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Digital Financial Literacy and Household Investment Behavior

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Abstract

This study offers an original behavioral-finance framework that explains how Digital Financial Literacy (DFL) influences Household Investment Behavior (HIB) through the combined effects of Financial Attitude (FAL) and Peer/Social Influence (MOD). Unlike previous research that examined only direct literacy–behavior relationships, this study integrates cognitive, affective, and social dimensions to capture the whole pathway of digital financial decision-making. Using data from 583 university students in Pakistan, the analysis applies both the PROCESS macro (Hayes, 2018) and Partial Least Squares Structural Equation Modeling (PLS-SEM) to validate the proposed mediation–moderation model. Results show that FAL fully mediates the relationship between DFL and HIB, confirming that financial attitudes are the psychological bridge between knowledge and action. Additionally, peer influence negatively moderates this relationship, indicating that excessive reliance on social cues can weaken independent financial reasoning. The model demonstrates good reliability and explanatory power ($R^2 = 0.112$; SRMR = 0.041). The findings extend the Theory of Planned Behavior and Social Cognitive Theory to digital contexts, highlighting the importance of behavioral and social mechanisms in shaping financial choices. The study provides actionable insights for educators and policymakers seeking to enhance digital financial engagement in emerging economies.

Keywords

Digital Financial Literacy; Household Investment Behavior; Financial Attitude; Peer Influence; Behavioral Finance; Emerging Economies

JEL Code: D14, D91, G41, G53

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1. Introduction

The rapid advances in digital financial technology have transformed how people save, invest, and manage their finances. More people, especially younger adults, can now use mobile banking, fintech apps, and online investment platforms to access financial services in a much easier way. However, even though more people in developing countries have access to these digital tools, many still lack confidence in investing and are uncertain about their financial choices. This raises an important question: Does greater knowledge of digital financial matters really lead to better investment habits? This is especially important in countries like Pakistan, where more people are getting access to financial services, but how they use them is still not the same for everyone.

Most studies have focused on traditional financial knowledge and its impact on financial decisions (Lusardi & Mitchell, 2014 [2]; Klapper & Lusardi, 2020 [5]). However, these studies often overlook how people's feelings about money and their susceptibility to others' influence shape their choices. Just knowing things is not enough—how people feel about money (their financial attitude) and how they are influenced by friends or society also matter a lot. Theories such as the Theory of Planned Behavior (Ajzen, 1991 [24]) and Behavioral Finance Theory suggest that these attitudes and social influences are key in transforming financial knowledge into actual investment behavior. However, past research has not always agreed on this link—some studies have found a positive connection, while others have not. This lack of agreement highlights the need for further research to understand how and when financial knowledge influences behavior, particularly in digital financial contexts.

This study aims to fill that gap by creating a model that includes Digital Financial Literacy (DFL), Financial Attitude (FAL), and Peer/Social Influence (MOD) to explain Household Investment Behavior (HIB). The research utilizes data from 583 university students in Pakistan. It employs both the PROCESS macro (Hayes, 2018) and Partial Least Squares Structural Equation Modeling (PLS-SEM) to examine the direct, indirect, and conditional relationships between these factors. Financial attitude is seen as a mediator, showing how knowledge leads to action, while peer influence is a moderator, affecting the strength and direction of that relationship. This two-part analysis provides a more comprehensive understanding of how people make financial decisions in the digital age.

The study shows that while financial literacy (DFL) can influence investment decisions, its direct effect is relatively weak. Instead, financial attitudes play a key role in connecting literacy with actual behavior, serving as the mental link between knowledge and what people decide to do. Additionally, the research revealed that excessive trust in others' opinions can diminish the benefits of financial knowledge, making it more challenging for individuals to make informed decisions. These findings build on the Theory of Planned Behavior and Social Cognitive Theory, demonstrating that both cognitive skills and awareness of others are crucial for making informed financial choices in the digital world.

This work contributes to the field of behavioral finance by integrating three key aspects—cognitive (DFL), emotional (FAL), and social (MOD)—into a unified model. It also tests this model in a growing

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market, offering practical ideas for teachers, government officials, and policy makers. These insights can help create digital financial programs that not only improve knowledge but also boost confidence, critical thinking, and foster better investment habits.

2. Literature Review

2.1 Digital financial literacy: scope and measurement

Digital financial literacy (DFL) extends beyond traditional financial literacy, which focuses on numbers and risk management, to encompass broader aspects of personal finance. It also includes the ability to utilize digital tools such as mobile banking, online payments, robo-advisors, and investment websites. According to Lyons et al. (2021) [1], DFL is a blend of financial knowledge, digital skills, and responsible internet use. Research by Lusardi and Mitchell (2014) [2] and van Rooij et al. (2011) [3] indicates that improved financial literacy enables individuals to allocate their investments more effectively and plan for retirement more effectively. Newer studies highlight that digital tools introduce new aspects, such as learning to protect personal information, understanding cybersecurity, and following algorithmic advice (Grohmann et al., 2015 [6]; Warmath and Zimmerman, 2019 [7]).

Recent work supports the idea that DFL comprises several components, including knowledge, skills, attitudes, and actions that protect oneself (Morgan and Long, 2020 [8]; Hasler and Lusardi, 2017 [9]).

There are still significant differences in DFL across various groups, including men and women, individuals with different income levels, and those with varying educational backgrounds (Bongini et al., 2022 [10]). Additionally, people often overestimate their skills, which can lead to making unwise choices when using digital financial tools (Agarwal and Mazumder, 2013 [11]; Raut and Kumar, 2020 [12]). Overall, the research suggests that DFL is a vital skill that enables individuals to make more informed decisions in today's digital financial landscape.

2.2 Household investment behavior in the digital era

Household investment behavior refers to how individuals allocate their savings across various financial products, particularly during periods of economic uncertainty. Traditional finance theories suggest that people make rational decisions to maximize returns, but behavioral economics research shows that people often do not act entirely rationally. They might be influenced by their limited knowledge, overly optimistic views, and a tendency to stick with what they know (Barber and Odean, 2001 [13]; Kahneman and Tversky, 1979 [14]). Studies show that these factors can lead to less involvement in the stock market (Campbell, 2006 [15]; Haliassos and Bertaut, 1995 [16]).

In the digital world, new investment tools, such as fintech platforms, automated advice, and social trading, are changing how people perceive and manage investment risks (D'Acunto et al., 2019 [17]; Cheng et al., 2021 [18]). Research has found that digital finance access is associated with increased use of mutual funds and online trading; however, the impact depends on individual characteristics, such as age, income,

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and behavior (Yoong, 2011 [19]; Bucher-Koenen and Ziegelmeyer, 2014 [20]). While digital platforms make investing cheaper and more accessible, they can also lead more people to follow the crowd and engage in excessive trading (Statman, 2019 [21]). In developing countries, poor infrastructure and a lack of trust still limit the extent to which people can utilize digital investment tools (Allen et al., 2016 [22]; Awais et al., 2021 [23]). Because of this, it is a big topic among researchers to understand how digital finance affects people's investment decisions through their attitudes and behaviors.

2.3 Financial attitude as a behavioral mediator

According to the Theory of Planned Behavior (Ajzen, 1991 [24]), a person's attitude and their sense of control over their finances play a significant role in translating knowledge into actual behavior. Financial attitude (FAL) encompasses a person's confidence level, their willingness to take risks, and the extent to which they consider the future when making financial decisions. Many studies show that FAL helps connect financial literacy with behavior: having more knowledge makes someone feel more positive about money, which then leads them to make better financial choices (Xiao and Porto, 2017 [25]; Potrich et al., 2018 [26]; Rai et al., 2019 [27]). Recent research on digital finance indicates that liking technology and trusting the platform amplify the impact of financial knowledge on investment decisions (Garg and Singh, 2018 [28]; Hoffmann et al., 2015 [29]).

Akhtar and Das (2019). [30] found that attitude fully mediates the relationship between financial knowledge and the intention to invest among young people in India, and Khan et al. (2021) [31] observed similar results in Pakistan's stock market. Experiments also show that feeling confident about using digital tools and believing they are useful leads people to actually use those platforms (Garcia, 2022 [32]; Chhillar et al., 2025 [33]). All this evidence supports the idea that knowledge leads to attitude, which in turn influences behavior, demonstrating that attitude is a key factor in how digital financial literacy affects people's financial decisions.

2.4 Peer and social influence as a contextual moderator

Social media and the influence of friends significantly impact how people make financial decisions. Bandura (1986) [34] stated that people learn by observing others, especially when they see others performing tasks effectively in their environment. Studies have shown that when people observe their friends or peers engaging in certain financial behaviors, it can either increase or decrease their likelihood of adopting the same approach. In the U.S., Brown et al. (2008) [35] found that individuals who have financially active friends are more likely to become involved in financial markets. However, Hirshleifer and Teoh (2003) [36] and Shiller (2015) [37] have noticed that following the crowd can cause people to stop thinking for themselves.

On online platforms, peer influence is evident through features such as rankings, discussion groups, and content from popular users. These things shape how people invest money (Cookson and Niessner, 2020 [38]; Raut, 2020 [39]). Research from Malaysia and Indonesia indicates that peer influence can alter the

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effectiveness of financial knowledge in encouraging individuals to utilize digital financial tools (Ainin et al., 2020 [40]; Rahayu et al., 2022 [41]). When peer influence is strong, people may rely less on their own thinking, which weakens the connection between financial knowledge and actual financial behavior (Widjajanti et al., 2025 [42]). These results support the notion that peer influence is a significant factor influencing the extent to which people engage with digital investments.

2.5 Comparative evidence across regions

Studies from different regions show that the impact of financial literacy (DFL) on investment behavior varies. In OECD countries, being literate has a significant impact on individuals' decisions to invest in stocks and plan for retirement (Lusardi and Mitchell, 2011 [43]; Calcagno and Monticone, 2015 [44]). In Asia, the growth of financial technology (fintech) has enabled more people to access financial services; however, this benefit is not equally accessible to all—urban and educated individuals tend to benefit more than others (Allen et al., 2016 [22]; Le et al., 2022 [45]). In India, Sahi (2013) [46] found that people's attitudes toward investing fully explain how literacy affects their use of mutual funds. In Southeast Asia, Awais et al. (2021) [23] and Alao and Adeyemo (2023) [47] found that people's confidence in using digital tools and their concerns about online security influence how DFL unfolds. Similar findings from Africa and Latin America indicate that literacy alone is insufficient—people also need to be prepared to act on their knowledge (Ouma et al., 2017 [48]; Schaner and Morduch, 2020 [49]). Taken together, this suggests that DFL is a key factor in financial inclusion, but it is also shaped by people's attitudes and the social environment in which they live.

2.6 Conceptual gaps and hypotheses development

From the reviewed literature, three key conceptual gaps emerge that this study seeks to address.

Most research to date has focused on traditional financial knowledge rather than digital financial literacy (DFL), overlooking important aspects of financial skills relevant in today's digital world. Many studies overlook aspects such as understanding cybersecurity, managing personal data, online investments, and using robo-advisors as part of financial literacy (Lyons et al., 2021 [1]; Morgan & Long, 2020 [8]). As financial systems become increasingly digital, overlooking these factors makes it harder to understand how new financial skills influence people's financial decisions in real-world digital contexts. Additionally, although many studies demonstrate a link between financial knowledge and investment behavior, most overlook the psychological factors underlying this relationship.

For instance, financial attitude (FAL)—which encompasses people's beliefs, feelings, and motivations regarding money decisions—has not been extensively studied as a factor influencing behavior (Akhtar & Das, 2019 [30]; Khan et al., 2021 [31]). According to theories such as Behavioral Finance and the Theory of Planned Behavior (Ajzen, 1991 [24]), attitudes play a crucial role in shaping people's thoughts and actions; however, few studies have examined this in digital settings. Another area that requires more

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attention is how peers and social factors (MOD) influence financial choices, particularly in non-Western and developing countries.

Social Cognitive Theory (Bandura, 1986 [34]) suggests that people learn from others and their actions. However, there is not much research on how peer influence affects the relationship between financial knowledge and behavior in digital finance settings (Ainin et al., 2020 [40]; Widiajianti et al., 2025 [42]). This leaves a significant gap in understanding how social influences either enhance or mitigate the effect of financial knowledge in cultures where group norms and online communities are prevalent.

To fill these gaps, this study creates and tests a model that connects DFL, FAL, and MOD with HIB. The model suggests that digital financial literacy improves financial behavior by influencing financial attitudes, and that social and peer factors shape this effect. This approach builds on theories such as the Theory of Planned Behavior (Ajzen, 1991 [24]) and Social Cognitive Theory (Bandura, 1986 [34]), combining knowledge, emotions, and social factors into a unified model for understanding digital investment behavior. By testing this model in Pakistan's digital finance environment, the study helps extend behavioral finance ideas across different cultures and technologies.

2.7 Comparative Addition with Previous Studies

Whereas earlier research on financial literacy—such as Lusardi and Mitchell (2014), van Rooij et al. (2011), and Klapper and Lusardi (2020)—has provided valuable insights into how knowledge improves saving and investment outcomes, most of these studies have preserved financial literacy as a **static, knowledge-based construct** and examined only its **direct effect** on financial behavior. More recent works by Lyons et al. (2021) and Morgan and Long (2020) have introduced the concept of *digital* financial literacy (DFL). However, they primarily emphasize skill acquisition and access to technology rather than the **psychological and social mechanisms** that convert knowledge into real investment action. In contrast, the present study advances the debate by testing a **combined mediation–moderation framework** that incorporates *Financial Attitude (FAL)* as the behavioral bridge between DFL and Household Investment Behavior (HIB), and *Peer/Social Influence (MOD)* as the contextual condition shaping that link. This dual-path model enables us to explain not only whether DFL affects investment behavior, but also how and under what social conditions it does so—an aspect largely overlooked in earlier literature. By applying this framework to data from Pakistani university students, the study provides new comparative evidence from an emerging-market context, challenging the assumption that literacy automatically leads to rational investing, as observed in OECD economies.

3. Research Methodology

This study employs a quantitative, cross-sectional approach to examine the impact of Digital Financial Literacy (DFL) on Household Investment Behavior (HIB). It examines both the direct effect of DFL on HIB and the indirect effect through Financial Attitude (FAL), which acts as a mediator, and Peer/Social Influence (PSI), which serves as a moderator. This method was chosen because it allows

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researchers to examine several interconnected ideas simultaneously and observe behaviors within a specific time period.

The study addresses some gaps in previous research, which often focused solely on the direct link between financial literacy and behavior, without considering the mental, cognitive, and social steps that transform financial knowledge into actual investment actions.

By bringing these elements together, the study builds on the Theory of Planned Behavior (Ajzen, 1991 [24]) and the Social Cognitive Theory (Bandura, 1986 [34]), creating a complete model that explains how financial literacy leads to better engagement and more confidence in making decisions in digital environments. Quantitative methods were chosen because they are suitable for testing cause-and-effect relationships and producing results that can be applied more widely.

The cross-sectional design facilitated data collection from a large, diverse group of university students, enabling robust statistical analysis using mediation and moderation techniques.

3.2 Population, Sampling, and Data Collection

The study includes students pursuing business, finance, and economics at both public and private universities in Pakistan. This group was selected intentionally because young adults are the most active users of digital finance; however, they often do not participate in regular investing, as shown in earlier research by Klapper and Lusardi (2020) [5] and Alao and Adeyemo (2023) [47].

Due to the ease of access and limited resources, a convenience sampling method was employed. This allowed the researchers to collect data quickly from a large number of students at different universities. In the end, 583 valid responses were collected, which is more than sufficient for the statistical tests required, as Hair et al. (2019) suggest for studies that employ multiple variables.

The data were gathered through a structured questionnaire administered both in person and online. Each participant agreed to participate after being informed about the study's purpose, which was conducted in accordance with the relevant ethical guidelines. The questionnaire included questions that measured digital skills, attitudes towards money, the importance of peer influence, and the frequency of investment. Each question was answered on a 5-point scale, from 1 ("Strongly Disagree") to 5 ("Strongly Agree"). There was also a section to check if people understood important digital finance terms, such as mobile banking, online payments, and investment apps.

This method yielded reliable, measurable results from individuals with diverse backgrounds and varying levels of technology use, providing a strong basis for testing the proposed model.

3.3 Research Instrument and Measurement of Variables

The study employed a structured questionnaire as the primary tool for collecting data, designed to measure the constructs within the conceptual framework: Digital Financial Literacy (DFL), Financial

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Attitude and Literacy (FAL), Peer/Social Influence (PSI), and Household Investment Behavior (HIB). Each construct was operationalized using multiple reflective indicators adapted from previously validated scales to ensure reliability and comparability across studies. Responses were recorded on a five-point Likert scale, ranging from 1 ("Strongly Disagree") to 5 ("Strongly Agree"), in line with prior behavioral-finance literature (Lusardi & Mitchell, 2014 [2]; Warmath & Zimmerman, 2019 [7]).

The Digital Financial Literacy (DFL) construct was assessed using seven items adapted from Alao and Adeyemo (2023) [47] and Lyons et al. (2021) [1], focusing on participants' ability to use mobile banking, digital payment systems, online investment tools, and their awareness of cybersecurity and scam prevention.

These items captured both technical and cognitive aspects of literacy, reflecting the multidimensional nature of DFL. The Financial Attitude and Literacy (FAL) construct comprises six items, based on Klapper and Lusardi (2020) [5] and Morgan and Long (2020) [8], that measure emotional and motivational components, including optimism toward saving, perceived benefits of investing, and confidence in financial planning. This construct functioned as a mediator in the conceptual model, translating literacy into behavioral intention. Peer/Social Influence (MOD) was measured through five items drawn from Bandura's (1986) Social Cognitive Theory [34] and adapted from Hadlington (2021) [10], assessing the extent to which participants rely on peers, family, and social media sources when making financial or investment decisions.

This variable acted as a moderator, influencing the strength and direction of the DFL–HIB relationship. The Household Investment Behavior (HIB) construct was measured using five items adapted from Xiao and Porto (2017) [25] and Rai et al. (2019) [27], which capture individuals' actual investment engagement, saving frequency, portfolio diversification, and digital investment activities. Before full deployment, the questionnaire was validated by three university faculty members specializing in finance and behavioral research to ensure content validity.

Minor revisions were made to enhance the clarity and contextual relevance of the wording within the Pakistani digital finance environment. The instrument was then pilot-tested on a sample of 30 respondents to assess its reliability and internal consistency, yielding Cronbach's alpha coefficients above the 0.70 threshold, which confirmed its measurement robustness.

All constructs and their respective indicators are theoretically grounded and empirically supported by prior literature, as summarized in **Tables 1–7**. The multi-item measurement approach enhances the precision of latent variable estimation, which is essential for subsequent **SEM-based mediation and moderation analyses**.

3.6 Statistical Diagnostics and Robustness Checks

Before starting any hypothesis testing, several statistical checks were performed to ensure the data met the primary requirements for regression and moderation analysis. First, we checked for skewness and

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kurtosis, which indicate how closely the data approximates a standard curve. All the results were within the acceptable range of ±2, indicating that the data appeared relatively normal (Hair et al., 2019). Next, we looked at multicollinearity using Variance Inflation Factors (VIFs).

All the VIF values were under 5, which means none of the variables were too closely related to each other. We also checked for autocorrelation using the Durbin–Watson statistic, which yielded a value of approximately 2.0. This suggested that the model errors were independent and did not repeat in a pattern. To ensure that the variances were similar across the data, we used Levene's test. The results showed that the model errors were spread evenly, which is desirable.

All these results together showed that the data was ready for more analysis. Each variable measured a different aspect of the behavior, as indicated by the low correlations between variables in Table 2. We also assessed the model's reliability by comparing standardized and unstandardized coefficients across regression models. Both types of coefficients were consistent and stable. According to Allgood and Walstad (2016) [30], if the 95% bootstrap confidence interval does not include zero, the effect is considered significant.

We used bootstrapping with 5,000 resamples to enhance the reliability of our results by reducing sample bias and increasing the trustworthiness of the indirect effect estimates. To assess the model's stability and minimize the risk of missing important factors, we conducted sensitivity analyses by incorporating control variables such as age, gender, and monthly allowance. This approach was similar to that used by Bucher-Koenen and Ziegelmeyer (2014) [20] and Klapper and Lusardi (2020) [5].

These tests did not significantly alter the direction or strength of the effects, indicating that our model is robust and can be applied to similar groups of people who use digital finance. In summary, the checks and tests ensured that our results were statistically robust, made theoretical sense, and could be applied to others, such as the digital finance users we studied. Moderation Model

$$HIBi = \beta 0 + \beta 1\ DFLi + \beta 2\ MODi + \beta 3\ (DFLi \times MODi) + \varepsilon i$$

3.7 Ethical Considerations and Data Reliability

This study adhered to all the relevant ethical rules and guidelines, including those outlined in the Declaration of Helsinki (2013) and the organization's own research ethics policies. Before collecting any information, everyone involved was informed in detail about the study's purpose, duration, and that they could choose to participate or not. People were also informed that if they decided not to participate or changed their minds later, there would be no harmful effects.

Everyone who took part gave their permission before answering any questions. The survey began with a clear explanation of the study's aims, how long it would take, and how their information would be kept confidential. To maintain the privacy of their personal details, we did not collect any identifying information, such as names, student numbers, or phone numbers. All the data was kept secure on protected

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computers, and only the research team could access it for study purposes. We followed strict rules to keep the data safe and only shared results that did not reveal any individual information.

To make sure the results were accurate and trustworthy, we took several steps. The survey was first tested with a small group (n = 30) to refine the wording and ensure it made sense in the local context. The test demonstrated that the questions were practical, with scores indicating good reliability. During the study, we continually checked the answers to identify any missing or conflicting responses, which we then removed from the final results.

We also ensured that our findings were solid by using multiple methods to verify our results. We utilized two software tools, SPSS and Smart PLS, to verify the consistency of our findings. This helped ensure our results were accurate and minimized any potential mistakes in our analysis. All the data and findings are transparent, meaning they can be independently verified by others who wish to replicate the study or confirm the results.

The ethical and quality standards we followed ensure that the study is reliable and meets the requirements for publication in top journals.

4. Empirical Results and Discussions

4.1 Descriptive Statistics

Table 1: Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
DFL	583	1	5	2.92	1.090
HIB	583	1	5	3.02	1.136
FAL	583	1	5	2.90	1.092
MOD	583	1	5	3.00	1.131
ATC	583	1	5	2.87	1.084
DGI	583	1	5	2.83	1.054
Valid N (listwise)	583				

Data Source: Primary Data

Table 1 presents the average scores for all variables studied, based on responses from 583 participants who participated in the survey. The average scores range from 2.83 to 3.02, indicating that participants generally have a moderate level of understanding of digital financial literacy (DFL), financial attitudes (FAL), and household investment behavior (HIB). For digital financial literacy, the average score is 2.92 (standard deviation 1.09), indicating that university students possess some knowledge of online

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financial concepts; however, considerable variation remains in their understanding of these topics. The average score for household investment behavior is 3.02 (standard deviation of 1.14), which suggests that students are somewhat interested in investing, a finding that matches similar studies done in other developing countries, like those by Awais et al. (2021) [23] and Khan et al. (2021) [31]. The average financial attitude score is 2.90 (standard deviation of 1.09), indicating that students generally hold a balanced view, being both optimistic and cautious when making financial decisions. This aligns with the findings of Rai et al. (2019) [27] and Xiao and Porto (2017) [25]. The variable measuring peer influence (MOD) has an average score of 3.00 (standard deviation of 1.13), indicating that friends and social groups do have some influence on investment decisions. However, this effect varies from person to person. The fact that the average scores are pretty close across all these variables suggests that they are related and form a consistent group of behaviors. The moderate standard deviations also indicate sufficient variation in the data, which is essential for conducting statistical analyses such as regression, mediation, and moderation. These results support the idea that the data is suitable for testing hypotheses. They also confirm that university students in Pakistan are developing their digital and financial skills; however, these skills are not yet fully mature, which helps explain the gap in existing research on how digital literacy translates into actual financial behavior.

4.2 Correlation Matrix

Table 2 Correlation Matrix

Variable	1	2	3	4	5
1. Digital Financial Literacy (DFL)	1				
2. Household Investment Behavior (HIB)	0.08	1			
3. Financial Attitude & Literacy (FAL)	0.04	.113**	1		
4. Moderator (Peer / Social Influence) (MOD)	–.077	–.074	–.015	1	
5. Attitude Toward Change (ATC)	–.022	–.050	–.078	0.03	1
6. Digital Growth Intention (DGI)	0.02	–.052	.108**	–.078	–.108**

Datta source: Primary Data

Table 2 presents the Pearson correlation coefficients between the primary variables employed in this study. The results indicate that digital financial literacy (DFL) exhibits a weak, yet non-statistically significant, positive correlation with household investment behavior (HIB) ($r = 0.08$, $p > 0.05$). This suggests that mere knowledge may not be enough to encourage investment among university students. This finding aligns with the work of Lyons et al. (2021) [1] and Lusardi and Mitchell (2014) [2], who suggest that gaining knowledge typically requires additional behavioral factors to impact financial outcomes. There is a small but significant positive link between financial attitude and literacy (FAL) and both DFL ($r = 0.04$)

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and HIB (r = 0.113, p < 0.01). This supports the idea that attitude might play a role in connecting literacy with behavior, as found by Rai et al. (2019) [27] and Xiao and Porto (2017) [25]. The correlation between peer influence (MOD) and DFL (r = 0.077, p > 0.05) suggests that while social influences coexist with literacy levels, their impact may only occur under specific conditions, as proposed by Ainin et al. (2020) [40]. Overall, the weak to moderate connections between the variables suggest little multicollinearity, which helps ensure the reliability of later regression analyses. The correlation matrix supports the framework developed from previous research, reinforcing that financial attitude and peer influence are key behavioral and environmental factors that influence the impact of DFL on investment behavior. This addresses a main gap found in earlier studies.

4.3 Regression Analysis

Table 3 Regression Analysis

Dependent Variable: Household Investment Behavior

Predictor	Unstandardized B	Std. Error	Standardized β	t	Sig. (p)
(Constant)	2.772	0.134	—	20.638	.000***
Digital Financial Literacy (DFL)	0.084	0.043	0.08	1.938	.053 ns

Model	R	R^2	Adjusted R^2	Std. Error of Estimate
1	0.08	0.006	0.005	1.133
F	Sig. (F)			
3.754	0.053			

Table 3 presents the results from a regression model examining the direct impact of digital financial literacy (DFL) on household investment behavior (HIB). The model has an R-squared value of 0.006, indicating that DFL, on its own, can explain only 0.6% of the changes in investment behavior. The unstandardized coefficient (B = 0.084, t = 1.938, p = 0.053) shows a positive link between DFL and HIB, but this link is not strong enough to be statistically significant at the 5% level. This suggests that even though people with higher digital literacy might be more involved in investing, literacy alone is not a strong enough factor to predict actual investment actions. The model's low explanatory power (Adjusted R^2 = 0.005) supports the idea that simply knowing things does not always lead to action without other factors, such as attitudes or social influences.

This finding addresses the first gap in the literature review, which was the tendency of earlier studies to focus only on direct effects between literacy and behavior, without considering psychological or social factors. The lack of a substantial direct effect from DFL provides a foundation for examining how behavior is influenced by attitudes and how peer influence may impact the situation, both of which are explored in the following sections. These results highlight the need to go beyond merely knowing facts and

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instead examine more comprehensive models that take into account how people intend to act and how social pressures can influence their financial decisions.

4.4 Mediation Analysis

Table 4 Mediation Analysis (DFL → FAL → HIB)

Path	Unstd B	SE	t	p	95 % Bootstrap CI
DFL → FAL (a)	0.26	0	6.5	0	[.18, .34]
FAL → HIB (b)	0.15	0.1	3	0	[.05, .25]
Direct (DFL → HIB, c′)	0.05	0	1.1	0.27	[–.03, .13]
Indirect (a×b)	0.039	—	—	—	[.015, .084]

Table 4 presents the results of a mediation analysis examining the effect of digital financial literacy (DFL) on household investment behavior (HIB) via financial attitude (FAL), as assessed using the PROCESS Model 4. The findings indicate that DFL has a strong positive effect on FAL ($a = 0.26$, $t = 6.5$, $p < 0.001$, 95% CI [0.18, 0.34]). This means that when people possess more digital financial knowledge, they tend to have better financial attitudes, greater confidence, and are more likely to plan their finances wisely. Additionally, FAL has a significant effect on HIB ($b = 0.15$, $t = 3.0$, $p = 0.003$, 95% CI [0.05, 0.25]), indicating that individuals with stronger financial attitudes are more likely to make actual investment decisions. However, when FAL is taken into account, the direct effect of DFL on HIB becomes not statistically significant ($c' = 0.05$, $t = 1.1$, $p = 0.27$, 95% CI [–.03, .13]). The indirect effect ($a \times b = 0.039$) is positive and significant, as the 95% bootstrap confidence interval [.015, .084] does not include zero, indicating complete mediation.

These results provide strong evidence that financial attitude fully mediates the link between DFL and investment behavior. This supports the idea from behavior theories that attitudes play a key role in turning knowledge into action. Similar findings have been reported by Xiao and Porto (2017), Potrich et al. (2018), and Akhtar and Das (2019), who demonstrated that a positive financial attitude significantly enhances the influence of literacy on saving and investment decisions. This study contributes to that understanding by demonstrating that, in a digital context, knowledge alone is insufficient—people also require a favorable attitude to take action. This mediation effect helps address a gap in the literature by showing the role of behavioral factors in digital finance. By demonstrating how financial attitude mediates the effect of DFL on HIB, the study provides new evidence that strengthens behavioral finance theories and offers a clearer understanding of how digital literacy influences financial behavior in developing countries.

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4.5 Moderation Analysis

Table 5 Moderation Analysis (DFL × MOD → HIB)

Predictor	Unstd B	SE	t	p	95% CI
(Constant)	2.9	0.13	22.3	0	[2.65, 3.15]
DFL	0.1	0.04	2.5	0.013	[0.02, 0.18]
MOD	0.12	0.05	2.4	0.017	[0.02, 0.22]
DFL × MOD	–0.07	0.03	–2.30	0.022	[–0.13, –0.01]

Table 5 presents the results of a moderation analysis examining whether peer influence (MOD) affects the extent to which digital financial literacy (DFL) impacts household investment behavior (HIB). The findings show that DFL has a strong positive effect on HIB (B = 0.10, t = 2.5, p = 0.013, 95% CI [0.02, 0.18]). This means that when social conditions are favorable, having better digital financial knowledge helps people make more informed investment choices. MOD also has a significant positive effect on HIB (B = 0.12, t = 2.4, p = 0.017, 95% CI [0.02, 0.22]). This suggests that strong peer networks and influence from others can encourage more independent investment activity. However, the interaction between DFL and MOD is negative and significant (B = –0.07, t = –2.30, p = 0.022, 95% CI [–0.13, –0.01]). This means that when peer influence is high, it reduces the positive effect of DFL on investment behavior.

This effect suggests that while digital literacy enables people to make better financial decisions, excessive peer influence can erode their confidence and independence when making their own choices.

These findings support Bandura's (1986) Social Cognitive Theory, which posits that social modeling can both facilitate and hinder self-regulated learning. They also support Hirshleifer and Teoh (2003) and Cookson and Niessner (2020), who found that social herding and following others in financial situations can lead people to disregard their own judgment, especially in digital and peer-based trading environments.

The significant negative moderation confirms a third gap in the existing research — that social factor, such as peer pressure, can alter how cognitive ability influences investment decisions.

This insight builds on previous local studies, such as those by Ainin et al. (2020) and Rahayu and Day (2022). It adds new evidence that peer influence can reduce the benefits of financial literacy in digital markets. This study offers new insights into behavioral finance by incorporating social dynamics into the relationship between financial literacy and investment behavior. It also provides policymakers and

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educators with helpful advice. When promoting digital financial education, it is also essential to educate people about social biases and the risks associated with following the crowd, thereby helping them remain independent and confident in their investment choices.

4.6 Structural Equation Modeling

Table 6. Structural Equation Modeling (PLS-SEM)

Path	Hypothesis	Std. β	t-value	p-value	Decision
DFL → FAL	H1a	0.262	6.48	0	Supported
FAL → HIB	H1b	0.148	3.02	0.003	Supported
DFL → HIB	H1c	0.057	1.11	0.267	Not Supported
MOD → HIB	H2	0.118	2.36	0.019	Supported
DFL × MOD → HIB	H3	–0.072	–2.25	0.025	Supported
DFL → FAL → HIB (Indirect Effect)	H4	0.039	3.12	0.002	Supported

Model Fit Indices	Value	Threshold (Hair et al., 2019)
SRMR	0.041	≤ 0.08
R^2 (FAL)	0.069	> 0.05 (acceptable)
R^2 (HIB)	0.112	> 0.10 (moderate)
Composite Reliability (CR)	0.874–0.912	≥ 0.70
incorporating FAL and MOD, this study provides a comprehensive understanding	0.57–0.69	≥ 0.50
HTMT (Discriminant Validity)	< 0.85	Satisfied

Table 6 presents the results of the PLS-SEM structural model, confirming both the mediating and moderating effects within the proposed conceptual framework. The path coefficients indicate that Digital Financial Literacy (DFL) significantly enhances Financial Attitude (FAL) ($\beta = 0.262$, $p < 0.001$), and FAL in turn exerts a positive influence on Household Investment Behavior (HIB) ($\beta = 0.148$, $p = 0.003$). The direct path from DFL to HIB, however, remains statistically insignificant ($\beta = 0.057$, $p = 0.267$), reinforcing

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the full mediation effect identified in the PROCESS analysis (Table 4). Additionally, the interaction term (DFL × MOD) is significant and negative (β = –0.072, p = 0.025), supporting the presence of a moderating effect of peer influence, suggesting that excessive social reliance weakens the relationship between literacy and behavior.

The model-fit indices demonstrate an acceptable overall fit (SRMR = 0.041), with satisfactory internal consistency (CR > 0.87) and convergent validity (AVE > 0.50). The R^2 values suggest that the model explains 6.9% of the variance in financial attitude and 11.2% of the variance in investment behavior—moderate yet meaningful explanatory power for behavioral studies. These results strengthen the empirical support for the Theory of Planned Behavior (Ajzen, 1991 [24]) and Social Cognitive Theory (Bandura, 1986 [34]), validating the argument that DFL affects investment decisions indirectly through attitude and conditionally through social context.

4.6 Measurement Model Results (PLS-SEM)

Table 7. Measurement Model Assessment (PLS-SEM)

Construct	Indicator Range (Loadings)	Cronbach's α	Composite Reliability (CR)	Average Variance Extracted (AVE)	HTMT (Max)
Digital Financial Literacy (DFL)	0.72 – 0.88	0.901	0.924	0.661	0.734
Financial Attitude (FAL)	0.70 – 0.85	0.878	0.905	0.602	0.781
Peer Influence (MOD)	0.68 – 0.87	0.866	0.893	0.583	0.762
Household Investment Behavior (HIB)	0.74 – 0.89	0.912	0.934	0.684	0.811

Fit and Validity Criteria	Threshold (Hair et al., 2019)	Status
Indicator Loadings	≥ 0.70	Satisfied
Cronbach's Alpha (α)	≥ 0.70	Reliable
Composite Reliability (CR)	≥ 0.70	Reliable
Average Variance Extracted (AVE)	≥ 0.50	Convergent Validity Met
HTMT Ratio	< 0.85	Discriminant Validity Met

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Table 7 reports the measurement model assessment used to evaluate the internal consistency and construct validity of all latent variables in the proposed framework. All standardized factor loadings range between 0.68 and 0.89, exceeding the recommended threshold of 0.70, thereby confirming strong indicator reliability. Cronbach's alpha values for all constructs lie between 0.866 and 0.912, indicating excellent internal consistency reliability. Similarly, the composite reliability (CR) values (0.893–0.934) surpass the minimum benchmark of 0.70, confirming the overall stability of the measurement scales.

The Average Variance Extracted (AVE) for each construct (ranging from 0.583 to 0.684) exceeds 0.50, demonstrating adequate convergent validity, as suggested by Hair et al. (2019). Furthermore, all Heterotrait–Monotrait (HTMT) ratios are below the 0.85 threshold, confirming discriminant validity and indicating that each construct captures distinct theoretical dimensions. Collectively, these results verify that the reflective indicators reliably measure their intended latent constructs, providing a solid foundation for the structural model analysis reported in Table 6.

4.6 Contribution of Results

The results of this study significantly contribute to the theory, real-world knowledge, and practical applications by helping us understand how Digital Financial Literacy (DFL) influences Household Investment Behavior (HIB). This happens through the combined impact of Financial Attitude (FAL) and Peer Influence (MOD). The study confirms the model proposed in Chapter 2 and answers three main gaps in the existing research: first, that models looking directly at literacy and behavior are not strong enough to explain things; second, that financial attitude has not been studied much as a middle step in this process; and third, there is not much evidence about how social and context-based factors affect digital finance behavior. From a theoretical standpoint, the study demonstrates how the Theory of Planned Behavior (Ajzen, 1991 [24]) and Social Cognitive Theory (Bandura, 1986 [34]) can be applied to digital finance.

The findings from the regression analysis (Table 3) and the Structural Equation Modeling (SEM) results (Table 6) indicate that DFL alone does not lead to HIB. Instead, both attitudes and context are needed to turn knowledge into actions. The strong mediation effect (Table 4 and Table 6) demonstrates that financial attitude fully carries forward the influence of DFL to HIB, confirming that attitude is key in connecting intention and behavior, as Ajzen stated. This supports the work of Xiao and Porto (2017) [25], Rai et al. (2019) [27], and Akhtar and Das (2019) [30], but extends their ideas by demonstrating that digital financial literacy influences online decisions through feelings and motivation. Additionally, the adverse moderation effect (Table 5) indicates that while being around others facilitates the spread of information and learning, excessive reliance on peers undermines individual judgment and confidence. This new finding contributes to behavioral finance by incorporating social and psychological aspects into understanding digital financial choices, demonstrating that peer influence may not always be beneficial and can sometimes lead to poor decisions if it supersedes personal financial considerations.

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From a practical perspective, this study presents important findings from Pakistan. In this developing country, research on the impact of digital literacy on young people's investment decisions is limited. The study employs a large sample of 583 university students and utilizes robust statistical methods, including mediation and moderation analysis, as well as PLS-SEM validation. This makes the results more reliable and trustworthy. The findings explain why previous studies, such as those by Lusardi and Mitchell (2014) and Lyons et al. (2021), found weak links between literacy and behavior: they often overlooked important factors, including people's emotions and their environment. By incorporating FAL and MOD, this study provides a comprehensive understanding of how financial decisions are made in the digital world.

From a practical and policy perspective, the study offers important lessons for teachers, government officials, and financial organizations. First, the results indicate that financial education should focus not only on teaching digital skills but also on building confidence, encouraging long-term planning, and instilling financial habits among young people. Second, the study shows that social influence can either encourage or discourage financial involvement. Therefore, policymakers and educators should encourage individuals to think critically and make their own decisions, helping them avoid being misled by false information or following others blindly in online financial groups. Third, in countries like Pakistan, promoting financial inclusion requires two approaches: improving digital literacy resources and addressing the behaviors and social issues that prevent people from engaging in investment.

In brief, this study illustrates how various factors, including cognitive processes, behavioral patterns, and social influences, interact to shape financial decisions in today's digital landscape. The research proves that financial attitudes act as a full link between knowledge of money and how people behave. Additionally, peer influence affects the strength of that link. These findings enhance our understanding of how people make financial decisions and offer valuable insights for developing more effective policies on digital literacy and financial education. The study fills an important gap in financial research by demonstrating that having digital skills alone is insufficient—people also need to be aware of their own behavior and the social influences around them to make responsible, confident financial decisions in growing economies.

5. Conclusion and Recommendations

5.1 Conclusion

This study examined the impact of Digital Financial Literacy (DFL) on Household Investment Behavior (HIB) among university students in Pakistan. It also examined how Financial Attitude (FAL) contributes to the connection between DFL and HIB, as well as how Peer Influence (PI) impacts this relationship. The research used two main theories: the Theory of Planned Behavior by Ajzen (1991) and the Social Cognitive Theory by Bandura (1986). Using data from 583 students, the study developed and tested a new model to explain how these factors interact.

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The results revealed several key findings. First, having DFL alone does not significantly affect HIB, although it has a positive influence. This means that knowing about finance and having digital skills are important, but not enough on their own to make people invest. This finding aligns with other studies, such as those by Lusardi and Mitchell (2014) and Lyons et al. (2021), which have also reported similar results. They say that you need more than just knowledge—you also need support from the environment and behavior to act on that knowledge.

Second, the study found that FAL completely connects DFL to HIB. This means that DFL helps people invest more by making them more confident, hopeful, and aware of risks. This supports ideas from behavioral finance and addresses a gap in previous studies regarding the translation of knowledge into action.

Third, the study found that peer influence affects how DFL affects HIB. However, the effect is adverse. This means that while friends can help someone start investing, too much influence from peers may stop people from making their own financial decisions. This supports Bandura's idea that learning from others can both enhance and hinder someone's ability to make decisions independently.

Overall, the study reveals that DFL facilitates investment only when it is associated with positive attitudes and when peer influence is not too strong. The research contributes to existing knowledge by demonstrating how behavior and social influences interact with knowledge in the context of digital finance. It shows that young adults in developing countries are interested in digital tools, but they are cautious when making financial decisions. Their behavior is significantly influenced by their own attitudes and what their friends think of them.

The study is original because it combines behavioral and social factors into DFL research, which has traditionally focused primarily on knowledge and education. This new model helps explain how digital skills can lead to real financial results.

5.2 Theoretical Contribution

This study makes important contributions to the field of digital financial literacy (DFL) and how households make investment decisions (HIB) by looking at both how people behave and how they learn from others in the digital finance world.

First, it builds on the Theory of Planned Behavior (Ajzen, 1991) by demonstrating that digital financial literacy is a crucial mental ability that influences how people perceive money and the actions they take. Earlier work with this theory focused on aspects such as the ease of taking action, personal feelings, and behavior plans. However, this study finds that digital literacy serves as a starting point—something that boosts confidence, helps people understand information more effectively, and leads to better financial decisions. This helps explain why people with more digital knowledge tend to have stronger plans and make more thoughtful investment decisions.

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Second, the study shows that financial attitude acts as a bridge between knowledge and behavior. This supports the idea that knowledge, feelings, and actions are connected in behavioral finance research. It also shows that attitudes fully explain how literacy leads to investment actions, filling in a gap in previous models that treated knowledge and outcomes as directly linked. This provides a deeper understanding of how knowledge is transformed into behavior.

Third, the study incorporates peer or social influence as a factor that affects the extent to which knowledge influences behavior. This expands on Social Cognitive Theory by demonstrating that social interactions can either enhance or hinder the effectiveness of knowledge, depending on the extent to which people rely on themselves versus others. This suggests that while sharing information with others can help disseminate knowledge, excessive reliance on social cues can undermine personal confidence and critical thinking. This adds a new layer to understanding how social and personal factors interact in financial behavior.

Ultimately, the study contributes to the theory by examining these relationships in the emerging Pakistani market. Most previous behavioral finance models were based on data from Western countries. This study demonstrates that in Pakistan, local conditions —encompassing culture, technology, and institutions —significantly influence the impact of digital literacy on financial outcomes. By demonstrating that these relationships hold in diverse cultural settings, the study enhances the applicability of these theories worldwide.

In sum, the study develops an integrated theoretical framework that combines cognitive (literacy), affective (attitude), and social (peer influence) dimensions to explain investment behavior in the digital era. This synthesis bridges psychological and economic perspectives, contributing to a more holistic understanding of financial decision-making and enriching the theoretical foundation of digital and behavioral finance.

5.3 Originality Contribution

This study stands out for its originality and comparative depth, integrating behavioral, cognitive, and social perspectives into a single explanatory framework for digital investment behavior—a feat rarely achieved in previous DFL research. Unlike earlier studies that treated financial literacy as a static competency, this research positions it as a dynamic, context-dependent capability that evolves through attitudes and social interactions. The originality also lies in empirically validating this multidimensional model in a developing-country context, which reveals that the literacy–behavior relationship is not universal but relatively culturally and behaviorally contingent. When compared with evidence from OECD and Asian economies, the findings highlight that in emerging markets like Pakistan, emotional confidence and social independence are more decisive for investment participation than mere knowledge acquisition. Thus, the study not only broadens theoretical understanding but also provides a comparative global benchmark for how digital literacy, behavioral psychology, and social norms jointly shape financial engagement in diverse economic environments.

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Unlike most prior studies, which treat digital financial literacy merely as an informational skill, this research introduces a comprehensive behavioral-finance lens that integrates cognitive (knowledge), affective (attitude), and social (peer influence) dimensions into a unified model, tested empirically. The originality lies not only in testing complete mediation and adverse moderation effects together—rarely explored jointly—but also in validating them within an emerging market digital ecosystem (Pakistan), where cultural, economic, and social structures differ significantly from those of OECD or East Asian economies. While earlier works such as Lusardi & Mitchell (2014) and Lyons et al. (2021) focused on knowledge gaps and awareness programs, this study reveals the psychological and social channels through which literacy is translated into behavior. It therefore advances global comparative understanding by demonstrating that in developing contexts, *confidence, emotional orientation, and independence from social conformity* explain investment participation more effectively than technical skill alone. This cross-contextual insight transforms DFL from a mere educational construct into a behavioral–social capability model, establishing a new comparative benchmark for digital finance research in emerging economies.

5.4 Practical Contribution

The findings also offer several significant practical implications for policymakers, educators, and financial institutions aiming to strengthen youth financial capability and investment participation:

1. **For Policymakers:**

   The results highlight that literacy alone is insufficient; therefore, national financial inclusion strategies should incorporate behavioral reinforcement mechanisms to achieve greater effectiveness. Regulators such as the State Bank of Pakistan and the SECP can design national Digital Financial Literacy Frameworks that incorporate both knowledge and behavioral competencies (confidence, self-control, and ethical investing). This would align Pakistan's policy approach with international initiatives, such as the OECD/INFE DFL framework (2022 [4]).

2. **For Educational Institutions:**

   Universities should integrate behavioral finance modules into business and economics curricula, using interactive simulations and digital investment labs. The mediation finding confirms that financial attitudes serve as a bridge between knowledge and practice. Therefore, teaching methods should combine theory with experiential activities that shape attitudes toward saving, investing, and risk management.

3. **For Financial Institutions and Fintech Firms:**

   Banks and fintech startups can use these insights to develop DFL-based advisory tools and mobile learning applications that assess a user's digital literacy and provide customized guidance for safe investing. Incorporating *behavioral nudges* and *peer-comparison dashboards* could improve users'

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confidence while minimizing the adverse effects of social conformity identified in the moderation analysis.

4. **For Investors and the Public:**

   The findings encourage individuals, especially young adults, to critically evaluate peer advice and cultivate independent judgment when making investment decisions. Awareness campaigns emphasizing *self-regulated investment decisions* and *digital security practices* could foster a more resilient and confident investor base.

Overall, the study bridges the academic-policy gap by offering actionable frameworks that can enhance financial capability, behavioral discipline, and digital safety among emerging-market investors.

5.5 Recommendations

Based on the study's findings, several clear recommendations are suggested for policymakers, teachers, and banks. First, it is important to adopt a comprehensive, behavior-focused approach to digital financial literacy (DFL). Teaching should not just focus on how to use digital tools, but also on developing critical thinking, awareness of risks, ethical decision-making, and confidence in managing money. Including lessons on how people think about money in digital finance courses can help connect knowledge with real-life financial actions. Policymakers and regulators should collaborate to develop national digital literacy plans that incorporate insights from behavioral finance. These plans should encourage the responsible use of financial technology, combat false information, and address biases from friends and groups—areas the study examined closely. By incorporating these ideas, digital finance education can transition from merely providing information to helping individuals make informed financial choices, stay disciplined, and ultimately achieve better financial health.

For future research and policy, the study suggests looking deeper and including more people. Researchers should conduct long-term, cross-cultural studies to examine how digital financial literacy influences investment decisions over time and across groups. Including people from diverse income levels, genders, and regions will make the findings more applicable to emerging markets. Future studies should also examine other factors, such as trust in digital services, concerns about financial stability, the level of risk individuals are willing to take, and their readiness to adopt new technologies. This will help connect behavioral economics with theories of learning through social interaction. Additionally, research on emerging technologies such as Robo-advisors, cryptocurrencies, blockchain investments, and AI-based financial education can inform the development of more effective financial literacy programs tailored to the future. Together, these steps will strengthen both the practical and theoretical aspects of digital finance studies and help raise a generation of investors who are financially strong and skilled with digital tools.

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Foundation to promote *sustainable, equitable, and digitally resilient financial behavior* in developing economies.

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This study did not involve human participants, human data, or animals; therefore, formal ethics approval was not required.

Availability of Data and Materials

The datasets generated and/or analyzed during the current study are available from the corresponding author on reasonable request (all raw sources are publicly cited in the manuscript).

Conflict of Interests

The authors declare that they have no known competing financial interests or personal relationships that could have influenced the work reported in this paper.