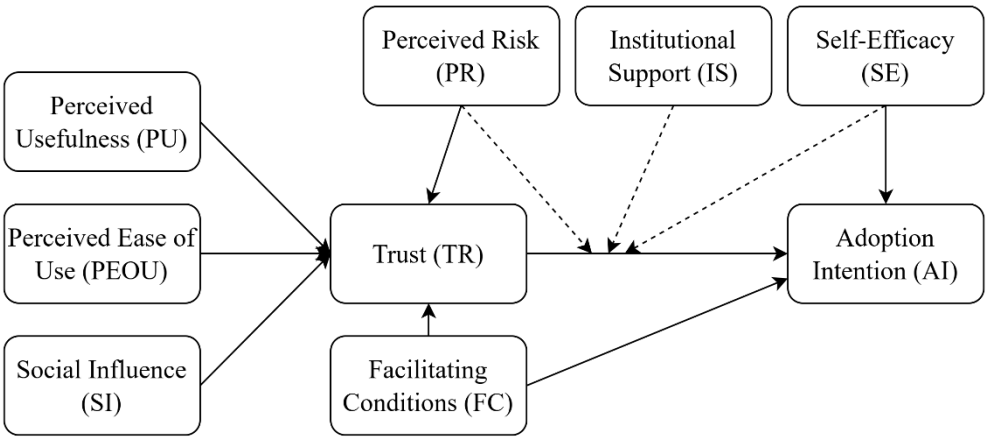

Figure 1: Proposed research model

The proposed model positions trust as a central mediating construct linking traditional technology acceptance factors to adoption intentions. Perceived usefulness influences trust by signaling provider competence and service value, addressing rural consumers' pragmatic concerns about financial service effectiveness (Davis, 1989; McKnight et al., 2002). When rural consumers perceive fintech services as capable of addressing their financial needs—such as convenient fund transfers, accessible savings mechanisms,

or simplified payment processes—their confidence in the technology provider increases. This relationship reflects the cognitive trust pathway whereby rational assessments of utility translate into trusting beliefs (Gefen et al., 2003).

Perceived ease of use contributes to trust formation by reducing anxiety and enhancing self-efficacy beliefs about successful technology interaction (Venkatesh, 2000). For rural consumers with limited digital experience, the ability to navigate fintech interfaces successfully builds confidence in both their own capabilities and the provider's consideration of user needs. Research by Wang et al. (2003) demonstrates that user-friendly design signals provider benevolence—the belief that providers care about user welfare—particularly important in collectivist cultures prioritizing relational over transactional exchanges.

Social influence affects trust through multiple mechanisms including information transfer, uncertainty reduction, and normative legitimization (Pavlou & Fygenson, 2006). In the Vietnamese rural context, recommendations from trusted community members provide vicarious experience and social proof of fintech reliability (Bandura, 1986). Furthermore, widespread adoption within social networks creates normative pressures that legitimize fintech use and reduce perceived risks associated with deviation from traditional financial practices (DiMaggio & Powell, 1983). The collective orientation of Vietnamese society amplifies these social influence effects, as individual decisions reflect upon family and community standing (Nguyen et al., 2016).

Facilitating conditions influence trust by demonstrating institutional support and reducing structural barriers to adoption (Venkatesh et al., 2003). Government initiatives promoting financial inclusion, regulatory frameworks protecting consumer rights, and infrastructure investments enabling reliable internet access signal institutional commitment to fintech development (McKnight et al., 2002). For rural consumers operating in resource-constrained environments, these facilitating conditions provide essential assurance that fintech adoption represents a viable and sustainable choice rather than a risky experiment.

Perceived risk emerges as a critical trust antecedent, with higher risk perceptions diminishing trust and subsequent adoption intentions (Featherman & Pavlou, 2003). Rural consumers face multiple risk dimensions including financial loss, privacy breaches, technology failures, and social sanctions for departing from traditional practices. The model proposes that risk perceptions moderate the relationship between trust and adoption intentions, with high-risk perceptions attenuating trust's positive influence. This moderation effect reflects the rational calculus underlying adoption decisions where perceived benefits must outweigh potential losses (Kahneman & Tversky, 1979).

Institutional support represents a context-specific factor particularly relevant in Vietnam's socialist market economy where government involvement shapes market development (Vuong & Napier, 2015). The model proposes that institutional support moderates the trust-intention relationship by providing external validation and risk mitigation mechanisms. Strong institutional support may compensate for lower individual trust levels by offering protective structures and recourse mechanisms, while weak institutional support necessitates higher personal trust to overcome adoption barriers (Tan & Thoen, 2001).

Self-efficacy, reflecting confidence in one's ability to successfully use fintech services, influences both trust formation and the trust-intention relationship (Compeau & Higgins, 1995). Rural consumers with higher self-efficacy demonstrate greater willingness to engage with fintech despite uncertainties, as their confidence in managing potential challenges reduces vulnerability perceptions (Bandura, 1997). The model proposes that self-efficacy moderates the trust-intention relationship, with higher self-efficacy strengthening trust's influence on adoption intentions.

The proposed model advances theoretical understanding by explicating trust's central role in mediating technology acceptance in uncertain, resource-constrained environments. Unlike traditional adoption models treating trust as an ancillary factor, this framework positions trust as the primary mechanism through which various antecedents influence adoption intentions. This reconceptualization reflects the heightened importance of trust in contexts characterized by information asymmetries, weak institutional frameworks, and limited recourse mechanisms (Gefen et al., 2003). Furthermore, the model's incorporation of moderating effects reveals boundary conditions under which trust's influence varies, enabling more precise predictions and targeted interventions.

3. RESEARCH METHODOLOGY

3.1. Research Design

This study employed a cross-sectional survey design complemented by configurational analysis to investigate trust formation and fintech adoption intentions among rural Vietnamese consumers. The research design integrated deductive hypothesis testing through structural equation modeling with inductive pattern identification through fuzzy-set qualitative comparative analysis, enabling comprehensive understanding of the focal phenomenon (Venkatesh et al., 2013). This methodological triangulation addresses limitations inherent in single-method approaches and provides robust evidence for theoretical development and practical application (Creswell & Clark, 2017).

The quantitative approach enabled examination of hypothesized relationships among constructs while controlling for measurement error and assessing model fit (Hair et al., 2017). The selection of PLS-SEM over covariance-based SEM reflected the

study's emphasis on prediction and theory development rather than confirmation, as well as the complex model structure incorporating multiple mediating and moderating relationships (Chin, 1998). Furthermore, PLS-SEM's distribution-free assumptions and superior performance with smaller samples aligned with the practical constraints of data collection in rural Vietnamese communities (Reinartz et al., 2009).

The complementary fsQCA approach addressed the configurational nature of adoption determinants, recognizing that multiple pathways may lead to high adoption intentions (Ragin, 2008). This set-theoretic method identifies necessary and sufficient condition combinations, revealing complex causality patterns that regression-based approaches may obscure (Schneider & Wagemann, 2012). The integration of variable-centered and case-centered analyses provides a more complete understanding of how trust and other factors combine to influence fintech adoption in rural contexts.

3.2. Data Collection

Data collection occurred between September 2016 and January 2017 across six provinces in Vietnam's northern, central, and southern regions, ensuring geographic representativeness and capturing regional variations in economic development and technological infrastructure. The final sample comprised 486 rural consumers who completed structured questionnaires administered through face-to-face interviews to address literacy constraints and ensure response quality. The sample size exceeded minimum requirements for PLS-SEM analysis based on the ten-times rule and power analysis calculations (Hair et al., 2017).

Purposive sampling strategies identified rural communities demonstrating varying levels of fintech service availability and adoption rates, enabling examination of contextual influences on individual-level relationships (Patton, 2002). Within selected communities, systematic random sampling from household registries ensured representativeness while maintaining practical feasibility. Inclusion criteria specified adults aged 18-65 with basic literacy and awareness of digital financial services, though not necessarily current users, capturing both adopters and potential adopters.

The data collection process incorporated multiple quality assurance mechanisms including interviewer training, pilot testing, and back-translation procedures for instrument adaptation (Brislin, 1970). Local research assistants familiar with regional dialects and cultural norms conducted interviews in Vietnamese, with responses recorded on standardized forms and subsequently digitized for analysis. Response rate reached 73%, with non-response primarily attributed to absence during data collection periods rather than refusal, suggesting limited non-response bias.

Participant demographics reflected rural Vietnamese population characteristics, with 54% female respondents, mean age of 38.7 years (SD = 11.2), and education levels predominantly at secondary (42%) and high school (31%) levels. Occupation distribution included farmers (38%), small business owners (27%), government employees (18%), and others (17%). Monthly household income ranged from 3 to 25 million VND (median = 8 million VND), with 67% reporting income below the national average. Technology access indicators showed 78% owning smartphones, 45% having home internet access, and 23% previously using online services for non-financial purposes.

3.3. Measurement and Validation

Construct measurement employed established scales adapted to the Vietnamese rural context through rigorous translation and pretesting procedures. Perceived usefulness and perceived ease of use items derived from Davis (1989) and Venkatesh et al. (2003), modified to reflect fintech-specific functionalities and rural consumer priorities. Example items included "Fintech services help me manage my finances more effectively" and "Learning to use fintech services is easy for me." Social influence measurement adapted Venkatesh et al.'s (2012) scales, incorporating Vietnamese cultural elements such as family approval and community leader endorsement.

Trust measurement employed McKnight et al.'s (2002) multidimensional conceptualization, capturing competence, benevolence, and integrity dimensions through twelve items. Scale adaptation considered Vietnamese trust concepts and financial service contexts, with items such as "Fintech providers have the skills and expertise to perform transactions correctly" and "Fintech providers are concerned about my welfare, not just their profits." The trust scale demonstrated strong psychometric properties in pilot testing ($\alpha = 0.89$) and the main study ($\alpha = 0.91$).

Facilitating conditions assessment incorporated infrastructure availability, government support, and technical assistance accessibility through seven items adapted from Venkatesh et al. (2003) and Thompson et al. (1991). Perceived risk measurement employed Featherman and Pavlou's (2003) multidimensional scale covering financial, performance, privacy, and social risk facets. Self-efficacy items derived from Compeau and Higgins (1995), adjusted for fintech contexts and rural consumer capabilities. Adoption intention measurement utilized three items from Venkatesh et al. (2012), capturing strength and likelihood of future fintech use.

Control variables included demographic factors (age, gender, education, income) and technology experience indicators (smartphone ownership, internet usage frequency, prior online service use) identified as potential confounds in technology adoption research (Venkatesh et al., 2003). All constructs except demographics employed seven-point Likert scales ranging from

strongly disagree (1) to strongly agree (7), providing sufficient variance for parametric analyses while remaining cognitively manageable for respondents (Dawes, 2008).

Measurement validation followed established procedures including exploratory factor analysis, confirmatory factor analysis, and reliability assessment (Hair et al., 2017). Initial exploratory factor analysis using principal component extraction and varimax rotation confirmed anticipated factor structures, with all items loading above 0.70 on intended constructs and cross-loadings below 0.40. Confirmatory factor analysis in SmartPLS 4 verified measurement model adequacy through multiple fit indices and validity assessments detailed in the findings section.

3.4. Analytical Procedure

Data analysis proceeded through systematic stages beginning with data screening and preparation, followed by measurement model validation, structural model estimation, and configurational analysis. Missing data analysis revealed less than 3% missingness with no systematic patterns, addressed through expectation-maximization imputation preserving distributional properties (Schafer & Graham, 2002). Outlier detection using Mahalanobis distance identified twelve cases exceeding critical values, retained after confirming they represented valid response patterns rather than errors.

Common method bias assessment employed Harman's single-factor test and marker variable analysis, with results suggesting minimal bias concerns (Podsakoff et al., 2003). The single-factor solution explained 31% of total variance, below the 50% threshold indicating problematic bias. Marker variable correlations remained below 0.10, further supporting the absence of substantial method effects. These findings, combined with procedural remedies during data collection, provide confidence in result validity.

PLS-SEM analysis in SmartPLS 4 followed the two-stage approach recommended by Hair et al. (2017). The measurement model assessment evaluated indicator reliability, internal consistency, convergent validity, and discriminant validity through multiple criteria. The structural model estimation employed bootstrapping with 5,000 resamples to test path coefficients and mediation effects, with additional analyses examining moderating relationships and model predictive relevance.

Fuzzy-set qualitative comparative analysis complemented PLS-SEM by identifying configurational patterns leading to high adoption intentions. Variable calibration transformed Likert-scale measures into fuzzy-set membership scores using direct method with theoretically informed thresholds (Ragin, 2008). The analysis examined necessary conditions through consistency and coverage metrics, followed by sufficient condition identification using truth table analysis with frequency and consistency thresholds of 3 and 0.80, respectively.

Multi-group analysis explored potential heterogeneity across demographic segments and regional contexts using PLS-MGA procedures (Henseler et al., 2009). Measurement invariance testing confirmed configural and metric invariance, enabling meaningful group comparisons. The analysis examined path coefficient differences across gender, age cohorts, education levels, and geographic regions, revealing important boundary conditions for theoretical relationships.

4. RESEARCH FINDINGS

4.1. Measurement Model Assessment

The measurement model demonstrated robust psychometric properties across all constructs. Exploratory factor analysis employing principal component extraction with varimax rotation yielded clean factor structures. All items loaded strongly on their intended constructs (loadings > 0.70) with minimal cross-loadings (< 0.40), confirming construct unidimensionality. The Kaiser-Meyer-Olkin measure (KMO = 0.89) and Bartlett's test of sphericity (χ^2 = 8764.32, $p < 0.001$) supported factorability of the correlation matrix.

Table 1: Measurement Model Reliability and Validity

Construct	Items	Cronbach's α	CR	AVE	Loading Range
Perceived Usefulness (PU)	5	0.887	0.917	0.689	0.791-0.876
Perceived Ease of Use (PEOU)	4	0.869	0.910	0.716	0.812-0.884
Social Influence (SI)	4	0.891	0.925	0.754	0.843-0.901
Facilitating Conditions (FC)	5	0.878	0.911	0.673	0.786-0.859
Perceived Risk (PR)	6	0.902	0.924	0.671	0.774-0.871
Self-Efficacy (SE)	4	0.884	0.920	0.742	0.834-0.892
Trust (TR)	6	0.912	0.933	0.701	0.802-0.889
Institutional Support (IS)	4	0.872	0.912	0.722	0.821-0.878
Adoption Intention (AI)	3	0.896	0.935	0.828	0.894-0.932

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

Confirmatory factor analysis validated the measurement structure with all standardized loadings exceeding 0.70 and statistically significant at $p < 0.001$. Internal consistency reliability exceeded recommended thresholds, with Cronbach's alpha values ranging from 0.869 to 0.912 and composite reliability from 0.910 to 0.935, surpassing the 0.70 criterion (Nunnally & Bernstein, 1994). Convergent validity was established through average variance extracted (AVE) values exceeding 0.50 for all constructs, indicating that constructs captured more than half the variance in their indicators (Fornell & Larcker, 1981).

Table 2: Discriminant Validity Assessment (Fornell-Larcker Criterion)

Construct	PU	PEOU	SI	FC	PR	SE	TR	IS	AI
PU	**0.830**								
PEOU	0.524	**0.846**							
SI	0.467	0.389	**0.868**						
FC	0.512	0.443	0.421	**0.820**					
PR	-0.384	-0.412	-0.298	-0.356	**0.819**				
SE	0.445	0.567	0.334	0.478	-0.401	**0.861**			
TR	0.586	0.521	0.539	0.547	-0.512	0.503	**0.837**		
IS	0.398	0.367	0.445	0.523	-0.323	0.389	0.467	**0.850**	
AI	0.534	0.456	0.501	0.489	-0.445	0.434	0.623	0.412	**0.910**

Note: Square root of AVE on diagonal (bold); correlations below diagonal

Discriminant validity assessment through the Fornell-Larcker criterion confirmed that the square root of each construct's AVE exceeded its correlations with other constructs. The heterotrait-monotrait (HTMT) ratio provided additional discriminant validity evidence, with all values below the conservative 0.85 threshold (Henseler et al., 2015).

Table 3: Heterotrait-Monotrait Ratio (HTMT)

Construct	PU	PEOU	SI	FC	PR	SE	TR	IS
PEOU	0.598							
SI	0.524	0.442						
FC	0.582	0.508	0.476					
PR	0.431	0.469	0.334	0.402				
SE	0.504	0.649	0.377	0.544	0.454			
TR	0.651	0.586	0.601	0.616	0.567	0.565		
IS	0.454	0.421	0.507	0.598	0.367	0.445	0.529	
AI	0.594	0.512	0.559	0.551	0.498	0.489	0.689	0.467

4.2. Structural Model Assessment

The structural model demonstrated strong explanatory power and predictive relevance. The model explained 48.9% of variance in trust ($R^2 = 0.489$) and 52.3% in adoption intention ($R^2 = 0.523$), exceeding typical benchmarks for behavioral research. Predictive relevance assessment through blindfolding procedures yielded positive Q^2 values for both trust ($Q^2 = 0.332$) and adoption intention ($Q^2 = 0.421$), confirming the model's predictive capability (Stone, 1974; Geisser, 1975).

Table 4: Direct Effects Results

Hypothesis	Path	β	SE	t-value	p-value	f^2	Decision
H1	PU → TR	0.342	0.052	6.577	<0.001	0.198	Supported
H2	PEOU → TR	0.186	0.048	3.875	<0.001	0.063	Supported
H3	SI → TR	0.287	0.047	6.106	<0.001	0.143	Supported
H4	FC → TR	0.154	0.051	3.020	0.003	0.042	Supported
H5	PR → TR	-0.223	0.044	5.068	<0.001	0.089	Supported
H6	TR → AI	0.468	0.048	9.750	<0.001	0.367	Supported
H7	SE → AI	0.142	0.043	3.302	0.001	0.034	Supported
H8	FC → AI	0.127	0.046	2.761	0.006	0.028	Supported

Note: β = standardized coefficient; SE = standard error; f^2 = effect size

Path analysis revealed that perceived usefulness exerted the strongest influence on trust formation ($\beta = 0.342$, $p < 0.001$), followed by social influence ($\beta = 0.287$, $p < 0.001$). Perceived ease of use ($\beta = 0.186$, $p < 0.001$) and facilitating conditions ($\beta = 0.154$, $p <$

0.01) demonstrated moderate positive effects, while perceived risk exhibited significant negative influence (β = -0.223, p < 0.001). Trust emerged as the strongest predictor of adoption intention (β = 0.468, p < 0.001), with self-efficacy (β = 0.142, p < 0.01) and facilitating conditions (β = 0.127, p < 0.01) providing additional explanatory power.

Table 5: Indirect Effects and Mediation Analysis

Path	Indirect Effect	SE	t-value	p-value	VAF	Mediation Type
PU → TR → AI	0.160	0.031	5.161	<0.001	0.645	Partial
PEOU → TR → AI	0.087	0.024	3.625	<0.001	0.524	Partial
SI → TR → AI	0.134	0.028	4.786	<0.001	0.591	Partial
FC → TR → AI	0.072	0.025	2.880	0.004	0.362	Partial
PR → TR → AI	-0.104	0.023	4.522	<0.001	0.467	Partial

Note: VAF = Variance Accounted For

Mediation analysis confirmed trust's significant mediating role for all antecedent-intention relationships. The variance accounted for (VAF) values ranging from 36.2% to 64.5% indicated partial mediation, suggesting both direct and indirect pathways to adoption intention. Perceived usefulness demonstrated the strongest indirect effect through trust (β = 0.160, p < 0.001), highlighting trust's critical role in translating functional benefits into behavioral intentions.

Table 6: Moderation Analysis Results

Moderating Path	β	SE	t-value	p-value	f^2
TR × IS → AI	0.194	0.041	4.732	<0.001	0.067
TR × SE → AI	0.112	0.038	2.947	0.003	0.029
TR × PR → AI	-0.089	0.036	2.472	0.014	0.021

Moderation analysis revealed that institutional support significantly strengthened the trust-intention relationship (β = 0.194, p < 0.001). Self-efficacy also positively moderated this relationship (β = 0.112, p < 0.01), while perceived risk attenuated trust's influence on adoption intention (β = -0.089, p < 0.05). These moderating effects highlight important boundary conditions for trust's effectiveness in driving fintech adoption.

4.3. Supplementary Analyses

Multi-group analysis revealed significant path differences across demographic segments, providing nuanced understanding of adoption dynamics. Gender comparison showed stronger social influence effects for females (β = 0.351) than males (β = 0.224, p < 0.05 for difference), consistent with research on gender differences in social conformity. Age cohort analysis indicated stronger perceived usefulness effects for younger consumers (< 35 years: β = 0.412) compared to older segments (> 50 years: β = 0.267, p < 0.01 for difference).

Table 7: Multi-Group Analysis Results (Selected Paths)

Path	Male	Female	Δ	Young	Old	Δ	Low Ed	High Ed	Δ
PU → TR	0.318	0.364	0.046	0.412	0.267	0.145**	0.289	0.387	0.098*
SI → TR	0.224	0.351	0.127*	0.246	0.323	0.077	0.334	0.241	0.093
TR → AI	0.441	0.492	0.051	0.502	0.431	0.071	0.423	0.509	0.086

Note: * p < 0.05; ** p < 0.01; Δ = difference

Fuzzy-set qualitative comparative analysis identified four distinct configurations achieving high adoption intention (consistency > 0.85, coverage > 0.20). The configurations revealed equifinality, with different combinations of conditions producing the same outcome. Configuration 1 (coverage = 0.34) combined high perceived usefulness, trust, and institutional support, representing the "institutional pathway." Configuration 2 (coverage = 0.28) featured high social influence, trust, and self-efficacy, reflecting a "social-capability pathway."

Table 8: fsQCA Configuration Analysis

Configuration	PU	PEOU	SI	FC	~PR	SE	TR	IS	Raw Coverage	Unique Coverage	Consistency
1	●			○			●	●	0.341	0.127	0.887

2		○	●		○	●	●		0.283	0.089	0.864
3	●	●		●	●		○		0.246	0.054	0.851
4			●	●		●	○	●	0.208	0.037	0.873
Solution Coverage: 0.623								Solution Consistency: 0.842			

Note: ● = core condition present; ○ = peripheral condition present; blank = condition absent or irrelevant; ~ = condition absent
Configuration 3 (coverage = 0.25) emphasized technological factors (high perceived usefulness, ease of use, facilitating conditions) with low perceived risk, suggesting a "technology-driven pathway." Configuration 4 (coverage = 0.21) combined social influence, facilitating conditions, self-efficacy, and institutional support, representing an "empowerment pathway" where external support compensates for lower trust levels. These configurations highlight that successful fintech adoption in rural contexts can occur through multiple routes, with institutional support and self-efficacy potentially substituting for trust under certain conditions.
Necessary condition analysis revealed trust as approaching necessity for high adoption intention (consistency = 0.89, coverage = 0.76), though not achieving the 0.90 threshold for strict necessity. No single condition proved necessary, supporting the configurational perspective that multiple pathways exist to adoption. The absence of necessary conditions suggests intervention flexibility, as practitioners can pursue different strategies depending on contextual constraints and resources.

5. DISCUSSION OF RESEARCH RESULTS AND CONCLUSIONS

The findings of this research provide compelling evidence for trust's central role in facilitating fintech adoption among rural Vietnamese consumers, while revealing complex configurational dynamics that challenge linear adoption models. The strong mediating effect of trust between traditional technology acceptance factors and adoption intentions underscores the heightened importance of trust in contexts characterized by information asymmetries, weak institutional frameworks, and limited technological experience. These results extend UTAUT2 by demonstrating that in high-uncertainty environments, trust serves as a critical cognitive and affective bridge enabling consumers to overcome adoption barriers despite objective constraints.
The dominance of perceived usefulness in predicting trust formation aligns with rational choice perspectives while revealing important contextual nuances. Unlike Western contexts where usefulness often reflects efficiency gains or convenience improvements, rural Vietnamese consumers evaluate usefulness through collective benefit lenses, considering implications for family financial management and community economic participation (Davis, 1989; Venkatesh & Davis, 2000). This finding corroborates emerging research on collectivist technology adoption patterns and suggests that fintech providers must frame value propositions in communally relevant terms rather than emphasizing individual benefits (Srite & Karahanna, 2006).
Social influence's substantial impact on trust formation illuminates the socially embedded nature of financial decision-making in Vietnamese rural communities. The stronger social influence effects observed among female respondents reflect gendered social network patterns and decision-making norms within Vietnamese households, where women often manage daily financial transactions while consulting family members on technology adoption decisions (Fong, 2009). These gendered dynamics extend beyond simple demographic differences to reveal complex intersections between technological innovation and traditional social structures that shape adoption pathways (Venkatesh et al., 2000).
The moderating role of institutional support demonstrates that external legitimization can compensate for individual-level trust deficits, particularly important given Vietnam's transitional economy context where institutional credibility remains under construction (North, 1990). This finding advances institutional theory by revealing how emerging economy governments can leverage their unique position to accelerate financial inclusion despite underdeveloped market institutions. The interaction between institutional support and trust suggests a substitution effect whereby strong government endorsement reduces the trust threshold required for adoption, enabling faster diffusion among risk-averse rural populations (Scott, 2001).
Perceived risk's negative influence on both trust and the trust-intention relationship confirms that rural consumers engage in sophisticated risk-return calculations despite limited financial literacy. The multidimensional nature of risk perception—encompassing financial, technical, privacy, and social dimensions—requires comprehensive risk mitigation strategies addressing each concern type (Bauer, 1960; Featherman & Pavlou, 2003). The finding that self-efficacy moderates the trust-intention relationship suggests that capability-building interventions can amplify trust's effectiveness, supporting social cognitive theory's emphasis on mastery experiences in behavior change (Bandura, 1997).
The configurational analysis reveals equifinality in adoption pathways, challenging universal best-practice approaches to financial inclusion. The identification of four distinct routes to high adoption intention—institutional, social-capability, technology-driven, and empowerment pathways—demonstrates that successful interventions must align with local resource availability and social structures rather than imposing standardized solutions (Ragin, 2008). This configurational perspective advances theory by

revealing how different condition combinations can achieve equivalent outcomes, suggesting that adoption theories must incorporate non-linear, synergistic relationships among predictors (Fiss, 2011).

The technology-driven pathway's emphasis on ease of use and facilitating conditions with low perceived risk highlights the importance of user experience design and infrastructure development in reducing cognitive and structural barriers. This configuration particularly resonates with younger, more educated rural consumers who possess greater technological self-efficacy but still require trust assurance before committing to fintech adoption (Venkatesh & Morris, 2000). Conversely, the empowerment pathway reveals how external support mechanisms can enable adoption even among consumers with lower trust levels, suggesting that institutional interventions can create adoption momentum that subsequently builds trust through positive experiences (Zucker, 1986).

Multi-group analysis findings regarding age and education differences in path relationships underscore the heterogeneity within rural populations, cautioning against monolithic characterizations of rural consumers. Younger consumers' stronger response to perceived usefulness reflects their greater openness to innovation and ability to envision technology's transformative potential, while older consumers' reliance on social influence reveals risk-mitigation strategies drawing on collective wisdom (Rogers, 2003). These generational differences suggest that fintech providers must develop segmented strategies recognizing diverse adoption motivations and barriers across rural demographic groups.

The research contributes to financial inclusion literature by empirically demonstrating trust's mediating mechanism in technology acceptance within collectivist, hierarchical societies. Unlike individualistic Western contexts where trust primarily reduces transaction costs, trust in Vietnamese rural communities serves multiple functions including uncertainty reduction, social legitimization, and collective risk-sharing (Fukuyama, 1995). This expanded trust conceptualization suggests that financial inclusion initiatives must cultivate not merely individual trust but community-level trust networks supporting collective adoption decisions.

Theoretical implications extend beyond the specific context to inform technology adoption research in similar emerging economy settings. The integration of UTAUT2 with institutional trust theory provides a robust framework capturing both individual-level psychological processes and macro-level institutional influences on adoption decisions. This multi-level theoretical synthesis addresses calls for more comprehensive adoption models recognizing the embedded nature of technology use within broader social and institutional contexts (Orlikowski & Barley, 2001).

Practical implications for fintech providers include the necessity of trust-building strategies preceding aggressive market expansion efforts. The finding that perceived usefulness strongly predicts trust suggests that demonstrating tangible value through pilot programs and success stories can accelerate trust formation more effectively than abstract marketing campaigns. Furthermore, the importance of social influence indicates that peer-to-peer promotion and community champion programs may generate greater adoption than traditional advertising approaches (Valente & Davis, 1999).

Policymakers can leverage these findings to design more effective financial inclusion interventions. The strong moderating effect of institutional support suggests that government endorsement and regulatory clarity can substantially accelerate fintech adoption by providing external validation and risk mitigation assurance. Additionally, the configurational analysis reveals that different policy instruments—infrastructure development, digital literacy programs, regulatory frameworks—can be combined flexibly based on local conditions rather than pursuing one-size-fits-all approaches (Duncombe & Boateng, 2009).

Several limitations warrant acknowledgment and provide directions for future research. The cross-sectional design prevents causal inference and cannot capture trust evolution over time, suggesting need for longitudinal studies examining trust dynamics across adoption stages. The focus on intention rather than actual behavior, while theoretically justified, limits understanding of the intention-behavior gap in fintech adoption. Future research should examine actual usage patterns and identify factors facilitating or impeding intention translation into behavior (Sheeran, 2002).

The study's geographic scope, while ensuring internal validity for the Vietnamese context, limits generalizability to other emerging economies with different institutional arrangements and cultural values. Comparative research across Southeast Asian nations could identify common versus context-specific adoption patterns, enabling more nuanced theory development. Additionally, the quantitative approach, despite its comprehensiveness, cannot fully capture the lived experiences and meaning-making processes underlying trust formation and adoption decisions, suggesting value in complementary qualitative investigations (Venkatesh et al., 2013).

Future research should explore trust repair mechanisms when fintech services fail to meet expectations, as negative experiences can generate distrust cascades within tight-knit rural communities. Investigation of how traditional financial practices and fintech services can be integrated rather than substituted may reveal hybrid models particularly suited to transitional economy contexts. Furthermore, examination of unintended consequences such as digital financial exclusion of the most vulnerable populations requires critical attention to ensure that fintech genuinely promotes inclusive development rather than exacerbating existing inequalities.

In conclusion, this research demonstrates that bridging the digital financial divide in rural Vietnam requires more than technological infrastructure and service availability. Trust emerges as the critical catalyst enabling rural consumers to overcome adoption barriers and embrace fintech services despite uncertainties and risks. The multi-pathway nature of adoption revealed through configurational analysis suggests that successful financial inclusion initiatives must be adaptive, context-sensitive, and capable of leveraging diverse resources and mechanisms. As Vietnam and similar emerging economies pursue financial inclusion through technological innovation, understanding and cultivating trust within existing social and institutional structures becomes paramount for achieving equitable and sustainable development outcomes.

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