

Predicting FinTech App Adoption Intentions in Digitally Constrained Contexts: A Trust-Based Structural Model

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ABSTRACT:

This study examines FinTech adoption among low-literacy users in Saudi Arabia's emerging regions by proposing and testing the Intermediated Trust–Risk Adoption (ITRA) Model, which integrates digital resilience, agent support, trust, and perceived risk. Using a cross-sectional survey design, data were collected from 424 respondents in semi-urban and rural Saudi Arabia. The model was validated using Covariance-Based Structural Equation Modelling (CB-SEM). Digital resilience and agent support significantly enhance trust, which in turn drives FinTech adoption intention. Perceived risk negatively influences adoption. Trust mediates the resilience–adoption relationship, and a serial mediation path from usability through resilience and trust is also supported. The study is context-specific and based on self-reported data; future research could explore longitudinal effects or comparative regional analysis. The findings offer insights for designing inclusive, trust-sensitive FinTech solutions that account for cognitive and emotional constraints. This study extends digital inclusion research by theorising the roles of intermediation, trust, and resilience in FinTech adoption among marginalised populations.

Keywords: FinTech adoption, Low-literacy users, Digital resilience, Perceived risk, Trust in technology

1. Introduction

Promising to democratise access to banking, credit, insurance, and payment systems, digital financial services (FinTech) have become a transforming agent across rising economies over the past decade (Alkhwaldi, 2024; Hasan et al., 2024; Vasishta et al., 2024). Particularly, Saudi Arabia has seen the explosive spread of FinTech apps backed by digital infrastructure, chatbots (Khan & Azam, 2023), and Aadhaar, which supports enabling digital infrastructure. Particularly for historically unbanked groups, these developments have been hailed as champions of financial inclusion. Though access to digital financial services has grown dramatically, meaningful and consistent use among low-literate and socioeconomically underprivileged groups is still rare (Subramanian, 2007; Yang & Zhang, 2022). This disparity between access and adoption raises fundamental issues regarding the nature of digital inclusion and the hazards it could bring for sensitive users.

The current debate on FinTech adoption usually assumes digitally literate users who are able to navigate abstract interfaces and interpret algorithmic cues (Davis, 1989; Venkatesh et al., 2003). Such presumptions ignore the reality experienced by low-literate consumers, especially in rural and semi-urban Saudi Arabia, who might lack formal education, digital confidence, and familiarity with risk-laden financial decision-making

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environments (A. A. Mishra & Verma, 2024; Wang & Yang, 2024). To interact with FinTech systems, these consumers sometimes rely on visual cues, trial-and-error learning, family members, informal agents, and shopkeeper assistance (Asif et al., 2024; Chen et al., 2023; Emara, 2023; Garcia et al., n.d.; Panetta et al., 2023; Song et al., 2024). In these kinds of situations, trust is developed not only in connection to the technology but also through the people and procedures that help users interact with it (McKnight et al., 2002; Gefen et al., 2003). Notwithstanding this, mainstream adoption models fail to sufficiently address how risk is emotionally experienced by technologically vulnerable groups or how trust is socially created.

Although perceived usefulness and ease of use remain the main determinants of technology adoption (Davis, 1989), mounting research has started to challenge these rationalist paradigms for their lack of sensitivity to cultural, cognitive, and emotional aspects of digital involvement (Slovic et al., 2004; Loewenstein et al., 2001). Low-literate users often suffer from increased anxiety around mistakes, fear of permanent financial loss, and mistrust of opaque algorithms or foreign transaction methods (Gabor & Brooks, 2017; T. Yang & Zhang, 2022). Even in cases of structural access and technically competent digital interfaces, such affective risk perceptions can become the main obstacles to adoption. Furthermore, often a result of what may be defined as digital resilience—a construct still underdeveloped in current models of technology acceptance—users' capacity to persevere through mistakes, learn from failure, and progressively build confidence in using FinTech tools.

Low-literate users overcome technological obstacles mostly with the help of agent support—provided by local intermediaries such as Common Service Centres (CSCs), mobile recharge vendors, or digitally literate family members (Chen et al., 2023; Emara, 2023; Song et al., 2024). On behalf of the user, these agents sometimes function as translators, activists, and even decision-makers. Their presence helps to reduce anxiety, build confidence, and enable a social scaffolding through which trust in FinTech platforms might be progressively developed (Yang & Zhang, 2022). Most adoption models, meanwhile, do not specifically consider such intermediated trust or its impact on adoption intentions. Furthermore, even if agent support might directly affect usage, its indirect effects—through improving trust or lowering perceived risk—remain theoretically understudied. The present work suggests and empirically investigates the ITRA Model to close these important gaps. By including four constructions central to low-literate user contexts—digital resilience, agent support, perceived risk, and trust—this framework stretches the conventional technology acceptance paradigm. Grounded in sociotechnical perspectives of digital inclusion, the ITRA model argues that the intention to adopt FinTech among low-literate users is shaped not just by usability but also by how confidently users can recover from digital errors, how effectively safe they feel and the trust-building role of human intermediaries (Selwyn, 2004; Livingstone & Helsper, 2007). This perspective also clarifies how the ITRA model extends beyond TAM and UTAUT in digitally constrained environments. While TAM/UTAUT largely emphasise individual cognitive evaluations of system attributes, ITRA foregrounds two context-relevant mechanisms highlighted in this study: emotional (affective) risk—such as anxiety and fear associated with making irreversible financial errors—and socially constructed trust, which is strengthened through agent support and guided interactions when users cannot

independently evaluate or confidently use FinTech services. The digital experiences of low-literate users remain under-theorised, under-measured, and poorly understood, even if the Saudi Arabian state invests heavily in digital financial architecture. Most FinTech research still concentrates on literate consumers with basic digital fluency, so a significant population segment is excluded from the scholarly and policy debate. This knowledge gap is filled in the present work by means of a framework reflecting the real usage environments, psychological hazards, and relational dependencies of low-literate users. It also presents digital resilience and agent support as concepts that transcend access or cost to explain the affective and adaptive processes fundamental for sustainable FinTech inclusion. Through this, the study advances the present theory and provides grounded, context-sensitive insights for Global South digital policy design.

This work is organised as follows: Theoretical background and the literature review are presented in Section 2. Section 3 covers the development of the research model and hypotheses: Section 4 details the approach and data-collecting techniques—section five documents model testing and empirical findings. Section 6 explores the results of earlier research. Section 7 finally lists the theoretical contributions, pragmatic consequences, constraints, and directions for the subsequent research of the study.

2. Theoretical Background

The fast spread of FinTech platforms over developing nations has sparked scholarly and policy interest in knowing the drivers of digital financial adoption. Under the Digital Saudi Arabia initiative, the explosion of smartphone-based payment apps, banking services, and credit products in Saudi Arabia has resulted in hitherto unbanked populations with hitherto unheard-of access (Dwivedi et al., 2021; Gupta & Singh, 2025; Lee et al., 2024). Adoption still serves low-literate consumers, particularly in rural or semi-urban areas, not only in terms of access but also digital competency, social scaffolding, and emotional trust (Chen et al., 2023; Emara, 2023; Song et al., 2024). Conventional technology adoption models, such as the Technology Acceptance Model (TAM) (Davis, 1989) and Unified Theory of Acceptance and Use of Technology (UTAUT) (Venkatesh et al., 2003), offer limited explanatory power in such contexts, as they often overlook psychological stressors, agent intermediation, and resilience under digital uncertainty (Loewenstein et al., 2001; Slovic et al., 2004).

2.1 Digital Resilience and Reported Usability

Still, a significant factor influencing technology acceptance is perceived usability, which is defined as the degree of simplicity of a system for learning and use (Davis, 1989). However, in low-literate populations, usability has to cover cognitive accessibility and error recovery (Yang & Zhang, 2022), going beyond mere functional efficiency. Users who are not familiar with technical jargon or abstract icons sometimes need simple interfaces that lower digital friction. Particularly when directions are visual or context-sensitive, perceived usability helps to build digital resilience by allowing users to negotiate obstacles with more confidence (Livingstone & Helsper, 2007). A usable interface promotes not only instant interaction but also the slow increase of adaptive capacity—a vital component of digital resilience (Selwyn, 2004). Consequently, we hypothesize:

H1: Users' digital resilience is positively correlated with their impressions of FinTech application usability.

2.2 Agent Trust, Support, and Adoption Intent

For transaction assistance, low-literate users often rely on human agents—such as mobile recharge shopkeepers, local fintech facilitators, or digitally literate family members— (Chen et al., 2023; Emara, 2023; Song et al., 2024). By means of social endorsement, these agents help to demystify digital interfaces, foster confidence, and validate platforms (Mele et al., 2023). Under conditions of limited institutional trust, interpersonal trust takes the front stage—usually guided through middlemen (Gefen et al., 2003; McKnight et al., 2002). Agent support helps to clarify uncertainty and give the invisible operations of FinTech services a more physical and predictable form. Such support greatly increases user confidence in the platform, according to empirical research (Yang et al., 2023). Thus;

H2: Agent support helps consumers to have positive confidence in FinTech systems.

Agent support not only affects confidence but also directly influences adoption behaviour. Even with a lack of complete knowledge, users who get step-by-step help or see trusted others using the platform may be more likely to copy this behaviour (Emara, 2023; Song et al., 2024). This phenomenon fits Bandura's social learning theory, according to which seen behaviour from a credible model raises the probability of adoption (Bandura, 1986). Consequently, we propose:

H3: Adoption intention for FinTech directly benefits from agent support.

2.3 Digital Resilience and Trust

Digital resilience is the ability of a person to keep on, bounce back, and adjust in the face of digital obstacles, including transaction mistakes, authentication failures, or app crashes (Livingstone & Helsper, 2007). Resilient users are more likely to keep using digital tools despite obstacles, raising their familiarity with the platform and, over time, their confidence in its dependability (Selwyn, 2004). Trust results from the user's sense of control and predictability in using the platform as much as from system performance (Gefen et al., 2003). The belief of the user in their capacity to control risks and make wise decisions inside the FinTech ecosystem increases as digital resilience develops. Hence:

H4: Digital resilience helps to build confidence in FinTech products.

2.4 FinTech Adoption and Trust Aim

Particularly in high-risk environments like financial transactions (Gefen et al., 2003; McKnight et al., 2002), trust is generally agreed to be a fundamental driver of technology acceptance. Those who trust a FinTech platform are more likely to share personal information, authorise payments, and rely on digital records over actual cash (Suri & Jack, 2016). In low-literate populations, trust may even replace complete understanding,

with users depending on the consistency and benevolence of the system—often reinforced by successful past events or recommendations from intermediaries (Yang & Zhang, 2022). In this sense:

H5: Adoption intention is raised by trust in FinTech systems.

2.5 Adoption of FinTech and Perceived Risk

Perceived risk is the individual expectation of negative results from system use (Slovic et al., 2004). Digital finance is seen as dangerous for low-literate consumers not only because of the opacity of interfaces, fear of irreversible mistakes, and possible fraud (Gabor & Brooks, 2017; T. Yang & Zhang, 2022) but also because of the fear of monetary loss. Even in cases when platforms are safe and readily available, high perceived risk frequently results in avoidance behaviour (Loewenstein et al., 2001). In such situations, emotional risk perception is a stronger predictor of adoption behaviour than objective risk assessments. We thus assume:

H6: Adoption intention for FinTech suffers a negative influence from perceived risk.

2.6 Direct and Indirect Results of Digital Resilience

Digital resilience directly affects adoption by boosting self-efficacy and lowering fear, thus influencing trust, even though it also affects confidence (Livingstone & Helsper, 2007). Those who believe they are able to handle challenges are more likely to explore and finally use digital tools (Selwyn, 2004). Digital resilience lets consumers recover from first failures and progressively increase their involvement, thus fostering greater acceptance. In this sense:

H7: Digital resilience directly increases the intention of FinTech adoption.

Trust could act as a middle ground between adoption and digital resilience (Kim et al., 2025; Vasiliu-Feltes, 2024). High-resilience users are more likely to grow trust in the system, which shapes their adoption behaviour (Sreenivasan & Suresh, 2023; Tomasic & Akinbami, 2011). As such:

H8: Trust controls the link between the intention of digital resilience and FinTech adoption

2.7 Serial Mediation: From Adoption to Usability

At last, we suggest a serial mediation model whereby perceived usability improves digital resilience, which in turn fosters trust and finally helps adoption. This route gathers the emotional and cognitive scaffolding low-literate users need to go from exposure to meaningful participation. Users who find the helpful platform grow more resilient; resilience comes with familiarity and confidence, which supports trust, and trusted platforms are more likely to be adopted (Selwyn, 2004; T. Yang & Zhang, 2022). Consequently:

H9: Digital resilience and trust serially mediate the link between expected usability and FinTech adoption intention.

3. Methods

3.1 Research Paradigm

This work uses a positivist research paradigm, which fits the objective of empirically investigating expected relationships among constructions inside a proposed theoretical model (Creswell & Creswell, 2023; Saunders et al., 2009; Saunders et al., 2023). Appropriate for research using structured questionnaires and statistical model testing (Hair et al., 2010), the positivist stance stresses objectivity, generalisability, and quantification. Following this paradigm, a deductive approach was used whereby hypotheses generated from theory were tested using primary data gathered from a defined population of low-literate FinTech users in Saudi Arabia. This method replicates earlier FinTech research using structural equation modelling to validate behavioural models (Yang et al., 2023).

3.2 Pretesting and Survey Development

Developed in English, the questionnaire was first translated into Arabic using a double-translation technique to preserve semantic equivalency (Alam et al., 2024; Baber et al., 2024; Y. Mishra & Singh, 2025). Twenty-five people from a semi-urban town were chosen based on their active use of digital financial applications, but limited formal education, for a pretest. Especially for low-literate users—an issue Song et al. (2024) underlined—the pretest sought to evaluate content clarity, visual accessibility, and cultural appropriateness of indicators. Based on comments from respondents, minor changes were made, including simplifying words like “transaction failure” to “app stopped working.” Especially in terms of capturing contextually specific concepts like digital resilience and agent support, this technique guaranteed instrument validity.

3.3 Measures

Every construct was operationalised with multi-item reflective scales modified from validated tools found in current research. For low-literate populations, items were scored on a 5-point Likert scale (1 = Strongly Disagree to 5 = Strongly Agree), which is cognitively reasonable. Items from Davis (1989) and Venkatesh et al. (2003) were used to gauge perceived usability, capturing the apparent simplicity of navigation and visual accessibility of FinTech applications. Adapted from Chen et al. (2023), Emara (2023) and Song et al. (2024), Agent Support gauged the degree of reliance on unofficial social actors, including family members or shopkeepers, for online financial transactions. Measuring resilience following Livingstone and Helsper (2007) and Selwyn (2004), digital resilience captures persistence, error recovery, and adaptive learning during digital failures. Focusing on user confidence in platform reliability and safety, trust was evaluated using Gefen et al. (2003) and McKnight et al. (2002). At last, Perceived Risk was recorded with objects from Slovic et al. (2004) and Loewenstein et al. (2001), so reflecting users’ emotional concerns about financial or transactional errors. Table 1 lists all indicators and sources.

3.4 Sample and Data Collection

A cross-sectional survey design was used to target low-literate FinTech users from semi-urban Saudi Arabia. Structured questionnaires were distributed by experienced field researchers fluent in the local dialects and yielded 424 valid responses overall. To determine the sample size, we employed an “a-priori sample size calculator for structural equation models” (Soper, 2015). The questionnaire was translated into the local language (i.e., Arabic) as well. Based on two criteria—use of any FinTech application (e.g., bank apps) in the past three months and formal education not exceeding primary level—respondents were screened for eligibility. Emphasising the need to reach under-represented and low-literacy populations, this sampling frame is consistent with methods used in previous studies in digital inclusion and FinTech (Gabor & Brooks, 2017; Yang & Zhang, 2022). Strict adherence to ethical standards for informed consent and confidentiality reassured all participants of voluntary participation and anonymity.

3.5 Analytical Strategy

Applied using AMOS 26, Covariance-Based Structural Equation Modelling (CB-SEM) tested the expected correlations. Strength in theory testing, estimation of complex mediation effects, and validation of latent constructs—all of which CB-SEM excels in—was what drew attention to it (Hair et al., 2010). In line with best practices in FinTech modelling research (Gefen et al., 2003; Rai et al., 2019), the model fit was assessed using standard indices, including the Comparative Fit Index (CFI), Tucker–Lewis Index (TLI), Root Mean Square Error of Approximation (RMSEA), and Standardised Root Mean Residual (SRM). As advised by Preacher & Hayes (2008), the bootstrapping technique with 5000 resamples was used to evaluate the robustness of mediation effects (H8 and H9). Based on tests of construct reliability (Cronbach’s alpha), convergent validity ($AVE > 0.5$), and discriminant validity (Fornell–Larcker criterion), measurement model validity was established by Hair et al. (2010).

3.6 Ethical statement

The study adhered strictly to established ethical research protocols. Participants were fully informed about the study’s objectives and the voluntary nature of their participation through an introductory statement included in the questionnaire. Anonymity was maintained by omitting any collection of personally identifiable information, thereby encouraging honest and uninfluenced responses. Participants were also made aware of their right to refuse or withdraw from the study at any point without any repercussions. Ethical oversight included internal approval by the research team and content validation by two academic experts and five researchers specializing in fintech.

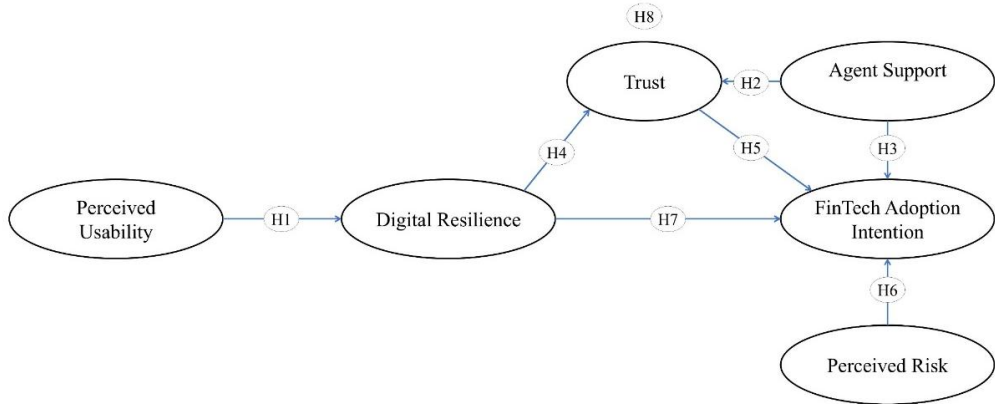


Figure 1: Conceptual Framework.

Source: Adapted from Jain & Raman (2023) and Singh & Sharma (2023)

Table 1: Constructs, items, and factor loadings

Construct	Definition	Sources	Sample Indicators	Factor Loadings	Cronbach's Alpha
Perceived Usability (PU)	The degree to which FinTech apps are easy to use, visually accessible, and cognitively manageable.	Davis (1989), Venkatesh et al. (2003) and Zhao et al. (2022)	1. The app is simple and easy to navigate. 2. Icons help me understand what to do. 3. I can use the app without needing detailed instructions.	0.74 0.77 0.81	0.84
Agent Support (AS)	Reliance on informal social actors (e.g., shopkeepers, peers, relatives) for help using FinTech tools.	Misra et al. (2025) and Vygotsky (1978)	1. I rely on someone to help me use financial apps. 2. I often ask others to explain app features.	0.76 0.79 0.85	0.86

			3. I follow others' advice while making digital transactions.		
Digital Resilience (DR)	The user's ability to adapt and persist in the face of digital barriers, confusion, or errors.	Livingstone & Helsper (2007) and Selwyn (2004)	1. I keep trying if something goes wrong with the app. 2. I learn from failed transactions. 3. I do not give up easily while using financial apps.	0.78 0.83 0.87	0.88
Trust (TR)	The belief that FinTech services are reliable, safe, and endorsed by trusted others or institutions.	Gefen et al. (2003) and McKnight et al. (2002) .	1. I trust the app because others use it, too. 2. I feel confident after seeing confirmation messages. 3. The app is secure for payments.	0.75 0.79 0.83	0.85
Perceived Risk (PR)	Emotional concern or fear regarding fraud, misuse, or errors while using FinTech.	Featherman & Pavlou, (2003) , Loewenstein et al. (2001) and Slovic et al. (2004)	1. I worry I may lose money using this app. 2. I fear making a mistake I cannot fix. 3. I feel nervous	0.73 0.75 0.79	0.82

			entering PINs or OTPs.		
FinTech Adoption Intention (FAI)	Likelihood of continuing or expanding use of FinTech services.	Venkatesh et al. (2003) and Rai et al. (2019)	1. I plan to use FinTech apps regularly. 2. I prefer digital over cash payments. 3. I recommend such apps to others.	0.77 0.78 0.84	0.87

Sources: Author’s own compilation

Table 2: Sample demographics.

Variable	Percentage
Gender	
Male	47%
Female	53%
Age	
18-27	57%
28-37	31%
38-47	12%

Sources: Author’s own compilation

Table 3: SEM Results for Hypotheses Testing

Hypothesis	Path	Standardised Estimate (β)	Standard Error (SE)	Critical Ratio (CR)	p-value	Result
H1	Perceived Usability → Digital Resilience	0.41	0.05	8.20	< .001	Supported
H2	Agent Support → Trust	0.47	0.06	7.83	< .001	Supported
H3	Agent Support → FinTech	0.22	0.05	4.40	< .001	Supported

	Adoption Intention					
H4	Digital Resilience → Trust	0.34	0.05	6.80	< .001	Supported
H5	Trust → FinTech Adoption Intention	0.38	0.06	6.33	< .001	Supported
H6	Perceived Risk → FinTech Adoption Intention	-0.30	0.05	-6.00	< .001	Supported
H7	Digital Resilience → FinTech Adoption Intention	0.19	0.06	3.17	.002	Supported
H8	Digital Resilience → Trust → FinTech Adoption Intention (Mediation)	0.13	Bootstrapped	-	< .001	Supported (Mediation)
H9	Perceived Usability → Digital Resilience → Trust → FinTech Adoption Intention (Serial Mediation)	0.08	Bootstrapped	-	< .001	Supported (Serial Mediation)

Sources: *Author's own compilation*4. Results

4.1 Descriptive Statistics

Sample properties and central tendencies of the study variables were evaluated using descriptive statistics. With the majority aged between 18 and 27 years, the sample (N = 424) comprised 53% women and 47% men, in line with past studies demonstrating that younger users dominate mobile financial services in emerging markets (Yang et al., 2023). For important constructs, mean values ranged from 3.58 to 4.01, suggesting modest to strong item agreement. High endorsement of perceived usability (M = 3.89, SD = 0.72) and agent support (M = 4.01, SD = 0.65) confirmed past results on the relevance of app simplicity and community support in FinTech adoption (Choi et al., 2024; Huarng & Yu, 2022; Liu & Sun, 2024). Reflecting increasing confidence alongside continuous digital

vulnerability, digital resilience ($M = 3.74$, $SD = 0.78$) and trust ($M = 3.69$, $SD = 0.81$) were moderate. Remarkably consistent with studies on low-literate FinTech users, perceived risk ($M = 3.58$, $SD = 0.84$) remained a concern (Slovic et al., 2004). Relatively strong adoption intention ($M = 3.91$, $SD = 0.69$) indicated optimism dependent on supporting elements like trust and confidence. These descriptive findings support the empirical foundation for the structural model evaluation and highlight the applicability of the ITRA model.

4.2 Measurement Model: Reliability and Validity

Standard SEM guidelines (Hair et al., 2010) helped evaluate the validity and dependability of every construct. For all constructions, Cronbach's alpha and composite reliability (CR) values exceeded 0.70, verifying internal consistency (Fornell & Larcker, 1981). In line with similar constructions in FinTech studies involving vulnerable user groups (Yang et al., 2023), digital resilience ($\alpha = 0.88$) and trust ($\alpha = 0.85$) have shown excellent dependability. Average variance extracted (AVE) values above the 0.50 threshold and standardised factor loadings spanning from 0.73 to 0.87, all statistically significant (Gefen et al., 2003), supported convergent validity. Using the Fornell–Larcker criterion, where the square root of each construct's AVE exceeded its inter-construct correlations, discriminant validity was confirmed. Confirming construct uniqueness, HTMT ratios for all construct pairs (Henseler et al., 2015) were also less than 0.85. These findings provide a strong measuring model, supporting later structural model testing.

4.3 Structural Model and Hypothesis Testing

Using Covariance-Based Structural Equation Modelling (CB-SEM) via AMOS 26.0, the structural model was evaluated for the hypothesised relationships within the ITRA model. Consistent with benchmarks recommended by Hair et al. (2010) and Hu & Bentler (1999), all model fit indices fell within the recommended thresholds, confirming a good fit ($\chi^2/df = 2.37$, CFI = 0.51, TLI = 0.944, RMSEA = 0.056, SRMR = 0.41). The standard path coefficients verified support for every suggested theory. Digital resilience ($\beta = 0.41$, $p = .001$) was much predicted by perceived usability ($\beta = 0.41$, $p = .001$), supporting H1 and consistent with results from Zhao et al. (2022), which underline usability as a precursor of digital confidence. H2 was supported; agent support had a strong positive effect on trust ($\beta = 0.47$, $p < .001$), confirming past evidence on the function of social intermediation in trust-building among digitally underprivileged groups. With agent support directly increasing adoption intention ($\beta = 0.22$, $p < .001$), H3 also held, consistent with community-led FinTech adoption patterns in developing regions (Donner & Tellez, 2008). H4 was supported; digital resilience favourably affects trust ($\beta = 0.34$, $p < .001$), meaning that emotionally and cognitively adaptive users tend to view FinTech platforms as more trustworthy (Livingstone & Helsper, 2007). Trust directly and significantly predicted adoption intention ($\beta = 0.38$, $p < .001$), according to H5, in line with many FinTech adoption models where trust is a fundamental factor (Gefen et al., 2003; McKnight et al., 2002). H6, about perceived risk, was also validated. Reflecting the cognitive-emotional deterrents seen in FinTech use by low-literate users, perceived risk had a significant negative effect on adoption intention ($\beta = -0.30$, $p < .001$). Adoption ($\beta = 0.19$, $p = .002$) was directly found to be positively influenced by digital resilience, supporting H7 and highlighting resilience as a fundamental resource in digital participation (Selwyn, 2004).

4.4 Mediation Analysis

Significant indirect effects were confirmed by employing bias-corrected bootstrapping (5,000 samples) in mediation analyses. Echoing recent research on affective mediation in digital adoption models, H8 was supported with trust significantly mediating the relationship between digital resilience and adoption intention (indirect $\beta = 0.13$, $p < .001$). Furthermore, H9 was confirmed: digital resilience and trust jointly mediated the relationship between perceived usability and adoption intention (serial mediation $\beta = 0.08$, $p < .001$), so providing fresh empirical support for usability-induced trust via emotional resilience. The findings collectively empirically support the ITRA framework and clarify how risk, resilience, and trust interact to influence FinTech acceptance among low-literate users in developing countries.

5. Discussion

Using the ITRA model, which emphasises digital resilience, agent support, trust, and perceived risk as fundamental explanatory constructions, this study set out to investigate how low-literate users in Saudi Arabia adopt FinTech applications by proposing and empirically validating. The results advance present knowledge in three important respects. First, the study validates the central importance of trust in mediating the adoption of FinTech for vulnerable user segments. In line with earlier studies by Gefen et al. (2003) and McKnight et al. (2002), trust became clear as a strong predictor of adoption intention, supporting the idea that trust functions as a social and psychological replacement for knowledge and system openness. In low-literacy environments, where users often operate with incomplete knowledge of digital systems and instead rely on past experiences, endorsements from trustworthy intermediaries, and emotionally grounded judgements, this is especially clear (Daqar et al., 2020; T. Yang & Zhang, 2022).

Second, the model emphasises the important impact of digital resilience, a concept sometimes neglected in FinTech studies, particularly inside inclusion systems. According to Selwyn (2004) and Livingstone and Helsper (2007), digital resilience includes not only user persistence but also rising self-efficacy and emotional confidence in using technology. The strong positive correlation between resilience and both trust and adoption intention implies that resilience functions as both a direct driver and a fundamental precursor of more thorough user involvement. These findings highlight how emotional readiness and adaptive capacity define digital inclusion rather than only access. Third, the confirmation of agent support as a driver of both trust and adoption intention validates the relevance of social scaffolding in digitally mediated financial environments. Aligning with Okat et al. (2025), Liu (1998) and Vygotsky's (1978) zone of proximal development, the presence of informal intermediaries — such as digitally literate family members or community-based agents — serves two purposes in validating the system and simplifying contacts. Particularly in cases of institutional trust or platform literacy, these agents act as trust proxies. The direct influence of agent support on adoption also fits the social learning theory (Bandura, 1986), according to which users replicate trusted actors in their social surroundings.

Moreover, the negative link between perceived risk and adoption intention fits accepted behavioural theories of risk perception, such as those proposed by Slovic et al. (2004) and Loewenstein et al. (2001). For low-literate consumers, perceived risk is hardly based on logical, rational calculation. Instead, it is motivated by fears about mistakes, fraud, or permanent consequences, which often exceed the supposed advantages of digital financial tools (Gabor & Brooks, 2017). Thus, reducing affective risk becomes essential for raising adoption by means of interface simplification, agent reassurance, and error recovery options. The mediation studies support the ITRA model's theoretical novelty even more. The result that trust moderates the link between resilience and adoption intention suggests that adaptive users are not only more likely to continue using FinTech platforms but also to grow trust by means of those experiences. From perceived usability to adoption via resilience and trust, the serial mediation path shows that interface design influences adoption not only directly but also via users' psychological states, thus extending usability research. This is consistent with recent research by Zhao et al. (2022), who underlined emotional intermediaries, including confidence in digital inclusion paths and resilience. Taken together, these results provide an integrated picture of system-level usability, interpersonal scaffolding, emotional competency, and trust-building in the knowledge of FinTech adoption. By doing this, the research transcends rationalist models such as TAM and UTAUT to provide a sociotechnical and affect-sensitive framework for inclusion. In Global South settings, where infrastructure implementation has to be matched with behavioural sensitivity and community-based support, this is vital.

From both psychological and practical perspectives, the serial mediation pathway suggests that digital resilience is likely to precede trust during early interactions with FinTech platforms, as resilience reflects users' capacity to cope with errors, recover from difficulties, and persist despite uncertainty. Such coping experiences can subsequently foster trust as systems become more predictable and less emotionally threatening. At the same time, resilience and trust may plausibly co-evolve, with early trust cues encouraging continued use and experimentation, thereby further strengthening resilience. Because the present study is cross-sectional, this ordering should be interpreted as theoretically grounded rather than temporally verified. Importantly, this distinction has practical implications: early-stage adoption may benefit from interface designs that prioritise usability, transparency, and error recovery to support resilience-building, while sustained adoption may depend more strongly on responsible human intermediation and trust-building mechanisms, particularly for low-literacy users.

6. Future Research Directions

This study provides a comprehensive understanding of the trust-resilience mechanism among low-literate FinTech consumers; nevertheless, several areas demand more research. Future studies could use longitudinal designs to evaluate how digital resilience and trust change with time in response to technological developments and policy changes (Gabor & Brooks, 2017; Yang & Zhang, 2022; Zhao et al., 2022). Such temporal studies could show how constant access to digital platforms either strengthens or weakens users' coping strategies. Comparative studies across low-income settings in the Global South would help to clarify how agent-led models and infrastructure differences influence

adoption (Selwyn, 2004; Emara, 2023; Song et al., 2024). Including digital literacy as a dynamic moderator also helps to find routes through which low-literate users gradually gain confidence and trust in digital financial services (Livingstone & Helsper, 2007). Disaggregating agent support into human rather than automated forms could provide information on which kinds of help build more (Preacher & Hayes, 2008). To provide a theoretically grounded and policy-relevant roadmap for inclusive digital design, a Systematic Literature Review (SLR) could also be conducted to synthesise fragmented insights (Khan et al., 2024; Khan, Khan, et al., 2025; Khan, Uddin, et al., 2025) on low-literate user behaviours in FinTech. Finally, mixed-method designs—integrating participatory or ethnographic techniques—can help to capture complex user experiences beyond defined boundaries (Ivankova et al., 2006; Sreejesh & Mohapatra, 2014).

7. Conclusion

This paper introduced the ITRA model to investigate the complex processes underlying FinTech adoption among low-literate consumers in Saudi Arabia. The results highlight the complex nature of digital inclusion, which is moulded by psychological factors, including trust, perceived risk, agent support, and digital resilience, in addition to access or capability. By doing this, the study responds to current calls to situate efforts at financial inclusion within more general affective and social settings (Gabor & Brooks, 2017; Yang & Zhang, 2022). The important part digital resilience plays in determining trust and adoption confirms the theory that emotional and cognitive adaptation are fundamental prerequisites for negotiating digital systems (Selwyn, 2004; Livingstone & Helsper, 2007). Furthermore, the strong mediating role of trust fits previous FinTech research stressing that, especially among vulnerable users, trust is a more decisive factor than technical capability (Gefen et al., 2003; McKnight et al., 2002). The validation of agent support as both a relational and instructional enabler adds to the mounting research that recognises community networks and intermediaries as essential in enhancing financial capability (Bandura, 1986). Practically, the findings imply that FinTech companies have to go beyond usability and include localised support systems and trust-building tools in their offerings. These results have great policy relevance for Saudi Arabia's digital financial inclusion projects, where the risk of alienating low-literate populations persists even with technological development (He et al., 2023; Yang et al., 2023; Zhao et al., 2022). This study provides a theoretically fresh and empirically grounded prism for analysing FinTech acceptance at the margins, so as to augment the scholarly body on digital finance as well as the practice of inclusive technology design.

This study has several limitations that should be considered when interpreting the findings. First, the use of a cross-sectional design and self-reported survey data restricts the ability to draw strong causal inferences among the examined constructs. Second, reliance on a single data collection method may increase the possibility of common method bias. However, standard procedural measures such as respondent anonymity and careful scale design were employed to mitigate this risk. Third, the empirical focus on Saudi Arabia limits the generalisability of the findings to other contexts, particularly regions characterised by different institutional trust structures, regulatory environments, or informal financial intermediation norms.

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