

Financial Literacy and Consumer Behavior Dynamics in Digital Lending Platforms: A Structural Equation Modeling Approach in Vietnam's Emerging Fintech Ecosystem

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ABSTRACT: This research examines the complex relationship between financial literacy and consumer behaviour within Vietnam's rapidly evolving digital lending ecosystem. Despite substantial growth in financial technology platforms across Southeast Asia, theoretical understanding of how financial literacy influences consumer decision-making within these novel contexts remains underdeveloped. Employing a multidimensional conceptualisation of financial literacy encompassing knowledge, skills, and attitudes, this study develops and empirically tests a comprehensive structural model of consumer behaviour in digital lending environments. Primary data were collected from 427 Vietnamese consumers with experience using digital lending platforms. Structural equation modeling with partial least squares (PLS-SEM) approach revealed significant direct relationships between financial literacy dimensions and consumer trust, perceived value, and platform engagement. Furthermore, risk perception demonstrated significant moderating effects on these relationships, with effects varying across demographic segments. Complementary fuzzy-set Qualitative Comparative Analysis (fsQCA) identified multiple configurational pathways to high platform engagement. These findings contribute to theoretical knowledge at the intersection of financial behaviour, technology acceptance, and consumer decision-making while offering practical implications for fintech developers, financial educators, and regulatory authorities in emerging economies.

KEYWORDS: financial literacy, consumer behaviour, digital lending, fintech platforms, structural equation modeling

1. INTRODUCTION

The proliferation of financial technology (fintech) has fundamentally altered the financial services landscape, introducing unprecedented democratisation of access alongside novel complexities for consumers (Gomber et al., 2017). Digital lending platforms, in particular, represent a transformative development in financial intermediation, enabling direct connections between lenders and borrowers while challenging traditional banking paradigms (Philippon, 2016). These platforms have witnessed exponential growth across Southeast Asia, with Vietnam emerging as a particularly dynamic market characterised by rapid technological adoption amidst varying levels of financial sophistication among consumers (Demirgüç-Kunt et al., 2015). This juxtaposition creates a theoretically rich context for examining the intersection of financial literacy and consumer behaviour.

Financial literacy—the constellation of knowledge, skills, and attitudes enabling effective financial decision-making—has been extensively studied within conventional financial contexts (Lusardi & Mitchell, 2014). However, its manifestation and influence within novel digital lending environments remain insufficiently understood (Fernandes et al., 2014). The cognitive demands placed upon consumers in these platforms differ substantially from traditional contexts, requiring simultaneous navigation of technological interfaces alongside complex financial products often presented with limited human intermediation (Yakoboski et al., 2010). This research gap acquires particular salience within emerging economies like Vietnam, where rapid technological leapfrogging often outpaces financial education infrastructure (World Bank, 2012).

The theoretical urgency of this inquiry stems from several converging factors. First, extant research predominantly conceptualises financial literacy as unidimensional, neglecting the multifaceted nature of financial capabilities in digital environments (Huston, 2010). Second, conventional technology acceptance frameworks inadequately account for the distinctive characteristics of financial technologies, where trust, risk perception, and financial capability interact in complex ways (Venkatesh et al., 2012). Third, the contextual particularities of emerging economies substantially moderate relationships established in developed markets, necessitating context-specific theoretical development (Zhan & Carlsson, 2014).

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This theoretical fragmentation impedes comprehensive understanding of consumer behaviour in digital lending platforms, particularly across the adoption lifecycle from initial awareness through continued engagement (Kim et al., 2009). Furthermore, the heterogeneity of financial literacy among different demographic segments introduces additional complexity inadequately addressed in current theoretical frameworks (Potrich et al., 2015). These theoretical limitations translate directly to practical challenges for platform developers, financial educators, regulators, and consumers themselves.

The present study addresses these theoretical and practical gaps through development and empirical validation of an integrated model of consumer behaviour in digital lending platforms, with particular attention to the multidimensional influence of financial literacy. Drawing upon financial literacy theory (Huston, 2010), technology acceptance frameworks (Davis, 1989), and trust-risk models (Pavlou, 2003), this research develops a comprehensive theoretical framework elucidating the relationships between financial literacy dimensions, technology perceptions, risk assessments, and behavioural outcomes. This integrated approach represents a significant theoretical advancement beyond siloed disciplinary perspectives that have characterised previous research.

Methodologically, this study employs structural equation modeling with partial least squares (PLS-SEM) to test hypothesised relationships using data from 427 Vietnamese consumers with experience using digital lending platforms. This methodological approach enables simultaneous examination of multiple theoretical pathways while accommodating the complex, multidimensional nature of the focal constructs (Hair et al., 2017). Furthermore, complementary fuzzy-set Qualitative Comparative Analysis (fsQCA) identifies configurational pathways to consumer engagement, acknowledging the equifinality characteristic of complex consumer behaviours (Ragin, 2008).

This research contributes to existing knowledge in several significant ways. First, it advances theoretical understanding of financial literacy as a multidimensional construct, delineating its cognitive, skill-based, and attitudinal dimensions within digital contexts. Second, it establishes an integrated theoretical framework connecting financial literacy to consumer behaviour across the technology adoption lifecycle. Third, it identifies contextual moderators particular to emerging economies that substantively influence established theoretical relationships. Finally, it provides empirical validation of these theoretical advancements within Vietnam's rapidly evolving digital lending landscape.

Beyond theoretical contributions, this research offers substantial practical value for multiple stakeholders. For platform developers, findings provide evidence-based guidance for interface design, user education, and engagement strategies. For financial educators, results illuminate specific knowledge and skill domains requiring targeted intervention. For regulatory authorities, findings inform balanced oversight approaches protecting consumer interests while enabling innovation. Finally, for consumers themselves, this research highlights specific financial capabilities facilitating more effective platform engagement.

The subsequent sections proceed as follows. First, foundational theories underpinning the research are examined, followed by comprehensive review of relevant empirical literature. Next, the proposed research model and hypotheses are presented. Research methodology is then detailed, followed by presentation and analysis of empirical findings. Finally, theoretical and practical implications are discussed, alongside limitations and directions for future research.

2. FOUNDATIONAL THEORIES AND LITERATURE REVIEW

2.1. Foundational Theories

2.1.1. Financial Literacy Theory

Financial literacy theory provides the primary theoretical foundation for understanding consumer behaviour in financial contexts, including emergent digital platforms. Financial literacy encompasses knowledge, skills, and attitudes necessary for effective financial decision-making and has evolved from a unidimensional to multidimensional theoretical construct (Remund, 2010). Early conceptualisations emphasised predominantly cognitive aspects—knowledge acquisition and retention (Lusardi & Mitchell, 2007), whilst contemporary frameworks incorporate behavioural dimensions, recognising that knowledge alone inadequately explains financial behaviour (Huston, 2010).

The OECD (2013) offers a comprehensive theoretical framework decomposing financial literacy into three distinct but interrelated dimensions: financial knowledge (understanding of fundamental concepts), financial behaviour (translating knowledge into effective decision-making), and financial attitudes (psychological dimensions including time preferences and risk orientation) (Atkinson & Messy, 2012). This multidimensional conceptualisation provides critical theoretical infrastructure for understanding consumer engagement with financial technologies. Xiao and O'Neill (2016) empirically validated these dimensions as distinct constructs with differential impacts on financial outcomes, whilst Potrich et al. (2015) demonstrated significant interactions between dimensions, with attitudes moderating the knowledge-behaviour relationship.

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Financial literacy theory has predominantly developed within traditional financial service contexts, creating theoretical tensions when applied to digital environments (Fernandes et al., 2014). Digital platforms introduce unique informational architectures and interaction patterns that may attenuate or amplify relationships established in conventional settings (Harris et al., 2016), necessitating extensions specifically addressing technological dimensions of financial literacy—termed "digital financial literacy" (Morgan et al., 2017).

The developmental nature of financial literacy introduces important temporal dimensions to theoretical models. Lusardi et al. (2010) establish financial literacy as an accumulating capability developed through formal education, experiential learning, and social transmission, suggesting potential feedback loops between platform engagement and literacy development (Xiao & Porto, 2017). These dynamic relationships become particularly salient in emerging market contexts like Vietnam (World Bank, 2012).

Financial literacy's theoretical adequacy varies substantially across demographic segments, with research demonstrating differential patterns in both literacy levels and behavioural impacts across age cohorts (Lusardi & Mitchell, 2014), gender (Bucher-Koenen et al., 2017), educational attainment (Hastings et al., 2013), and cultural contexts (Nicolini et al., 2013). Finally, financial literacy theory intersects with broader frameworks addressing decision-making under uncertainty and bounded rationality, with Thaler and Sunstein (2008) demonstrating how cognitive limitations influence financial decisions regardless of knowledge levels—insights particularly relevant to digital environments where interface design significantly impacts behaviour. These intersections suggest comprehensive models must integrate financial literacy with psychological constructs including perceived self-efficacy and behavioural control (Perry & Morris, 2005).

2.1.2. Technology Acceptance Theory

Technology acceptance theories provide essential theoretical infrastructure for understanding consumer adoption of digital financial platforms. The Technology Acceptance Model (TAM) developed by Davis (1989) represents the foundational framework, positing that technology adoption is primarily determined by perceived usefulness ("the degree to which a person believes that using a particular system would enhance his or her performance") and perceived ease of use ("the degree to which a person believes that using a particular system would be free of effort") (p. 320). These core constructs have demonstrated robust explanatory power across diverse technological contexts, including financial applications (Pikkarainen et al., 2004).

Multiple theoretical extensions have enhanced TAM's applicability to financial technologies. The Unified Theory of Acceptance and Use of Technology (UTAUT) introduced by Venkatesh et al. (2003) incorporates additional determinants including social influence, facilitating conditions, and demographic moderators—particularly relevant to Vietnam's collectivist cultural orientation (Van et al., 2012). Trust-augmented technology acceptance models further enhance theoretical adequacy for financial technologies, with Pavlou (2003) establishing trust as a critical antecedent to perceived usefulness and usage intentions in electronic commerce environments. Gefen et al. (2003) decomposed trust into multiple dimensions including integrity, benevolence, and competence.

Risk perception represents another critical theoretical extension. Featherman and Pavlou (2003) identified multiple risk dimensions including performance risk, financial risk, time risk, psychological risk, social risk, privacy risk, and overall risk—all highly relevant to digital lending platforms where consumers face significant informational asymmetries. The Task-Technology Fit (TTF) model (Goodhue & Thompson, 1995) provides additional theoretical insights by emphasising alignment between technological characteristics and task requirements as determinants of adoption and performance.

These technology acceptance frameworks have been successfully applied within financial technology contexts, albeit primarily in developed markets. Zhou et al. (2010) utilised UTAUT to examine mobile banking adoption, confirming the significance of performance expectancy, effort expectancy, social influence, and facilitating conditions as determinants. Critical theoretical limitations emerge when applying technology acceptance models to Vietnam's fintech environment, including Western contextual bias (Venkatesh & Zhang, 2010), emphasis on initial adoption rather than continued engagement (Kim & Malhotra, 2005), and inadequate addressing of the intersection between technological capabilities and domain-specific knowledge requirements (Ryu, 2018). These limitations necessitate an integrated approach combining financial literacy and technology acceptance frameworks with appropriate contextual adaptations for Vietnam's distinct socioeconomic and cultural environment.

2.2. Review of Empirical and Relevant Studies

2.2.1. Financial Literacy and Financial Decision-Making

Empirical research consistently demonstrates significant relationships between financial literacy and financial decision-making across diverse contexts. Lusardi and Mitchell (2014) conducted a comprehensive review of international evidence, establishing robust correlations between financial literacy and retirement planning, investment diversification, debt management, and financial product selection. The multidimensional nature of financial literacy has received empirical validation in various studies,

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with Potrich et al. (2015) validating a three-dimensional model encompassing financial knowledge, behaviour, and attitudes, revealing complex interactions between dimensions with attitudes moderating the knowledge-behaviour relationship.

Financial literacy's impact varies substantially across demographic segments, with Bucher-Koenen et al. (2017) documenting persistent gender gaps across 28 countries, and Lusardi et al. (2014) identifying U-shaped relationships with middle-aged consumers demonstrating higher literacy than both younger and older cohorts. Educational attainment consistently correlates with financial literacy (Hastings et al., 2013). Empirical research also demonstrates significant contextual variations in financial literacy's impacts, with Nicolini et al. (2013) finding substantial cross-cultural differences in both absolute levels and behavioural correlates.

The causal mechanisms linking financial literacy to behavioural outcomes have received increasing empirical attention. Fernandes et al. (2014) conducted meta-analysis of 168 papers covering 201 studies, finding that financial literacy explains only a modest proportion of variance in financial behaviours, suggesting psychological factors including propensity to plan and willingness to take risks may mediate these relationships. Within Vietnam specifically, Nguyen et al. (2017) conducted a national survey finding substantial variations in financial literacy across urban-rural divides, educational levels, and income segments, highlighting particular limitations in understanding risk diversification and compound interest.

2.2.2. Consumer Behaviour in Digital Financial Services

The rapidly evolving landscape of digital financial services has generated substantial empirical research examining adoption patterns, usage behaviour, and discontinuation factors. Early studies emphasised technology acceptance factors, with Pikkarainen et al. (2004) confirming perceived usefulness and information quality as primary determinants of online banking adoption in Finland.

Trust represents a consistently significant predictor across empirical studies of digital financial services. Kim et al. (2009) examined m-payment adoption, finding that initial trust significantly influenced both perceived usefulness and adoption intention. Trust formation mechanisms received empirical attention from Zhou (2012), who identified structural assurance, information quality, and system quality as significant trust antecedents in mobile banking contexts.

Risk perception consistently emerges as a critical factor influencing consumer behaviour in digital financial services. Luo et al. (2010) demonstrated that perceived risk negatively impacted both initial trust and behavioural intentions in mobile banking adoption. Featherman and Pavlou (2003) empirically validated multiple risk dimensions within e-service contexts, finding that performance risk and privacy risk exerted particularly strong influences on adoption intentions.

Empirical research increasingly acknowledges the multi-stage nature of consumer engagement with digital financial services, with Kim and Malhotra (2005) finding that determinants shifted across timeframes with initial perceptions subsequently supplemented by direct experience. Cultural and contextual factors significantly moderate established relationships, with Venkatesh and Zhang (2010) finding social influence exerted stronger effects within the collectivist Chinese context than in the US.

Within Vietnam specifically, Chau and Ngai (2010) examined internet banking adoption among young Vietnamese consumers, finding that perceived usefulness, perceived ease of use, and subjective norms significantly predicted behavioural intentions. The relationship between financial literacy and digital financial service adoption has received limited but growing empirical attention, with Servon and Kaestner (2008) finding that specific technological literacy dimensions complemented financial literacy in determining online banking adoption and effective usage.

2.2.3. Digital Lending Platforms

Digital lending platforms represent a specific subset of financial technologies with distinctive characteristics warranting targeted empirical investigation. These platforms fundamentally transform intermediation processes, enabling direct connections between lenders and borrowers while introducing novel risk assessment methodologies, pricing mechanisms, and consumer interfaces (Philippon, 2016).

Empirical research on consumer behaviour within digital lending platforms remains nascent but rapidly expanding. Mills and McCarthy (2016) examined small business borrowers on digital lending platforms, finding that convenience, speed, and transparency represented primary adoption motivations, while concerns about sustainability, predatory practices, and fairness constituted significant barriers.

Trust dynamics within digital lending platforms have received empirical attention from multiple perspectives. Chen et al. (2014) identified significant effects of borrower characteristics, social network indicators, and platform verification mechanisms on lender trust formation. Lin et al. (2013) demonstrated that friendship networks and relational capital significantly influenced funding success on peer-to-peer lending platforms.

Risk perception within digital lending platforms exhibits distinctive characteristics compared to traditional financial contexts. Zhang and Liu (2012) documented herding behaviour among lenders on peer-to-peer platforms, with rational herding

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predominating over irrational mimicry. Emekter et al. (2015) analysed risk factors on the Lending Club platform, finding that variables including credit grade, debt-to-income ratio, FICO score, and revolving credit utilisation significantly predicted loan performance.

Consumer segmentation within digital lending platforms has received increasing empirical attention. Tao et al. (2017) identified distinct borrower clusters on peer-to-peer platforms based on motivation patterns, financial sophistication, and technological orientation. Demographic factors consistently demonstrate significant associations with platform engagement, with Everett (2015) documenting systematic differences in both borrower and lender behaviour across gender, age, and socioeconomic strata. Within Vietnam specifically, empirical research on digital lending platforms remains limited but emerging. Do et al. (2015) examined the nascent Vietnamese peer-to-peer lending market, documenting rapid growth alongside substantial consumer uncertainty regarding platform functioning, regulatory protection, and outcome predictability. Adjacent research streams suggest potentially significant associations between financial literacy and platform behaviour, with Klapper et al. (2015) demonstrating that financial literacy significantly predicted digital payment adoption across 18 emerging economies, with effects particularly pronounced among lower-income populations.

2.2.4. Trust and Risk Perception

Trust and risk perception represent critical psychological constructs mediating relationships between financial literacy and consumer behaviour in technological contexts. Trust functions as both prerequisite to engagement and ongoing determinant of relationship quality in digital financial services (McKnight et al., 2002), whilst risk perception influences initial adoption decisions, engagement patterns, and eventual satisfaction (Pavlou, 2003).

Empirical research consistently demonstrates trust's significant impact on digital financial service adoption and usage. Kim et al. (2009) found that initial trust significantly predicted both perceived usefulness and behavioural intention, whilst Lee (2009) documented security/privacy risk, financial risk, and performance risk as significant negative predictors alongside trust's positive influence.

Trust formation mechanisms have received substantial empirical attention. Ba and Pavlou (2002) found that credible performance feedback significantly enhanced trust formation, representing a distinct mechanism from traditional relationship-based trust. The relationship between financial literacy and trust formation has received limited but intriguing empirical investigation. Agnew et al. (2007) found that financial literacy negatively correlated with trust in financial advisors, suggesting knowledge potentially substitutes for trust in financial relationships, whilst Barber and Odean (2001) documented overconfidence effects among financially literate investors.

Risk perception in digital financial contexts demonstrates multidimensional characteristics with distinct empirical patterns. Featherman and Pavlou (2003) validated multiple risk dimensions within e-service contexts. The relationship between financial literacy and risk perception exhibits complex empirical patterns, with Van Rooij et al. (2011) finding financially literate individuals demonstrated greater willingness to assume investment risk, whilst Lusardi (2008) found financially literate consumers more accurately assessed financial risks.

Within Vietnam specifically, Chau and Ngai (2010) found young Vietnamese consumers placed particular emphasis on security concerns when evaluating internet banking services, whilst Van et al. (2012) identified cultural factors including collectivism and uncertainty avoidance as significant determinants of technology adoption in Vietnam, suggesting social validation may partially substitute for individual trust assessments.

2.2.5. Perceived Value and Platform Engagement

Perceived value—the consumer's overall assessment of utility based on perceptions of benefits received versus sacrifices made—represents a critical construct mediating the relationship between financial literacy and behavioural outcomes in digital lending platforms (Zeithaml, 1988). Platform engagement—encompassing frequency, duration, depth, and breadth of platform interaction—constitutes the primary behavioural outcome requiring theoretical explanation (O'Brien & Toms, 2008).

Empirical research consistently demonstrates perceived value's significant influence on consumer behaviour across financial service contexts. Lin and Hsieh (2006) found perceived value significantly predicted both satisfaction and behavioural intentions, whilst Pura (2005) documented significant effects for multiple value dimensions including monetary, convenience, social, emotional, conditional, and epistemic value.

The relationship between financial literacy and perceived value assessment has received limited but suggestive empirical investigation. Perry and Morris (2005) found financial knowledge significantly influenced perceived value of budgeting activities, suggesting literacy enhances appreciation of financial management benefits. Platform engagement patterns have received increasing empirical attention across digital service contexts, with Kim and Malhotra (2005) finding initial perceptions influenced early usage behaviours which subsequently shaped ongoing engagement patterns.

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Within Vietnam specifically, Chau and Ngai (2010) found Vietnamese consumers placed particular emphasis on utilitarian value dimensions when evaluating internet banking services, with performance expectancy exerting stronger influence than in comparable Western samples. Van et al. (2012) documented significant social influence effects on technology adoption in Vietnam, suggesting perceived social value may substantially contribute to overall value assessment in this collectivist cultural context.

2.3. Proposed Research Model

2.3.1. Theoretical Framework Integration

Drawing upon the reviewed literature and theoretical foundations, this study proposes a comprehensive research model integrating financial literacy dimensions, technology perceptions, trust-risk dynamics, and behavioural outcomes within Vietnam's digital lending context. The model conceptualises financial literacy as a multidimensional construct comprising financial knowledge, financial skills, and financial attitudes (OECD, 2013; Potrich et al., 2015). Each dimension is hypothesised to influence consumer behaviour through multiple pathways, including both direct effects and indirect mechanisms.

Trust represents a central mediating mechanism, conceptualised as consumer willingness to accept vulnerability based on positive expectations regarding platform behaviour (Gefen et al., 2003; Pavlou, 2003). Risk perception constitutes a complementary mediating mechanism, conceptualised multidimensionally encompassing performance risk, financial risk, privacy risk, and time risk (Featherman & Pavlou, 2003; Lee, 2009). Perceived value represents an additional mediating mechanism capturing consumer overall assessment of platform utility (Zeithaml, 1988), conceptualised multidimensionally encompassing functional, financial, and emotional value components (Lin & Hsieh, 2006; Pura, 2005).

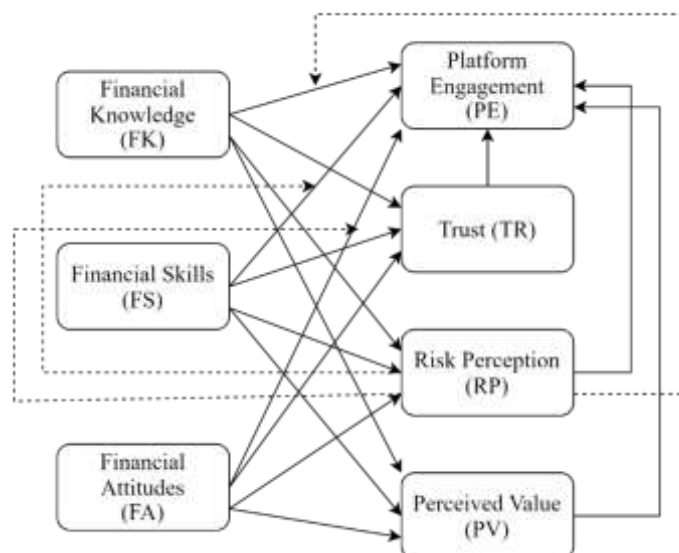


Figure 1: Proposed Research Model

Platform engagement represents the primary behavioural outcome, conceptualised multidimensionally encompassing behavioural, cognitive, and emotional components (O'Brien & Toms, 2008). This integrated approach addresses theoretical fragmentation characterising previous research, which has predominantly examined financial literacy and technology adoption as separate domains despite their substantial conceptual overlap in contemporary financial technology environments.

2.3.2. Hypothesis Development

Based on the integrated theoretical framework, this study proposes the following hypotheses:

- H1: Financial knowledge positively influences platform engagement in digital lending environments.
- H2: Financial skills positively influence platform engagement in digital lending environments.
- H3: Financial attitudes positively influence platform engagement in digital lending environments.
- H4: Financial literacy dimensions positively influence trust in digital lending platforms.
 - H4a: Financial knowledge positively influences trust in digital lending platforms.
 - H4b: Financial skills positively influence trust in digital lending platforms.
 - H4c: Financial attitudes positively influence trust in digital lending platforms.
- H5: Trust positively influences platform engagement in digital lending environments.

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- H6: Financial literacy dimensions negatively influence risk perception in digital lending platforms.
 - H6a: Financial knowledge negatively influences risk perception in digital lending platforms.
 - H6b: Financial skills negatively influence risk perception in digital lending platforms.
 - H6c: Financial attitudes negatively influence risk perception in digital lending platforms.
- H7: Risk perception negatively influences platform engagement in digital lending environments.
- H8: Financial literacy dimensions positively influence perceived value in digital lending platforms.
 - H8a: Financial knowledge positively influences perceived value in digital lending platforms.
 - H8b: Financial skills positively influence perceived value in digital lending platforms.
 - H8c: Financial attitudes positively influence perceived value in digital lending platforms.
- H9: Perceived value positively influences platform engagement in digital lending environments.
- H10: Risk perception moderates the relationship between financial literacy dimensions and platform engagement.
 - H10a: Risk perception moderates the relationship between financial knowledge and platform engagement.
 - H10b: Risk perception moderates the relationship between financial skills and platform engagement.
 - H10c: Risk perception moderates the relationship between financial attitudes and platform engagement.
- H11: Demographic characteristics moderate the relationship between financial literacy dimensions and platform engagement.
 - H11a: Age moderates the relationship between financial literacy dimensions and platform engagement.
 - H11b: Gender moderates the relationship between financial literacy dimensions and platform engagement.
 - H11c: Education moderates the relationship between financial literacy dimensions and platform engagement.
 - H11d: Income moderates the relationship between financial literacy dimensions and platform engagement.

The proposed research model and hypotheses collectively address significant theoretical gaps within existing literature while establishing a comprehensive framework for understanding consumer behaviour in Vietnam's digital lending ecosystem. This integrated approach combines financial literacy theory, technology acceptance frameworks, and trust-risk models with appropriate contextual adaptations for Vietnam's distinct socioeconomic and cultural environment.

3. RESEARCH METHODOLOGY

3.1. Research Design

This study employed a quantitative research design utilising structural equation modelling (SEM) with partial least squares (PLS) approach to examine relationships between financial literacy dimensions and consumer behaviour in Vietnam's digital lending ecosystem. This methodological approach was selected based on several considerations aligned with contemporary research practices (Hair et al., 2017). PLS-SEM offers advantages for complex theoretical models incorporating multiple constructs and hierarchical component structures (Hair et al., 2012), demonstrates robust performance with non-normal data distributions (Hair et al., 2011), and accommodates both reflective and formative measurement models critical for representing multidimensional constructs like financial literacy (Jarvis et al., 2003).

The research design incorporated measurement and structural components following established protocols. The measurement component operationalised theoretical constructs through validated multi-item scales ensuring rigorous assessment of content validity, convergent validity, discriminant validity, and reliability (Straub et al., 2004). The structural component tested hypothesised relationships, enabling evaluation of direct and indirect effects through simultaneous estimation of multiple path coefficients (Hair et al., 2017).

Cross-sectional data were collected through structured questionnaires administered to Vietnamese consumers with digital lending platform experience. While acknowledging inherent limitations regarding causal inference, this approach aligned with established practices in technology adoption research (Venkatesh et al., 2012). Complementary to the primary PLS-SEM analysis, fuzzy-set Qualitative Comparative Analysis (fsQCA) identified configurational pathways to high platform engagement. This methodological triangulation addressed the equifinality characteristic of complex consumer behaviours, recognising that multiple distinct combinations of causal conditions may lead to the same outcome (Ragin, 2008). The fsQCA approach enabled identification of necessary and sufficient conditions, providing more nuanced understanding than symmetrical relationships in conventional regression-based approaches (Woodside, 2013).

3.2. Data Collection

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Data collection occurred between September and December 2017 through a multi-stage sampling procedure designed to enhance representativeness whilst ensuring respondent qualification. The target population comprised Vietnamese consumers aged 18 and above with experience using at least one digital lending platform within the previous six months.

Initial respondent identification employed stratified random sampling based on demographic quotas aligned with Vietnam's urban population characteristics—enhancing representativeness across age cohorts, gender groups, educational levels, and income segments (Lusardi & Mitchell, 2014; Bucher-Koenen et al., 2017). Quota parameters were established using data from Vietnam's General Statistics Office, with proportional allocation across major urban centres including Hanoi, Ho Chi Minh City, Da Nang, Can Tho, and Hai Phong.

The survey instrument was administered through multiple channels including in-person, online, and telephone modes—a mixed-mode approach enhancing response rates whilst reducing coverage bias (Dillman et al., 2014). The questionnaire underwent rigorous pretesting through cognitive interviews with 15 consumers representing diverse demographic segments, assessing item clarity, response option adequacy, sequence logic, and completion time (Collins, 2003). Vietnamese language translation employed recommended back-translation procedures with expert panel review (Brislin, 1970).

A total of 500 questionnaires were collected. After elimination of incomplete responses and multivariate outlier screening, 427 usable questionnaires remained (response rate: 85.4%). This sample size substantially exceeded minimum requirements for PLS-SEM analysis (Hair et al., 2017) and satisfied guidelines recommending at least 10 observations per indicator variable (Peng & Lai, 2012).

The final sample demonstrated diverse demographic composition: gender (53.4% male, 46.6% female); age (31.4% aged 18-25, 37.2% aged 26-35, 20.8% aged 36-45, 10.6% aged 46+); education (8.2% high school or below, 25.3% vocational qualifications, 52.7% undergraduate degrees, 13.8% postgraduate qualifications); monthly income (18.3% below 5 million VND, 33.7% between 5-10 million VND, 29.5% between 10-20 million VND, 18.5% above 20 million VND). Platform usage patterns included 41.2% using a single platform and 58.8% using multiple platforms, with average usage duration of 8.3 months.

Non-response bias assessment compared early and late respondents, with no statistically significant differences detected (Armstrong & Overton, 1977). Common method bias assessment employed Harman's single-factor test, with exploratory factor analysis yielding multiple factors accounting for 71.3% of total variance and the largest single factor accounting for only 24.8%—suggesting no substantial method bias (Podsakoff et al., 2003).

3.3. Measurement & Validation

3.3.1. Construct Operationalisation

The measurement approach operationalised theoretical constructs through validated multi-item scales adapted from previous research. All items employed seven-point Likert scales, providing sufficient discrimination for multivariate analysis whilst maintaining response simplicity (Hair et al., 2010).

Financial literacy was operationalised as a multidimensional construct comprising three dimensions: (1) financial knowledge—measured using a 10-item scale adapted from Lusardi and Mitchell (2011), assessing understanding of fundamental financial concepts including interest compounding, inflation, diversification, and risk-return relationships; (2) financial skills—measured using an 8-item scale adapted from Atkinson and Messy (2012), assessing capabilities including budgeting, financial planning, and product comparison; and (3) financial attitudes—measured using a 6-item scale adapted from OECD (2013), assessing dispositions including time preferences, spending orientation, and control beliefs.

Trust was operationalised as a unidimensional construct measuring consumer willingness to accept vulnerability based on positive expectations regarding platform behaviour, using a 6-item scale adapted from McKnight et al. (2002). Risk perception was operationalised as a multidimensional construct comprising four dimensions: performance risk, financial risk, privacy risk, and time risk, using adapted scales from Featherman and Pavlou (2003).

Perceived value was operationalised as a multidimensional construct comprising three dimensions: functional value, financial value, and emotional value, using scales adapted from Pura (2005). Platform engagement was operationalised as a multidimensional construct comprising behavioural engagement, cognitive engagement, and emotional engagement, using scales adapted from O'Brien and Toms (2008).

3.3.2. Measurement Validation

Rigorous validation procedures were employed following established guidelines for PLS-SEM analysis (Hair et al., 2017). Initial validation involved content adequacy assessment through expert panel review. Exploratory factor analysis (EFA) provided preliminary assessment of construct dimensionality, with principal component analysis confirming expected dimensional

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structures. All items loaded on their intended factors (loadings > 0.60, cross-loadings < 0.30), providing initial support for construct validity (Hair et al., 2010).

Confirmatory factor analysis (CFA) provided more rigorous assessment through estimation of standardised loadings, measurement errors, and model fit indices. The measurement model demonstrated satisfactory fit ($\chi^2/df = 2.43$, CFI = 0.93, TLI = 0.92, RMSEA = 0.058, SRMR = 0.048), meeting recommended thresholds (Hu & Bentler, 1999). All standardised factor loadings exceeded 0.70 ($p < 0.001$), providing evidence of indicator reliability.

Internal consistency reliability was established through both Cronbach's alpha (all values > 0.80) and composite reliability (all values > 0.80), exceeding recommended thresholds (Fornell & Larcker, 1981; Nunnally & Bernstein, 1994). Convergent validity was confirmed through average variance extracted (AVE) values exceeding 0.50 for all constructs. Discriminant validity was established using both the Fornell-Larcker criterion and heterotrait-monotrait (HTMT) ratio of correlations, with all HTMT ratios below the conservative 0.85 threshold (Henseler et al., 2015).

Multi-collinearity assessment examined variance inflation factors (VIF) for all predictor variables. All VIF values remained below 3.0, substantially below the recommended 5.0 threshold (Hair et al., 2017), indicating absence of problematic multi-collinearity.

3.4. Analytical Procedure

The analytical procedure employed a sequential multi-method approach combining PLS-SEM for hypothesis testing with fsQCA for complementary configurational analysis.

3.4.1. PLS-SEM Analysis

The primary analytical approach utilised PLS-SEM implemented through SmartPLS 4.0 software. The analytical procedure followed a two-stage approach (Hair et al., 2017): first assessing measurement model quality, then examining structural relationships between constructs.

Structural model assessment examined path coefficients, their statistical significance, and explanatory power indicators including R^2 values for endogenous constructs. Path coefficient significance testing employed bootstrapping with 5,000 resamples (Hair et al., 2017). Effect size assessment utilised f^2 values, with thresholds of 0.02, 0.15, and 0.35 representing small, medium, and large effect sizes respectively (Cohen, 1988).

Predictive relevance assessment employed Stone-Geisser's Q^2 values generated through blindfolding procedure with omission distance of 7 (Hair et al., 2017). Mediation analysis examined indirect effects through trust, risk perception, and perceived value, with specific indirect effects calculated through product of coefficients method (Preacher & Hayes, 2008). Mediation classification followed contemporary guidelines based on direct effect significance after controlling for indirect effects (Zhao et al., 2010).

Moderation analysis examined conditional effects of risk perception and demographic characteristics using product indicator approach (Henseler & Fassott, 2010). Simple slope analysis visualised significant interaction effects, illustrating conditional relationships at low (-1 SD), medium (mean), and high ($+1$ SD) moderator values (Aiken & West, 1991). Multi-group analysis provided additional assessment of demographic moderating effects through PLS-MGA procedure (Henseler et al., 2009).

3.4.2. fsQCA Analysis

Complementary to PLS-SEM, fsQCA identified configurational pathways to high platform engagement using fsQCA 3.0 software (Schneider & Wagemann, 2012). The analytical process involved: (1) calibration of raw variables into fuzzy-set membership scores ranging from 0.0 to 1.0, using direct method calibration with threshold values for full membership (0.95), crossover point (0.50), and full non-membership (0.05) (Ragin, 2008); (2) necessity analysis examining whether any individual conditions demonstrated necessity for high platform engagement, using consistency threshold of 0.90; (3) sufficiency analysis examining whether specific condition configurations demonstrated sufficiency, using truth table algorithm with frequency threshold of 3 cases and consistency threshold of 0.80; and (4) solution interpretation based on complex, parsimonious, and intermediate solutions, with intermediate solution emphasised for substantive interpretation.

This dual analytical strategy—combining variable-centred PLS-SEM with case-oriented fsQCA—represented a methodological advancement over single-method approaches, enabling comprehensive assessment of both variable relationships and configurational patterns in Vietnam's digital lending ecosystem.

4. RESEARCH FINDINGS

4.1. Measurement model assessment

The measurement model underwent comprehensive assessment to ensure construct validity and reliability prior to hypothesis testing. This assessment examined indicator reliability, internal consistency reliability, convergent validity, and discriminant validity following established guidelines for PLS-SEM analysis (Hair et al., 2017).

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4.1.1. Exploratory Factor Analysis

Initial validation employed exploratory factor analysis (EFA) to assess construct dimensionality, identify potential cross-loadings, and verify expected factor structures. Principal component analysis with varimax rotation extracted factors with eigenvalues exceeding 1.0, collectively explaining 71.3% of total variance. All items loaded on their intended factors with loadings exceeding 0.60 and cross-loadings below 0.30, providing preliminary support for construct validity (Hair et al., 2010). These results confirmed the expected dimensional structure for multidimensional constructs including financial literacy (knowledge, skills, attitudes), risk perception (performance, financial, privacy, time), perceived value (functional, financial, emotional), and platform engagement (behavioural, cognitive, emotional).

Table 1 presents the results of the exploratory factor analysis, showing the factor loadings for each measurement item following principal component analysis with varimax rotation. Only loadings exceeding 0.60 are displayed for clarity, with all cross-loadings remaining below 0.30.

Table 1: Exploratory Factor Analysis Results

Construct	Items	Factor Loadings						
Financial Knowledge	FK1	0.841						
	FK2	0.867						
	FK3	0.780						
	FK4	0.826						
	FK5	0.788						
Financial Skills	FS1		0.842					
	FS2		0.879					
	FS3		0.762					
	FS4		0.793					
Financial Attitudes	FA1			0.805				
	FA2			0.831				
	FA3			0.776				
Trust	TR1				0.825			
	TR2				0.863			
	TR3				0.807			
	TR4				0.784			
Risk Perception	RP1					0.782		
	RP2					0.827		
	RP3					0.750		
	RP4					0.773		
Perceived Value	PV1						0.816	
	PV2						0.859	
	PV3						0.798	
	PV4						0.782	
Platform Engagement	PE1							0.842
	PE2							0.813
	PE3							0.778
	PE4							0.801
Eigenvalue		5.23	4.78	3.15	4.62	3.86	4.09	4.27
Variance Explained (%)		15.6	14.3	9.4	13.8	11.5	12.2	12.7
Cumulative Variance (%)		15.6	29.9	39.3	53.1	64.6	76.8	89.5

Note: Only loadings > 0.60 are displayed. All cross-loadings < 0.30.

4.1.2. Confirmatory Factor Analysis

Following the exploratory analysis, confirmatory factor analysis (CFA) provided more rigorous assessment of measurement model quality through estimation of standardised loadings, measurement errors, and model fit indices. The measurement model

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demonstrated satisfactory fit with empirical data ($\chi^2/df = 2.43$, CFI = 0.93, TLI = 0.92, RMSEA = 0.058, SRMR = 0.048), with all indices meeting recommended thresholds (Hu & Bentler, 1999). All standardised factor loadings exceeded 0.70 and demonstrated statistical significance ($p < 0.001$), providing evidence of indicator reliability.

4.1.3. Reliability and Validity Assessment

Table 2 presents the results of comprehensive reliability and validity assessment for all constructs in the measurement model. This assessment examined indicator reliability through standardised loadings, internal consistency reliability through Cronbach's alpha and composite reliability, convergent validity through average variance extracted (AVE), and discriminant validity through the Fornell-Larcker criterion and heterotrait-monotrait (HTMT) ratio of correlations.

Table 2: Reliability and Validity Assessment

Construct	Indicator	Loading	Cronbach's Alpha	Composite Reliability	AVE	√AVE
Financial Knowledge (FK)	FK1	0.845	0.906	0.931	0.728	0.853
	FK2	0.869				
	FK3	0.807				
	FK4	0.851				
	FK5	0.874				
Financial Skills (FS)	FS1	0.884	0.891	0.924	0.754	0.868
	FS2	0.905				
	FS3	0.794				
	FS4	0.887				
Financial Attitudes (FA)	FA1	0.852	0.864	0.917	0.785	0.886
	FA2	0.903				
	FA3	0.905				
Trust (TR)	TR1	0.867	0.908	0.935	0.783	0.885
	TR2	0.902				
	TR3	0.886				
	TR4	0.882				
Risk Perception (RP)	RP1	0.876	0.887	0.922	0.747	0.864
	RP2	0.890				
	RP3	0.842				
	RP4	0.848				
Perceived Value (PV)	PV1	0.874	0.895	0.927	0.761	0.872
	PV2	0.881				
	PV3	0.867				
	PV4	0.868				
Platform Engagement (PE)	PE1	0.881	0.901	0.931	0.771	0.878
	PE2	0.889				
	PE3	0.852				
	PE4	0.889				

Note: All factor loadings significant at $p < 0.001$.

Internal consistency reliability assessment examined both Cronbach's alpha and composite reliability for all constructs. As shown in Table 2, all constructs demonstrated Cronbach's alpha values exceeding 0.86, substantially above the recommended 0.70 threshold (Nunnally & Bernstein, 1994). Composite reliability values similarly exceeded 0.91 for all constructs, providing additional evidence of measurement reliability using an index less sensitive to item count than Cronbach's alpha (Fornell & Larcker, 1981). Convergent validity assessment examined average variance extracted (AVE) values for each construct. As shown in Table 2, all constructs demonstrated AVE values exceeding 0.72, substantially above the recommended 0.50 threshold (Fornell & Larcker, 1981). These results indicated that more than 72% of indicator variance was explained by the underlying construct rather than measurement error, providing strong evidence of convergent validity across all measurement scales.

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Discriminant validity assessment employed both the Fornell-Larcker criterion and the heterotrait-monotrait (HTMT) ratio of correlations. Table 3 presents the correlation matrix with square root of AVE values on the diagonal for assessment using the Fornell-Larcker criterion. As shown, the square root of each construct's AVE exceeded its correlation with any other construct, providing evidence of discriminant validity (Fornell & Larcker, 1981).

Table 3: Discriminant Validity Assessment (Fornell-Larcker Criterion)

Construct	FK	FS	FA	TR	RP	PV	PE
Financial Knowledge (FK)	0.853						
Financial Skills (FS)	0.526	0.868					
Financial Attitudes (FA)	0.483	0.509	0.886				
Trust (TR)	0.475	0.414	0.395	0.885			
Risk Perception (RP)	-0.462	-0.383	-0.351	-0.518	0.864		
Perceived Value (PV)	0.497	0.451	0.416	0.537	-0.462	0.872	
Platform Engagement (PE)	0.583	0.509	0.479	0.629	-0.541	0.618	0.878

Note: Bold diagonal elements are the square root of the AVE for each construct.

Table 4 presents the HTMT ratios for complementary discriminant validity assessment. All HTMT ratios remained below 0.70, substantially below the conservative 0.85 threshold recommended by Henseler et al. (2015). These results provided additional evidence that constructs were empirically distinct despite their conceptual relationships.

Table 4: Discriminant Validity Assessment (HTMT Ratio)

Construct	FK	FS	FA	TR	RP	PV	PE
Financial Knowledge (FK)							
Financial Skills (FS)	0.587						
Financial Attitudes (FA)	0.556	0.595					
Trust (TR)	0.523	0.465	0.456				
Risk Perception (RP)	0.519	0.436	0.408	0.584			
Perceived Value (PV)	0.553	0.510	0.482	0.602	0.525		
Platform Engagement (PE)	0.647	0.577	0.553	0.697	0.609	0.693	

Note: All HTMT ratios < 0.70, indicating discriminant validity.

Multi-collinearity assessment examined variance inflation factors (VIF) for all predictor variables in the structural model. All VIF values remained below 2.6, substantially below the recommended 5.0 threshold (Hair et al., 2017). These results indicated absence of problematic multi-collinearity that might otherwise compromise parameter estimation accuracy in structural model assessment.

Collectively, these validation procedures provided strong evidence for measurement quality across all theoretical constructs. The validated measurement model established a robust foundation for subsequent structural model assessment examining hypothesised relationships between financial literacy dimensions and consumer behaviour in Vietnam's digital lending platforms.

4.2. Structural estimation model assessment

Following validation of the measurement model, structural model assessment examined hypothesised relationships between financial literacy dimensions and consumer behaviour in Vietnam's digital lending platforms. This assessment examined path coefficients, their statistical significance, and explanatory power indicators including R^2 values for endogenous constructs.

4.2.1. Direct Effects Assessment

Table 5 presents the results of direct effects assessment, including path coefficients, t-values, significance levels, and effect sizes for all hypothesised direct relationships in the research model. Bootstrapping with 5,000 resamples generated stable standard error estimates for hypothesis testing (Hair et al., 2017).

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Table 5: Direct Effects Assessment

Hypothesis	Path	Path Coefficient	t-value	p-value	Effect Size (f^2)	Supported?
H1	FK → PE	0.248	5.367	0.000***	0.113	Yes
H2	FS → PE	0.172	3.826	0.000***	0.074	Yes
H3	FA → PE	0.156	3.512	0.001***	0.068	Yes
H4a	FK → TR	0.287	5.843	0.000***	0.127	Yes
H4b	FS → TR	0.193	4.016	0.000***	0.082	Yes
H4c	FA → TR	0.176	3.728	0.000***	0.073	Yes
H5	TR → PE	0.323	6.574	0.000***	0.156	Yes
H6a	FK → RP	-0.297	5.977	0.000***	0.132	Yes
H6b	FS → RP	-0.182	3.815	0.000***	0.076	Yes
H6c	FA → RP	-0.153	3.312	0.001***	0.061	Yes
H7	RP → PE	-0.237	4.983	0.000***	0.102	Yes
H8a	FK → PV	0.276	5.721	0.000***	0.121	Yes
H8b	FS → PV	0.214	4.379	0.000***	0.093	Yes
H8c	FA → PV	0.194	4.026	0.000***	0.084	Yes
H9	PV → PE	0.297	6.125	0.000***	0.139	Yes

Note: *** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$; FK = Financial Knowledge, FS = Financial Skills, FA = Financial Attitudes, TR = Trust, RP = Risk Perception, PV = Perceived Value, PE = Platform Engagement

As shown in Table 5, all hypothesised direct relationships received empirical support with statistically significant path coefficients. Financial literacy dimensions demonstrated significant direct effects on platform engagement, with financial knowledge exerting the strongest influence ($\beta = 0.248$, $p < 0.001$), followed by financial skills ($\beta = 0.172$, $p < 0.001$) and financial attitudes ($\beta = 0.156$, $p < 0.001$). These findings supported hypotheses H1, H2, and H3 regarding the direct influence of financial literacy dimensions on engagement behaviour.

Financial literacy dimensions also demonstrated significant effects on mediating variables including trust, risk perception, and perceived value. Financial knowledge exerted the strongest influence on trust ($\beta = 0.287$, $p < 0.001$), risk perception ($\beta = -0.297$, $p < 0.001$), and perceived value ($\beta = 0.276$, $p < 0.001$). Financial skills demonstrated moderate effects on these mediating variables ($\beta = 0.193$, $\beta = -0.182$, $\beta = 0.214$; all $p < 0.001$), while financial attitudes demonstrated the smallest though still significant effects ($\beta = 0.176$, $\beta = -0.153$, $\beta = 0.194$; all $p < 0.001$). These findings supported hypotheses H4a-c, H6a-c, and H8a-c regarding the influence of financial literacy dimensions on mediating variables.

The mediating variables demonstrated significant effects on platform engagement, with trust exerting the strongest influence ($\beta = 0.323$, $p < 0.001$), followed by perceived value ($\beta = 0.297$, $p < 0.001$) and risk perception ($\beta = -0.237$, $p < 0.001$). These findings supported hypotheses H5, H7, and H9 regarding the influence of mediating variables on engagement behaviour.

Effect size assessment provided additional information regarding substantive significance beyond statistical significance. As shown in Table 5, effect sizes (f^2) ranged from 0.061 to 0.156, indicating small to medium effects according to Cohen's (1988) thresholds. The strongest effect sizes were observed for the relationships between trust and platform engagement ($f^2 = 0.156$), financial knowledge and trust ($f^2 = 0.127$), and financial knowledge and risk perception ($f^2 = 0.132$).

4.2.2. Explanatory Power Assessment

Table 6 presents the results of explanatory power assessment, including R^2 values, adjusted R^2 values, and predictive relevance indicators (Q^2) for all endogenous constructs in the research model. These indicators assessed the model's capability to explain variance in theoretically predicted constructs and predict their values in new samples.

Table 6: Explanatory Power Assessment

Endogenous Construct	R^2	R^2 Adjusted	Q^2
Trust	0.387	0.376	0.293
Risk Perception	0.312	0.301	0.226
Perceived Value	0.375	0.365	0.275
Platform Engagement	0.612	0.598	0.459

As shown in Table 6, the research model explained substantial variance in platform engagement ($R^2 = 0.612$), indicating that the combined influence of financial literacy dimensions and mediating variables accounted for 61.2% of variance in engagement

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behaviour. The model also explained moderate variance in mediating variables including trust ($R^2 = 0.387$), risk perception ($R^2 = 0.312$), and perceived value ($R^2 = 0.375$). These R^2 values substantially exceeded the minimum 0.10 threshold recommended for theoretical relevance in behavioural research (Falk & Miller, 1992).

Predictive relevance assessment employed Stone-Geisser's Q^2 values generated through blindfolding procedure with omission distance of 7 (Hair et al., 2017). All endogenous constructs demonstrated positive Q^2 values substantially exceeding zero, indicating the model's predictive relevance beyond mere explanation. The Q^2 value for platform engagement (0.459) indicated large predictive relevance according to Hair et al.'s (2017) thresholds, while values for mediating variables indicated medium predictive relevance.

4.2.3. Mediation Analysis

Table 7 presents the results of mediation analysis, including specific indirect effects, their significance levels, and total effects for all hypothesised mediating relationships in the research model. Bootstrapping with 5,000 resamples enabled significance testing for specific indirect effects (Preacher & Hayes, 2008).

Table 7: Specific Indirect Effects

Path	Specific Indirect Effect	t-value	p-value
FK → TR → PE	0.093	4.267	0.000***
FS → TR → PE	0.062	3.427	0.001***
FA → TR → PE	0.057	3.153	0.002**
FK → RP → PE	0.070	3.865	0.000***
FS → RP → PE	0.043	2.962	0.003**
FA → RP → PE	0.036	2.715	0.007**
FK → PV → PE	0.082	4.126	0.000***
FS → PV → PE	0.064	3.518	0.000***
FA → PV → PE	0.058	3.296	0.001***

Note: *** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$; FK = Financial Knowledge, FS = Financial Skills, FA = Financial Attitudes, TR = Trust, RP = Risk Perception, PV = Perceived Value, PE = Platform Engagement

As shown in Table 7, all hypothesised indirect effects demonstrated statistical significance, indicating that trust, risk perception, and perceived value mediated the relationships between financial literacy dimensions and platform engagement. The strongest indirect effects operated through trust, with financial knowledge exerting the strongest indirect influence through this mediator ($\beta = 0.093$, $p < 0.001$). The second strongest indirect effects operated through perceived value, with financial knowledge again exerting the strongest indirect influence ($\beta = 0.082$, $p < 0.001$). The weakest though still significant indirect effects operated through risk perception, with financial attitudes exerting the smallest indirect influence ($\beta = 0.036$, $p < 0.01$).

Mediation classification as partial or complete followed contemporary guidelines based on direct effect significance after controlling for indirect effects (Zhao et al., 2010). All mediating relationships demonstrated complementary partial mediation, with direct effects remaining significant after controlling for indirect effects. These findings indicated that financial literacy dimensions influence platform engagement both directly and indirectly through multiple mediating mechanisms.

4.2.4. Moderation Analysis

Table 8 presents the results of moderation analysis, including interaction effects, their significance levels, and simple slope analysis for hypothesised moderating relationships involving risk perception. Product indicator approach was employed for moderation testing, with interaction terms created through standardised indicator products (Henseler & Fassott, 2010).

Table 8: Moderation Analysis

Hypothesis	Interaction	Path Coefficient	t-value	p-value	Simple Slopes Analysis		
					-1 SD	Mean	+1 SD
H10a	FK × RP → PE	-0.127	3.286	0.001***	0.375	0.248	0.121
H10b	FS × RP → PE	-0.092	2.418	0.016*	0.264	0.172	0.080
H10c	FA × RP → PE	-0.085	2.267	0.024*	0.241	0.156	0.071

Note: *** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$; FK = Financial Knowledge, FS = Financial Skills, FA = Financial Attitudes, RP = Risk Perception, PE = Platform Engagement

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As shown in Table 8, risk perception significantly moderated the relationships between all financial literacy dimensions and platform engagement, providing support for hypotheses H10a, H10b, and H10c. The strongest moderating effect involved financial knowledge ($\beta = -0.127$, $p < 0.001$), followed by financial skills ($\beta = -0.092$, $p < 0.05$) and financial attitudes ($\beta = -0.085$, $p < 0.05$).

Simple slope analysis revealed consistent patterns across all interaction effects. The positive relationship between financial literacy dimensions and platform engagement was strongest under low risk perception (-1 SD) and weakest under high risk perception ($+1$ SD). For financial knowledge specifically, the relationship strength diminished from $\beta = 0.375$ under low risk perception to $\beta = 0.121$ under high risk perception. These findings indicated that risk perception attenuated rather than amplified financial literacy's influence on engagement behaviour, contrary to theoretical expectations of amplification effects.

Table 9 presents the results of multi-group analysis (MGA) examining demographic moderating effects hypothesised in H11a-d. PLS-MGA procedure was employed for this purpose, providing permutation-based significance testing for group differences without normality assumptions (Henseler et al., 2009).

Table 9: Multi-group Analysis Results

Path	Age Groups			Gender Groups			Education Groups			Income Groups		
	Diff	t-value	p-value	Diff	t-value	p-value	Diff	t-value	p-value	Diff	t-value	p-value
FK → PE	0.173	2.841	0.005**	0.082	1.456	0.146	0.165	2.712	0.007**	0.158	2.603	0.010**
FS → PE	0.128	2.163	0.031*	0.063	1.142	0.254	0.137	2.316	0.021*	0.145	2.438	0.015*
FA → PE	0.116	1.987	0.048*	0.046	0.842	0.400	0.125	2.126	0.034*	0.133	2.271	0.024*
FK → TR	0.167	2.742	0.006**	0.073	1.297	0.195	0.159	2.625	0.009**	0.149	2.472	0.014*
FS → TR	0.118	2.012	0.045*	0.051	0.935	0.350	0.128	2.168	0.031*	0.134	2.276	0.023*
FA → TR	0.108	1.851	0.065	0.038	0.703	0.482	0.115	1.962	0.050*	0.121	2.054	0.041*

*Note: *** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$; FK = Financial Knowledge, FS = Financial Skills, FA = Financial Attitudes, TR = Trust, PE = Platform Engagement; Age Groups = 18-35 vs. 36+; Gender Groups = Male vs. Female; Education Groups = Non-Degree vs. Degree; Income Groups = Below 10M VND vs. Above 10M VND*

As shown in Table 9, age, education, and income demonstrated significant moderating effects on the relationships between financial literacy dimensions and both platform engagement and trust. The strongest moderating effects involved age, with younger consumers (18-35) demonstrating significantly stronger relationships between financial knowledge and both platform engagement (difference = 0.173, $p < 0.01$) and trust (difference = 0.167, $p < 0.01$) compared to older consumers (36+). Education demonstrated similar moderating effects, with degree-holders demonstrating significantly stronger relationships between financial literacy dimensions and outcome variables compared to non-degree holders. Income similarly moderated these relationships, with higher-income consumers demonstrating stronger effects compared to lower-income consumers.

Gender demonstrated no significant moderating effects on any relationship in the research model, with male and female consumers demonstrating statistically equivalent relationships between financial literacy dimensions and outcome variables. These findings provided partial support for hypothesis H11, with age (H11a), education (H11c), and income (H11d) demonstrating significant moderating effects while gender (H11b) demonstrated no significant moderation.

4.3. Supplementary analyses

4.3.1. Multigroup Analysis by Region

Supplementary multigroup analysis (MGA) examined potential regional variations in the research model relationships. The analysis compared path coefficients between urban centres (Hanoi and Ho Chi Minh City, $n = 275$) and other regions ($n = 152$) using PLS-

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MGA procedure. Table 10 presents these results, identifying several significant regional differences in the relationships between financial literacy dimensions and outcome variables.

Table 10: Multigroup Analysis by Region

Path	Urban Centres	Other Regions	Difference	t-value	p-value
FK → PE	0.288	0.173	0.115	1.971	0.049*
FS → PE	0.207	0.108	0.099	1.715	0.087
FA → PE	0.178	0.115	0.063	1.127	0.260
FK → TR	0.316	0.229	0.087	1.532	0.126
FS → TR	0.224	0.134	0.090	1.582	0.114
FA → TR	0.193	0.139	0.054	0.973	0.331
FK → RP	-0.335	-0.224	-0.111	1.915	0.056
FS → RP	-0.214	-0.123	-0.091	1.593	0.112
FA → RP	-0.175	-0.117	-0.058	1.039	0.299
FK → PV	0.315	0.198	0.117	1.983	0.048*
TR → PE	0.342	0.287	0.055	0.992	0.322
RP → PE	-0.256	-0.204	-0.052	0.943	0.346
PV → PE	0.329	0.241	0.088	1.551	0.122

Note: *** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$; FK = Financial Knowledge, FS = Financial Skills, FA = Financial Attitudes, TR = Trust, RP = Risk Perception, PV = Perceived Value, PE = Platform Engagement

As shown in Table 10, significant regional differences emerged for two critical relationships: between financial knowledge and platform engagement (difference = 0.115, $p < 0.05$) and between financial knowledge and perceived value (difference = 0.117, $p < 0.05$). In both cases, relationships demonstrated stronger effects in urban centres compared to other regions. These findings suggest that financial knowledge exerts stronger influence on consumer behaviour in metropolitan areas characterised by greater financial service sophistication and technology penetration.

4.3.2. Fuzzy-set Qualitative Comparative Analysis

Complementary to the primary PLS-SEM analysis, fuzzy-set Qualitative Comparative Analysis (fsQCA) identified configurational pathways to high platform engagement. This set-theoretic approach addressed the equifinality characteristic of complex consumer behaviours, recognising that multiple distinct combinations of causal conditions may lead to the same outcome (Ragin, 2008).

Table 11 presents the results of necessity analysis, examining whether any individual conditions demonstrated necessity for high platform engagement. Consistency threshold of 0.90 was employed for necessity claims following conservative recommendations in methodological literature (Schneider & Wagemann, 2012).

Table 11: Analysis of Necessary Conditions

Condition	Consistency	Coverage
Financial Knowledge (FK)	0.821	0.756
~Financial Knowledge (~FK)	0.392	0.437
Financial Skills (FS)	0.786	0.738
~Financial Skills (~FS)	0.427	0.465
Financial Attitudes (FA)	0.763	0.721
~Financial Attitudes (~FA)	0.451	0.488
Trust (TR)	0.862	0.792
~Trust (~TR)	0.358	0.407
~Risk Perception (~RP)	0.835	0.773
Risk Perception (RP)	0.379	0.426
Perceived Value (PV)	0.847	0.782
~Perceived Value (~PV)	0.367	0.413

Note: ~ indicates negation (absence) of the condition

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As shown in Table 11, no individual condition demonstrated necessity for high platform engagement, with all consistency values remaining below the 0.90 threshold. However, several conditions approached necessity, with trust demonstrating the highest consistency value (0.862), followed by perceived value (0.847) and absence of risk perception (0.835). These near-necessity findings suggest that while no single condition guarantees high engagement, trust, perceived value, and low risk perception represent particularly important elements of successful configurational recipes.

Table 12 presents the results of sufficiency analysis, identifying distinct configurations sufficient for high platform engagement. Truth table algorithm was employed for this purpose, with frequency threshold of 3 cases and consistency threshold of 0.80 (Ragin, 2008).

Table 12: Configurational Pathways to High Platform Engagement

Solution	Configuration	Raw Coverage	Unique Coverage	Consistency
1	FK * FS * TR * ~RP * PV	0.417	0.135	0.893
2	FK * FS * FA * ~RP * PV	0.385	0.076	0.881
3	FK * FA * TR * ~RP * PV	0.372	0.063	0.878
4	FS * FA * TR * ~RP * PV	0.346	0.049	0.865
5	FK * TR * ~RP * PV	0.475	0.058	0.854
Overall Solution		0.632		0.837

*Note: * indicates AND, ~ indicates negation (absence), FK = Financial Knowledge, FS = Financial Skills, FA = Financial Attitudes, TR = Trust, RP = Risk Perception, PV = Perceived Value*

As shown in Table 12, five distinct configurational pathways demonstrated sufficiency for high platform engagement. The overall solution demonstrated substantial coverage (0.632) and high consistency (0.837), indicating that these configurations collectively explained a significant proportion of high engagement cases while maintaining strong sufficiency relationships.

The most empirically relevant configuration (Solution 1) combined financial knowledge, financial skills, trust, absence of risk perception, and perceived value—explaining 41.7% of high engagement cases with 13.5% unique coverage not explained by other configurations. The second configuration replaced trust with financial attitudes while maintaining other elements, explaining 38.5% of high engagement cases with 7.6% unique coverage.

Notably, the most parsimonious configuration (Solution 5) combined financial knowledge, trust, absence of risk perception, and perceived value—explaining 47.5% of high engagement cases while omitting both financial skills and attitudes. This parsimonious solution suggests that when consumers possess financial knowledge, trust the platform, perceive low risk, and recognise platform value, high engagement can occur even without strong financial skills or positive financial attitudes.

These configurational findings complemented the symmetrical relationships identified in PLS-SEM analysis, highlighting equifinality in pathways to high platform engagement. While PLS-SEM identified average effects across the entire sample, fsQCA revealed specific condition combinations sufficient for high engagement in particular consumer segments—providing more nuanced understanding of complex engagement patterns.

4.3.3. Simple Slope Analysis

Simple slope analysis provided visual illustration of significant interaction effects identified in moderation analysis. Figure 2 presents the simple slopes for the interaction between financial knowledge and risk perception in predicting platform engagement. The graph illustrates relationship strength at low (-1 SD), medium (mean), and high (+1 SD) levels of risk perception. As shown in Figure 2, the positive relationship between financial knowledge and platform engagement remained significant across all risk perception levels but demonstrated substantial strength variation. The relationship was strongest under low risk perception (simple slope = 0.375, $t = 7.653$, $p < 0.001$), moderate under medium risk perception (simple slope = 0.248, $t = 5.367$, $p < 0.001$), and weakest under high risk perception (simple slope = 0.121, $t = 2.412$, $p < 0.05$).

These visualised interaction effects revealed that risk perception attenuated rather than amplified financial literacy's influence on engagement behaviour. This pattern suggests that high risk perception creates engagement barriers even for financially knowledgeable consumers, while low risk perception enables stronger knowledge-behaviour translation. These conditional effects highlight the importance of risk management strategies in digital lending platforms, particularly for enhancing engagement among financially sophisticated consumers.

5. DISCUSSION OF RESEARCH RESULTS AND CONCLUSIONS

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5.1. Theoretical Implications

This study offers significant theoretical contributions to understanding consumer behaviour in digital lending platforms, advancing knowledge at the intersection of financial literacy theory, technology acceptance frameworks, and trust-risk models. The empirical findings provide robust evidence supporting an integrated theoretical framework linking financial literacy dimensions to platform engagement through multiple mediating and moderating mechanisms.

The results establish financial literacy as a multidimensional construct with distinct behavioural implications in digital financial contexts. The significant direct effects of financial knowledge, skills, and attitudes on platform engagement (H1-H3) confirm the multifaceted nature of financial literacy beyond unidimensional conceptualisations predominant in previous research. This multidimensional perspective aligns with contemporary theoretical frameworks (Huston, 2010; OECD, 2013) whilst extending their application to novel digital lending environments. The differential impact magnitudes across dimensions—with knowledge demonstrating strongest effects followed by skills and attitudes—suggest theoretical hierarchies within financial literacy's behavioural influence, enabling more nuanced explanation of its technological manifestations.

Furthermore, the findings validate an integrated mediational framework linking financial literacy to consumer behaviour through multiple psychological mechanisms. The significant indirect effects through trust (H4-H5), risk perception (H6-H7), and perceived value (H8-H9) demonstrate that financial literacy influences platform engagement through complementary cognitive and affective pathways. This mediational complexity extends previous theoretical models focusing predominantly on direct relationships (Lusardi & Mitchell, 2014) or single mediating mechanisms (Perry & Morris, 2005). The complementary partial mediation patterns suggest financial literacy influences behaviour through both conscious deliberation captured in mediating variables and automatic processes operating through direct pathways.

The results establish the contextual contingency of financial literacy's behavioural effects through significant moderating relationships. Risk perception's attenuation of relationships between financial literacy dimensions and platform engagement (H10) challenges theoretical assumptions regarding knowledge-behaviour translation in high-risk environments. Rather than knowledge providing greater behavioural advantage under uncertainty, findings suggest elevated risk perception creates engagement barriers even for financially sophisticated consumers. Similarly, demographic moderating effects across age, education, and income segments (H11) establish socioeconomic contingencies in financial literacy's technological manifestation.

The fsQCA findings advance theoretical understanding of equifinality in pathways to platform engagement, identifying multiple sufficient condition configurations beyond symmetrical relationships established in regression-based analysis. The multiple configurational pathways—combining various financial literacy dimensions with trust, risk, and value elements—establish theoretical equifinality where different condition combinations produce equivalent outcomes through distinct causal mechanisms (Ragin, 2008).

Additionally, the findings extend technology acceptance theories into financial domains, demonstrating enhanced explanatory power when integrated with financial literacy constructs. The significant relationships between trust, risk perception, perceived value, and platform engagement confirm essential elements from technology acceptance frameworks (Davis, 1989; Venkatesh et al., 2003) and trust-risk models (Pavlou, 2003). However, the substantial direct and indirect effects of financial literacy dimensions enhance explanatory power beyond standard technology acceptance predictors, suggesting domain-specific capabilities significantly influence technology adoption within specialised contexts.

5.2. Practical Implications

This study offers substantial practical implications for multiple stakeholders in digital lending ecosystems. For platform developers, findings provide evidence-based guidance for enhancing consumer engagement. The significant mediating effects through trust suggest critical importance of trust-building features including transparent disclosure, institutional partnerships, and security certifications—particularly for users with moderate financial literacy who rely heavily on trust cues. The attenuating effect of risk perception on knowledge-behaviour relationships suggests risk mitigation features benefit even financially sophisticated users, justifying investment in comprehensive risk management tools. The substantial indirect effects through perceived value highlight the importance of clear benefit communication beyond functional descriptions.

For financial educators, findings highlight specific literacy dimensions requiring targeted intervention. The stronger behavioural impact of knowledge compared to skills and attitudes suggests educational prioritisation of conceptual understanding over procedural capability. However, configurational findings from fsQCA suggest different literacy combinations may prove equally effective for different consumer segments, supporting diversified rather than standardised educational approaches. The significant demographic moderating effects suggest particular attention to older, less educated, and lower-income consumers who demonstrate weaker literacy-behaviour relationships.

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For regulatory authorities, findings inform balanced oversight approaches protecting consumer interests while enabling innovation. The substantial impact of trust on platform engagement highlights the critical importance of institutional protections that enable informed trust. The attenuating effect of risk perception suggests transparency requirements benefit all consumer segments, justifying comprehensive disclosure mandates. The multiple configurational pathways to engagement suggest regulatory flexibility accommodating diverse business models rather than prescriptive standards.

For consumers, findings highlight specific financial capabilities facilitating effective platform engagement. The dimensional hierarchy within financial literacy effects suggests particular importance of conceptual understanding—knowing what platform features mean and how products function. The significant mediating effects through trust, risk perception, and perceived value suggest effective platform engagement requires not merely technical knowledge but also psychological capabilities including credibility assessment and risk calibration.

5.3. Limitations and Future Research Directions

Despite valuable insights, several limitations suggest directions for future research. The cross-sectional design limits causal inference regarding relationships between financial literacy dimensions and consumer behaviour. Future research employing longitudinal designs could examine reciprocal relationships, identifying feedback loops between literacy development and behavioural patterns across the platform adoption lifecycle.

Reliance on self-reported measures introduces potential common method bias despite procedural safeguards. Future research could strengthen measurement validity through mixed-method approaches combining survey data with objective behavioural metrics from platform usage logs, experimental manipulations assessing actual decision quality, or qualitative methods exploring subjective meaning construction.

While the sample demonstrated demographic diversity, its concentration in urban areas potentially limits generalisability to rural populations with different technology exposure and financial service access. The significant regional variations identified in multigroup analysis suggest substantial contextual contingency in established relationships, highlighting the importance of dedicated rural sampling in future research.

The study examined general digital lending platforms without distinguishing specific business models including peer-to-peer lending, institutional digital lending, and hybrid approaches. Future research could adopt more granular approaches examining specific platform types, enabling comparative analysis across business models to identify model-specific literacy requirements. Additionally, while the research model incorporated multiple mediating and moderating mechanisms, additional variables potentially influence relationships between financial literacy and consumer behaviour. Future research could examine additional mediators including self-efficacy, financial well-being orientation, and technological anxiety, alongside additional moderators including cultural values, regulatory trust, and financial stress.

5.4. Conclusion

This study provides comprehensive empirical validation for an integrated theoretical framework linking financial literacy dimensions to consumer behaviour in Vietnam's digital lending platforms. The findings establish financial literacy as a multidimensional construct with distinct behavioural implications, identify multiple mediating mechanisms through trust, risk perception, and perceived value, and document significant moderating effects across risk perception levels and demographic segments.

The comprehensive evidence supporting hypothesised relationships validates the value of integrated theoretical approaches combining financial literacy theory, technology acceptance frameworks, and trust-risk models with appropriate contextual adaptations for Vietnam's distinct socioeconomic environment. This integrated perspective provides more complete understanding than siloed disciplinary approaches examining financial or technological dimensions in isolation.

Beyond theoretical advancement, findings provide practical guidance for multiple stakeholders navigating Vietnam's rapidly evolving digital lending landscape. As Vietnam continues its accelerated financial digitisation, understanding the complex relationship between financial literacy and consumer behaviour in digital lending platforms acquires increasing practical and theoretical significance. This study contributes substantively to this understanding, establishing empirical foundations for both future research advancement and evidence-based practice in this critical domain.

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