Research Article

Mediation and Moderation Effects in Modelling the Acceptance of Financial Technology Services by Consumers in Delhi-NCR

Ashish Kumar[1], Dr. Indira Sharma[2]

[1]PhD Research Scholar, Oriental University, Indore (M.P), 453555, E-mail: ashish4rv@gmail.com, ORCID: 0009-0009-5742-8394
[2]Associate Professor, Oriental University, Indore (M.P), 453555, E-mail: indirasharma@orintaluniversity.in, ORCID: 0000-0001-9290-9171

Abstract

The introduction of Financial technology (FinTech) in India has completely changed the way financial services are being sold and used with Unified Payments Interface (UPI), mobile banking, digital wallets, digital lending, investment app, insurtech platforms, and app-based financial services. As the digital financial ecosystem grows, the technology alone does not necessarily lead to adoption. Before accepting and consistently using or rejecting FinTech services, consumers assess their usefulness, effort, security, institutional credibility, social influence, financial risk and technological competence and trust. The paper proposes an integrated framework that involves direct, mediating and moderating mechanisms in the acceptance of FinTech among the consumers of Delhi-NCR. The framework combines the following theories: Technology Acceptance Model (TAM), Unified Theory of Acceptance and Use of Technology (UTAUT/UTAUT2), perceived-risk theory and trust-based technology-acceptance literature. The following variables, which are considered as key determinants of acceptance, are conceptualised: performance expectancy, effort expectancy, social influence, facilitating conditions, perceived security, perceived value and digital financial literacy. Perceived risk and digital financial literacy are identified as boundary conditions and strengtheners of selected relationships, while trust is proposed as an important mediating mechanism. Behavioural intention is then associated with the actual usage and continuance usage. The paper brings together the international research and the Indian research and suggests a quantitative Cross Section survey of Delhi, Gurugram, Noida/Greater Noida, Ghaziabad and Faridabad regarding the adult users of FinTech. A bootstrapped mediation and interaction-based moderation of the structural equation modelling is recommended. The framework addresses an important research gap as a majority of the current Indian studies focuses on the immediate determinants of mobile payment or banking, whereas only a small number of studies include the mediation and moderation effects and the behavioral intention to use. The proposed model provides theoretical contribution by bringing together the cognitive, institutional, risk/capability viewpoints and practical implications for various stakeholders such as banks, FinTech firms, regulators and consumer protection agencies for sustainable digital financial adoption in the Delhi-NCR market.

Keywords: FinTech adoption, Delhi-NCR, trust, perceived risk, mediation, moderation, UTAUT2, TAM, digital financial literacy, consumer acceptance, digital payments

1. Introduction

One of the most visible indicators of the digital transformation in the financial services in the modern world is financial technology. FinTech is an umbrella term for the technology that enables payments, banking and lending, investing, insurance, wealth management, remittances and services of all kinds that are offered via digital means. Smartphones, interoperable payment systems, Aadhaar-based services, growing bank account penetration, UPI, electronic know-your-customer (e-KYC), acceptance of QR code and the digital public infrastructure ecosystem have all facilitated the diffusion process in India. More and more, consumers are engaging with financial services outside of traditional “branch” channels via their smartphones, and the challenge is no longer whether or not a digital channel exists, it's whether they trust it enough to keep coming back.

The Reserve Bank of India Digital Payments Index (RBI-DPI) is indicative of this shift. With March 2018 assigned a base value of 100, the index increased to 153.47 in March 2019, 207.84 in March 2020, 270.59 in March 2021, 349.30 in March 2022, 395.57 in March 2023, 445.50 in March 2024 and 493.22 in March 2025 (Reserve Bank of India, 2025). The shift is indicative of a widespread increase in payment enablers and infrastructure, as well as performance and consumer-side digitisation. However, the sudden growth in the number of aggregates should not be seen as one of consumer acceptance. They may have a smartphone and a bank account but not use a FinTech due to fears of fraud, privacy issues, lack of awareness, a lack of grievance redressal or lack of trust in the provider.

The research on technology acceptance put the emphasis on perceived usefulness and perceived ease of use in the

beginning, using the Technology Acceptance Model (TAM) of Davis, 1989. UTAUT was later narrowed down into multiple adoption viewpoints in performance expectancy, effort expectancy, social influence and facilitating conditions (Venkatesh et al., 2003), and UTAUT2 extended UTAUT to consumer related context by incorporating other constructs like hedonic motivation, price value and habit (Venkatesh et al., 2012). These theories are still relevant because they help to answer why the technology that offers clear benefits and is comparatively easy to use is more likely to be adopted. Financial technologies are not just like many other information technologies, however, in that the financial transaction reveals money, identity, credentials and personal information to technological and institutional processes that consumers are unable to fully observe.

In the process of adopting FinTech, trust and perceived risk are therefore pivotal factors and not just incidental. Trust is used to mitigate uncertainty when there is a dependency on a provider, platform, or infrastructure to reliably process a financial instruction. Perceived risk is the combination of the negative consequences associated with the transaction, including the experience of financial loss, privacy invasion, failure of the transaction, and identity theft or misuse of information (Featherman & Pavlou, 2003; Pavlou, 2003). Trust, risk, security, performance expectations, innovativeness and grievance redressal have been found as relevant in mobile banking, wallets and payments in various studies conducted in India (Chawla & Joshi, 2019; Kesharwani & Bisht, 2012; Patil et al., 2020; Singh et al., 2020).

Another drawback of traditional adoption studies is that they can only determine if one thing is associated with another and not how or when this association is manifested. Mediation analysis can be used to determine a mechanism between an antecedent and an outcome, and moderation analysis can be used to determine when a relationship is stronger, weaker or reversed (Hayes, 2022). In FinTech, we might argue that security can reinforce behavioural intention, in that it first instills trust, which in turn explains the intention.In FinTech, we might argue that security can reinforce behavioural intention, in that it first instills trust, which in turn explains the intention. On the other hand, however, perceived risk can moderate the intention to buy when the consumer feels high financial risk or fraud risk, such that the perceived risk is a moderating factor in the intention to buy.

Delhi-NCR offers a theoretically interesting setting for a look at such contingent relationships. The area is the mix of high income professionals, students, migrants, small business men, salaried workers, entrepreneurs, homemakers and older users of banking services. Ranging from very financial and technologically capable neighbourhoods and consumers to very digitalised commercial centres like Gurugram and Noida. Such diversity suggests, for example, that the same FinTech feature may lead to different gamer perceptions of usefulness, trust, risk, and control. In view of this, the present paper proposes an integrated model to study the effects, mediation and moderation in the acceptance of FinTech among the consumers of Delhi-NCR, where behavioural intention has been differentiated from actual or continued use of FinTech.

Identify a research problem and develop a rationale for it.

There has been a significant amount of research into the acceptance of FinTech that has used TAM, UTAUT or UTAUT2 and has tested direct relationship between technological perceptions and behavioural intention. While this book has yielded important findings, the focus on the direct effects is insufficient for digital financial services. First, it is not able to explain fully the psychological pathway that converts technological and institutional features into willingness to transact. Consumers might accept a platform as beneficial, but not adopt it without confidence that the platform will be reliable, secure and treat the consumers' information properly and fairly if there are transaction failures. Trust thus is a possible intervening variable between the underlying evaluations and behavioural intention. Second, acceptance relationships are not likely to be constant within the users. Magnitude of relationships may vary due to the perceived risk, digital financial literacy, age, and experience of the individual and their prior exposure to fraud. Ease of use, for instance, will be a crucial element of a successful website for someone who does not have a high level of literacy, but not necessarily of a site for a user with a large number of financial applications. Similarly, the trust boosts intention significantly when perceived monetary loss risk is high, but has a smaller behavioural impact when the user is still quite a bit concerned about monetary loss. In order to identify the boundary conditions, therefore, a level of moderation is necessary rather than a general, population-wide effect.

Third, there is no direct connection between behavioural intention and actual behaviour. While consumers might express positive attitudes toward the FinTech service, they may not become active or continuing users because other

reasons, such as merchants' non-use of the service, transaction failure, or cash being more convenient in certain contexts, might be in play. By separating the intention and usage (or continuance) of the model, it allows the examination of the intention-behaviour gap. This is particularly true in a more established digital-payment world where awareness and trial of the technology might be ubiquitous, but usage in order to be sustainable requires experience, service and confidence.

The central problem of the study can thus be put as: What are the technological, social, institutional, risk related and capability related factors affecting the acceptance of FinTech services among the consumers of Delhi-NCR and how do these factors work through the mediation and in which direction they will work in the given conditions, strengthening or worsening the relationship?

Table 1: Research gaps and proposed responses

Existing limitation	Implication	Proposed response
Dominance of direct-effect TAM/UTAUT models	Limited explanation of underlying psychological mechanisms	Introduce trust mediation.
Trust and risk often treated only as parallel predictors	Conditional nature of financial decisions is obscured	Test risk as a moderator and trust as a mediator.
Limited integration of digital financial literacy	Capability differences remain underexplored	Model literacy as antecedent and boundary condition.
Intention frequently used as the final outcome	Intention-behaviour gap remains unresolved	Include actual/continuance use.
Payment studies often isolated from broader FinTech	Generalisation across financial services is limited	Define a multi-service FinTech context and capture service type.
Limited Delhi-NCR integrated evidence	Findings from other locations may not capture NCR heterogeneity	Use multi-location Delhi-NCR sampling.
Few simultaneous mediation-moderation models	Mechanisms and boundary conditions are not jointly tested	Use SEM with bootstrapped indirect effects and interactions.

3. Objectives of the Study

The seven objectives of the study are to explore the impact of performance expectancy, effort expectancy, social influence, facilitating conditions, perceived value and perceived security on consumer acceptance of FinTech services, identify the roles of trust and perceived risk in the study of the consumer acceptance of FinTech services,

investigate whether or not the selected antecedent-intention relationships are mediated by trust, investigate whether or not the relationship between trust and behavioural intention is mediated by perceived risk, investigate whether or not the selected technology-acceptance relationships are moderated by digital financial literacy, investigate whether or not the relationship between behavioural intention and actual or continuance use is mediated by digital financial literacy, and whether or not theoretically important relationships vary across major consumer segments within Delhi-NCR.

4. Research Questions

RQ1: What are the most significant technological, social, institutional and consumer related factors influencing the acceptance of FinTech by the consumers in Delhi-NCR?
RQ2: Is trust as a mediator between perceptions of performance, security, and capability, and intention to behave?
RQ3: Does perceived risk have a negative interaction effect with trust on FinTech acceptance?
RQ4: Does the influence of effort expectancy and facilitating conditions change due to digital financial literacy?
RQ5: How strong is the relationship between behavioural intention and actual or continued use of FinTech?
RQ6: Is there a meaningful difference in the acceptance mechanisms used across demographic and usage groups?

5. Theoretical Foundation

The Technology Acceptance Model suggests perceived usefulness and perceived ease of use as two underpinning factors of technology acceptance (Davis, 1989). Perceived usefulness relates to the expected improvement in task performance, while the perceived ease of use relates to the expected ease of use. The logic is of paramount importance in the context of FinTech: consumers appreciate faster transfers, having access to the transaction at any time, and visibility of what went on in their accounts, to name just a few. Financial technologies, however, need extensions of TAM due to the monetary and personal data consequences, which make trust, security and risk more salient (Gefen et al., 2003; Pavlou, 2003).

According to UTAUT, performance expectancy, effort expectancy, social influence and facilitating conditions are the key factors for adoption (Venkatesh et al., 2003). UTAUT2 has been modified for consumer context to include hedonic motivation, price value and habit (Venkatesh et al., 2012). These models have been widely utilized in mobile-banking and payment studies, such as the extensions of trust, security, innovativeness and risk (Alalwan et al., 2017; Baptista & Oliveira, 2015; Slade et al., 2015). In the context of India, Patil et al. (2020) added personal innovativeness, anxiety, trust and grievance redressal to the extended Meta-UTAUT. These extensions show that technology features and contextual protections are needed to ensure financial-service acceptance.

Trust-based acceptance theory is used in situations where the consumer cannot see or control the technological and institutional processes on which an electronic transaction relies. Trust can be seen as a feeling of confidence in the competence, reliability and integrity of the platform and service provider. Suh and Han (2002) showed its importance in Internet banking and Gefen et al. (2003) introduced trust in conjunction with TAM, and Pavlou (2003) introduced trust along with risk in electronic commerce. The relationship is key in digital finance as errors can have immediate financial repercussions.

Perceived-risk theory is one that explains resistance to adoption in terms of the user's expectation of adverse outcomes. Featherman and Pavlou (2003) defined e-service risk as multidimensional with dimensions such as performance, financial, psychological, social and privacy. Consumers might fear that mobile payments fail, they can be fooled into providing personal information via phishing, their SIM card or device can be compromised, someone else can access their mobile data, the data will leak, or the remedy will be insufficient. Risk thus has a direct inhibitory effect on positive relationships generated by usefulness, trust or social encouragement, and a potential conditional effect, weakening positive relationships under certain circumstances.

This paper integrates a theoretical approach to the issue of FinTech acceptance that considers it a conditional process. Technological and service attributes offer performance cues and signals, institutional safeguards and security signals influence trust, perceived risk limits the conversion of trust into intention, and consumer capability affects the level of ease and external support required. Behavioural intention is then used to predict actual or

continued use, which is then considered a proximal predictor. This is an architecture that is not based on an additive model, but on concepts of explanatory mechanisms and boundary conditions.

To conduct a literature review and develop a hypothesis.

Performance expectancy is the confidence that using a FinTech service will enhance the efficiency, speed and/or quality in the performance of financial tasks. In both TAM and UTAUT research, the usefulness and performance expectancy are also recurring factors that predict adoption. It has been found that in terms of mobile payment adoption, performance oriented expectations are important (Oliveira et al., 2016) and performance expectancy is instrumental in explaining Indian mobile-payment behaviour (Patil et al., 2020). Similarly, Hu et al. (2019) showed that long form technology-acceptance constructs can predict intention to use FinTech services. Time saving, instant settlement, remote access and simplified financial management should therefore boost the behavioural intention in the context of Delhi-NCR. H1 suggests that there is a positive relationship between performance expectancy and behavioural intention.

Effort expectancy is related to the perceived ease of learning and using a technology. Part of the competition of mobile applications is through frictionless onboarding, easy to understand menus and few steps to transact. But as consumers become more savvy to their smartphones, the effect may diminish. There have been widely reported usability-related effort effects for mobile banking and payments, though not as pronounced in one study as another (Baptista & Oliveira, 2015; Merhi et al., 2019). This is theoretical rationale for testing digital literacy as a moderator because of this lack of consistency. H2 suggests that effort expectancy is positively related to behavioural intention.

Social influence refers to how much the consumers' key influencers recommend or normalise the use of FinTech. Payments have network properties because the value of a payment is enhanced when friends, family, merchants and colleagues are all operating within the same digital environment. Yang et al. (2012) demonstrated that social influences impact in all phases of mobile-payment adoption, while Slade et al. (2015) showed social effects were relevant to mobile payments for remote payments. The mobile payment and wallet adoption literature also shows evidence of social influence in India through research studies (Patil et al., 2020; Singh et al., 2020). Hence, the authors suggest that social influence and behavioral intention are positively related in the case of H3.

Facilitating conditions are those resources, knowledge and infrastructure that allow for the use of the service. For FinTech this involves, amongst other things, compatible devices, Internet connectivity, linked accounts, merchant acceptance, customer support and grievance process. The construct is especially relevant for continued use because the intention might not work if the transactions are not supported. Kumar et al. (2018) proved that both security and grievance redressal can affect mobile-wallet continuance, and Patil et al. (2020) added grievance redressal into an Indian mobile-payment context. H4 suggests that facilitative factors have positive relationships with both behavioral intention and/or actual continuance use.

Perceived value is the consumer's evaluation of the value of FinTech, based on both monetary and non-monetary costs. Pros and cons are a matter of convenience and rewards, faster performance, transparency, reduced travel cost, fees, learning effort, data usage, switching costs, psychological burden of risk. Financial services tend to need a more comprehensive consumption value lens, which is not included in UTAUT2. The findings from the papers by Chawla and Joshi (2019) and Sankaran and Chakraborty (2022) indicate that considering value-related evaluations also is essential in Indian digital-finance adoption. H5 posits that the perceived value has a positive relationship with behavioural intention.

Perceived security concerns the confidence in the technological system to be able to secure transactions, credentials and personal information. It is related to trust, but trust covers more than the security assessment of security measures; trust is the overall feeling of being able to rely on the platform and provider. Kesharwani and Bisht (2012) identified trust and perceived risk in Indian Internet banking, whereas Kumar et al. (2018) indicated perceived security for mobile-wallet continuance. Security features like multi-factor authentication, transaction alerts, transparent refund policies, and prominent fraud detection elements should therefore add to the trust. H6 is that people who believe they are more secure will be more trusting.

Across all the areas of online banking, mobile banking, payments and FinTech, trust has been recognised as a core element of the solution. Lin (2011) showed a relationship between knowledge-based trust and the mobile-banking adoption, while Shaw (2014) revealed that trust had a mediating effect between mobile-wallet adoption and actual

usage of the mobile wallet, and Sharma and Sharma (2019) established a link between trust and quality dimensions and actual adoption of the mobile wallet. The importance of trust in digital payment selections and adoption of FinTech continues to be supported by Indian research (Chawla et al., 2023; Shree et al., 2021). H7 suggests that trust positively impacts on behavioural intention.

The greater the perceived risk is, the less likely the consumer is to accept it, as they are at risk of financial loss, compromise and manipulation through FinTech adoption, as well as privacy breaches. De Kerviler et al. (2016) demonstrated that risk is still a factor even when mobile payments are convenient. Thakur and Srivastava (2014) associated risk with the intention to use mobile payment in India and Kumar et al. (2023) showed that perceived risk is still valid for mobile banking adoption in India. According to H8, there is a negative relationship between perceived risk and behaviour intention.

The mediation logic comes from the notion of difference between objective or perceived system characteristics and willingness of a consumer to rely on the system. A secure platform is of value but does not necessarily lead to acceptance; it helps to build trust and reduce uncertainty. Similarly, high performance can establish the confidence of the provider to perform as they say they will. The research and studies by Chawla and Joshi (2023), Chawla et al. (2023), Shaw (2014) etc., support mediator-based explanations in digital financial contexts. H9a suggests the relationship between perceived security and behavioural intention is mediated by trust, H9b suggests that the relationship between performance expectancy and behavioural intention is mediated by trust, and H9c suggests that the relationship between digital financial literacy and behavioural intention is mediated by trust.

Moderation enhances the model by acknowledging that the impact of trust may vary based on the risk that the consumer feels. A person might trust a bank or platform overall, but refrain from a specific online transaction if there is a large potential loss or if fraud reports are salient. Kumar et al. (2023) show that trust and risk are conditional in the context of mobile-banking behaviour in India. Thus, H10 suggests that the link between trust and the behavioral intention is negatively moderated by perceived risk, meaning that perceived risk makes the positive relationship between trust and behavioral intention weaker.

Digital financial literacy is an intersection of technology skills and awareness of financial implications, signs of fraud, security of credentials, information analysis skills, and complaint procedures. There is a direct positive relationship between literacy and adoption because the ability to consume provides a sense of control, and indirect positive relationship between literacy and adoption because it changes other adoption relationships. If literacy is high, ease of use may be less important because the user can compensate for moderate interface complexity; or usability benefits may be better transformed into usability gains in terms of adoption, because knowledgeable users are aware of the benefits. The direction is thus an empirical one, but theoretically there is a moderating role. One of the hypotheses was H11, which tested the interaction of digital financial literacy and effort expectancy, whereas H12 tested whether facilitating conditions were moderated by digital financial literacy.

Finally, intention is hypothesized to lead to actual use and continued use, but this should be modeled explicitly and not assumed. Reasons for failure of intention to become behavior include competing habits, failed transactions, situational preference for cash, and ecosystem constraints. Patil et al. (2020) differentiate between intention and use behaviour in the context of mobile payments in India, while Sharma and Sharma (2019) concentrate on mobile-banking actual use. H13 suggests a positive relationship between behavioral intention and actual/continuance use.

Table 2: Proposed hypotheses

Hypothesis	Proposed relationship
H1	Performance expectancy is positively associated with behavioural intention to use FinTech services.
H2	Effort expectancy is positively associated with behavioural intention.

Hypothesis	Proposed relationship
H3	Social influence is positively associated with behavioural intention.
H4	Facilitating conditions are positively associated with behavioural intention and/or actual use.
H5	Perceived value is positively associated with behavioural intention.
H6	Perceived security is positively associated with trust.
H7	Trust is positively associated with behavioural intention.
H8	Perceived risk is negatively associated with behavioural intention.
H9a	Trust mediates the relationship between perceived security and behavioural intention.
H9b	Trust mediates the relationship between performance expectancy and behavioural intention.
H9c	Trust mediates the relationship between digital financial literacy and behavioural intention.
H10	Perceived risk negatively moderates the trust-behavioural intention relationship.
H11	Digital financial literacy moderates the effort expectancy-behavioural intention relationship.
H12	Digital financial literacy moderates the facilitating conditions-use relationship.
H13	Behavioural intention is positively associated with actual or continuance use.

7. Conceptual Framework

The relationships that have been proposed are combined in Figure 1. The variables considered direct antecedents of behavioural intention, which are modeled include: performance expectancy, effort expectancy, social influence, facilitating conditions and perceived value. Intention is proposed to be mediated by perceived security and digital financial literacy, which in turn are proposed to mediate trust. The mediation mechanism examines the existence of the transmission of selected antecedent effects to intention. The perceived risk construct is incorporated as an inhibitory construct and as a moderator of trust-intention relationship. From behavioural intention, it is then predicted that the actual use or continuance would occur. The framework is, by design, parsimonious; constructs are added to the framework as a means to represent a different theoretical mechanism, not just to account for the maximum amount of variance.

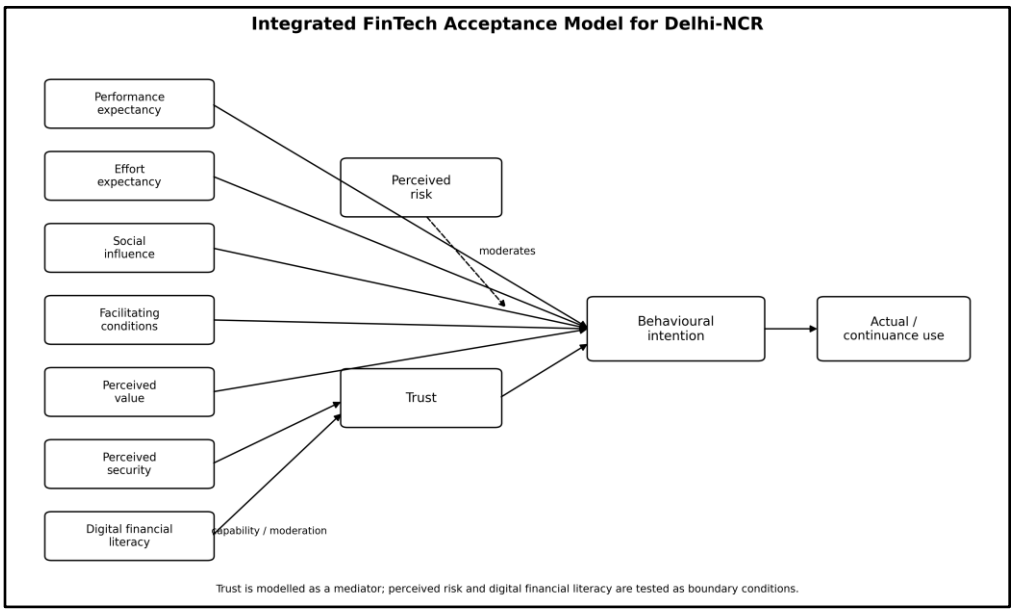

Figure 1: Integrated FinTech acceptance model for Delhi-NCR

Note. The figure presents the proposed theoretical architecture. It does not report empirical path coefficients.

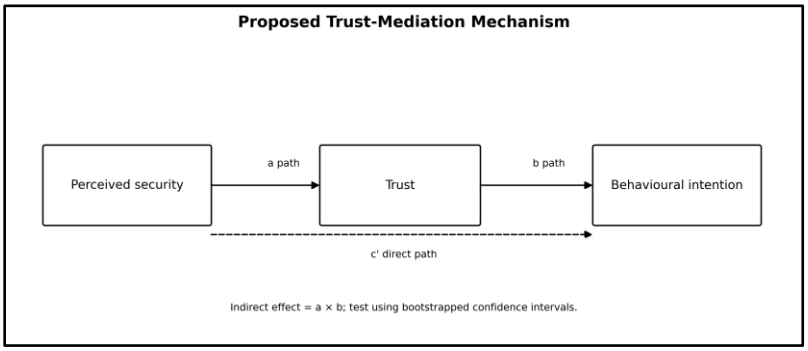

Figure 2: Proposed trust-mediation mechanism

Note. Bootstrapped confidence intervals should be used to test the indirect effect in the genuine survey data.

8. Research Methodology

The quantitative, explanatory, cross-sectional design is suitable for estimating associations and conditional processes proposed. The cross-sectional design allows for efficient data collection across a geographically distributed metropolitan area, and facilitates structural equation modelling. It does not, however, create a temporal causality. Therefore the final interpretation should refrain from words like cause, causality, or cause and effect in favor of words like associated with, statistically predicts, or is related to.

Geographical area should include the NCR area along with the major hubs of Greater NCR like Noida/Greater Noida, Ghaziabad, Faridabad and Gurugram. The target population includes adults (18+ years) living, working or studying in Delhi-NCR and who have availed at least one of the specified FinTech services in the last six months. Examples of qualified services might be UPI, mobile wallets, mobile banking, digital lending, investment or wealth apps, insurtech, and other regulated app-based financial services.

A multistage quota or stratified sampling approach is suggested since a convenience sample collected online might overrepresent young, well educated and tech-savvy consumers. In the first phase, recruitment quotas must be fixed in different centres in Delhi and major NCR centres. In the second stage, an attempt to obtain diversity of age, gender, work and income is to be made. An acceptable number of usable responses would be around 600, which would allow for several latent constructs and interaction terms in the model, as well as for subgroup analysis. The final manuscript should include the number of samples that were collected and the number of samples excluded from screening and the number of actual responses received, not the number of samples that the target is assumed to be received.

There should be five parts to the survey instrument. The sections are A for demographic characteristics, B for FinTech usage profile, C for antecedents of UTAUT/TAM, D for trust, security, risk and digital financial literacy, and E for behavioural intention and actual or continuance usage. Given that a latent construct requires a more nuanced response, 1 to 7 (strongly disagree – strongly agree) is recommended as a suitable Likert scale.

Measurements items should be modified from existing scales as much as possible. The concepts of performance expectancy, effort expectancy, social influence and facilitating conditions are adapted from Venkatesh et al. (2003, 2012). Adaptations of trust measures can be based on Gefen et al. (2003), Pavlou (2003), and the mobile banking. The perceived risk can be adopted from Featherman and Pavlou (2003) and perceived security and continuance measures can be borrowed from Indian banking and wallet studies. Financial literacy assessments for mobile devices should assess financial skills and financial decision-making, not just self-reported smartphone skills.

Content validity should be evaluated by information systems experts, consumer behaviour, banking or FinTech experts. An initial test with about 30-50 potential users should then assess clarity, ambiguity, questionnaire length, terminology, and initial reliability. If significant revisions in the wording are done, the pilot respondents should generally be removed from the final sample. Although Cronbach's alpha is considered to be one of the best measures of quality, it should not be the only measure because it can be indicative of redundant questions and because latent-variable models require convergent and discriminant validity tests.

Controlled Online recruitment and physical respondent recruitment at universities, offices, commercial areas, markets and residential communities can be combined. Whenever possible, an unrestricted public link should be avoided as duplicate or ineligible responses are more difficult to identify. Screening should be for age, Delhi-NCR, recent use of FinTech, and consent. The questionnaire shouldn't ask for passwords, PINs, account numbers or other authentication details that are sensitive. Ethical participation involves free consent, confidentiality and assurance that respondents may withdraw at any time.

Field data should never be combined with fabricated data or data generated by algorithms. When the research is reported as primary empirical research, all means, percentages, correlations, path coefficients, and p and confidence values must be back-referenced to the original data set. While the secondary evidence like RBI indicators can be used to put the market in context, it cannot be used to replace the Delhi-NCR respondent data for hypothesis testing.

Table 3: Construct operationalisation

Construct	Indicative meaning	Principal source basis
Performance expectancy	Belief that FinTech improves speed, convenience and financial-task performance	Venkatesh et al. (2003, 2012)
Effort expectancy	Perceived ease of learning and operating FinTech services	Venkatesh et al. (2003)
Social influence	Perceived encouragement or normative support from important others	Venkatesh et al. (2003)
Facilitating conditions	Availability of resources, infrastructure and support for successful use	Venkatesh et al. (2003, 2012)
Perceived value	Assessment that benefits outweigh monetary and non-monetary costs	Chawla & Joshi (2019); Sankaran & Chakraborty (2022)
Perceived security	Belief that the system can protect transactions and personal information	Kesharwani & Bisht (2012)
Trust	Confidence in platform/provider reliability, competence and integrity	Gefen et al. (2003); Pavlou (2003)

Construct	Indicative meaning	Principal source basis
Perceived risk	Expected financial, privacy, security or performance loss	Featherman & Pavlou (2003)
Digital financial literacy	Ability to understand, evaluate and safely use digital financial services	Adapted from contemporary FinTech/digital-literacy research
Behavioural intention	Intention to use or increase use of FinTech services	Venkatesh et al. (2003)
Actual/continuance use	Reported repeated usage and willingness to continue	Patil et al. (2020); Sharma & Sharma (2019)

Table 4: Proposed Delhi-NCR sample allocation

Location	Target n	Rationale
Delhi (NCT)	220	High heterogeneity; multiple education, occupation and income groups
Gurugram	100	Large professional, corporate and digitally intensive population
Noida / Greater Noida	100	IT, services, students, residents and merchants
Ghaziabad	90	Mixed residential, salaried and small-business population
Faridabad	90	Industrial, salaried, household and business users

Location	Target n	Rationale
Total target	600	Proposed target only; final achieved sample must be reported from fieldwork

Note. The allocation is a proposed fieldwork target, not an achieved sample. The final paper must report the actual collected sample and response rate.

9. Data Analysis Strategy

First steps in data analysis involve checking for missing data, duplicated records, responses which take an implausibly short time to complete, straight line responding, multivariate outlier cases. Frequencies, percentages, means and/or medians should be used to summarise the demographic variables and the usage variables. Prior to the use of estimators and the interpretation of conventional parametric statistics, distributional properties should be investigated.

Since both predictors and outcomes are measured with the same questionnaire, common method bias needs to be addressed both procedurally as well as statistically. Procedural safeguards encompass neutral terminology, anonymity, separation of predictors and outcomes, and lack of significant hypothesis cues. Harman's one factor test can be used as a simple diagnostic tool but should not be considered to be definitive. Podsakoff et al. (2003) suggest that procedural remedies are more robust, and that additional statistical tests are needed.

Prior to interpretation of the structural hypotheses, reliability and construct validity of the measurement model should be determined. Cronbach's alpha and composite reliability can be used for assessing internal consistency. In terms of convergent validity, good indicator loadings and average variance extracted are required and discriminant validity is determined by the heterotrait-monotrait ratio as well as the older criterion of Fornell-Larcker. In variance-based SEM, Henseler et al. (2015) demonstrate the advantages of HTMT as compared with the traditional discriminant validity test.

PLS-SEM is especially well suited when the focus of the study is prediction, in cases where multiple latent interactions are present and the study involves well known and new constructs. Path coefficients, bootstrapped confidence intervals, p-values, and effect sizes, explained variance should be reported for the structural model. If possible predictive assessment should be incorporated. Hair et al. (2022) give up-to-date advice on model assessment and reporting. Otherwise, if the SEM is covariance type, the global model fit, the standardised residuals and decisions taken on modifications should be reported, and the decision should be based on the research objective and not because it is easier to use.

The mediation tests should be bootstrapped indirect effects. If we use the suggested security-trust-intention mechanism, the indirect effect is the product of the security-to-trust path and the trust-to-intention path. If the direct effect is not in the interval (0, ∞), then it does not constitute a statistically significant indirect effect. The direct path should be included in the model as well to allow for classification of the nature of mediation rather than assuming full mediation. The proposed mechanism is shown in figure 2.

From this, it is clear that an explicit interaction term is necessary for moderation. The behaviour intention of H10 can be modeled as a function of the interaction between trust and perceived risk, as well as perceived risk.Behaviour intention of H10 can be modelled as a function of perceived risk and the interaction between trust and perceived risk. If there is a significant interaction, the slope of trust is different at different risk levels. Only the interaction coefficient should never be used as the only measure of the results; rather, the results should be interpreted using either simple slopes or a conditional-effect plot. A conceptual illustration is given in Figure 3; the figure is not an empirical finding and should be replaced by the simple slopes obtained from the modelling of the actual Delhi-NCR data after the analysis of the data.

Multi-group analysis can be used to investigate if there are gender, age, income, education, or FinTech type and prior cyber-fraud experience differences. But before drawing conclusions about structural paths that vary between

groups, testing for the measurement invariance should be conducted. If not, the differences observed in the groups may be because they have different views on how the scale was interpreted, rather than because of actual behavioural differences.

Table 5: Recommended measurement-model criteria

Criterion	Preferred guideline
Cronbach's alpha	≥ .70
Composite reliability	.70-.95
Outer loading	Preferably ≥ .708
Average variance extracted (AVE)	≥ .50
HTMT	< .85 or < .90 depending on construct similarity
Inner VIF	Preferably < 3.3-5.0
Bootstrap resamples	At least 5,000

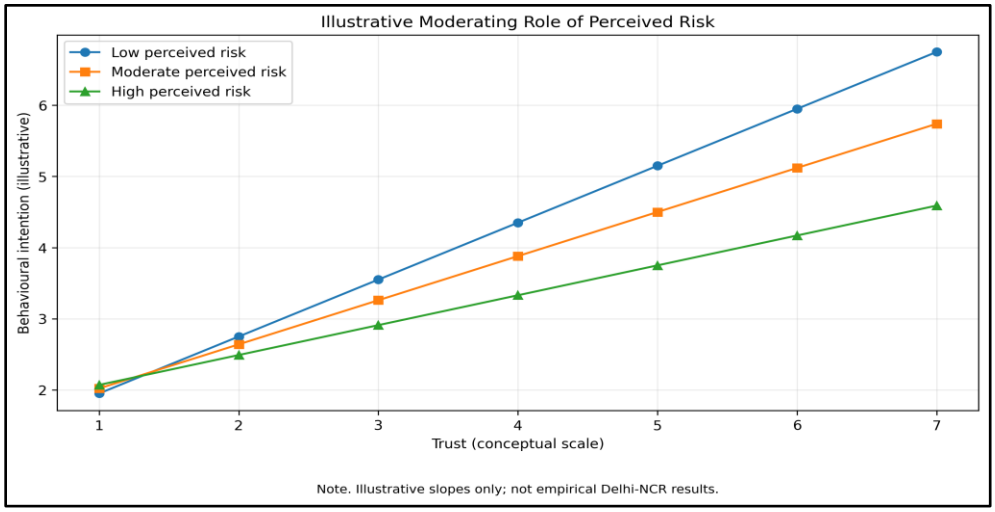

Figure 3: Illustrative moderation pattern for perceived risk

Note. The plotted values are conceptual examples used only to illustrate how moderation is interpreted. They are not results from Delhi-NCR respondents.

Table 6: Recommended statistical analysis plan

Stage	Key procedures
Data screening	Eligibility, missingness, duplicates, straight-lining, completion time, outliers
Descriptive analysis	Demographics, service categories, usage frequency, central tendency

Stage	Key procedures
Measurement model	Loadings, alpha, composite reliability, AVE, HTMT, collinearity
Structural model	Path coefficients, confidence intervals, R^2, f^2, predictive assessment
Mediation	Bootstrapped indirect effects; retain and interpret direct effect
Moderation	Latent/product interaction; simple slopes and conditional effects
Multi-group analysis	Only after measurement invariance; compare relevant user segments
Robustness	Alternative specifications and, where feasible, predictive validation

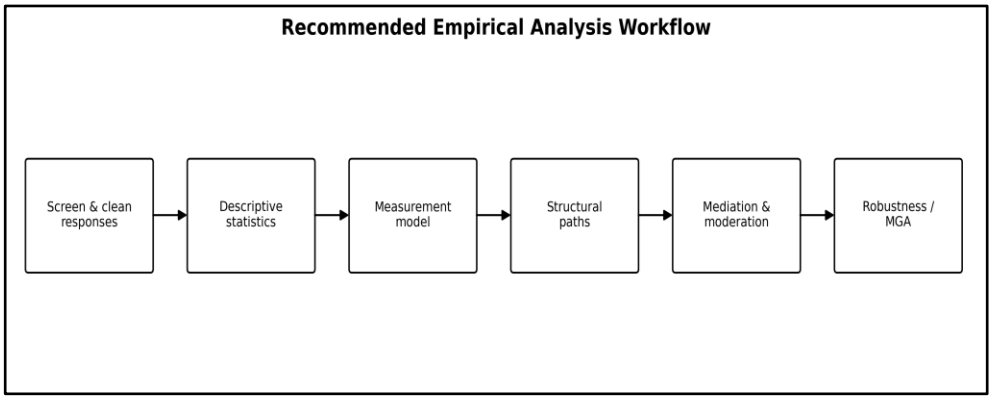

Figure 4: Recommended empirical analysis workflow

Note. The workflow shows the sequence from response screening to robustness and multi-group analysis.

10. Secondary Evidence: India's Digital-Payment Environment

The planned study takes place in the context of a rapidly evolving Indian Digital Payment landscape. The trajectory of RBI-DPI from March 2018 to March 2025 is shown in Table 7 and Figure 5. This index rose from 100 to 493.22, which shows significant development of infrastructure and usage for payments. This is an expansion that alters the character of the research question. Access and awareness are key challenges at early stages of adoption. Important questions now include, as infrastructure becomes commonplace, trust, fraud resilience, continuity, satisfaction, responsible digital credit and converting trial to stable behaviour.

The national trend is also a warning. It's possible for aggregate growth to happen with some consumers having a higher capability to consume than others, and some consumers having a higher exposure to risk than others. However, a high national index doesn't mean that all users know how to practice digital-security or feel as safe as each other. The more sites that are adopted, the more potential victims of phishing, social engineering and mistaken

transfers will exist. As digital finance grows, then, consumer-protection mechanisms and even literacy could become more—not less—significant. It supports the paper's approach of combining the facilitating conditions, security, trust, risk and traditional technology-acceptance factors with digital financial literacy.

Table 7: Reserve Bank of India Digital Payments Index

Period	RBI-DPI
Mar 2018	100.00
Mar 2019	153.47
Mar 2020	207.84
Mar 2021	270.59
Mar 2022	349.30
Mar 2023	395.57
Mar 2024	445.50
Mar 2025	493.22

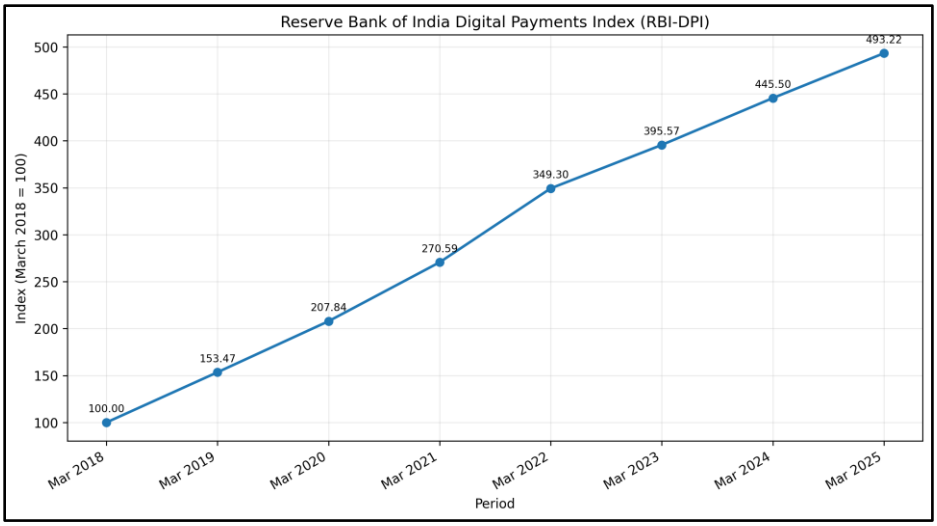

Figure 5: Growth of the RBI Digital Payments Index, March 2018-March 2025

Note. March 2018 = 100. Source: Reserve Bank of India (2025) and published RBI-DPI series.

11. Expected Relationships and Analytical Interpretation

Since actual data of Delhi-NCR respondents was not provided for this manuscript, there is no information provided on numerical path coefficients, p-values, mediation estimates, and percentages of the respondents in the specific demographic groups. Rather, the expectations that should be judged in relation to field data are summarized in Table 8 using the literature. Performance expectancy is expected to have a positive association with intention because FinTech provides a clear advantage in terms of convenience and speed. The other factors are expected to be positive, except for perceived risk which is expected to be negative.

It is expected that Trust is one of the strongest proximal predictors of intention. It's not just because more people would like to rely on services that they trust, but also because trust decreases the uncertainty that comes with delegating financial tasks to an application and infrastructure. The points of security, performance consistency, provider reputation, and successful transactions and grievance handling should all help the formation of trust. The mediation tests are thus conceptually more useful than simply including trust as an additional parallel independent variable.

The magnitude of the moderation results is more complicated to predict, as conditional relationships are influenced by sample composition. It is expected that perceived risk will be a negative influence on the trust-intention connection and perhaps be more noticeable for respondents that have experienced fraud before and for those that are leveraging higher stakes services like lending and investing. Digital financial literacy can also result in heterogeneous patterns. If a user is more knowledgeable, he or she may be less sensitive to effort expectancy since complexity can be dealt with; alternatively, literacy may enable the user to more fully recognize and harness usability enhancements. It is therefore necessary to interpret the interaction on the basis of an empirical approach and not by forcing it into a predetermined narrative.

Table 8: Literature-based expectations for the proposed structural model

Relationship	Expected pattern	Illustrative supporting literature
Performance expectancy → intention	Positive	Patil et al. (2020); Hu et al. (2019)
Effort expectancy → intention	Positive but potentially heterogeneous	Baptista & Oliveira (2015); Merhi et al. (2019)
Social influence → intention	Positive	Slade et al. (2015); Patil et al. (2020)
Facilitating conditions → use	Positive	Venkatesh et al. (2012); Kumar et al. (2018)
Perceived value → intention	Positive	Chawla & Joshi (2019); Sankaran & Chakraborty (2022)
Security → trust	Positive	Kesharwani & Bisht (2012); Stewart & Jürjens (2018)
Trust → intention	Strong positive relationship expected	Shree et al. (2021); Chawla et al. (2023)
Risk → intention	Negative	Featherman & Pavlou (2003); Thakur & Srivastava (2014)

Relationship	Expected pattern	Illustrative supporting literature
Security → trust → intention	Positive indirect effect expected	Shaw (2014); Chawla & Joshi (2023)
Trust × risk → intention	Negative interaction expected	Kumar et al. (2023)
Intention → actual use	Positive	Patil et al. (2020); Sharma & Sharma (2019)

12. Discussion

The integrated framework suggests that the technology aspect cannot be solely relied upon to explain FinTech acceptance – it still needs to be useful. Speedy and convenient early become the default criteria as digital payments have become commonplace. Competitive and regulatory differentiation evolves to reliability, security, dispute resolution, transparency and confidence. A useful service that is considered to be insecure may be rejected, and an insecure service that has a low value or is too complex may also not hold on to users.

Trust is a more unique role in that it connects the platform attributes to users' willingness to use the platform. An investment in cyber security provides a technical benefit, but also a psychological path toward adoption; if security is perceived to increase, then so will trust, and consequently intention to adopt. Likewise, a successful grievance resolution process can foster trust once the problem has arisen, which can have a positive impact on continuance behaviour even if no technology can prevent each and every transaction failure. This difference is important to managers because consumers do evaluate the system on how a failure is resolved not just if it is resolved, but how. Perceived risk needs to be thought of as more than a negative direct predictor. The moderation perspective acknowledges that an individual may react differently to a given level of trust if he or she thinks the consequences are more or less severe. The same smartphone might be the source of a low-value peer-to-peer payment, and a high-value digital investment. And with both, there's different risk perceptions! The research in the field of FinTech is able to integrate all of these contexts into a “typical” coefficient and ignore the meaningful heterogeneity.

The concept of digital financial literacy is also multi-dimensional. Financial judgement and cyber-safety awareness are not synonymous with operational competence, for example, using an app safely. A consumer might be able to scan QR codes but could be susceptible to the social engineering call or collect request from fraudsters. Future measurement should therefore differentiate functional digital skill, the understanding and security awareness of financial. The difference also has policy implications, since there are different weaknesses that need to be addressed.

The intention-behaviour gap has ramifications in the area of customer acquisition. While merchants, technical reliability, quick support and habit formation are necessary to ensure continued use, marketing can boost intention. As such, the provider which tracks just app installs or app registrations can overestimate actual adoption. Academic research should also not assume that if someone says they are going to do something, then they will do it, when there is data available on usage or validated measures for continuance.

The socio-economic diversity and advanced infrastructure of Delhi-NCR makes it a precious region. People from diverse backgrounds, such as a highly educated professional in Gurugram, a university student in Delhi, a small merchant in Ghaziabad, a homemaker in Noida, and an older banking customer in Faridabad, can experience the same digital public infrastructure, but have different resources, knowledge and risk tolerance. The integrated model can help to determine the strength of these connections and can help target interventions.

13. Theoretical Contributions

The proposed study has four major impacts on the existing studies on FinTech acceptance. Firstly, it shifts its focus

from the identification of determinants to the explanation of mechanisms, modelling trust as a mechanism between the determinants and the outcomes. Instead of simply finding positive relationship between security and performance and intention, the model examines the performance and security as a partial explanation of intention. Second, a conditional-process perspective is used in the framework with the moderation of perceived-risk and literacy. This is in response to the empirical observation of the fact that technology relationships do not remain the same in different contexts and among different users. It also offers a theoretically sound approach to the explanation of inconsistent results from previous research: a path can be strong in one sample and weak in another as a result of the variation in an unmodelled boundary condition.

Third, the framework incorporates the technology acceptance, institutional confidence and consumer capability and financial-risk perceptions. TAM and UTAUT can explain the cognitive judgment of technology, while trust theory can explain the reliance when the situation is uncertain, the perceived-risk theory can explain the expected negative consequences, and the digital financial literacy is the capability of users. These views yield a more economically viable model than the general technology model.

Fourth, by distinguishing between behavioral intention and actual or continuance use, this study helps to advance the research on the intention-behavior gap. This becomes significant when the ecosystem is more mature since the initial trial is no longer the only management challenge. Successful transactions must be repeated for the adoption to be sustainable and risk and support must be manageable if problems arise.

14. Practical and Policy implications

Trust should not only be a branding goal, but a design and service-management outcome too, for FinTech companies. Clear and visible communication of transaction status, authentication process, immediate alerts, privacy statements that are easy to understand and clear processes for support and dispute resolution can help alleviate uncertainty. Any communication related to security should be informative enough to calm consumers but not so detailed that they feel it's a frightening reality that no fraud can occur.

Banks and payment service providers should clearly define accountability when it comes to multiple banks. A bank account, UPI application, payment service provider and merchant are likely to be the interplay in a single transaction for consumers. If failures do happen, it is easy to lose some trust if there is an unclear responsibility in the process even if the money is reclaimed in the end. The adoption process can then be leveraged as a mechanism for complaint tracking while the relationship becomes a mechanism for service quality.Complaints from the perspective of the adoption process can then be tracked and communicated based on the integrated complaint tracking and communication systems.

There is a need to bring together regulators and consumer protection agencies to apply innovation policy while also providing education on digital safety. Awareness programmes should not just educate how to complete transactions but how to identify social engineering techniques, safeguard credentials, verify payment requests and identify and follow proper complaint channels. With digital payment scaling up at such a rapid pace, financial inclusion should not be confined to just paying, but also financial literacy on fraud prevention.

The market strategies to be adopted in the Delhi-NCR region should not be done in a blanket fashion. Onboarding and education can be customized by age and experience, by type of services, and without compromising security standards. It will take step-by-step guidance and reassurance for new users and advanced controls, transaction analytics and fast self-service for experienced users. While settlement reliability and the ability to resolve grievances might be more important to small merchants, investment-app users may be more concerned about data security and potential financial risk.

Future research and limitations.

The proposed cross-sectional design has a weakness in terms of causal inferences since all the predictors, mediators and outcomes are measured at around the same period of time. Longitudinal studies would allow for the determination of whether an increase in security perceptions is followed by an increase in trust, and whether trust precedes other continuance. The following behaviour could also be differentiated from first adoption using panel

data.

Self-reported use may not necessarily reflect what is reflected in transaction-record behaviour. In future, it would be possible to integrate surveys with anonymous behavioural data (such as frequency categories, transaction summary, tenure or opt-in) where ethically appropriate and feasible. This data would give powerful tests of the intention-behaviour gap – without compromising privacy.

FinTech is heterogeneous. Factors that influence UPI payments can be different from those influencing other digital payments such as digital lending, investment applications, insurance or buy now pay later services. Future research must consider different levels of risk and trust at different services, instead of assuming that all digital financial services share the same risk and trust process. There could be more financial literacy and moderation of risk in higher-cost services.

Delhi-NCR is an economically and technologically unique area, therefore generalisation to the rural areas and small towns should not be made. Replication in metropolitan, tier-2, tier-3 and rural settings would help to determine if the mechanisms as proposed are infrastructure dependent. Further studies are needed on other applications of AI in financial services, such as financial advice, biometric authentication, embedded finance and agentic payment systems, in which algorithmic trust and autonomy can create novel ways of perceived risk.

16. Conclusion

User acceptance of a technology doesn't simply equal usefulness or ease of use for the end-user; it also depends on their perceptions of the technology's usefulness or ease of use to them.User acceptance is not just about usefulness or ease of use for consumers, but also about the perception of usefulness or ease of use for the consumers. In the financial services realm, it's a multi-layered opinion, across areas of financial risk, trust, capability of the users, security, value, support, social legitimacy, and performance. The paper thus suggests an integrated model for Delhi-NCR which includes both direct and mediation and moderation as well as a downstream actual use outcome.

The core technology-acceptance structure is made up of elements of performance expectancy, effort expectancy, social influence, facilitating conditions and perceived value. The perceived security and the level of financial literacy of digital tools can influence the trust, which can then cause a favorable evaluation of the tool, which, in turn, can influence the behavioural intention, which can predict financial use or continuance of use. This is a theoretical more robust architecture than a purely additive adoption model since it gives explanations both on mechanisms and boundary conditions.

An empirical implementation should always gather valid respondent data throughout Delhi-NCR, test the measurement model, estimate the structural paths, test bootstrapped indirect effects, and test interaction terms and check for comparability of subgroups before multi-group interpretation. These procedures must be completed with actual answers and numerical coefficients and hypothesis decisions should be reported only then. This would uphold the integrity of the research and provide insights that could contribute to the development of FinTech companies, banks, regulators and consumer education initiatives in the fast-changing digital financial landscape in India.

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