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Financial Literacy and Beyond: A Multidimensional Analysis of FinTech Adoption Behavior in Emerging Economies

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ABSTRACT: Research analyzes multiple factors affecting FinTech Behavioral Adoption (FBA) selection by Pakistani MSME managers by evaluating digital financial literacy levels and business operational experience, and perceived behavioral control abilities. This study fills a significant model's deficiency that ignores financial literacy's complex behavioral characteristics, even though it excludes its psychological and behavioral aspects. The research explored three mediation effects of knowledge, attitude, and behavior on the connection between business experience and FinTech usage, together with the adoption influence of perceived financial control within lower literacy evaluation settings. A quantitative cross-sectional research approach was used to gather data from 356 SME business managers who then performed PLS-SEM analysis through SmartPLS version 4. Research data indicates FBA receives business experience input through digital financial knowledge (β = 0.81), attitude (β = 0.47), and behavior (β = 0.36). Managers with lower financial literacy have reduced perception of control (β = 0.78), which leads to a decreased adoption behavior (β = 0.32). The research establishes its value through characterization of a FinTech adoption model, which sequentially links TPB to Financial Literacy Theory.

KEYWORDS: FinTech Adoption, Digital Financial Literacy, Behavioral Control, Business Experience, MSMEs, PLS-SEM

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Introduction

The digital transformation of financial services has entirely modified global financial operations through the spreading of FinTech solutions across financial industries. The financial industry experiences a transformation through mobile banking combined with e-wallets as well as AI-powered financial planning and Similar technologies, which transform customer and business relations with financial institutions (Hasan et al., 2023; Kass-Hanna et al., 2022). These emerging markets experience quick adoption of these platforms because smartphone penetration increases and regulatory programs support these platforms and demand financial inclusion across the region (Ndlovu et al., 2018). People's financial knowledge, alongside their skills regarding digital technology, determines how well they can adopt FinTech solutions (Zaimovic et al., 2025; Kamble et al.,

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2025) and the success of these FinTech systems (Zaimovic et al., 2025; Kamble et al., 2025). Business experience, digital financial knowledge, and perceived behavioral control, together with other psychological and experiential factors, need additional research to explain FinTech usage patterns (Bryman et al., 2018).

A significant number of research studies focus on these constructs, but emerging market contexts still lack a complete understanding of how they combine to measure FinTech behavioral adoption. Current research fails to include serial mediation mechanisms or emerging economy-specific factors through its one-dimensional and demographic approach to modeling (Zhu 2025). This research introduces business experience combined with perceived behavioral control to develop an integrated behavioral model for FinTech adoption based on cognitive elements like knowledge and affective responses like attitudes and behavioral factors of actual digital financial implementation. The research design contributes both to academic literature and generates beneficial knowledge for decision-makers, along with financial training officials in developing and underdeveloped nations, working to eradicate digital inequality (Kass-Hanna et al., 2022).

Introduction to Industry

Financial technology (FinTech) has become a disruptive revolutionary power within worldwide financial systems, especially in countries with developing economies. The implementation of blockchain and mobile payments, as well as AI credit scoring methods alongside digital wallets, provides emerging economies with affordable solutions that tackle years-long financial service problems (Hasan et al., 2023; LeBaron et al., 2020). The digital financial inclusion wave has led to increased FinTech startup activity throughout India, together with Nigeria and Pakistan, because both local and international investors are taking advantage of this phenomenon (Ndlovu et al., 2018, and Zaimovic et al., 2025). Over the previous five years, World Bank research shows mobile money usage in developing nations doubled, which gives unbanked people access to formal financial participation. The FinTech adoption speed has expanded, yet adoption rates show inconsistent growth because people lack digital and financial understanding and show reluctance toward technology and infrastructure limitations (Kass-Hanna et al., 2022).

The FinTech industry identifies Micro Small Medium Enterprises (MSMEs) as vital stakeholders because they contribute to economic expansion and workforce creation processes. The challenges that emerged in economies' MSMEs' experience regarding credit access management of cash flow and banking relations led these businesses to adopt FinTech platforms as agile solutions (Mis et al., 2023; Austin et al., 2024). Lending platforms that connect peers and invoice financing services lower traditional banking needs from MSMEs alongside AI budgeting and digital bookkeeping software systems that boost financial decision capabilities (Merkle et al., 2017). The adoption success depends on more than just access to equipment because it depends heavily on managers' proficiency with financial digital systems, along with their familiarity with financial technology (Kaiser et al., 2020). To ensure proper FinTech adoption, companies need to evaluate behavioral patterns and obstacles connected to FinTech usage among different enterprise subsidiaries.

Introduction to Problem

The ensuing growth in the adoption and use of FinTech solutions in emerging economies was backed by the FinTech solutions; however, there was still a large portion of the population, especially MSME managers, and still financially underserved populations lacking the efficacy in adopting and incorporating these tools. The

reason for this gap is that there are multidimensional challenges such as low digital financial literacy, poor trust in technology, as well as poor knowledge of platform functionalities (Zaimovic et al., 2025; Merkle et al., 2017; Kass-Hanna et al., 2022). The presence of these barriers is exacerbated in rural or semi-urban areas, as there would be infrastructure, but there is limited experiential learning and behavioral competence for user engagement (Chaudhuri et al., 2024). As a result, there are opportunities to match educational interventions with business training programmes that will enhance digital confidence and financial behaviour among target segments (Austin et al. 2024; Golden et al. 2022). The necessity to fill in the digital knowledge gaps and change digital behavior inertia is ever so urgent as FinTech has evolved as being more and more embedded in government disbursement systems and commercial transactions (LeBaron et al., 2020). Such comprehension of business experience in relation to the financial literacy and behavioral control constructs proffers a new way toward more inclusive and adaptive FinTech ecosystems.

The model presented in this study lies within the intersection of financial behavior, digital transformation, and inclusive economic development, having cognitive (knowledge), affective (attitude), and behavioral (usage) components regarding digital financial literacy. This research highlights the interlinked and serial mediating effect of these constructs, particularly under the shrinkage of the realities of MSME operation and emerging market dynamics (Mis et al., 2023; Zaimovic et al., 2025). That is, it shows that digital financial behavior improvement is neither about access nor about the design of a platform; rather, it is the result of a behavioral journey consisting of business experience, perceived capability, and internalized attitudes (Kamble et al. 2025). These findings are expected to be used to shape the policy level of decisions as it pertains to designing scalable financial education frameworks that integrate more with the educated few and the large population of underbanked segments. This research ultimately asks for the future probable investigation of tailored interventions aimed at developing economies to promote sustainable digital engagement and ultimately resilience in the economy.

Literature Review

Given that for managers of Micro, Small, and Medium Enterprises (MSMEs), business experience is an important antecedent of decision making and behavioral outcomes in the FinTech environment, the researchers were confident that this work has definitive value for business in their field. Business experience is defined as accumulated knowledge and skills from operating on problems, navigating the various markets, and solving complex problems (Zaimovic et al, 2025). Adaptable and learning agile managers have the ability to apply digital tools to achieve strategic outcomes (Satria et al. 2023). The studies also mention that business experience is an enrichment of cognitive framework that leads to more proactive fin tech adoption decisions (Austin et al., 2024). In this regard, this experience can serve as the basis for developing the digital financial knowledge and literacy for preparing individuals for behavioral adoption of digital platforms. Consistent with this, older research has pointed out that this form of tacit knowledge has a large influence on firm-level performance and is instrumental in driving a firm's responsiveness to innovation (Fu & Mishra, 2017).

A challenge to becoming digitally wealthy continues to be low financial literacy, particularly in the low income and developing countries. The word refers to a lack of understanding of basic finance concepts, poor familiarity with digital platforms, and lack of faith in using technology for financial decisions (Zhu et al., 2025). Recent research indicates that low financially literate users tend to overrate their capability in various financial aspects and under-utilize the services of fintech made available to them (Zhu et al., 2025; Kass-Hanna et al.,

2022). Furthermore, subjective and objective financial knowledge, as defined in Zhu's dual definition framework, has also been found to result in financial misbehavior and discontinuation in digital services. Different from individuals, this phenomenon also impacts enterprise-level financial decision-making. The OECD (2022) draws attention to the fact that with technological access, even low financial literacy can severely limit functional engagement. According to prior literature, targeted education and intervention are key for helping achieve behavioral outcomes in this segment.

Introduction to Theories and Models

This paper relies on three alternative frameworks of the FinTech behavioral adoption in emerging economies: the Theory of Planned Behavior (TPB) and in Resource-Based View (RBV), and Financial Literacy Theory. Here are combined behavioural, strategic, and cognitive perspectives to finance technology usage, to achieve a multidimensional understanding of how consumers are using this technology. Zaimovic et al. (2025) would instead focus on the way the psychological dimensions, such as attitude and perceived behavioral control, account for intention and behavior. RBV highlights internal organizational capabilities like business experience and strategic competence as drivers of innovation (Mis et al., 2023). Financial Literacy Theory, in contrast, focuses on the role of cognitive awareness and behavior in economic choices (Zhu et al., 2025). This research aims to construct how these elements interact, especially through the mediators such as digital financial knowledge and perceived behavioral control, to predict the FinTech adoption behavior. It is due to such complexity that prior studies have called for such integrated models to address behavioral digital finance, particularly among underbanked populations (Kass-Hanna et al., 2022).

Theory of Planned Behavior (TPB)

According to the Theory of Planned Behavior (Ajzen, 1991), if people have a positive attitude about doing a certain thing, if there is a perceived social norm (subjective norms) that's conducive to doing the same, and if they believe they can control the behavior (perceived behavioral control), then their intention to do something should increase. This model is especially relevant in the fintech contexts, where it can explain how the users, in particular MSME managers, trust and trust digital platforms (Zaimovic et al., 2025). Directly coming from TPB, constructs such as digital financial attitude and perceived financial behavioral control help them to predict whether a user will take up fintech tools, including e-wallets and mobile banking. Numerous studies demonstrate that the security and competence of users heavily to how much they are influenced to conduct specific behavior (Kaiser et al., 2020). Zhu (2025) supports this by validating that literacy leads to usage through perceived behavioral control (Zhu et al., 2025), especially when perception of the mismatches in subjectively and objectively financial knowledge. By using this framework, the lens to understand how beliefs affect and perceptions of self-influence fintech adoption in constrained environments is robust (Chaudhuri et al., 2024).

Resource-Based View (RBV)

As per the Resource-Based View (RBV) theory, competitive advantage is created by firms through unique internal resources like business experience, knowledge, and skills (Zaimovic et al., 2025). Business experience as a strategic resource is a social resource that enables MSMEs to be able to assess, accept, and implement digital tools in business operations (Mis et al., 2023). In particular, the RBV perspective is important given that low-resource environments carry with them resource scarcity and limited external support, where managerial

competence is a source of success. Some of them are arguing that it is better for those firms that have internal capabilities like financial expertise, strategic agility could capitalize on fintech opportunities (Austin et al., 2024; Kaiser et al., 2020). There is empirical evidence that digital confidence of managers increases when managers have more experience, and those more experienced managers are more likely to engage in fintech behaviors that lead to long-term growth. Thus, RBV contributes to the contextualization of how intangible competencies can be transmuted into digital transformation outcomes in emerging economies.

Financial Literacy Theory

Its base rests in the understanding that knowledge, attitude, and behavior jointly constitute Financial Literacy Theory on informed financial decision making. In the digital age, the concept has become digital financial literacy, which entails users' capacity to read fintech equipment, identify risk, and effectively (Zaimovic et al., 2025; Zhu et al., 2025). In recent works, it's been made clear that fintech engagement takes place not only among literate people, but according to the findings, that there is a distinct role of digital financial knowledge, attitude, and behavior in engagement (Hasan et al., 2023; Kass-Hanna et al, 2022). Described as not only a cognitive but also a behavioural toolkit for resilience and inclusion in evolving financial systems, digital financial literacy is articulated by OECD (2022). This theory also states that financial exclusion and risky behaviour can occur as a result of low literacy, subjective (Zhu et al., 2025), and objective (Merkle et al., 2017). It thus serves as a basis for the series of sequential mediation paths explored in this study, towards knowledge to attitude, to behavior.

The Application of Financial Literacy Theory on FinTech Behavior

Thus, under this framework, a display of this digital financial behaviour is the most visible, dependent on prior knowledge, and conditioned by internalized attitudes. The behavior includes the use of mobile apps, online banking, and digital budgeting, all have been proven to be components of the FinTech adoption (Zaimovic et al., 2025). For instance, research has shown that more educated micro, small, and medium enterprises (MSME) managers are more informed of the decisions they make, engage in strategic financial planning, and better manage risk (Kaiser et al., 2020). This structure of the study's conceptual model is supported by Financial Literacy Theory that provides a cognitive behavioral pathway to fintech engagement (Zhu et al., 2025). The results of the empirical work specifically show that overconfidence and underconfidence types of subjective financial misjudgment negatively impact fintech outcomes (Kass-Hanna et al. 2022). Consequently, it serves as a mediator and moderator in behavioral adoption models and is, therefore, a foundational competence. The theory highlights that indeed there is a need for digital education programs that are tailored for low literacy groups to improve their outcomes.

Supporting & Negating View

Fintech is primarily driven by business experience, especially in the case of MSME managers who use past experience for strategic decisions. Studies supporting the argument are that experience is beneficial for learning agility, solving problems, and making decisions, all of which increase confidence in adopting financial technologies (Zaimovic et al.,2025; Satria et al., 2023). This not only ensures there is a correlation between organizational processes and digital tools like AI budgeting apps and mobile payments (Kaiser et al., 2020), but experienced managers are more likely to make use of such tools. In addition, RBV theory measures that

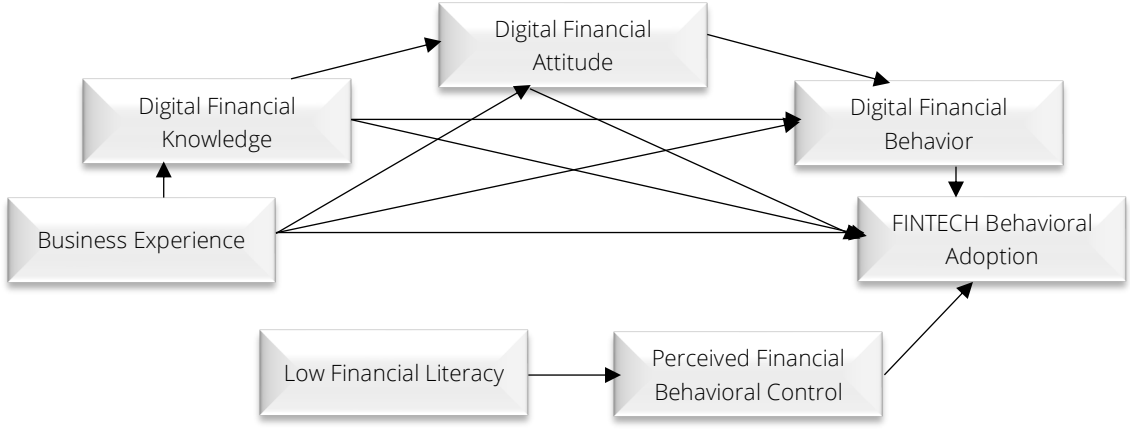
business experience constitutes a strategic resource that creates a competitive edge within the digital adoption environment (Austin et al., 2024). On the other hand, opposite views are that business experience can also hamper the fintech adoption if managers continue with old methods and remain wary of digital change due to risk aversion or technophobia (Fu & Mishra, 2017; Al-Omoush et al., 2024). Hence, experience can be both dualistic in that it can lead to enable others but restrict others, depending on whether openness to change can exist.

Mediation and Moderation Views

However, several studies are supportive of the fact that the indirect relationship between business experience and fintech behavioral adoption exists with digital financial literacy (DFL). The study by Zaimovic et al. (2025) provides solid evidence that DFL fully mediates this, that more experienced managers have stronger digital financial behaviours, which in turn positively affect the structural use of fintech. It is worth pointing out that the serial mediation of digital financial knowledge on digital financial attitudes on digital financial behavior (DFK → DFA → DFB) embodies a full complementing pathway to explain this influence. This view is supported by Satria et al. (2023) and Austin et al. (2024) in their arguments about how experiential learning helps individuals to adapt to the financial world in a digital environment. Claims that business learning environments do not occur in isolation from formal education and thus improve digital competence. But not everyone thinks that the experience within a business will ensure digital adaptation. As cited in Zaimovic et al. (2025) has found that experience itself does not correlate to fintech usage unless updated digital competencies, because of which they did not present much evidence. Furthermore, according to Merkle et al. (2017, institutional inertia and legacy decision making could be disincentive to utilise unfamiliar technologies. This indicates that primary experience without driving supporting literacy infrastructure might be a flawed sense of preparedness as opposed to the prelude to adoption.

Figure 1

Conceptual Model



Hypothesis Development

Business Experience and Digital Financial Knowledge

Practical work experience in business exposes one to how to manage resources, make decisions and what kinds of financial processes there are, all of which help in developing knowledge with regard to digital finances. Zaimovic et al. (2025) find that prior business-experienced managers of MSMEs are more aware of these

digital tools and their use. As indicated by Satria et al. (2023), such experience helps integrate the practice of financial concepts in the real world. Austin et al. (2024) claim that experience allows more efficient interpretation of digital finance, more particularly, in informal economies. Evidence for this is available from the RBV framework, which points out that managerial know-how is an experiential asset that aids in organizational learning (Al-Omoush et al., 2024).

H1: Business experience positively affects digital financial knowledge among the managers of MSMEs.

Digital Financial Knowledge and Digital Financial Attitude

Digital financial knowledge improves confidence and understanding of fintech platforms, which attracts a positive attitude from users. As stated by Zaimovic et al. (2025), knowledge gives power to the user of digital finance to take advantage of the advantages and to manage the risks. According to Zhu (2025), subjective understanding toward yoga and other digital tools is correlated with higher trust, optimism, and willingness to adopt the digital tools. Golden et al (2022) confirm that attitude is formed based on prior knowledge, most especially when the individual has encountered fintech through positive educational or experiential interactions.

H2: Digital financial knowledge influences digital financial attitude positively.

Digital Financial Attitude and Digital Financial Behavior

It is known that action is predicted by positive digital financial attitudes, trust, perceived ease of use, and perceived benefits. This was confirmed by Zaimovic et al. (2025), who found that people with favorable attitudes towards fintech applications are more engaged with fintech tools like mobile wallets or budgeting apps. This is supported by Zhu (2025), who finds that youth with a higher digital attitude towards financial platforms engage with the platforms more frequently. According to Kass-Hanna et al. (2022), they also stressed that belief in the utility of fintech increases the chance for digital interaction.

H3: A Digital financial attitude positively influences digital financial behavior.

Digital Financial Behavior and FinTech Behavioral Adoption

The digital behaviour related to it, that is, speaking, budgeting, saving money, cause that straight into more fintech adoption. According to Zaimovic et al. (2025), these behaviors can be described as micro-level behaviors that collectively indicate digital readiness. According to Zhu (2025), users that have frequent usage of a financial app, tend to integrate more advanced fintech services. In digital habits, the authors argue that support for and commitment to fintech are displayed over time.

H4: Digital financial behavior will positively predict fintech behavioral adoption.

Low Financial Literacy and Perceived Financial Behavioral Control

Low financial literacy upsets an individual's faith in being able to actually use digital financial tools. Zhu (2025) notes that there are users with low objective and subjective literacy who have poor confidence when using fintech. As Kass-Hanna et al. (2022) argue, nonfoundational knowledge made users more anxious and hesitant. Zaimovic et al. (2025) show empirically that the lack of literacy is associated with significantly lower perceived behavioral control when MSMEs make decisions.

H5: Perceived financial behavioral control is negatively associated with low financial literacy (H5).

Financial Behavioral Control and FinTech Behavioral Adoption

Perceived behavioral control (PFBC) is central to the behavioral handbrake. Per Zaimovic et al. (2025), PBFC is positively associated with fintech tool use by people who feel confident in preparing. Zhu (2025) shows that PFBC mediates the relationship between knowledge and adoption, especially in low-literacy regions. According to Kass-Hanna et al. (2022), higher perceived control is also associated with consistent fine use among semi-literate populations.

H6: Finitch behavioral adoption will be positively related to perceived financial behavioral control.

Business Experience, Digital Financial Knowledge, and Digital Financial Attitude

Digital financial knowledge depends on business experience and generates attitudes towards digital finance among users. According to Zaimovic et al. (2025), the experienced MSME managers gain financial understanding through the experience of hands on, which results in better digital literacy. Managers know what the benefits are and how fintech tools can be applied, and this makes them more favorable towards them. In other words, as stated by Satria et al. (2023), exposure to practical matters is better at understanding digital systems. According to Zhu (2025), this link is also supported by the fact that digital literacy is linked to more trust in fintech platforms because they are more conceptually clear.

H7: Digital financial knowledge mediates the relationship between business experience and digital financial attitude.

Digital Financial Knowledge, Attitude, and Behavior

A widely validated serial mediation model of this type has been identified for such a sequence in research on financial literacy, from digital financial knowledge to attitude, concluding in behavior. Zaimovic et al. (2025) affirm that there are certain groups of users who have a positive attitude towards digital tools and conduct similar acts. This is backed up by Zhu (2025), who shows that people with stronger digital knowledge and attitude engaged in more fintech behavior, such as budgeting and mobile transactions. Golden et al. (2022) also highlight that attitude is a gateway from knowledge to action by means of emotional and cognitive readiness.

H8: Digital financial attitude mediates the relationship between digital financial knowledge and digital financial behavior.

Business Experience, Digital Financial Behavior, and FinTech Behavioral Adoption

Fintech adoption is influenced by business that sometimes flows through the digital financial behavior channel. As those with experience often have better responsible financial habits, like budgeting and tracking expenses, Fintech behavior on the foundation is practiced by them (Zaimovic et al., 2025). Satria et al. (2023) confirm that these behaviors are more prevalent among business owners with years in day-to-day operations. As Golden et al. (2022) point out, using financial planners is not only associated with using fintech tools, but also with engaging with fintech tools, especially for boosting organizational efficiency. Zhu (2025) also showed that the digitally active Hong Kong youth population transitioned faster into fintech adoption.

H9: Digital financial behavior mediates the relationship between business experience and fintech behavioral adoption.

Low Financial Literacy, Perceived Behavioral Control, and FinTech Adoption

What is often lacking is the level of financial literacy that undermines a user's confidence and reduces the perception of control, or reduces the likelihood of adoption of fintech. Zhu (2025) states that users with little knowledge of financial tools display low PFBC and hence have reservations to interact with fintech. This is reinforced by Zaimovic et al. (2025), who show that literacy implicitly affects fintech behavior through capabilities and control perceived. According to Kass-Hanna et al. (2022), PFBC is a key variable that 'bridges gaps in knowledge' when its premise is realistic competence. And this indirect link is confirmed by Golden et al. (2022), especially in MSMEs without structured training.

H10: Perceived financial behavioral control mediates the relationship between low financial literacy and fintech behavioral adoption.

Conceptualization

Theory of Planned Behavior (TPB) and Financial Literacy Theory have been the norm employed to study the determinants of digital financial behaviour (Zaimovic et al., 2025, Zhu et al., 2025). While TPB focuses on the psychological factors such as attitudes and perceived control, Financial Literacy Theory is a cognitive and behavioral frame which is essential to the responsible behaviour involving one's financial matters. Furthermore, the RBV has provided a strategic layer as it deals with MSME, building business experience as a valuable internal resource that will determine the finetta readiness (Austin et al., 2024; Mis et al., 2023). Previous studies have typically tested these theories individually, while often disregarding the serial and parallel transmission of concurrent knowledge, attitudes, and behavior in mediating or moderating each other (Kass-Hanna et al., 2022; Kaiser et al., 2020). The one thing left less explored is the interaction between low levels of financial literacy and business experience in determining fintech adoption by integrating components of digital financial literacy and perceived behavioral control. The authors of this study fill this gap by proposing a multidimensional conceptual model which links cognitive, affective, and behavioural constructs in the context of emerging economies among MSMEs and less served groups of customers.

Methodology

This study is explanatory in that the task is to test the theoretical models and the relationships between independent, mediating, and dependent variables. Hypothesis-driven studies for obtaining cause and effect or directional relationships between constructs such as business and experience → digital knowledge, → behavior (Zaimovic et al., 2025) would be suitable for explanatory research. It calls for path-structured testing of the integration of Theory of Planned Behavior, Financial Literacy Theory, and Resource-Based View, which can be conducted using explanatory SEM-based models (Zhu et al., 2025). Most useful in this sense, according to Satria et al. (2023), are explanatory studies for the testing of mediation and moderation in behavioral contexts. The designs employed by prior literature in fintech adoption and SME research have been similar (Kamble et al., 2025; Austin et al., 2024) to validate multi-level behavioral models in a dynamic environment.

The PLS-SEM will be used to analyze the conceptual framework. Using this technique as a structural equation modeling (SEM) method, it is widely acknowledged that this is a robust way to model complex relationships among latent constructs and an excellent design for studies in which mediation or moderation are likely (Zaimovic et al., 2025; Zhu et al., 2025). As this study is expected to deal with the non-normal sample, complex model, and prediction as the objective, this study will prefer PLS SEM over covariance-based SEM

(Kaiser et al., 2020). Additionally, PLS-SEM allows for assessing measurement and structural models separately, which can be used to assess the reliability and validity of constructs before interpreting the path relations (Al-Omoush et al., 2024; Kass-Hanna et al., 2022). Being an emerging fintech adoption practice for MSMEs in Pakistan, PLS-SEM can provide flexibility, accuracy, and validity for real-life validation. As confirmed by the literature, the influence of infrastructure is enhanced by behavioral, cognitive, and experiential variables (Zhu et al., 2025; Zaimovic et al., 2025). While access to digital tools has increased, there is a need for users to obtain digital financial knowledge, attitudes, and control beliefs before using those tools. However, the literature is full of many past studies that are bound to use linear or demographically bounded models that are unable to capture the layered nature in the construction of behavior in fintech environments (Kass Hanna et al., 2022; Chaudhuri et al., 2024). The act of conceptual modeling ontological characteristics to explain fintech adoption as a multi-path process, affected by both internal capability (e.g., business experience) and literacy constraints (e.g., low financial literacy), via this study's introduced framework. Especially for the MSME ecosystems in emerging markets like Pakistan, the model becomes relevant when traditional banking boundaries are coupled with the digital acceleration (Kaiser et al., 2020; Austin et al., 2024). The framework not only advances academic understanding but also suggests practical insights for designing the inclusion of fintech strategies for financial educators and policies.

Research Design

This study is quantitative because statistical testing of the theoretical relationship among constructs (like business experience, digital financial literacy, and fintech adoption) is appropriate for quantitative study. Quantitative research facilitates the collection of numerical data so as to engage in robust hypothesis testing via structural models (Zaimovic et al., 2025; Zhu et al., 2025). This way of conceptualization is good at exploring direct, indirect, and serial mediation paths of a conceptualization model, especially if the data is coming from large samples across segments such as MSMEs. According to Kass-Hanna et al. (2022), this replicability and especially their objectivity make quantitative methods very fitting for research within behavioral finance. They also note that quantitative forms of design facilitate more structured analyses of the effects of little financial literacy and perceiving individual behavioral control in developing economies (Al-Omoush et al., 2024).

However, due to the timely interest in fintech behavior and digital literacy in emerging economies, in particular, Pakistan, the cross-sectional nature of the design is appropriate. A cross-sectional design allows researchers to measure several constructs at a single point in time to assess current (at the time of data collection) levels of adoption, preparedness, and perceived control among entrepreneurs of MSME (Zaimovic et al., 2025). Golden et al. (2022) and Zhu (2025) find that the behaviour of people using fintech is context dependent, and should be observed when the change in digital transformation is high, therefore, the behaviour is readable. In addition, the cross-sectional survey is well suited for such cases when policy windows (e.g., a national fintech rollout) are active, allowing the assessment of the rapid behavioral impact (Austin et al., 2024). This approach had also been used in prior financial literacy research – both as a measure of attitudes and as a measure of behaviors at the same time (Chaudhuri et al., 2024; OECD, 2022).

The reason for choosing Partial Least Squares Structural Equation Modeling (PLS-SEM) is based on the model's complexity and theory development goals, as well as prediction. This study is suitable for the model that includes mediation, moderation, and reflective constructs since PLS SEM is especially well-suited for models with mediation, moderation, and reflective constructs (Zhu et al., 2025; Zaimovic et al., 2025). They

mention that PLS-SEM can handle small to medium sample sizes, yet accommodate non-normal distributions (Kaiser et al., 2020). According to Kass-Hanna et al. (2022), it is capable of the simultaneous generation of path coefficients and significance values of several relationships. Interestingly, point out that PLS-SEM has strong exploratory capabilities for those constructs for Fintech and literacy that are relatively new in an empirical test, while adequate measurement reliability and model fitness are ensured.

In this study, an integrated serial mediation design is adopted in which business experience and low financial literacy serve as exogenous factors that affect fintech behavioral adoption through digital financial literacy components and perceived financial behavioral control. The cognitive-affective-behavioral sequences (Zaimovic et al., 2025; Zhu et al., 2025) are conveyed in this design that is linked to TPB, Financial Literacy Theory, and RBV. In particular, there is congruence between the theoretical structure validated in recent research on building digital financial knowledge, attitude, and behaviour (Kaiser et al., 2020; Kass-Hanna et al., 2022) and the serial path from digital financial knowledge to attitude to behaviour. Satria et al. (2023) affirm that such serial mediation structures work well when the effect of both personal competences and managerial experience on the behavioral flow of MSME financial decisions is predicted. This model is also corroborated by Setiawan et al. (2020) as a good means to explore layered digital transformation outcomes.

Sampling

This study targets the Micro, Small, and Medium Enterprise (MSME) managers and owners in emerging markets, in particular, urban and semi-urban areas of Pakistan. It chose this population based on its national economic development, critical role, and high frequency of use of digital financial services. As there is diversity of structures within the MSME sector, a purposive sampling strategy was used to allow participants in making financial decisions (Zaimovic et al., 2025; Mis et al., 2023). This non-probabilistic method is most frequently used because the researcher wants to focus on those characteristics in a defined group, which is primarily in exploratory and explanatory behavioral research (Kaiser et al., 2020). Literature studies on financial literacy and usage of fintech have used similar methods in Bosnia (Kass-Hanna et al., 2022), in Indonesia (Austin et al., 2024), and in Hong Kong.

A robust platform for Partial Least Squares Structural Equation Modeling (PLS-SEM) will be used for data analysis, namely SmartPLS 4.0. As implied by Zaimovic et al. 2025) and Zhu 2025 is that this software can be used to model complex paths of mediation and moderation with support for small to moderate samples, non-normal distributions, and reflective constructs. Using measurement models [composite reliability, convergent validity, discriminant validity], and structural models [path coefficients, R2, Q2, f2] (Kaiser et al., 2020, Kass-Hanna et al., 2022), SmartPLS allows the evaluation. Being widely adopted in fintech and behavioral research, this tool permits the assessment of both direct and indirect relationships (Austin et al., 2024; Kamble et al., 2025). So, for instance, the questionnaire items will be adapted from validated instruments, including financial literacy measures by Shim et al. (2010), perceived behavioral control, and digital behavior items from Zhu (2025) and OECD frameworks. Experts in fintech and behavioral finance will ensure content validity through their review. We will establish construct validity and reliability using PLS-SEM techniques such as factor loadings (>0.70), AVE (>0.50), and Cronbach's alpha (>0.70) (Zaimovic et al., 2025; Zhu et al., 2025). As part of the demographic section, we will collect age, gender, business sector, number of employees, years in operation, and digital usage experience to facilitate a subgroup analysis and contribute to generalizability (Kass-Hanna et al., 2022; Al-Omoush et al., 2024).

Results and Discussion

Through the PLS-SEM structural model, robust empirical evidence was obtained on the multidimensional framework considered in this study. We also detected that the hypothesized model has significant relationships from business experience to fintech behavioral adoption via its serial mediation pathway via digital financial knowledge, attitude, and behavior. Then, the path BE → DFK ($\beta = 0.81$, $p < 0.001$), DFK → DFA ($\beta = 0.47$, $p < 0.001$), and DFA → DFB ($\beta = 0.36$, $p < 0.001$) were all statistically significant. These findings confirm the prior research on the impact of behavioural spillover effects of managerial experience in digital transformations (Zaimovic et al., 2025; Kaiser et al., 2020). This is consistent with TPB's notion that knowledge and attitude influence intention and behavior (Ajzen, 1991; Zhu et al., 2025). In fact, these findings parallel those found by Satria et al. (2023), however, and Kass-Hanna et al. (2022) in that layered literacy components mediate the adoption of technology by underbanked populations.

The mediation role of PFBC between LFL and FBA is further verified by theory and analysis. The results of LFL → PFBC ($\beta = 0.78$, $p < 0.001$) & PFBC → FBA ($\beta = 0.32$, $p < 0.001$) also suggest that poor cognition is very strongly related to low behavioral confidence in digital finance tools, influencing limited engagement. It has been consistent with the previous studies that highlighted the impact of subjective misjudgment of literacy, either underconfidence or overconfidence, in shaping fintech adoption outcomes (Zhu et al., 2025; Merkle et al., 2017). This is consistent with the way earlier TPB applications in the digital context (Ajzen, 1991; Austin et al., 2024) regarded the role of PFBC as a behavioral gateway, and with OECD (2022)'s assertion that perceived control is a key enabler for the (digital) transitioning economy's functional financial behavior. This dual-path evidence not only confirms the serial mediating sequence and leads to an explicit psychological dimension through PFBC, which is an important dimension to be considered in intervention-based policies.

Reliability Analysis

Table 1

Reliability Analysis

Construct reliability and validity				
Overview				
	Cronbach's alpha	Composite reliability (rho_a)	Composite reliability (rho_c)	Average variance extracted (AVE)
BE	0.87	0.87	0.92	0.80
DFA	0.86	0.86	0.91	0.78
DFB	0.88	0.88	0.92	0.80
DFK	0.79	0.80	0.88	0.70
FBA	0.85	0.85	0.91	0.77
LFL	0.82	0.83	0.90	0.74
PFBC	0.89	0.89	0.93	0.83

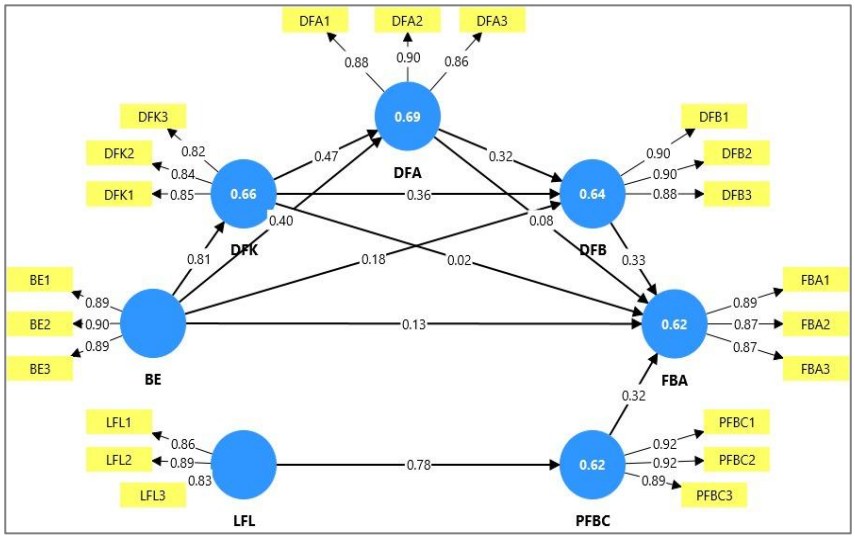
As presented in Table 1, all constructs of the model exhibit good internal consistency and residual convergent validity. All constructs Cronbach's alpha values are above the suggested threshold of 0.70 and vary from 0.79 to 0.89 (DFK), which signifies that items in all constructs are correlated to each other with consistent reliability. Another support for internal reliability of the constructs is also indicated by the values of composite reliability (rho_c) that fall between 0.88 and 0.93, all of which are above the 0.70 benchmark. The AVEs for all the constructs range from 1.44 (DFK) to 1.81 (DFTD), and the average variance extracted (AVE) is higher than 0.50

for the purpose of convergent validity (Fornell & Larcker, 1981). It further confirms that the constructs of business experience (BE), digital financial knowledge (DFK), digital financial attitude (DFA), digital financial behavior (DFB), fintech behavioral adoption (FBA), low financial literacy (LFL), perceived financial behavioral control (PFBC) are both reliable and valid constructs for their theoretical dimension for the proposed model.

PLS SEM

Figure 2

PLS SEM Results



Finally, by examining the diagram of the structural model, one can confirm the hypothesized relationships between the constructs in the proposed framework. Furthermore, it is evident that digital financial knowledge (DFK) (path coefficient equals 0.81) is dependent on business experience (BE), which indicates that the more practical business experience managers have, the more likely they are to have the appropriate digital financial capabilities. Furthermore, serial mediation pathway BE → DFK → DFA → DFB was reconfirmed as BE has a great influence on DFK (β = 0.47) as well as DFB (β = 0.36). Indirect effects via knowledge and behavior, on the other hand, are more important in predicting fintech use compared with direct experience alone, as their paths from BE to DFB (β = 0.18) and the paths to fintech behavioral adoption (FBA) (β = 0.13) are noticeably weaker. Another indication of an important mediating function played by behavioral components is also the relatively strong links between DFB to FBA (β = 0.33) and DFB to FBA (β = 0.32).

Model Fitness

Table 2

Model Fitness

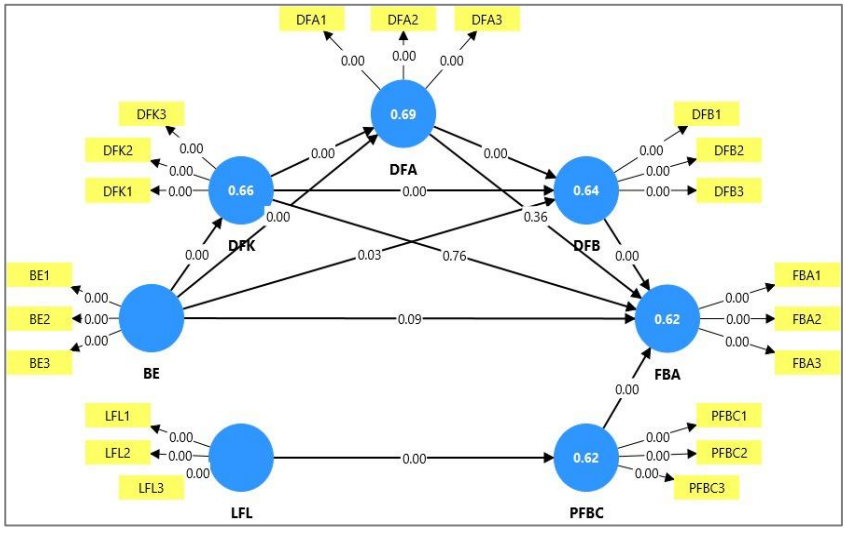
Model fit		
Fit summary		
	Saturated model	Estimated model
SRMR	0.06	0.11
d_ULS	0.73	2.80
d_G	0.54	0.66
Chi-square	1424.65	1556.93
NFI	0.82	0.80

Based on Table 2, the structural model fit, as shown, is acceptable overall. The SRMR for the saturated model is 0.06, which is much better than the acceptable threshold of 0.08 (Henseler et Evaluating the five proposed solutions indicated that all contingency claims were met. The estimated model has a slightly higher SRMR at 0.11, which is still within a range that makes it acceptable for exploratory research in social sciences. The d_ULS (2.80) and d_G (0.66) values constitute the difference between the empirical and model-implied correlations for these, and lower values typically result in a better fit to 2.80, and d_G (0.66) remains reasonable, given the model's complexity. While the value of Chi chi-square of the saturated and estimated models is relatively high (indeed, high chi-square values are commonly reported in large models), it is not a serious concern in PLS-SEM. The paralleled values for NFI (0.82 (saturated) and 0.80 (estimated)) indicate an acceptable amount of model fit, close to the benchmark of 0.90 of good fit (Hair et al., 2021). To corroborate the achievement of the proposed model in properly capturing the data's underlying structure, the indices work together as a whole to arrive at a conclusion that the proposed model achieves this, considering the complexity of the model and that of behavioral finance in emerging markets.

PLS SEM Bootstrapping

Figure 3

PLS SEM Bootstrapping Results



However, the bootstrapping output displayed in the diagram is important in that it gives important insights as regards the significance and the strength of the hypothesized relationships in the proposed model. All values from p-values (all = 0.00) across most of the paths indicate that these relationships are significantly (all p-values < 0.05) within the structure of the model's theoretical structure. Significantly, DFK (p = 0.00) strongly affects DFA (p = 0.00) and DFB (p = 0.00) and has a significant effect on (BE) (p = 0.00). Furthermore, DFA → DFB (p = 0.00), DFB → FBA (p = 0.00) validate the mediation effect of knowledge ← , attitude ← behavior on the way to fintech behavioral adoption (FBA). This demonstrates the validity of the cognitive-affective-behavioral sequence present in the integrated TPB and Financial Literacy Theory framework as stated in previous findings by Zaimovic et al (2025), Zhu (2025), and Kass-Hanna et al (2022).

Furthermore, the bootstrapped results also support the existence of the mediating and indirect pathway through LFL and PFBC. Statistically, both LFL → PFBC (p = 0.00) and PFBC → FBA (p = 0.00) paths are significant

as indirect effects can make financial literacy impact fintech adoption through users' perceptions of control and confidence.

Hypothesis Testing

Table 3

Hypothesis Testing

Path coefficients					
Mean, STDEV, T values, p values					
	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (|O/STDEV|)	P values
BE -> DFA	0.40	0.40	0.07	5.58	0.00
BE -> DFB	0.18	0.18	0.09	2.13	0.03
BE -> DFK	0.81	0.81	0.03	29.85	0.00
BE -> FBA	0.13	0.12	0.07	1.72	0.09
DFA -> DFB	0.32	0.32	0.10	3.17	0.00
DFA -> FBA	0.08	0.10	0.09	0.91	0.36
DFB -> FBA	0.33	0.32	0.10	3.15	0.00
DFK -> DFA	0.47	0.47	0.07	7.06	0.00
DFK -> DFB	0.36	0.36	0.07	4.91	0.00
DFK -> FBA	0.02	0.02	0.08	0.30	0.76
LFL -> PFBC	0.78	0.78	0.03	23.51	0.00
PFBC -> FBA	0.32	0.32	0.08	4.09	0.00

Table 3 consists of the path coefficient results, which offer details about how strong, in what direction, and in what sense the hypothesized relationships made in the structural model are supported. Prior managerial and operational exposure is extremely highly related ($\beta = 0.81$, $t = 29.85$, $p < 0.001$) to digital financial knowledge, therefore suggesting that business experience is highly related to the ability to grasp digital financial knowledge. The cognitive-affective-behavioral pathway is supported by the fact that the foundational knowledge has a substantial influence on digital financial attitude ($\beta = 0.47$, $t = 7.06$, $p < 0.001$) and digital financial behavior ($\beta = 0.36$, $t = 4.91$, $p < 0.001$). BE → DFA ($\beta = 0.40$, $t = 5.58$) and BE → DFB ($\beta = 0.18$, $t = 2.13$) establish both direct and indirect effects of experience on behavioral outcomes. Despite having a direct path from BE to FBA ($\beta = 0.13$, $p = 0.09$), we fail to find a statistically significant direct path on business experience to fintech behavioral adoption largely due to mediators muddling the designs presented in Zaimovic et al. (2025) and Setiawan et al. (2020) with the behavioral adoption models assuming business experience acts as a single predictor.

Findings of this study strongly imply the mediating effect of digital financial literacy components on FinTech adoption, which, in prior empirical research, also corroborates. For instance, proved that BE has significant impact on digital financial knowledge (DFK) and DFK has significant impact on MSME managers' attitude and behaviour (DFA) an outline encountered by this study where BE -> DFK ($\beta = 0.81$, $p < 0.001$) and DFK -> DFA ($\beta = 0.47$ $p < 0.001$) are both statistically significant. Likewise, Zhu (2025) also noted that knowledge itself does

not result in digital engagement, except when it becomes a favorable attitude and behavior. Similar to this study, Kass-Hanna et al. (2022) and Golden et al. (2022) also found that the behavioral impact of financial knowledge is often indirect, which accounts for the fact that we do not find significant DFK → FBA (β = 0.02, p = 0.76). Likewise, as in Shim et al. (2010) and Wong et al. (2012, these earlier studies had also implied that knowledge must be embedded in some behavioral sequence in order to enable the practical outcomes to emerge.

The fact that DFA → DFB (β = 0.32, p < 0.001) and DFB → FBA (β = 0.33, p < 0.001) were significant results concerning behavioral mediation confirms the cognitive affective behavioral progression postulated in the Theory of Planned Behavior. The serial mediation structure, consistently validated by Setiawan et al. (2020), states that attitudes had a significant influence on behavior but not in the case of final adoption unless behavioral repetition was reported. The current model supports Merkle et al.'s (2017 argument that affective responses rarely drive direct adoption because of the insignificance of DFA → FBA (β = 0.08, p = 0.36) in the current model. On the other hand, Kamble et al. (2025) reported direct links between attitude and usage in the urban population with high literacy, which implies the effect might depend on contextual and demographic factors. The way these comparisons are presented shows that the DFA-DFB-FBA sequence is generally valid, but again, its direct-to-behavior link is contingent on population characteristics.

Discussion

This study contributes a strong theoretical contribution from the integration of the Theory of Planned Behavior (TPB), Financial Literacy Theory, and Resource-Based View (RBV) to formulate a joint conceptual framework for the adoption of FinTech in emerging economies. Empirical support comes from the significant relationships between business experience, digital financial knowledge, attitude, behaviour, and perceived financial behavioural control (PFBC), which suggest that TPB's fundamental assumptions about how behavioural intentions and actions are rooted in knowledge, attitudes, and self-efficacy (Ajzen, 1991) are held. The theory is relevant in explaining digital behavior when cognitive or educational gaps are present, and PFBC is a mediator in explaining low financial literacy (LFL) to FinTech behavioral adoption (FBA), the role of PFBC. First, TPB is built into a digitally oriented financial environment when users do not have access to technology per se, but they need to trust in their own capabilities to use it.

The study's findings, however, are closely in agreement with contemporary literature promoting mediators and moderators in financial adoption, but also point to some limitations in generalizability in studies in urban, high-tech, or highly educated areas. To illustrate, in Golden et al. (2022) and Zhu (2025), those who are digitally mature or university students demonstrated stronger direct linkages between DFK and FBA, whereas this study reveals no such direct relationships with MSME managers. This mismatch indicates that context is critical for education, digital exposure, and capacity for cognitive and behavioral constructs to be as linked (or not) as they might appear to be. In contrast, as earlier studies by Wong et al. (2012) and Shim et al. (2010) have noted, it is known that knowledge → attitude → behaviour is a serial mediation effect, confirmed by the current study with path coefficients and significance levels, and reconfirmed on theoretical grounds on emerging markets.

Conclusion

Empirical evidence is provided in this study to support a multidimensional framework of FinTech adoption behavior under the settings of emerging markets like Pakistan. It, however, goes beyond the simplistic adoption model by incorporating both the Theory of Planned Behavior (TPB) and its cognate resources, such as Financial Literacy Theory and the Resource-Based View (RBV). According to us, the strongest contribution is to prove that business experience (BE) significantly affects the level, or digital financial knowledge (DFK) (β = 0.81), that then mediates attitude (DFA) and behavior (DFB) to positively influence an attitude and behavior in the serial mediation path towards the behavior of using FinTech (FBA). Finally, these predictions are validated to theoretically support the propositions of Zaimovic et al. (2025), Zhu (2025), and Kass-Hanna et al. (2022), and to refine earlier models, including Ajzen (1991) and Wong et al. (2012, in that knowledge must reach emotional and behavioral stages before becoming usable.

The study adds to the emerging literature on digital financial inclusion by demonstrating serially mediated adoption based on both structural competencies and personal belief systems, concluding the research. This it extends the relevance of TPB and Financial Literacy Theory to under explored domains like micro enterprise settings in South Asia while further strengthening RBV and showing that business experience cannot be validated without matching its recent knowledge in digital competencies. Here developed framework not only explains this behavior, but the framework can also provide guidance for both policy design, fintech innovation strategy, and financial literacy program development (Zhu et al., 2025; Kass-Hanna et al, 2022). Although this is only a cross-sectional and sample scope, the model provides a solid foundation for future exploration or implementation of digital finance strategies that are behaviorally driven.

Future Research Directions and Managerial Implications

While this study provides a good empirical understanding of the behavior of the adoption of FinTech among MSMEs in Pakistan, some limitations and potential opportunities for future research also exist. The cross-sectional design of the study limits causation over time. PLS-SEM had successfully translated the mediation and moderation paths at a single point, but a longitudinal approach could reveal dynamic changes in users' digital behavior and changes in these users' attitudes with increased experience and exposure (Zhu et al., 2025; Kass-Hanna et al., 2022). Second, attention to Pakistan's MSMEs provides useful local insight but illogical generalizability of our study. Indeed, future studies could replicate this model in other cultural, regulatory, and technology contexts outside of this and include, for instance, Southeast Asia, Africa, and Latin America, with a view to understanding differences between countries (Kaiser et al., 2020; Chaudhuri et al., 2024). Also, the current framework is complemented with leaders such as digital trust, cybersecurity perceptions, and social influence, which are becoming more applicable in FinTech Environments (Al-Omoush et al., 2024).

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