



Integrating Individual Capabilities, Infrastructure Quality, and Social Capital: A Novel Framework for FinTech Trust in Rural Vietnam

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ABSTRACT

Purpose: This study investigates the pathways from Digital Financial Literacy (DFL) to FinTech Trust (FTT) in rural economies, extending the Unified Theory of Acceptance and Use of Technology (UTAUT2) through a novel framework positioning Digital Infrastructure Accessibility (DIA) as mediator and Community Trust (CT) as moderator. **Design/methodology/approach:** Structural equation modeling analyzed data from 587 respondents across rural Vietnam, employing PLS-SEM to assess the hypothesized relationships, mediation mechanisms, and moderation effects. **Findings:** The empirical analysis confirms that DFL significantly influences FTT directly and indirectly through DIA. Furthermore, CT substantially moderates the DIA-FTT relationship, with stronger effects observed in communities with higher interpersonal trust levels. **Research limitations/implications:** The research addresses theoretical gaps regarding context-specific determinants of FinTech trust, extending existing technology acceptance models by integrating socio-cultural dimensions critical to emerging economies. The findings support a capability-opportunity interaction model where individual literacy and infrastructure accessibility synergistically foster trust. **Originality/value:** This study uniquely integrates infrastructure accessibility as a mediating mechanism and community-level social capital as a contextual moderator, offering a more nuanced understanding of FinTech adoption barriers in rural settings and informing targeted interventions to enhance financial inclusion through digital means in developing contexts.

Keywords: Digital Financial Literacy, FinTech Trust, Digital Infrastructure Accessibility, Community Trust, Rural Economies, UTAUT2, Vietnam, Financial Inclusion

I. Introduction

Financial Technology (FinTech) innovations are fundamentally reshaping global financial ecosystems (Mention, 2019; Palmié et al., 2020; Alslaibi, 2024), offering transformative potential for enhancing

financial inclusion amongst approximately 1.7 billion unbanked adults globally (Demirgüç-Kunt et al., 2022). This paradigm shift particularly promises to address financial exclusion in rural emerging economies, where sparse traditional infrastructure significantly impedes economic development (Klapper et al., 2016; Ozili, 2018).

FinTech leverages ubiquitous technologies to deliver affordable, accessible financial services (Iman, 2018), with evidence demonstrating the capacity to

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improve livelihoods throughout Africa and Asia (David-West et al., 2018; Gabor & Brooks, 2017; Kepramareni et al., 2025). However, realising this potential hinges critically on user trust (Cao et al., 2018; van Deventer et al., 2017), which functions as a fundamental lubricant in financial transactions (Rousseau et al., 1998). Trust assumes paramount importance in FinTech contexts due to technology novelty, service intangibility, absence of face-to-face interaction, and heightened security concerns (Stewart & Jürjens, 2018; Tran & Corner, 2016; Parashar et al., 2024).

By 2025, trust's critical role has evolved beyond encouraging initial adoption to fostering confidence required for users to: (1) transition from simple payments to complex, high-value services like digital credit and micro-insurance; (2) move from occasional to intensive use; and (3) maintain loyalty in competitive markets. Trust is not merely an adoption antecedent but a fundamental requirement for unlocking FinTech's transformative potential for comprehensive financial well-being.

This study examines FinTech trust dynamics within Vietnam's rural economies, which are characterised by lower income and education levels, infrastructure limitations that create digital divides, and distinct socio-cultural structures (Salemink et al., 2017; Kshetri, 2018). Urban-centric assumptions in FinTech discourse may inadequately capture rural realities (Wang et al., 2025), where infrastructure accessibility and community trust dynamics likely play pronounced roles in shaping perceptions (Viswanathan et al., 2021).

Two factors emerge as particularly critical: Digital Financial Literacy (DFL), encompassing financial knowledge alongside digital skills and security awareness (Lyons & Kass-Hanna, 2021); and Digital Infrastructure Accessibility (DIA), extending beyond physical infrastructure presence to perceived quality, reliability, and affordability (Salemink et al., 2017). These interact with Community Trust—the trust individuals place in their immediate vicinity (Abdelzadeh & Lundberg, 2024)—significantly influencing attitudes towards innovations in close-knit rural communities (Viswanathan et al., 2021).

Therefore, this research develops, theoretically justifies, and empirically validates a novel conceptual framework explaining FinTech Trust formation in rural Vietnam, integrating DFL as an antecedent, DIA as a mediator, and Community Trust as a moderator. This extends established technology adoption theories—specifically TAM (Davis, 1989) and UTAUT/UTAUT2 (Venkatesh et al., 2003; Venkatesh et al., 2012)—to address rural FinTech complexities. The research contributes by focusing on FinTech Trust as a central outcome rather than merely an adoption antecedent; providing empirical evidence of mechanisms through which DFL influences FinTech Trust via DIA; introducing Community Trust as a critical moderator; and offering a comprehensive, contextually sensitive framework for rural, developing economies. Practically, these insights inform targeted interventions to foster FinTech trust and adoption in rural areas, particularly relevant for Vietnam and similar emerging economies striving to bridge rural-urban financial inclusion gaps through technological innovation.

II. Literature Review and Conceptual Framework

A. Deconstructing Digital Financial Literacy (DFL): Conceptualisations and Dimensions

Digital Financial Literacy (DFL) represents the amalgamation of financial knowledge, digital skills, cybersecurity awareness, and technological adaptability necessary to navigate the digital financial ecosystem effectively and safely. The Alliance for Financial Inclusion defines it as "knowledge, skills, confidence and competencies to safely use digitally delivered financial products and services," whilst alternative conceptualisations view DFL as financial literacy applied within digital contexts (AFI, 2020).

A significant challenge is the lack of universally standardised definitions, hindering consistent measurement and cross-study comparisons. This study

focuses on subjective or perceived DFL, operationalising it as self-assessed competence. This approach is particularly relevant as individual confidence and perceived ability—not just actual knowledge—are potent drivers of technology-related attitudes and behaviours, including trust formation.

DFL's multifaceted nature typically encompasses knowledge, skills, attitude, behaviour, and risk awareness dimensions. Recent studies have developed validated scales incorporating these aspects, including Chhillar et al.'s (2024) 22-item scale and Vieira et al.'s (2024a, 2024b) Digital Financial Knowledge and Capability Scales. Empirical evidence consistently demonstrates that higher DFL correlates with increased adoption of digital financial services (Morgan et al., 2019), greater financial inclusion for underserved populations (Lyons & Kass-Hanna, 2021), and enhanced financial well-being, whilst insufficient literacy development may expose users to fraud vulnerability (Chhillar et al., 2024).

B. Understanding FinTech Trust: Dimensions, Determinants, and Perceived Risk

Trust is a cornerstone of financial interactions, managing inherent uncertainties when relying on others to handle assets or information (Moin et al., 2015). In FinTech landscapes, where transactions occur digitally without face-to-face contact, establishing trust becomes particularly critical (Stewart & Jürjens, 2018). By 2025, trust's nature has evolved from overcoming basic mobile payment novelty towards enabling deeper, more complex digital financial engagement through higher-stakes services and sustained long-term loyalty, especially in emerging markets with developing regulatory environments.

Trust fundamentally involves a willingness to be vulnerable based on positive expectations regarding others' intentions (Mayer et al., 1995), with trustworthiness assessed through perceptions of ability, benevolence, and integrity. Research identifies multiple FinTech trust dimensions: trust in technology itself, trust in providers, trust in regulatory frameworks (AlHassan

et al., 2025; Aldboush & Ferdous, 2023; Palmié et al., 2020), disposition to trust (McKnight et al., 2002), and trust derived from social influence (Tam & Oliveira, 2019).

Numerous factors influence FinTech trust formation, including perceived security and privacy (Stewart & Jürjens, 2018), operational transparency (Frost et al., 2019), perceived usefulness and ease of use (Cao et al., 2018), provider reputation (Zhao et al., 2024), service quality (van Deventer et al., 2017), regulatory clarity (Palmié et al., 2020), social endorsements (Tam & Oliveira, 2019), and digital financial literacy (Morgan et al., 2019). Perceived risk is intrinsically linked to trust, with high perceived risk inhibiting adoption (Stewart & Jürjens, 2018). FinTech-specific risks include financial loss (Budianto, 2019), security breaches (Stewart & Jürjens, 2018), privacy violations, operational failures (Moin et al., 2015), regulatory uncertainties (Palmié et al., 2020), and performance concerns (Halimah & Suryani, 2025).

C. Digital Infrastructure Accessibility (DIA) in Rural Economies

Digital Infrastructure Accessibility (DIA) serves as the fundamental enabler for digital economy participation, including FinTech service utilisation (Wang et al., 2025). This study conceptualises DIA as perceived digital infrastructure accessibility—an individual's subjective assessment and lived experience of available infrastructure. This perceptual approach is theoretically more proximal to trust formation, as user attitudes and behaviours are shaped by experienced reality rather than objective statistics of which they may be unaware, aligning with UTAUT models where perceived "Facilitating Conditions" influence behaviour more than objective resource availability.

Sophisticated DIA conceptualisation incorporates multiple dimensions: subjective availability/access, perceived quality, perceived affordability, and perceived usability/accessibility (Wang et al., 2025; Williams et al., 2016; Roberts et al., 2017; Salemlink et al., 2017). This focus addresses the "digital divide"

—inequalities in access to, use of, and benefit from digital technologies (Wang et al., 2025)—which is particularly pronounced between urban and rural areas, intersecting with socioeconomic disparities (Philip et al., 2017). Rural communities frequently encounter limited network coverage, slower speeds, higher relative costs, unreliable service, and inadequate technical support (Salemink et al., 2017).

Robust digital infrastructure increasingly functions as a fundamental driver of rural transformation, with studies demonstrating positive impacts on agricultural productivity, income generation, and economic resilience (Wang et al., 2025). DIA facilitates economic activity by reducing information asymmetries and lowering transaction costs (Cao et al., 2018), serving as a prerequisite for effective FinTech adoption (Jena, 2025).

D. Community Trust as Social Capital: Relevance in Rural Settings

Social capital provides a valuable framework for understanding community dynamics, with trust as a key component facilitating coordination and collective action (Putnam, 2000; Anh & Anh, 2015). This study conceptualises and measures Perceived Community Trust (CT), defined as an individual's subjective assessment of the trustworthiness of people within their immediate geographic vicinity—neighbours, fellow residents, and local leaders (Abdelzadeh & Lundberg, 2024). This localised trust differs from generalised trust and institutional trust.

This individual-level approach is theoretically justified because personal perception of community trustworthiness directly influences attitudes and behaviours, including willingness to trust innovations like FinTech, consistent with "personal social capital" frameworks recognising differential access to social resources within communities. Community trust holds particular salience in rural environments characterised by higher social cohesion and greater reliance on local networks for information and support (Sampson, 2012). Where formal information channels are limited,

individuals rely heavily on local social cues when evaluating unfamiliar propositions like FinTech adoption (Abdelzadeh & Lundberg, 2024).

E. Critique of Existing Adoption Models in the Rural FinTech Context

The Technology Acceptance Model (TAM) (Davis, 1989) and its successors, UTAUT and UTAUT2 (Venkatesh et al., 2003; Venkatesh et al., 2012), constitute predominant frameworks for explaining technology adoption. Despite considerable explanatory power (Williams et al., 2015), they exhibit significant limitations when applied to rural developing economies: oversimplification and neglecting contextual factors, development in organisational settings within developed economies, overlooking infrastructure constraints creating digital divides (Roberts et al., 2017), literacy gaps impeding effective use (Klapper et al., 2016), distinct socio-cultural factors beyond generic 'Social Influence' constructs (Tam & Oliveira, 2019), and economic vulnerabilities heightening risk aversion (Roberts et al., 2017).

These models typically position trust as merely one predictor among many, failing to capture its centrality in high-risk contexts like rural FinTech adoption. Similarly, 'Facilitating Conditions' inadequately represents digital infrastructure accessibility's critical role in resource-constrained settings (Williams et al., 2016). Consequently, explaining FinTech trust in rural economies necessitates extending these frameworks by integrating context-specific factors like DFL, nuanced DIA conceptualisations, and Community Trust (Jena, 2025).

F. Hypotheses Development

Drawing upon theoretical foundations and empirical evidence, this study proposes hypothesised relationships constituting a comprehensive framework explicating FinTech trust formation in rural economies as shown in Figure 1.

Digital Financial Literacy is critical for navigating the digital financial landscape (Lyons & Kass-Hanna, 2021). Individuals with greater knowledge and skills are better equipped to evaluate FinTech platform trustworthiness, understand security measures, and protect themselves from threats (Chhillar et al., 2024). Studies establish positive associations between financial literacy and trust in financial institutions (Lusardi, 2019) and between digital literacy and trust in digital services (AlHassan et al., 2025). Therefore:

H1: Digital Financial Literacy (DFL) positively affects FinTech Trust (FTT) in rural economies.

Individual capabilities may influence perceptions of infrastructure accessibility (Williams et al., 2016). Research indicates that digitally literate individuals can navigate infrastructure limitations and utilise available connectivity more effectively (Roberts et al., 2017). Therefore:

H2: Digital Financial Literacy (DFL) positively affects perceived Digital Infrastructure Accessibility (DIA) in rural economies.

Digital infrastructure quality and reliability significantly shape users' experiences with digital services (Williams et al., 2016). Positive experiences with reliable infrastructure foster confidence in the digital ecosystem (van Deventer et al., 2017), whilst poor perceived DIA generates frustration and distrust (Salemink et al., 2017). Therefore:

H3: Perceived Digital Infrastructure Accessibility (DIA) positively affects FinTech Trust (FTT) in rural economies.

The DFL-FTT relationship likely operates through enabling experiences facilitated by accessible and reliable infrastructure (Appiah & Agblewornu, 2025). DFL provides a cognitive foundation for FinTech engagement, but this potential cannot materialise without adequate infrastructure (Roberts et al., 2017). Therefore:

H4: Perceived Digital Infrastructure Accessibility (DIA) mediates the relationship between

Digital Financial Literacy (DFL) and FinTech Trust (FTT) in rural economies.

Community-level trust significantly influences innovation evaluation in rural environments characterised by strong social ties (Sampson, 2012). In high-trust communities, infrastructure-enabled benefits are more readily shared and amplified (Murayama et al., 2017), whilst in low-trust communities, scepticism may undermine this relationship (Viswanathan et al., 2021). Therefore:

H5: Community Trust (CT) moderates the positive relationship between perceived Digital Infrastructure Accessibility (DIA) and FinTech Trust (FTT), such that the relationship is stronger in communities with higher levels of trust.

H6: Community Trust (CT) moderates the positive direct relationship between Digital Financial Literacy (DFL) and FinTech Trust (FTT), such that the relationship is stronger in communities with higher levels of trust.

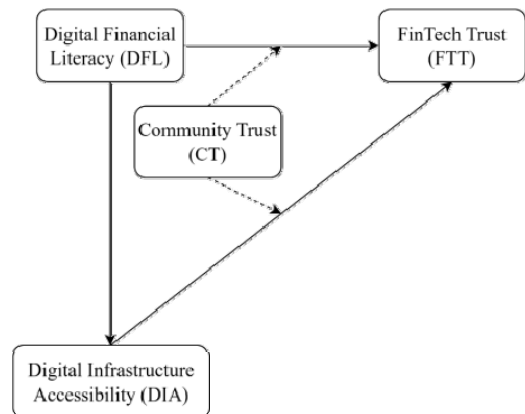


Figure 1. Conceptual framework

III. Research Methodology

A. Research Design and Rationale

This study employs a quantitative, explanatory research design utilising partial least squares structural equation modelling (PLS-SEM) for several methodologically sound reasons. First, the research examines a complex model with direct and indirect paths (mediation) and interaction effects (moderation), for which PLS-SEM is particularly well-suited (Hair et al., 2019). Second, the study is primarily prediction-oriented and exploratory, seeking to understand FinTech trust determinants where such relationships remain underexplored. Third, the model includes formative constructs (DFL and DIA), which PLS-SEM handles effectively (Hair et al., 2017). Finally, the achieved sample (n=587) substantially exceeds minimum requirements (Hair et al., 2019).

The cross-sectional survey design, though unable to capture trust development temporally, was deemed appropriate for initial model validation given the practical constraints of conducting research in rural developing regions (Saunders et al., 2019).

B. Data Collection Procedures

1. Population and Sampling

The target population comprised adult residents (aged 18+) of rural Vietnam with at least basic FinTech awareness, regardless of personal usage experience. Vietnam was selected to represent emerging economies with rapidly growing FinTech adoption alongside persistent rural-urban digital divides (World Bank, 2022).

A stratified random sampling approach ensured adequate representation across Vietnam's diverse rural regions. The country was divided into three geographical strata (Northern, Central, and Southern regions), with provinces randomly selected within each stratum, followed by districts and communes. This created a multi-stage sampling process capturing

variation in infrastructure development, socioeconomic conditions, and cultural factors.

Following Hair et al.'s (2019) recommendations for PLS-SEM analysis, the sample size should be at least ten times the maximum number of structural paths directed at any construct. Our most complex construct has five incoming paths (considering interaction terms), indicating a minimum requirement of 50 respondents. The final achieved sample of 587 valid responses substantially exceeds methodological requirements, providing robust statistical power.

2. Data Collection Methods

Data was collected through structured questionnaires administered via face-to-face interviews rather than online surveys to overcome potential limitations in internet access and digital literacy, ensuring more representative sampling and higher response quality (Saunders et al., 2019). Local research assistants fluent in Vietnamese and familiar with local dialects administered the questionnaires between November 2024 and February 2025. A pilot study with 45 respondents assessed questionnaire clarity, relevance, and cultural appropriateness before the data collection.

C. Measurement Instruments

All constructs were measured using multi-item scales adapted from previously validated instruments, with modifications ensuring contextual appropriateness for rural Vietnam. The questionnaire underwent rigorous back-translation to ensure conceptual equivalence, with items measured on 7-point Likert scales except for demographic variables.

Perceived Digital Financial Literacy (DFL) was operationalised as self-assessed competence across multiple dimensions. We adapted Chhillar et al.'s (2024) scale, using 18 items capturing respondents' perceptions of their basic and advanced knowledge, risk awareness and control, attitude, and behaviour.

FinTech Trust (FTT) was measured using a 12-item scale adapted from AlHassan et al. (2025), Moin

et al. (2015), and Aldboush and Ferdous (2023), capturing trust in technology itself, FinTech providers, and the regulatory environment.

Digital Infrastructure Accessibility (DIA) was operationalised as users' subjective perceptions of availability, quality, reliability, affordability, and ease of use of digital infrastructure in their local area. The 10-item scale was adapted from Williams et al. (2016) and Saleminck et al. (2017).

Community Trust (CT) was measured using an 8-item scale adapted from Murayama et al. (2013) and the World Values Survey, focusing specifically on trust in neighbours and fellow community members.

Control variables included age, gender, education, income, occupation, prior FinTech experience, smartphone ownership, and geographical region to account for potential confounding effects (Venkatesh et al., 2012).

D. Data Analysis Procedures

The analytical framework employed a systematic multi-stage approach using SmartPLS 4.1. Initial data screening addressed missing values, identified outliers, and assessed distribution patterns (Hair et al., 2019). The measurement model assessment implemented differentiated evaluation criteria for reflective and formative constructs, whilst structural model evaluation entailed collinearity assessment, path coefficient examination through bootstrapping (5,000 subsamples), and explanatory power determination through R^2 values (Hair et al., 2019). Mediation analysis followed Hair et al.'s (2017) approach, whilst moderation analysis employed the product indicator approach with mean-centred variables to mitigate multicollinearity.

IV. Research Results

A. Descriptive Statistics

The final sample consisted of 587 respondents from rural Vietnam (Table 1). Gender distribution was relatively balanced (53.2% male, 46.8% female), with the largest age segment being 26-35 years (32.7%). Educational attainment varied substantially, with secondary (28.9%) and high school education (35.8%) being most common. Agricultural workers constituted the largest occupational group (36.6%), followed by small business owners/traders (24.5%). Most respondents (73.6%) had monthly household incomes below 10 million VND, reflecting typical rural Vietnamese economic conditions. Geographic distribution provided good coverage across Northern (35.6%), Central (33.2%), and Southern provinces (31.2%).

Regarding technology access, 87.9% owned smartphones, indicating substantial technological readiness. However, FinTech experience varied significantly: 34.2% had never used FinTech services, 41.9% used them occasionally, and only 23.9% identified as regular users, underscoring the potential for increased adoption.

Descriptive statistics (Table 2) for primary constructs revealed that Digital Financial Literacy showed the lowest mean score (3.85), suggesting moderate levels of digital financial knowledge among rural residents. Community Trust displayed the highest mean (5.12), reflecting strong social bonds typical in rural Vietnamese communities. Perceived Digital Infrastructure Accessibility scored moderately (4.29), whilst FinTech Trust showed a mean of 4.45, indicating cautiously optimistic attitudes.

B. Measurement Model Assessment

1. Reflective Measurement Model

The reflective measurement model assessment focused on FinTech Trust (FTT) and Community

Table 1. Demographic characteristics of respondents (N=587)

Characteristic	Category	Frequency	Percentage (%)
Gender	Male	312	53.2
	Female	275	46.8
Age	18-25 years	112	19.1
	26-35 years	192	32.7
	36-45 years	143	24.4
	46-55 years	87	14.8
	Above 55 years	53	9.0
Education	No formal education	21	3.6
	Primary education	62	10.6
	Secondary education	170	28.9
	High school	210	35.8
	College/University	118	20.1
	Postgraduate	6	1.0
Occupation	Agricultural worker	215	36.6
	Small business/trader	144	24.5
	Wage employee	109	18.6
	Public servant	41	7.0
	Student	35	6.0
	Unemployed/homemaker	28	4.8
	Other	15	2.5
Monthly Household Income	Below 5 million VND	182	31.0
	5-10 million VND	250	42.6
	10-15 million VND	94	16.0
	15-20 million VND	38	6.5
	Above 20 million VND	23	3.9
Region	Northern provinces	209	35.6
	Central provinces	195	33.2
	Southern provinces	183	31.2
FinTech Experience	Never used	201	34.2
	Used occasionally	246	41.9
	Regular user	140	23.9
Smartphone Ownership	Yes	516	87.9
	No	71	12.1

Table 2. Descriptive statistics of main constructs

Construct	Mean	Standard Deviation	Range
Digital Financial Literacy (DFL)	3.85	1.38	1-7
Digital Infrastructure Accessibility (DIA)	4.29	1.21	1-7
Community Trust (CT)	5.12	0.94	1-7
FinTech Trust (FTT)	4.45	1.17	1-7

Trust (CT) constructs. All items demonstrated loadings above 0.7 (ranging from 0.712 to 0.844), indicating good indicator reliability. Both constructs showed excellent internal consistency with Cronbach's alpha and composite reliability values well above 0.7 (FTT: $\alpha = 0.937$, CR = 0.947; CT: $\alpha = 0.922$, CR = 0.935). Convergent validity was supported by AVE values exceeding 0.5 (FTT: 0.620; CT: 0.643) (Table 3).

Discriminant validity was confirmed through multiple approaches. The Fornell-Larcker criterion showed that each construct's AVE square root

exceeded its correlations with other constructs (Table 4). All HTMT ratios were below 0.85, with the highest being 0.675 (between DIA and FTT). Cross-loadings revealed that all indicators loaded highest on their respective constructs, establishing the reflective measurement model's reliability and validity.

2. Formative Measurement Model

Digital Financial Literacy (DFL) and Digital Infrastructure Accessibility (DIA) were conceptualised as formative constructs (Table 5). For DFL, all five

Table 3. Reliability and convergent validity of reflective constructs

Construct	Items	Loadings	Cronbach's Alpha	Composite Reliability	AVE
FinTech Trust (FTT)	FTT1	0.823	0.937	0.947	0.620
	FTT2	0.812			
	FTT3	0.791			
	FTT4	0.834			
	FTT5	0.762			
	FTT6	0.801			
	FTT7	0.743			
	FTT8	0.818			
	FTT9	0.754			
	FTT10	0.772			
	FTT11	0.765			
	FTT12	0.712			
Community Trust (CT)	CT1	0.844	0.922	0.935	0.643
	CT2	0.830			
	CT3	0.801			
	CT4	0.817			
	CT5	0.780			
	CT6	0.756			
	CT7	0.805			
	CT8	0.782			

Table 4. Fornell-Larcker criterion for discriminant validity

Construct	DFL	DIA	CT	FTT
DFL	Formative			
DIA	0.523	Formative		
CT	0.311	0.284	0.802	
FTT	0.574	0.613	0.407	0.787

Note: The diagonal values (italicized) represent the square root of the AVE for reflective constructs.

dimensions (Basic Knowledge, Advanced Knowledge, Risk Awareness, Skills, and Attitude) showed significant weights ($p < 0.05$), with Skills (0.386) and Risk Awareness (0.317) being the most substantial contributors. For DIA, all dimensions (Availability, Quality, Reliability, Affordability, and Usability) demonstrated significant weights, with Quality (0.324) and Reliability (0.293) having the strongest influences.

All VIF values were below 5 (ranging from 1.684 to 2.615), indicating no problematic multicollinearity. Convergent validity was established through redundancy analysis, yielding path coefficients of 0.783 for DFL and 0.812 for DIA, exceeding the recommended 0.7 threshold.

C. Structural Model Assessment

1. Model Fit and Collinearity Assessment

VIF values for all predictor relationships ranged from 1.042 to 1.891, well below the threshold of 5, confirming the absence of problematic collinearity (Table 6). The standardised root mean square residual (SRMR) was 0.062, below the recommended 0.08 threshold, indicating acceptable model fit.

For the structural model predicting FTT including interaction terms, collinearity assessment revealed VIF values well below 3 for all predictors and interaction terms, confirming that multicollinearity is not a concern in the moderation analysis.

2. Main Effects

Table 7 presents the results of the path analysis examining the direct relationships hypothesised in the research model.

Table 5. Assessment of formative measurement model

Construct	Dimension/Item	Outer Weight	t-value	p-value	VIF
Digital Financial Literacy (DFL)	Basic Knowledge (BK)	0.298	4.432	<0.001	2.342
	Advanced Knowledge (AK)	0.173	2.658	0.008	2.615
	Risk Awareness (RA)	0.317	5.024	<0.001	1.873
	Skills (SK)	0.386	6.179	<0.001	2.128
	Attitude (AT)	0.140	2.345	0.019	1.946
Digital Infrastructure Accessibility (DIA)	Availability (AV)	0.286	4.756	<0.001	2.187
	Quality (QU)	0.324	5.342	<0.001	2.345
	Reliability (RE)	0.293	4.874	<0.001	2.021
	Affordability (AF)	0.196	3.421	<0.001	1.684
	Usability (US)	0.174	2.897	0.004	1.723

Table 6. Collinearity assessment for structural model predicting FinTech trust with interaction terms

Predictor	VIF	Result
Digital Financial Literacy (DFL)	1.643	Acceptable
Perceived Digital Infrastructure Accessibility (DIA)	1.891	Acceptable
Perceived Community Trust (CT)	1.148	Acceptable
Interaction Term (DIA $\times$ CT)	1.087	Acceptable
Interaction Term (DFL $\times$ CT)	1.042	Acceptable

Note: VIF values < 3 are considered ideal; values < 5 are acceptable (Hair et al., 2019).

The analysis revealed significant positive relationships for most hypothesised direct effects:

H1 was supported ($\beta = 0.302$, $p < 0.001$), indicating that higher Digital Financial Literacy significantly enhances FinTech Trust among rural residents.

H2 was strongly supported ($\beta = 0.523$, $p < 0.001$), demonstrating that individuals with higher digital financial literacy perceive digital infrastructure as more accessible and reliable.

H3 was supported ($\beta = 0.445$, $p < 0.001$), showing that better perceived digital infrastructure accessibility significantly enhances FinTech Trust.

H5 was supported ($\beta = 0.142$, $p < 0.001$), confirming that Community Trust moderates the DIA-FTT relationship, with stronger effects in high-trust communities.

H6 was not supported ($\beta = 0.057$, $p = 0.116$), indicating that the direct DFL-FTT relationship remains consistent regardless of community trust levels.

3. Mediation Analysis

The indirect effect of DFL on FTT through DIA was significant ($\beta = 0.233$, $p < 0.001$) (Table 8), supporting DIA's mediating role. The results indicate partial mediation since both direct and indirect effects were significant. The variance accounted for (VAF) was 43.5%, confirming that whilst DFL directly influences FTT, a substantial portion operates through improved perceptions of digital infrastructure accessibility. Therefore, H4 was supported.

4. Moderation Analysis

Simple slopes analysis revealed that whilst the DIA-FTT relationship was significant at all Community Trust levels, the effect was substantially more substantial in high-trust communities ($\beta = 0.578$) compared to low-trust communities ($\beta = 0.311$) (Table 9). This confirms H5 and demonstrates that digital infrastructure accessibility's positive impact on FinTech trust is amplified in communities with strong interpersonal trust.

Table 7. Path coefficients and hypothesis testing results

Hypothesis	Path	Standardised Coefficient (β)	t-value	p-value	95% CI	Result
H1	DFL $\rightarrow$ FTT	0.302	5.948	<0.001	[0.203, 0.401]	Supported
H2	DFL $\rightarrow$ DIA	0.523	13.427	<0.001	[0.446, 0.600]	Supported
H3	DIA $\rightarrow$ FTT	0.445	9.182	<0.001	[0.352, 0.538]	Supported
H5	DIA $\times$ CT $\rightarrow$ FTT	0.142	3.847	<0.001	[0.070, 0.214]	Supported
H6	DFL $\times$ CT $\rightarrow$ FTT	0.057	1.573	0.116	[-0.014, 0.128]	Not Supported

Table 8. Mediation analysis results

Effect	Path	Coefficient	t-value	p-value	95% CI
Direct Effect	DFL $\rightarrow$ FTT	0.302	5.948	<0.001	[0.203, 0.401]
Indirect Effect	DFL $\rightarrow$ DIA $\rightarrow$ FTT	0.233	7.362	<0.001	[0.171, 0.295]
Total Effect	DFL $\rightarrow$ FTT (Total)	0.535	13.812	<0.001	[0.459, 0.611]

Table 9. Simple slopes analysis for the moderating effect of community trust

Level of Moderator	Effect of DIA on FTT	t-value	p-value
Low CT (-1 SD)	0.311	5.235	<0.001
Mean CT	0.445	9.182	<0.001
High CT (+1 SD)	0.578	10.673	<0.001

5. Coefficient of Determination and Predictive Relevance

The R^2 value for DIA was 0.273, indicating that DFL explains 27.3% of the variance in perceived digital infrastructure accessibility. For FTT, the R^2 was 0.505, suggesting that the model explains 50.5% of the variance in FinTech trust, representing substantial explanatory power. Stone-Geisser's Q^2 values were 0.167 for DIA and 0.298 for FTT, both significantly above zero, indicating good predictive relevance (Table 10).

6. Effect Sizes

Cohen's f^2 values revealed that DFL had a large effect on DIA ($f^2 = 0.379$) and a small to medium effect on FTT ($f^2 = 0.121$). DIA demonstrated a medium to large effect on FTT ($f^2 = 0.261$), underscoring its important role. The moderating effect of CT on the DIA-FTT relationship showed a small

but meaningful effect size ($f^2 = 0.052$) (Table 11).

D. Supplementary Analyses

1. Multi-Group Analysis (MGA)

Comprehensive multi-group analyses compared key subgroups, successfully establishing measurement invariance using the MICOM procedure (Henseler et al., 2016) (Table 12).

Table 11. Effect sizes (f^2)

Relationship	f^2	Effect Assessment
DFL $\rightarrow$ FTT	0.121	Small to medium
DFL $\rightarrow$ DIA	0.379	Large
DIA $\rightarrow$ FTT	0.261	Medium to large
DIA $\times$ CT $\rightarrow$ FTT	0.052	Small
DFL $\times$ CT $\rightarrow$ FTT	0.009	Negligible

Table 10. Coefficient of determination and predictive relevance

Endogenous Construct	R^2	R^2 Adjusted	Q^2
Digital Infrastructure Accessibility (DIA)	0.273	0.272	0.167
FinTech Trust (FTT)	0.505	0.500	0.298

Table 12. MICOM results for measurement invariance assessment

Construct	Configural Invariance	Original Correlation	5% Quantile	95% Quantile	Compositional Invariance
FinTech Users vs. Non-Users					
DFL	✓	0.998	0.994	1.000	Yes
DIA	✓	0.997	0.991	1.000	Yes
CT	✓	0.999	0.996	1.000	Yes
FTT	✓	0.995	0.989	1.000	Yes
Smartphone Owners vs. Non-Owners					
DFL	✓	0.994	0.985	1.000	Yes
DIA	✓	0.991	0.978	1.000	Yes
CT	✓	0.998	0.995	1.000	Yes
FTT	✓	0.996	0.990	1.000	Yes
Gender Groups					
DFL	✓	0.999	0.997	1.000	Yes
DIA	✓	0.998	0.995	1.000	Yes
CT	✓	0.999	0.997	1.000	Yes
FTT	✓	0.998	0.994	1.000	Yes

Note: Configural invariance is achieved when the same model specification is applied across groups (✓ indicates satisfied). Compositional invariance is established when the original correlation falls within the 95% confidence interval derived from permutation testing (5,000 permutations). "Yes" indicates compositional invariance is established; "No" would indicate it is not established.

The comparison between FinTech users and non-users revealed significant differences: the direct DFL-FTT effect was significantly stronger for non-users ($\beta = 0.368$) compared to users ($\beta = 0.216$, $p = 0.009$), whilst the DIA-FTT effect was substantially stronger for experienced users ($\beta = 0.521$) compared to non-users ($\beta = 0.324$, $p = 0.003$) (Table 13).

Similarly, comparing smartphone owners and non-owners showed that amongst non-smartphone owners, DFL exerted a significantly stronger direct effect on FTT ($\beta = 0.412$) compared to owners ($\beta = 0.289$, $p = 0.034$), whilst smartphone owners showed stronger DFL-DIA relationships ($\beta = 0.541$) than non-owners ($\beta = 0.387$, $p = 0.021$) (Table 14).

The effect of Digital Infrastructure Accessibility on FinTech Trust was more pronounced for smartphone owners ($\beta = 0.467$) than non-owners ($\beta = 0.289$, $p = 0.018$). The moderating influence of Community Trust on the DIA-FTT relationship was significantly stronger among non-smartphone owners ($\beta = 0.267$) compared to owners ($\beta = 0.124$, $p = 0.008$). For completeness, we maintained the gender-based comparison whilst expanding the analytical scope to include age and educational

attainment groups.

The additional demographic comparisons revealed no statistically significant differences in the structural relationships across gender, age, or educational groups. This suggests that the primary drivers of heterogeneity in the model relationships relate specifically to technology experience and access rather than traditional demographic characteristics (Table 15).

2. Common Method Bias Assessment

Given the cross-sectional, self-reported nature of the data, we assessed potential common method bias (CMB). Harman's single-factor test revealed that the first factor explained only 28.7% of the variance, well below the 50% threshold, indicating problematic CMB. Additionally, the full collinearity approach showed that all VIF values for constructs were below 3.3, further suggesting that CMB was not a significant concern in this study.

Table 13. Multi-group analysis results - FinTech users vs. Non-users

Path	FinTech Users (β)	FinTech Non-Users (β)	Difference	Significance
DFL $\rightarrow$ FTT	0.216	0.368	0.152	**
DFL $\rightarrow$ DIA	0.487	0.574	0.087	n.s.
DIA $\rightarrow$ FTT	0.521	0.324	0.197	**
DIA $\times$ CT $\rightarrow$ FTT	0.089	0.198	0.109	*
DFL $\times$ CT $\rightarrow$ FTT	0.041	0.089	0.048	n.s.

Note: ** $p < 0.01$, * $p < 0.05$, n.s. = not significant

Table 14. Multi-group analysis results - Smartphone owners vs. Non-owners

Path	Smartphone Owners (β)	Smartphone Non-Owners (β)	Difference	Significance
DFL $\rightarrow$ FTT	0.289	0.412	0.123	*
DFL $\rightarrow$ DIA	0.541	0.387	0.154	*
DIA $\rightarrow$ FTT	0.467	0.289	0.178	*
DIA $\times$ CT $\rightarrow$ FTT	0.124	0.267	0.143	**
DFL $\times$ CT $\rightarrow$ FTT	0.049	0.134	0.085	n.s.

Note: ** $p < 0.01$, * $p < 0.05$, n.s. = not significant

Table 15. Multi-group analysis results - Additional demographic groups

Comparison	Path	Group 1 (β)	Group 2 (β)	Difference	p-value
Gender		Male (n=312)	Female (n=275)		
	DFL $\rightarrow$ FTT	0.288	0.319	0.031	0.645
	DIA $\rightarrow$ FTT	0.457	0.428	0.029	0.619
	DIA $\times$ CT $\rightarrow$ FTT	0.157	0.128	0.029	0.558
Age Groups		≤ 35 years (n=304)	>35 years (n=283)		
	DFL $\rightarrow$ FTT	0.334	0.268	0.066	0.298
	DIA $\rightarrow$ FTT	0.421	0.472	0.051	0.387
	DIA $\times$ CT $\rightarrow$ FTT	0.163	0.119	0.044	0.423
Education		$\leq$ Secondary (n=253)	$\geq$ High School (n=334)		
	DFL $\rightarrow$ FTT	0.275	0.323	0.048	0.453
	DIA $\rightarrow$ FTT	0.398	0.486	0.088	0.187
	DIA $\times$ CT $\rightarrow$ FTT	0.184	0.103	0.081	0.134

V. Discussion and Conclusions

This study developed and empirically validated a comprehensive framework explaining FinTech trust formation in rural economies, using Vietnam as an exemplary emerging market context. The findings offer significant theoretical advancements while providing actionable insights for stakeholders engaged in rural financial inclusion initiatives.

A. Interpretation of Findings

The comprehensive empirical analysis provides substantial support for the proposed theoretical framework while revealing nuanced patterns of heterogeneity across critical subpopulations. The operationalisation of Digital Financial Literacy (DFL) as a perceived construct shapes understanding of its influence on FinTech Trust, particularly among populations with limited digital finance exposure, potentially reflecting actual competence and the powerful role of self-confidence in trust formation.

The confirmed direct, positive influence of perceived DFL on FTT aligns with literature suggesting that knowledge and skills—or confidence therein—enhance users' capacity to evaluate services

and mitigate risks. However, multi-group analysis reveals that this relationship manifests across experience and access groups differently. The substantially stronger relationship between DFL and perceived Digital Infrastructure Accessibility ($\beta = 0.523$) challenges assumptions that infrastructure accessibility represents merely objective external conditions, suggesting that individual capabilities significantly influence subjective perceptions.

The substantial effect of perceived DIA on FTT ($\beta = 0.445$) underscores the reliable digital infrastructure's critical importance in fostering FinTech confidence. This relationship demonstrates marked heterogeneity across usage groups, with experienced users showing substantially stronger sensitivity to infrastructure quality ($\beta = 0.521$) compared to non-users ($\beta = 0.324$, $p = 0.003$), suggesting that whilst non-users form trust judgements based primarily on individual capabilities and social validation, experienced users develop more nuanced evaluations grounded in actual infrastructure performance.

Confirming DIA's partial mediating role (VAF = 43.5%) provides compelling validation that whilst DFL directly enhances FTT, a substantial portion operates through improved perceptions of infrastructure accessibility. The most theoretically significant finding emerges from heterogeneous patterns across

experience and access groups. The substantially stronger direct DFL-FTT effect among non-users ($\beta = 0.368$) compared to users ($\beta = 0.216$, $p = 0.009$) suggests that theoretical knowledge assumes heightened importance in trust formation for individuals lacking experiential validation.

The positive moderation effect of Perceived Community Trust on the DIA-FTT relationship ($\beta = 0.142$) confirms that infrastructure accessibility's impact becomes amplified in communities characterised by higher interpersonal trust, proving substantially stronger among both FinTech non-users ($\beta = 0.198$) and non-smartphone owners ($\beta = 0.267$). This indicates that community-level trust is a compensatory mechanism, providing social validation when direct experiential validation is unavailable.

The hypothesised moderating effect of Community Trust on the direct DFL-FTT relationship was not supported ($\beta = 0.057$, $p = 0.116$), suggesting that the pathway from perceived competence to trust is a predominantly individual cognitive process operating largely independently of external social validation. This implies a boundary condition for social capital theory's application in technology acceptance models.

B. Theoretical Contributions and Practical Implications

This research advances understanding of FinTech trust formation by positioning trust as a central dependent variable rather than merely an adoption antecedent (Cao et al., 2018; van Deventer et al., 2017). It extends UTAUT2 to rural contexts by elevating Digital Infrastructure Accessibility from a generic facilitating factor to a central mediating mechanism, whilst reconceptualising social influence through Community Trust as a contextual moderator (Venkatesh et al., 2012; Jena, 2025; Tam & Oliveira, 2019). Additionally, it integrates social capital theory into technology acceptance frameworks (Viswanathan et al., 2021).

The findings suggest a holistic approach to digital financial inclusion for policymakers, addressing

individual capabilities and infrastructural enablers. FinTech providers entering rural markets should adopt community-based approaches, particularly in areas with stronger trust networks, whilst designing services under variable connectivity conditions. Development organisations should implement contextualised interventions that address literacy, infrastructure access, and community trust through integrated programmes.

C. Limitations and Future Research Directions

The cross-sectional nature precludes causal inferences and examination of trust development over time. Longitudinal studies are needed to track how relationships evolve as users gain experience. The reliance on self-reported, perceptual measures, whilst theoretically justified, could be supplemented with objective measures of DFL and DIA to explore potential gaps between perception and reality.

This study operationalised all constructs at the individual level. Future research could adopt multi-level modelling to disentangle individual subjective perceptions from objective community characteristics. The non-significant moderation effect of Community Trust on the DFL-FTT relationship opens avenues for exploring other social capital facets, such as informational support networks, which may be more relevant moderators of the literacy-trust link.

D. Conclusion

This study empirically validates a novel theoretical framework explaining FinTech trust formation in rural economies. The findings demonstrate that trust development operates through sophisticated mechanisms that adapt to individual experience and access contexts. The research reveals that whilst fundamental theoretical relationships remain valid across subpopulations, their relative magnitudes and operational mechanisms shift systematically based on technological familiarity and access. This

heterogeneity has profound implications for both theoretical development and practical intervention design, suggesting that effective FinTech adoption strategies must account for differential trust formation mechanisms across experience and access contexts rather than applying uniform approaches across diverse rural populations.

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Conflicts of Interest

No potential conflict of interest was reported by the author(s).

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