**JSMS**

# Interplay Between Financial Literacy and Financial Inclusion through Digital Financial Innovation among the University Students: Moderating Role of Trust

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## ABSTRACT

**Purpose:** Digital financial services are experiencing explosive growth, offering unprecedented access to financial tools and inclusion for millions. This study investigates the interplay between financial literacy and financial inclusion, and proposes a modified framework by incorporating the mediating role of digital financial innovation and the moderating role of trust based on TPB and Financial literacy theory.

**Design/methodology/approach:** Based on positivist philosophy, a self-administered survey was conducted to empirically test the model using Structural Equation Modelling. By using the convenience sampling technique, data were collected from 484 respondents of different Nepalese universities operating in Kathmandu Valley.

**Findings:** The study findings highlighted financial literacy and digital financial innovation as significant predictors of financial inclusion. Further, digital financial innovation advantage mediated the interplay between financial literacy and financial inclusion. In contrast, Trust did not show a moderating effect.

**Implications**: The scope of the study is confined to university students within the Kathmandu Valley, cross-sectional data, and self-reported bias, which restricts the generalizability of the findings. By filling in empirical gap, this study contributes to the expanding topic of expanding the comprehension of financial inclusion in the context of digital financial use. Equipping university students with financial literacy is key to unlocking the potential of digital finance for a more inclusive and empowered financial future.

**Originality/value:** To the best of the authors' knowledge, this empirical study represents a novel approach by integrating the principles of combining financial literacy and behavioral theory, a combination not previously explored. Thus, the modified framework helps to understand how digital finance empowers responsible financial behavior and fosters trust, driving financial inclusion and economic growth among Nepalese University students.

**Keywords:** Financial literacy, digital financial innovation, financial inclusion, financial technology, university students

**JEL Classification**: G2, G20

## Introduction

Financial literacy (FL) has emerged as a critical determinant of individuals' financial behavior, influencing decision-making related to saving, borrowing, retirement planning, and risk management. A growing body of global research confirms that financially literate individuals are better equipped to engage with formal financial systems and utilize financial services effectively, thereby enhancing their economic well-being. Beyond knowledge alone, FL encompasses awareness, skills, attitudes, and behaviors required to access, evaluate, and responsibly use financial services, positioning it as a foundational pillar of financial inclusion (Bongomin et al., 2018).

Parallel to the rise of FL discourse, digital financial services (DFS) and financial innovation have transformed the global financial landscape. Rapid advancements in mobile technology, internet penetration, and platform-based financial solutions have redefined how individuals access and interact with financial services. Digital banking, mobile payments, e-wallets, and QR-based transactions have expanded financial access at an unprecedented scale, particularly in developing economies (Lyons et al., 2022). As a result, financial inclusion has accelerated globally: account ownership increased from 51% a decade ago to 76% worldwide, while developing economies now report account ownership rates exceeding 70% (Nugroho & Sugiyanto, 2020). These shifts underscore the role of digitalization as a catalyst for inclusive finance.

The COVID-19 pandemic further intensified this digital transformation. Restrictions on physical movement and in-person transactions compelled individuals and institutions to adopt digital financial solutions, leading to an unprecedented surge in access to and usage of DFS (Amoah et al., 2021). Globally, nearly two-thirds of adults now make or receive digital payments, reflecting a structural shift in financial behavior rather than a temporary response to crisis. This transformation has enabled previously unbanked populations to enter formal financial systems, while also reshaping consumer expectations toward speed, convenience, and interoperability in financial services (Hamzah et al., 2023).

Despite these advances, digital financial inclusion is not automatically achieved through technological availability alone. Effective participation in digital finance requires adequate financial knowledge, confidence, and trust in financial systems. As digital finance becomes increasingly complex, gaps in financial literacy can undermine the potential benefits of innovation, resulting in underutilization, misuse, or exclusion. Consequently, scholars argue that financial inclusion policies must be complemented by efforts to enhance financial literacy and consumer capability, particularly in digitally mediated financial environments (Gomber et al., 2018).

This challenge is especially salient among young adults and university students. Although often perceived as technologically adept, many students lack essential financial

knowledge related to budgeting, credit management, savings, and digital financial products. The mismatch between digital familiarity and financial capability can lead to poor financial decision-making and reluctance to engage fully with digital financial innovations. Empirical evidence suggests that limited financial literacy constrains individuals' ability to understand the functionalities, benefits, and risks associated with digital financial services, thereby weakening their contribution to financial inclusion (Kumar et al., 2023).

The Nepalese context presents a compelling case for examining these dynamics. Financial inclusion remains a national priority, yet progress has been uneven. World Bank data indicate that only 67.3% of Nepalese adults hold an account with a formal financial institution, with notable disparities across gender and socio-economic groups (World Bank, 2021). At the same time, Nepal has made significant strides toward a digital financial ecosystem. Policy initiatives such as the Digital Nepal Framework, retail payment systems, QR-based payments, mobile and internet banking, and the promotion of digital transactions have accelerated the adoption of digital finance. The COVID-19 pandemic further reinforced this shift, normalizing digital transactions across households, businesses, and educational institutions.

University students in Kathmandu Valley represent a strategically important demographic within this evolving financial ecosystem. As future professionals, entrepreneurs, and decision-makers, their financial behaviors have long-term implications for economic stability and inclusive growth. While students increasingly rely on digital platforms for payments and financial transactions, their level of financial literacy and trust in digital financial innovations remains underexplored. Existing studies in Nepal have largely examined financial inclusion or digital finance adoption in isolation, with limited attention to the mechanisms through which financial literacy translates into inclusion outcomes in a digital context.

Moreover, trust has emerged as a critical yet underexamined factor in digital financial inclusion. Concerns related to data privacy, security, fraud, and system reliability can weaken users' willingness to adopt and consistently use digital financial services. For young users, trust may shape whether digital financial innovation serves as a bridge or a barrier to financial inclusion. Understanding how trust conditions the relationship between digital financial innovation and financial inclusion is therefore essential for designing effective policy and institutional interventions.

Against this backdrop, this study investigates the interrelationship between financial literacy, digital financial innovation, and financial inclusion among university students in Kathmandu Valley. Specifically, it examines whether financial literacy directly influences financial inclusion and the adoption of digital financial innovation, whether digital financial innovation mediates the relationship between financial literacy and financial inclusion, and

whether trust moderates the impact of digital financial innovation on financial inclusion. By integrating these dimensions into a single analytical framework, the study responds to calls for more nuanced, mechanism-based analyses of digital financial inclusion in developing economies.

The contribution of this study is threefold. First, it extends the financial inclusion literature by empirically linking financial literacy and digital financial innovation within a youth-centric context. Second, it provides evidence from Nepal, an underrepresented setting in global research on financial inclusion. Third, by incorporating trust as a moderating variable, the study offers deeper insight into behavioral and institutional factors shaping digital financial inclusion. The findings are expected to inform policymakers, financial institutions, and educational stakeholders seeking to design inclusive, resilient, and literacy-driven digital financial ecosystems in Nepal and similar emerging economies.

## Literature Review

### Financial Innovation, Technology, and Financial Inclusion

Rapid technological advancement has fundamentally transformed the global financial services sector, giving rise to financial technology (fintech) as a central driver of financial innovation. Since the 1990s, fintech has evolved from basic electronic banking to sophisticated digital platforms offering payments, lending, investment, and risk management services. These innovations have reshaped financial products, service delivery channels, customer experiences, and institutional structures, significantly influencing financial institutions, regulators, and consumers alike (AFI, 2018; Gomber et al., 2018). Fintech-driven transformation is widely recognized as a critical mechanism for advancing financial inclusion by reducing transaction costs, overcoming geographic barriers, and expanding access to formal financial services.

The convergence of internet connectivity, mobile technologies, artificial intelligence, and big data analytics has accelerated the diffusion of digital financial services (DFS), including mobile banking, digital wallets, peer-to-peer lending, robo-advisory services, and platform-based payments (Gimpel et al., 2018; Lee & Shin, 2018). The growing preference for cashless transactions, supported by regulatory reforms and digital infrastructure, has further reinforced fintech adoption across both developed and developing economies. However, while digital platforms enhance accessibility, their effective use depends on users' financial knowledge, digital capability, and trust in technology-enabled systems.

Existing literature highlights that financial inclusion is not achieved through technological innovation alone. Rather, it is shaped by a combination of supply-side enablers, such as digital infrastructure, regulatory support, and innovative financial products, and demand-side factors, particularly financial literacy and digital competence (Morgan et al., 2019; Lyons & Hanna, 2021). Individuals must possess not only access to digital tools but also the ability to understand, evaluate, and responsibly use financial services. The Digital Literacy Ecosystem Model emphasizes this interaction, suggesting that digital inclusion

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and financial inclusion are mutually reinforcing when supported by education, affordability, and institutional trust (Ozili, 2018).

Empirical studies consistently demonstrate that financial innovation contributes positively to financial inclusion by expanding outreach and facilitating low-cost transactions, especially through mobile and internet-based platforms (Beck et al., 2014; Ouma et al., 2017; Chinoda & Kwenda, 2019). Widespread smartphone adoption and internet penetration have been particularly influential in integrating unbanked and underbanked populations into formal financial systems. Nevertheless, disparities persist across regions due to variations in income levels, education, digital literacy, and institutional capacity. Evidence indicates that individuals in higher-income and better-educated contexts are more likely to adopt and benefit from digital financial services, highlighting the importance of financial education in sustaining inclusive outcomes.

International organizations and policymakers increasingly recognize financial inclusion as a cornerstone of economic development, poverty reduction, and financial system stability. Global and regional initiatives, such as those led by the G20, OECD, World Bank, and regional development banks, emphasize the integration of fintech innovation with consumer protection, financial literacy, and regulatory oversight. As fintech continues to evolve, its impact on financial inclusion will depend on how effectively technological progress is aligned with human capital development. Strengthening financial literacy alongside digital innovation is therefore essential to ensure that fintech serves as an inclusive and sustainable force within the global financial system.

### *Financial Literacy and Financial Inclusion in the Digital Age for University Students*

The rapid expansion of digital financial innovation (DFI) has fundamentally transformed access to financial services, positioning university students as one of the most active user groups in the digital financial ecosystem. As digitally proficient young adults, university students are often early adopters of mobile banking, digital payments, budgeting applications, and online investment platforms. However, technological familiarity does not necessarily translate into financial capability or meaningful financial inclusion. A central concern in the digital age is whether higher education and digital access sufficiently equip students with the financial literacy required to make informed and responsible financial decisions (Morgan et al., 2019; Lyons & Hanna, 2021).

Despite increased attention from policymakers and educators, financial literacy remains persistently low worldwide. Global evidence suggests that only around one-third of adults possess adequate financial literacy, with substantially lower levels observed in developing economies (Klapper et al., 2015). Even in advanced economies, studies report limited financial knowledge among young adults, challenging assumptions that formal education alone ensures financial competence. Empirical research consistently shows that university students struggle with core financial concepts such as budgeting, credit management, saving, and investment, resulting in poor financial decision-making and increased vulnerability to financial stress (Holden et al., 2020; Sabri et al., 2019).

At the same time, fintech-enabled services offer significant potential to enhance financial inclusion among university students transitioning toward financial independence. Digital financial services, including mobile banking, peer-to-peer payments, budgeting tools, and

micro-investment platforms, provide low-cost, convenient, and accessible financial solutions aligned with students' needs (Gomber et al., 2018; Lee & Shin, 2018). High adoption rates among millennials and Generation Z indicate that digital platforms can serve as effective entry points into formal financial systems (Ernst & Young, 2019). Empirical studies from diverse contexts show that students increasingly rely on digital tools for managing daily expenses, savings, fee payments, and peer-to-peer transfers, strengthening their financial participation (Masibo et al., 2018; Agarwal et al., 2019; Chakladar et al., 2020).

Nevertheless, the effectiveness of DFI in promoting financial inclusion is contingent upon financial literacy. Without adequate financial knowledge, students may misuse digital tools, accumulate unsustainable debt, or fail to engage with more advanced financial products, thereby limiting inclusion outcomes (OECD, 2020). Prior studies highlight that financial literacy acts as a critical enabler that transforms digital access into responsible financial behavior and sustainable inclusion (Ozili, 2018; Morgan et al., 2019).

Accordingly, strengthening financial literacy alongside digital capability is essential for ensuring that digital financial innovation translates into inclusive, resilient, and long-term financial well-being for university students.

### Research Model

Financial literacy, digital financial innovation, and financial inclusion are inherently interdisciplinary, drawing theoretical insights from economics, finance, psychology, sociology, and information systems. To examine behavioral and decision-making processes underlying the adoption and effective use of digital financial services, this study develops an integrated conceptual framework grounded primarily in the Theory of Planned Behavior (TPB) and Financial Literacy Theory.

TPB provides a robust explanation of how individual behavior is shaped through attitudes, perceived behavioral control, and subjective norms, making it particularly suitable for understanding the adoption of digital financial innovations and participation in formal financial systems. Complementing this perspective, Financial Literacy Theory emphasizes the role of financial knowledge, skills, and understanding in shaping rational financial decision-making and long-term financial outcomes. Integrating these theories enables a comprehensive examination of both behavioral intentions and cognitive capability in explaining financial inclusion in the digital context.

The proposed framework incorporates four core constructs—financial literacy, digital financial innovation, financial inclusion, and trust—derived from established literature and aligned with the study's research objectives. These constructs are not examined in isolation; rather, their relationships are theorized based on prior empirical and theoretical work addressing digital finance adoption and inclusion outcomes. Financial literacy is positioned as a key antecedent influencing both the adoption of digital financial innovation and financial inclusion, while digital financial innovation serves as a mechanism through which financial literacy translates into inclusive outcomes. Trust is conceptualized as a contextual factor shaping the effectiveness of digital financial innovation.

Thus, this integrated framework provides a theoretically grounded foundation for analyzing financial inclusion in the digital age.

Figure 1

*Research Model*
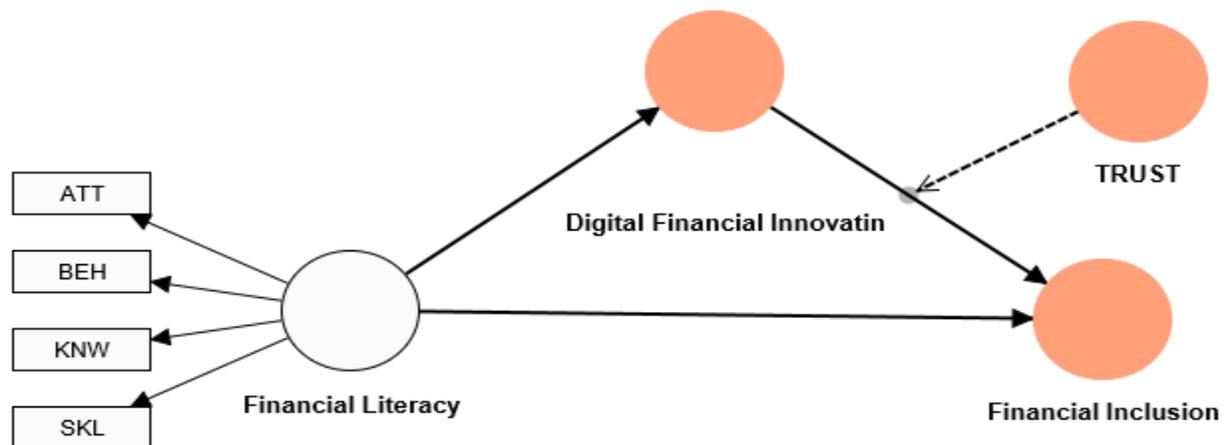


**Financial Literacy and Financial Inclusion:** Financial literacy and digital financial inclusion are inextricably linked and mutually reinforcing, as a rise in one leads to a rise in the other, encouraging financial well-being and economic empowerment. Numerous studies highlighted that individuals with higher financial knowledge are more likely to have access to and utilize financial products and services. Huston et al. (2015) demonstrated that financial literacy programs can significantly increase financial inclusion by empowering individuals to make informed financial choices. For example, basic financial literacy empowers individuals to understand and utilize savings accounts, budgeting, and credit management, enhancing financial decision-making and banking services utilization. In a nutshell, financial literacy serves as a fundamental driver of financial inclusion, empowering individuals with the knowledge and skills needed to access and utilize formal financial services effectively.

*H1: Financial Literacy has a significant and positive influence on Financial Inclusion.*

**Financial Literacy and Digital Financial Innovation:** Digital financial literacy is projected to become an increasingly significant part of education in the digital age. The financially educated folks is more likely to grasp and accept new digital financial technology, resulting in increased financial inclusion and access to financial services. Digital financial innovation includes the creation and adoption of new financial technologies like mobile banking, digital payments, and online services. The use of software, apps, and digital platforms to provide financial services to individuals and companies via digital devices such as smartphones has emerged as a viable strategy for promoting financial inclusion. Multiple studies, including those by Lusardi and Mitchell (2017), Atkinson and Messy (2018), and the OECD (2019), demonstrate that individuals with greater financial literacy are more inclined to adopt digital financial tools, while countries with higher financial literacy levels exhibit greater usage of digital financial

services, highlighting a strong association between financial literacy and technological innovation. Thus, individuals who lack financial literacy may not completely understand the pitfalls and benefits of new digital financial products and services and may lose out the opportunities they provide. In a nutshell, financial literacy catalyzes fostering innovation and adoption of digital financial solutions, enabling individuals to harness the full potential of technology to improve their financial lives and promote economic empowerment.

*H2: Financial Literacy has a significant and positive influence on Digital Financial Innovation.*

**Digital Financial Innovation and Financial Inclusion:** Digital technology is an effective medium for reaching a larger customer base, and the digital revolution is developing a new dimension of financial inclusion culture, enabling new options for expanding financial inclusion. It serves as a powerful driver of financial inclusion by offering greater accessibility, affordability, and convenience, and has the ability to significantly expand financial inclusion by giving individuals access to previously inaccessible financial services, and also can reach to individuals in remote and underserved areas, where traditional banking services might not be accessible. The financial sector is being transformed by digital technology, which is altering how payments, savings, borrowing, and investment services are delivered. Several studies by Kunt et al. (2018), GSMA (2020), and Awa et al. (2022) highlight how innovations like mobile money expand financial access, enabling diverse transactions and boosting inclusion rates, especially in low-income and developing nations. By providing technology-enabled solutions, they may better response customer demands and preferences, ensuring increased availability, accessibility, usage, convenience, and quality of services and customized goods, which leap towards inclusiveness. In the context of digital financial innovation, positive attitudes towards innovative financial technologies, coupled with supportive social norms and perceived ease of use, can enhance individuals' intentions to adopt and utilize these services, thereby contributing to their financial inclusion. Thus, digital financial innovation holds immense potential to catalyze progress towards financial inclusion by expanding access to formal financial services, empowering individuals to participate more actively in the financial system, and fostering economic empowerment and resilience

*H3: Digital Financial Innovation has a significant and positive effect on financial inclusion.*

**Mediating Role of Digital Financial Innovation:** Digital financial innovation bridges the gap between financial literacy and financial inclusion by giving individuals the required technology, resources, and infrastructure to engage in the financial system. The influence of financial literacy on financial inclusion is channeled through the adoption and utilization of digital financial innovations, which serve as facilitators of access to formal financial services. By simplifying access, reducing costs, and enhancing transparency, DFIs empower individuals to participate in the financial system regardless of their financial knowledge level. Studies conducted by Suri and Jack (2016) and Mark (2019) demonstrated that access to mobile money services and digital credit significantly improves financial behaviors and outcomes among individuals, thereby promoting financial inclusion. For example, in rural communities where literacy rates are lower and physical access to banks is limited, the adoption of digital financial innovations such as

mobile banking and agent banking services can bridge the gap between financial literacy and inclusion. Thus, Fintech and financial innovations are increasing financial literacy and risk awareness to foster financial inclusion.

*H4: Digital Financial Innovation mediates the relationship between Financial Literacy and Financial Inclusion.*

**Moderating Role of Trust:** In the dynamic landscape of digital financial services, the role of trust emerges as a pivotal factor shaping individuals' perceptions and behaviors. It acts as a bridge between DFIs and financial inclusion. When individuals trust the providers of these innovations and the overall financial system, they are more likely to embrace and utilize them. Conversely, a lack of trust can create significant barriers to adoption. This implies that the impact of digital financial innovation on financial inclusion is contingent upon the level of trust individuals have in these innovative solutions. Previous studies have demonstrated the significance of trust in fostering the adoption and utilization of digital financial services. Several studies (Nug et al., 2022; Zhang et al., 2023) found that trust in FinTech platforms increased user adoption of their services and fosters confidence in DRIs, leading to greater financial inclusion. In line with TPB, higher levels of trust are likely to strengthen individuals' intentions to engage with digital financial services, consequently facilitating their inclusion in the financial ecosystem.

*H5: Trust moderates the relationship between Digital Financial Innovation and Financial Inclusion.*

## Research Methods

This study adopts a positivist research philosophy, premised on the assumption that social phenomena such as financial literacy, digital financial innovation, trust, and financial inclusion exist objectively and can be measured empirically. A quantitative mono-method research design was employed to align with the study's explanatory objectives. The research seeks not merely to describe financial behaviors but to explain the mechanisms through which financial literacy and digital financial innovation influence financial inclusion, both directly and indirectly. Given the presence of mediating and moderating relationships in the proposed model, a quantitative explanatory design was deemed most appropriate. The study relies on cross-sectional primary data collected at a single point in time to capture the prevailing financial knowledge, perceptions, and usage of digital financial services among university students.

The study was conducted in Kathmandu Valley, Nepal, which was selected due to its relatively advanced digital infrastructure, high concentration of financial institutions, growing fintech ecosystem, and dense population of higher education institutions. University students were chosen as the target population because they represent a digitally proficient segment transitioning toward financial independence and are among the early adopters of digital financial services. The unit of analysis was the individual student, as financial literacy, trust, and digital financial service usage are inherently individual-level constructs.

Primary data were collected using a structured, self-administered questionnaire designed to measure the study variables comprehensively. The questionnaire was developed

based on established and validated measurement scales from prior studies, with minor contextual adaptations to ensure relevance to the Nepalese financial environment. All observed items were assessed using a five-point Likert scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). Financial literacy was operationalized as a multidimensional construct encompassing financial knowledge, skills, attitudes, and behavior, with items adopted from Bongomin et al. (2018). Financial inclusion and digital financial innovation were measured using scales adapted from Bongomin et al. (2018) and Hussain and Papastathopoulos (2022), respectively, while trust was measured using items from Pavlou (2006). .

Due to the absence of a comprehensive sampling frame and limitations in accessing official student enrollment lists, probability sampling was not feasible. Consequently, a non-probability convenience sampling technique was adopted to ensure broad participation across universities and colleges within the Valley. Sample size adequacy was determined using multiple criteria to ensure statistical power and reliability. Following recommendations for Partial Least Squares Structural Equation Modeling (PLS-SEM), a minimum sample size of 200 was required, while the ten-times rule suggested a higher threshold. Considering these guidelines and prior empirical studies in financial inclusion research, the study targeted and achieved a sample exceeding 400 respondents, ensuring sufficient power for model estimation.

Data collection was carried out over two months (October to December, 2025) using both online and printed questionnaires to maximize response rates and accessibility. Before the main survey, the instrument underwent expert review to establish face and content validity, followed by a pilot test involving 37 respondents. The pilot study confirmed acceptable reliability levels, with Cronbach's alpha values exceeding recommended thresholds, and no evidence of multicollinearity based on variance inflation factor diagnostics. Feedback from the pilot test was incorporated to refine item wording and improve clarity.

Collected data were screened, coded, and cleaned using Excel and KOBO Toolbox before analysis. Descriptive statistics were employed to summarize demographic characteristics and general response patterns. Inferential analysis was conducted using SPSS and SmartPLS 4. PLS-SEM was selected as the primary analytical technique due to its suitability for prediction-oriented research, its robustness with non-normal data distributions, and its ability to handle complex models involving mediation and moderation. The analysis followed a two-step procedure, beginning with measurement model evaluation to assess internal consistency reliability, convergent validity, and discriminant validity, followed by structural model assessment to test hypothesized relationships, mediation effects, predictive relevance, and overall explanatory power. This rigorous methodological approach ensures the reliability, validity, and generalizability of the study's findings while providing a robust foundation for examining financial inclusion in the digital age.

# Results

## *Response Rate and Data Screening*

A total of 750 questionnaires were distributed through multiple channels, of which 545 were returned, yielding an initial response rate of 72.66%. After excluding 39 incomplete printed questionnaires, 506 responses were retained, resulting in an effective response rate of 67.47%, which is considered methodologically adequate for empirical research (Mugenda & Mugenda, 2003). Before analysis, data were screened for univariate outliers using standardized z-scores, leading to the removal of 22 cases exceeding the ±3.0 threshold. Multivariate outliers were subsequently assessed using Mahalanobis distance at a conservative significance level of $p < 0.001$, as recommended by Tabachnick and Fidell (2007). The final dataset comprised 484 valid responses, providing a robust sample for subsequent PLS-SEM analysis.

## *Respondents' Profile*

Table 8 summarizes the socio-demographic characteristics of the respondents across gender, age, education level, university affiliation, academic discipline, and occupation. The sample is moderately male-dominated (59.02%), with the majority of respondents concentrated in the 18–27 age group, reflecting the typical age structure of university students. Educationally, bachelor's and master's level students are almost evenly represented, ensuring balanced academic exposure and maturity in financial understanding. Most respondents are enrolled in Tribhuvan University, followed by Kathmandu University and Pokhara University, while management and science disciplines together constitute the dominant fields of study. This disciplinary mix ensures representation of both management-oriented and non-management perspectives. Finally, although most respondents are not formally employed, a substantial proportion combine work with study, which may enhance practical exposure to financial decision-making.

Table 1

*Respondent's Profile*

| Variable | Category | Frequency | Percentage |
|---|---|---|---|
| Gender | Female | 198 | 40.98 |
| | Male | 286 | 59.02 |
| Age | 18-22 | 230 | 47.45 |
| | 23-27 | 238 | 49.1 |
| | 28-40 | 16 | 3.45 |
| Education Level | Bachelor | 232 | 48 |
| | Masters | 252 | 52 |
| University | TU | 175 | 36.16 |
| | KU | 115 | 23.76 |
| | Pokhara | 110 | 22.72 |
| | Purbhanchal | 48 | 9.92 |
| | Mid-Western | 36 | 7.44 |

| | | | |
|---|---|---|---|
| | Management | 243 | 50.24 |
| | Science | 135 | 27.8 |
| Faculty | Education, Humanities, and Arts | 77 | 15.87 |
| | Others | 29 | 6.09 |
| Occupation | Yes | 201 | 41.46 |
| | No | 283 | 58.54 |

## Descriptive Statistics and Normality Assessment

Table 2 presents the descriptive statistics of the study constructs, including measures of central tendency, dispersion, and distributional normality. The mean values range from 3.088 (financial inclusion) to 3.522 (digital financial innovation), indicating generally favorable perceptions across all constructs. Standard deviations vary between 0.59 and 1.14, suggesting moderate variability, with responses for financial literacy–related constructs more closely clustered around the mean than those for trust. The skewness values fall within the acceptable range of −1 to +1, indicating reasonably symmetric distributions (Hair et al., 2017). Similarly, kurtosis values remain within the permissible threshold of −3 to +3, confirming that the assumption of normality is sufficiently satisfied for subsequent multivariate analysis.

Table 2

*Descriptive Statistics and Normality Assessment*

| Constructs | Mean | Standard Deviation | Skewness | Kurtosis |
|---|---|---|---|---|
| Financial Literacy (FL) | 3.2487 | .59561 | -.547 | 1.181 |
| Attitude (ATT) | 3.2662 | .81517 | -.495 | .652 |
| Knowledge (KNW) | 3.2798 | .81896 | -.664 | .534 |
| Skills (SKL) | 3.3199 | .77812 | -.669 | .920 |
| Behavior (BEH) | 3.1289 | .81836 | -.737 | .848 |
| Digital Financial Inclusion (DFI) | 3.5224 | .75388 | -.881 | 1.725 |
| Financial Inclusion (FI) | 3.0880 | .84923 | -.562 | .286 |
| Trust (TR) | 3.1958 | 1.14289 | .123 | -.758 |

## Measurement Model

Before assessing structural relationships and model fit, it is essential to clearly distinguish between reflective and formative constructs, as each requires different validation criteria

(Roy & Tarafdar, 2012; Finn & Wang, 2014). Given the conceptual nature of the constructs, this study specifies all latent variables as reflective and therefore evaluates them using established reflective measurement model criteria (Hair et al., 2014). The measurement model was assessed following the guidelines proposed by Hair et al. (2010), focusing on standardized factor loadings, internal consistency reliability, and construct validity. Indicator reliability was examined through standardized factor loadings, with items below the acceptable threshold of 0.40–0.70 being considered for removal (Hulland, 1999; Duarte & Raposo, 2009). As a result, 42 indicators exhibited satisfactory loadings above 0.70, while six items were excluded due to inadequate loadings. Internal consistency was evaluated using Cronbach's alpha and composite reliability, both of which exceeded the recommended minimum value of 0.70, indicating reliable measurement (Cohen, 2013; Hair et al., 2017). However, caution was exercised in interpreting composite reliability values approaching or exceeding 0.90, as excessively high values may indicate indicator redundancy and potential threats to construct validity (Hair et al., 2017). Overall, the results confirm that the reflective measurement model demonstrates adequate reliability and indicator performance. This rigorous evaluation ensures that the retained indicators appropriately represent their underlying latent constructs. Consequently, the measurement model is deemed suitable for subsequent structural model assessment.

Table 3

*Reliability and Validity*

| Constructs | Observed Items | SFL | Cronbach's Alpha | Composite Reliability | AVE |
|---|---|---|---|---|---|
| Attitude | ATT_2 | 0.722 | 0.884 | 0.912 | 0.636 |
| | ATT_3 | 0.874 | | | |
| | ATT_4 | 0.831 | | | |
| | ATT_5 | 0.669 | | | |
| | ATT_6 | 0.841 | | | |
| | ATT_7 | 0.829 | | | |
| Behavior | BEH_1 | 0.709 | 0.889 | 0.926 | 0.717 |
| | BEH_3 | 0.881 | | | |
| | BEH_4 | 0.898 | | | |
| | BEH_5 | 0.892 | | | |
| | BEH_6 | 0.839 | | | |
| Knowledge | KNW_1 | 0.82 | 0.935 | 0.947 | 0.719 |
| | KNW_2 | 0.876 | | | |
| | KNW_3 | 0.86 | | | |
| | KNW_4 | 0.861 | | | |
| | KNW_5 | 0.84 | | | |
| | KNW_6 | 0.862 | | | |
| | KNW_7 | 0.814 | | | |

| | | | | | |
|---|---|---|---|---|---|
| **Skills** | SKL_1 | 0.795 | 0.908 | 0.928 | 0.684 |
| | SKL_2 | 0.808 | | | |
| | SKL_3 | 0.85 | | | |
| | SKL_4 | 0.821 | | | |
| | SKL_5 | 0.86 | | | |
| | SKL_6 | 0.828 | | | |
| **Digital Financial Innovation** | DFI_1 | 0.803 | 0.891 | 0.917 | 0.649 |
| | DFI_2 | 0.857 | | | |
| | DFI_3 | 0.846 | | | |
| | DFI_4 | 0.849 | | | |
| | DFI_6 | 0.739 | | | |
| | DFI_7 | 0.731 | | | |
| **Financial Inclusion** | FI_1 | 0.722 | 0.889 | 0.913 | 0.6 |
| | FI_2 | 0.744 | | | |
| | FI_3 | 0.795 | | | |
| | FI_4 | 0.796 | | | |
| | FI_5 | 0.831 | | | |
| | FI_9 | 0.801 | | | |
| | FI_10 | 0.728 | | | |
| **Trust** | TR_1 | 0.755 | 0.957 | 0.969 | 0.886 |
| | TR_2 | 0.815 | | | |
| | TR_3 | 0.977 | | | |
| | TR_4 | 0.944 | | | |

### *Discriminant Validity*

Discriminant validity was examined using multiple complementary criteria to ensure construct distinctiveness. First, the Fornell–Larcker criterion demonstrated that the square root of each construct's AVE exceeded its correlations with other constructs, satisfying the traditional requirement for discriminant validity (Fornell & Larcker, 1981). Given the documented limitations of this approach, the Heterotrait–Monotrait (HTMT) ratio was additionally employed as a more stringent and sensitive test (Henseler et al., 2015). All HTMT values were below the conservative threshold of 0.85, indicating strong discriminant validity among the constructs (Hair et al., 2019). Furthermore, cross-loading analysis confirmed that each indicator loaded more strongly on its intended construct than on any other construct, providing further support for discriminant validity. Collectively, these results demonstrate that the measurement model satisfies all key validity requirements and is appropriate for subsequent structural model evaluation.

Table 4

*Fornell-Larcker Values*

|  | ATT | FI | BEH | DFI | KNW | SKL | TR |
|---|---|---|---|---|---|---|---|
| ATT | **0.798** | | | | | | |
| FI | 0.595 | **0.775** | | | | | |
| BEH | 0.418 | 0.419 | **0.847** | | | | |
| DFI | 0.346 | 0.376 | 0.281 | **0.806** | | | |
| KNW | 0.453 | 0.418 | 0.353 | 0.338 | **0.848** | | |
| SKL | 0.473 | 0.56 | 0.266 | 0.242 | 0.401 | **0.827** | |
| TR | -0.03 | -0.107 | -0.028 | -0.043 | -0.004 | -0.015 | **0.941** |

Table 5

*HTMT Values*

|  | ATT | FI | BEH | DFI | KNW | SKL | TR |
|---|---|---|---|---|---|---|---|
| ATT | | | | | | | |
| FI | 0.66 | | | | | | |
| BEH | 0.473 | 0.485 | | | | | |
| DFI | 0.384 | 0.416 | 0.313 | | | | |
| KNW | 0.494 | 0.464 | 0.385 | 0.369 | | | |
| SKL | 0.524 | 0.598 | 0.299 | 0.268 | 0.439 | | |
| TR | 0.043 | 0.116 | 0.042 | 0.055 | 0.041 | 0.036 | |

## Structural Model

After establishing the adequacy of the measurement model, the structural model was evaluated to examine the hypothesized relationships among latent constructs using a bootstrapping procedure with 10,000 resamples (Benitez et al., 2020; Hair et al., 2017). The assessment focused on explanatory power ($R^2$), effect size ($f^2$), and predictive relevance ($Q^2$), which together provide a comprehensive evaluation of model performance. The coefficient of determination indicates that the model explains 16.6% of the variance in Digital Financial Innovation (DFI), reflecting weak explanatory power, and 48.9% of the variance in Financial Inclusion (FI), indicating moderate explanatory strength (Hair et al., 2013). Effect size analysis shows that Financial Literacy (FL) exerts a moderate effect on DFI and a large effect on FI, whereas DFI, Trust (TR), and the interaction term (TR × DFI) exhibit relatively small effects on FI (Cohen, 1992). Predictive relevance was further assessed using Stone–Geisser's $Q^2$ via PLS-Predict, with all $Q^2$ values exceeding zero, confirming the model's out-of-sample predictive capability (Henseler et al., 2009). Lower RMSE and MAE values for the PLS model compared to the linear benchmark further indicate acceptable predictive accuracy. Overall, the structural model demonstrates satisfactory explanatory and predictive performance, supporting its suitability for hypothesis testing.

Table 6

*R-square, Effect Size, and Q-square Predict*

| Construct / Relationship | R² | f² on DFI | f² on FI | Q² Predict | RMSE | MAE |
|---|---|---|---|---|---|---|
| DFI | 0.166 | — | | 0.018 | 0.156 | 0.926 | 0.706 |
| FI | 0.489 | — | — | 0.461 | 0.737 | 0.481 |
| FL | — | 0.199 | 0.643 | — | — | — |
| TR | — | — | 0.009 | — | — | — |

### Hypothesis Testing

Hypothesis testing was conducted using a bootstrapping procedure to examine direct, mediating, and moderating relationships among the study variables. The results indicate that financial literacy has a strong and positive effect on financial inclusion ($\beta = 0.628$, $t = 15.414$, $p < 0.001$), providing robust support for H1. Financial literacy also significantly influences digital financial innovation adoption ($\beta = 0.408$, $t = 7.470$, $p < 0.001$), confirming H2 and suggesting that financially knowledgeable students are more inclined to engage with digital financial tools. Digital financial innovation, in turn, exerts a positive but modest effect on financial inclusion ($\beta = 0.105$, $t = 2.171$, $p < 0.05$), supporting H3. Mediation analysis reveals that digital financial innovation partially mediates the relationship between financial literacy and financial inclusion ($\beta = 0.043$, $t = 2.207$, $p < 0.05$), thereby supporting H4. In contrast, trust does not significantly moderate the relationship between digital financial innovation and financial inclusion ($\beta = 0.083$, $t = 1.659$, $p > 0.05$), leading to the rejection of H5. Thus, the findings highlight the central role of financial literacy in enhancing financial inclusion, both directly and indirectly through digital financial innovation, while indicating that trust alone does not condition this relationship among university students.
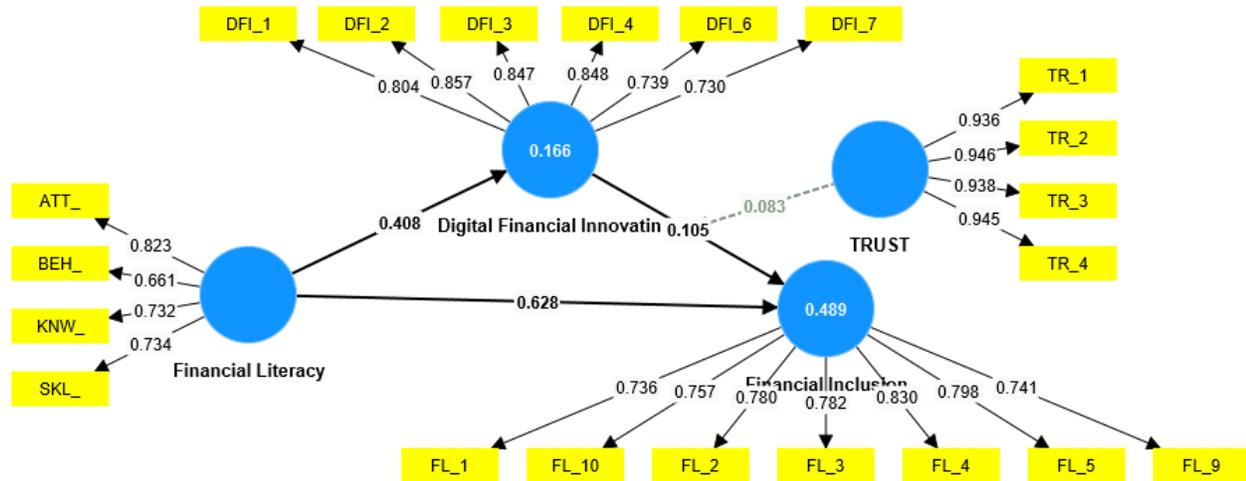
Figure 2

*Path Analysis*



Table 7

*Hypothesis Testing*

| Structural Path | Beta Value | Standard Deviation | *t-value* | *p-values* | Empirical Decision |
|---|---|---|---|---|---|
| **FL-> FI** | -0.628 | 0.041 | 15.414 | 0 | Supported |
| **FL -> DFI** | -0.408 | 0.055 | 7.47 | 0 | Supported |
| **DFI-> FI** | -0.105 | 0.048 | 2.171 | 0.03 | Supported |
| **FL -> DFI -> FI** | -0.043 | 0.021 | 2.2074 | 0.038 | Supported |
| **TR_x DFI-> FI** | 0.083 | 0.05 | 1.659 | 0.097 | Not Supported |

## Discussion

Grounded in the TPB and financial literacy theory, this study clarifies the relationships among financial literacy, digital financial innovation, financial inclusion, and trust among university students in the Kathmandu Valley, yielding both consistent and nuanced insights. Financial literacy demonstrates a strong and significant association with both financial inclusion and digital financial innovation, reinforcing prior evidence that financially knowledgeable individuals are better equipped to adopt innovative financial products and participate in formal financial systems (Grohmann et al., 2018; Bongomin et al., 2018). Consistent with TPB, greater financial knowledge appears to foster favorable attitudes and behavioral intentions toward the use of digital financial services, thereby reducing perceived complexity and barriers to access. These findings underscore financial literacy as a foundational driver that enables informed decision-making and effective engagement with the digital financial ecosystem.

The results further confirm that digital financial innovation positively contributes to financial inclusion among university students. Digital platforms such as mobile banking and digital payment systems enhance accessibility, lower transaction costs, and provide convenience, which are particularly salient for digitally adept student populations (Buteau et al., 2021). As digital natives, students are more inclined to integrate technology-driven financial solutions into their daily lives, making DFI an effective mechanism for expanding inclusion within this demographic. Moreover, the mediation analysis reveals that digital financial innovation partially transmits the effect of financial literacy on financial inclusion, indicating that financial knowledge translates into tangible inclusion outcomes primarily when supported by accessible digital tools (Salampasis et al., 2018; Shen et al., 2018; Yue et al., 2022).

In contrast, trust does not significantly moderate the relationship between digital financial innovation and financial inclusion, diverging from some prior studies that emphasize trust as a central determinant of fintech adoption (Smith, 2017; Johnson et al., 2019). This finding suggests that among younger and more digitally literate users, functional attributes such as usability, convenience, and regulatory safeguards may outweigh trust considerations. It also highlights the need to distinguish between trust in technology, institutions, and service providers when examining digital finance adoption (Eriksson et al., 2020). Thus, the study indicates that while trust remains relevant, financial literacy and the practical advantages of digital financial innovations play a more decisive role in advancing financial inclusion among university students.

## Conclusion and Implications

This study highlights the pivotal role of financial literacy in shaping university students' engagement with digital financial innovation, while revealing its uneven translation into broader financial inclusion. Although financially literate students demonstrate a greater propensity to adopt digital financial tools, literacy alone does not guarantee inclusive financial participation, suggesting the influence of contextual constraints such as the digital divide, socio-economic disparities, and behavioral factors. These findings indicate that financial literacy must be complemented by enabling digital capabilities and supportive institutional environments to foster meaningful inclusion. Thus, the study highlights that integrating financial knowledge with practical digital competencies remains essential for building inclusive and resilient financial ecosystems among young populations.

By integrating the TPB with Financial Literacy Theory, this study advances a comprehensive framework that explains how financial literacy, digital financial innovation, financial inclusion, and trust interact within the context of Nepalese university students. Unlike prior studies that narrowly equate financial inclusion with access to formal banking, this research adopts a broader perspective by incorporating digital financial usage and literacy, thereby addressing an important theoretical gap. The findings provide empirical support for the role of digital finance as a conduit through which financial literacy can contribute to sustainable economic participation, aligning with contemporary views of financial inclusion as a driver of sustainable development. Contextualizing these relationships in Nepal enriches the existing literature and offers a nuanced understanding of fintech-driven inclusion in emerging economies.

From a practical standpoint, the results emphasize the need to strengthen financial education initiatives that go beyond basic literacy to include applied digital financial skills. Universities, financial institutions, and policymakers should collaborate to design targeted interventions that equip students with the competencies required to confidently and responsibly use digital financial services. Additionally, fintech firms and regulators must address contextual barriers by combining behavioral nudges, robust consumer protection frameworks, and continuous monitoring of user experience and security. Such coordinated efforts are critical to promoting inclusive digital finance and empowering students to make informed financial decisions.

Despite its contributions, this study is subject to certain limitations that offer avenues for future research. The focus on university students within the Kathmandu Valley restricts the generalizability of the findings; future studies could extend the model to diverse institutional settings, both nationally and internationally. Longitudinal research designs would further enhance causal understanding of how financial literacy and digital finance adoption evolve. Moreover, incorporating qualitative approaches, such as in-depth interviews with students and domain experts, could provide richer insights into behavioral and contextual dynamics. Expanding the model to include variables such as regulatory environment, user attitudes, and differentiated dimensions of trust would also offer a more comprehensive understanding of fintech-enabled financial inclusion.

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## Conflict of Interest

The Authors declare that there is no conflict of interest.

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