



Evaluating the mediating effect of financial literacy between fintech adoption in microfinance services

Nazia Hasan¹ · Shweta Nanda² · Manoj Kumar Agarwal³ · Sumit Kumar Debnath⁴

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Abstract The study aims to show the impact of financial literacy on fintech adoption in microfinance services by urban borrowers in Uttar Pradesh (India). The study adopted a cross-sectional study and data was collected from the poor who resides in urban areas of Uttar Pradesh, India. Structural equation modelling through analysis of moment structures (AMOS) was used to analyse the data. Bootstrap approach with 500 samples was run to establish the mediating effect of financial literacy in the relationship between fintech adoption and microfinance services of urban the poor by microfinance institutions. This study carries out a survey-oriented method with a structured questionnaire. The present study uses AMOS 22.0 version to analyse the mediating effect of the data gathered from a sample of 231 respondents residing in Uttar Pradesh(India).Information related to the demographic profile, the correlation coefficient of the constructs, direct and indirect effects, and the path coefficients of the structural model was presented in tabular form. The model's R^2

coefficient of determination was discovered to be 47%. The study's proposed model was able to add to the body of knowledge on Fintech adoption and Microfinance Services.

Keywords Microfinance · Fintech · Financial literacy · Financial services

1 Introduction

This paper adopts a simple definition of FinTech: “financial innovation realized by information technology (IT)”. According to studies, some existing financial institutions have chosen to partner with or acquire FinTech companies rather than learn FinTech technologies themselves to participate in the new financial ecosystem that FinTech platform operators have created. Anagnostopoulos (2018) provides examples of banks that see FinTech-driven financial business transformation as an opportunity to add value and have joined the new financial ecosystem by strategically partnering with FinTech companies and attempting to influence the FinTech regulatory environment. Fintech is built on the foundations of information technology and telecommunications, allowing it to expand its operations without the need for a network of branches and transaction offices. As a result, Fintech has attracted a large number of customers, particularly those in remote areas whether rural or urban who lack a bank account and are not targeted customers of traditional banks or financial institutions. According to the Asia Development Bank, “microfinance is defined as the provision of financial services such as deposits, lending, payment services, and insurance to poor people, low-income households, and their micro, small businesses” (ADB, 2010). Since the 2000s, increased

✉ Nazia Hasan
nazia14m@gmail.com

Shweta Nanda
snanda@amity.edu

Manoj Kumar Agarwal
agarwalmanoj21@gmail.com

Sumit Kumar Debnath
sumitdebnath.iimt@gmail.com

¹ Amity College of Commerce and Finance, Amity University, Uttar Pradesh, Noida, India

² Amity International Business School, Amity University, Uttar Pradesh, Noida, India

³ TMIMT, Teerthanker Mahaveer University, Uttar Pradesh, Moradabad, India

⁴ IIMT Delhi, Delhi, India

internet and mobile coverage have also enabled the development of financial technologies, which has fuelled the microfinance sector. MFIs and fintech firms are working together more and more these days. According to (Next-Gen Microfinance: The Role of Digital Technology Foreword from PwC, n.d.), there are numerous instances of MFIs and fintech firms working together in India for customer onboarding, credit assessment, loan disbursal, and collections. Examples of these partnerships include those between the Entrepreneurial Finance LabEFL, a psychometric credit assessment company, and Janalakshmi Financial Services (an MFI), a partnership between Oxigen Services and Sonata Finance Limited (an MFI), which aims to provide mobile financial services and education to the latter's clients, and Artoo, a technological firm that assists Ujjivan (an MFI, which is now a Small Finance Bank), in onboarding customers. (Priyamvada et al. 2021)The world is changing quickly, and organizations are keen to deal with challenges associated with handling deteriorating and subpar quality items, wastage, economic and environmental and social concerns, etc. efficiently in this pursuit of constant improvement. The use of technology is one clever strategy that provides the best results when dealing with deteriorating objects of society. Recent advancements in technology have resulted in previously unheard-of levels of performance accuracy in some network operations, including as hop-to-hop power consumption, network throughput for data transmission, and data dissemination latency.

Additionally to making a variety of new financial services available to those who were previously excluded, they improve the current products. This study aims to understand the mediating effect of financial literacy on fintech adoption in microfinance services. The paper has also thrown light on how fintech adoption, financial literacy, and microfinance services are related to each other. Financial literacy is widely regarded as an important component of economic and financial stability and growth. Financial literacy encompasses a wide range of concepts, including financial awareness and knowledge, financial skills, financial capability, and financial behavior. Studies have drawn attention to the ambiguous definition of financial literacy, particularly when it comes to understanding the distinctions between these concepts, such as financial knowledge and financial education. This distinction between the terms financial literacy and financial knowledge is made by Robb, Babiarz and Woodyard (2012) who assert that financial literacy entails the capacity to comprehend financial information. Financial education merely entails recalling a set of facts, i.e. financial knowledge, as opposed to using that information to inform decisions. Financial education focuses primarily on knowledge, whereas financial literacy also considers an individual's behavior and financial attitude.

1.1 Rationale of the study

This study examines participants' financial literacy based on financial knowledge, financial skills and financial behaviour to ascertain the effect of the digitization of microfinance services on microfinance borrowers in urban area. The motivation behind proposing such technique is urban areas host a wide range of economic activities, from small businesses to informal sector enterprises. Recognize the diversity of economic activities in urban settings and the potential of microfinance to support the financial needs of various urban entrepreneurs and small businesses. The new generation of urban-focused MFIs has made many technology advancements to accelerate the retail banking model while modifying the conventional microlending strategy. Researcher proposes new methods as to how emerging technologies, can be used to gain new insights in microfinance industry not possible with traditional approaches.

1.2 Source: Sadhan report: 2023

Figure 1 indicates that client outreach in rural areas constitutes 75% whereas the share in urban areas is 25%. The study takes note of the over-indebtedness situation and evaluates the challenges in the implementation of microfinance. The researchers are aware of the dominance of the microfinance market in India and its reach in rural communities. This paper then offers a framework for how microfinance can be implemented to better ensure that consumers repay their debts by utilizing digital financial literacy.

The study has been carried out in a systematic manner. The flowchart of the study is given below (Fig. 2).

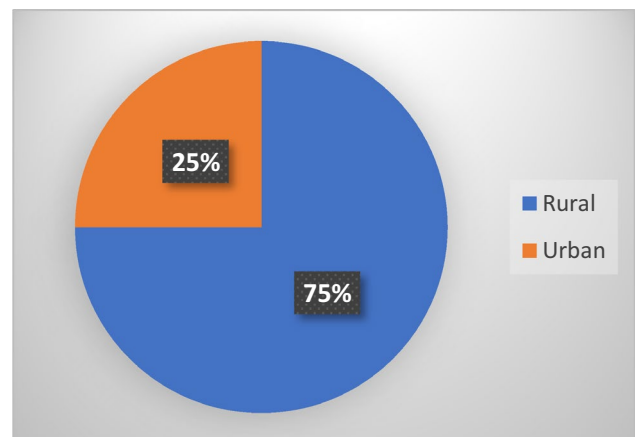


Fig. 1 Comparison between rural–urban share of microfinance borrowers

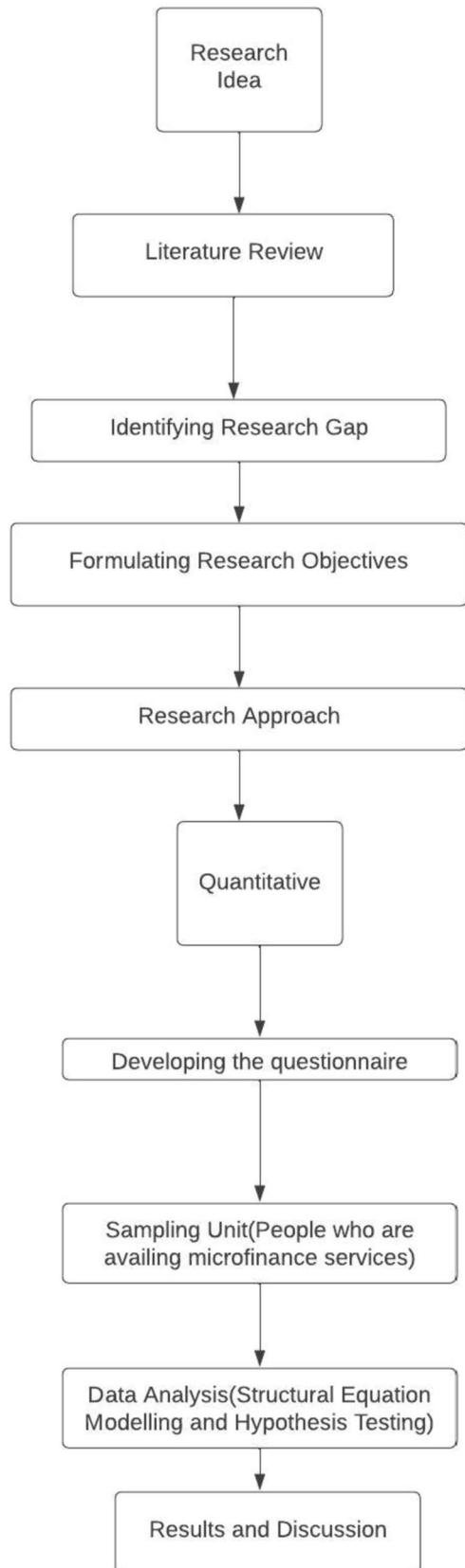


Fig. 2 Flowchart of the work

The study contributes to the financial literacy programs that are implemented in India to spread financial awareness among the poor population in urban area. Two major issues were faced while conducting the research firstly it was finding sufficient funds and resources for research which were constraining the quality and calibre of research and another was the availability of data, as the majority of the population who was availing microfinance services was not much educated and making them understand the questionnaire was the challenging task.

2 Related works

2.1 Fintech adoption and microfinance services

For MFIs to evaluate and implement to increase operational effectiveness and customer experience, there are several trends and innovations in the financial services sector. These innovations include e-KYC, Geo-tagging and GPS mapping for center meetings, digital credit, digital channels, etc. (Yoshino et al. 2020) (KPMG 2021). It is abundantly clear that MFIs have benefited from their organizations' adoption of technology. With the introduction of IT, MFIs have seen increased savings (less paperwork), increased efficiency, and improved service delivery; in addition, the MFIs have seen lower transaction costs and improved market performance (Singh and Padhi 2015). Data shared by technology service providers (MFIN, 2017) reports that organizations that adopted "cash-lite" models experienced shorter turnaround times, lower risks of errors and fraud in disbursement and repayment, and fewer reconciliation tasks. MFIs are aware of the need to digitize the lending process and the benefits of increased efficiency. The digital services that deal with loan application automation and document management are the most helpful. The main advantage of digitization is increased operational effectiveness, which results in faster client service and lower operating expenses. (Pytkowska and Access 2017) MFIs are aware of the need to digitise the lending process and the benefits of increased efficiency. The digital services that deal with loan application automation and document management are the most helpful. The main advantage of digitization is increased operational effectiveness, which results in faster client service and lower operating expenses. Digital financial services are rapidly growing on a global scale. They also have a great chance of helping farmers in isolated rural areas with their credit needs. Digital credit is given based on an automated analysis of the loan applicant's existing data, as opposed to traditional credit, which is granted based on a thorough evaluation of the loan applicant's financial situation (Sarfo et al., 2021) (Los, n.d.) There are

various requirements of information across microfinance institutions like payment and remittances, deposits, know your clients (KYC) practices, with respect to loans and insurance all this information are being made easy with the digitization of microfinance services. (Osman, 2020) The increased adoption of fintech contributes to a country's financial inclusion and prosperity. As demonstrated in the study, financial literacy is required for the development of future responsible financial behavior. Financial literacy is required among various groups, such as the unbanked population, which primarily lives far from formal financial institutions.

H1: There is a significant and positive relationship between Fintech adoption and Microfinance Services by urban borrowers.

2.2 Fintech and financial literacy

Using electronic money, mobile payment apps, and at least one of these two fintech services are all benefits of financial literacy. Financial literacy affects how often people use fintech services. Financial literacy and the adoption of fintech are found to be positively correlated. Given the potential advantages of fintech for fostering financial inclusion and financial well-being, there should be policies to promote financial literacy. Financial literacy was considered concerning consumer education levels, and its use in FinTech had an impact on digital financial inclusion. The likelihood that people would use digital financial products and services to increase their access to credit increased with financial literacy as well (Hasan et al. 2020). Higher levels of digital financial literacy are needed to use fintech's improved access to financial services effectively and avoid miss-selling, frauds like phishing, hacking attacks, unauthorized use of data, discriminatory treatment, and behavioral problems like excessive borrowing. The importance of digital financial literacy in education in the digital age is likely to rise (Yoshino et al. 2020). Initiatives to promote financial literacy ensure that people are aware of new FinTech possibilities, can interact with systems and compare prices, and can use tools to make plans (Gmbh 2016). FinTech's adoption on internet-based platforms means that clients' and/or consumers' ability to control and manage their personal or business finances will depend more and more on their efforts. As a result, they will have to assume more and more direct responsibility for their financial future. Therefore, to achieve digital financial literacy for entrepreneurs, it is necessary to adapt financial training to the digital environment (Basar et al. 2022).

H2: There is a significant and positive relationship between Fintech adoption and the Financial literacy of urban borrowers availing microfinance services.

2.3 Financial literacy and microfinance services

Financial literacy and women's emancipation were the main themes of Nawaz (2015), women who have sufficient financial literacy skills and can use their money effectively and efficiently can achieve a suitable level of socioeconomic empowerment. (Okello Candiya Bongomin et al. 2020) Financial literacy teaches people how to manage their money and helps the poor evaluate complex financial products and services so they can make wise decisions and get the most out of them. Due to its ability to help people escape poverty, financial literacy has grown to be a crucial tool in the fight against poverty (Engelbrecht, 2008). Numerous financial transfers are occurring at the moment therefore strengthening education in this area is necessary (Chiu et al. 2022). There are many different aspects of microfinance, and empirical findings in a study (Banciu et al. 2022) show that increased penetration and consumption of financial services and goods reduce poverty. Establishing financial literacy centers and promoting financial literacy advisors will help underprivileged communities understand the advantages of microfinance. The study (Marini et al. 2018) investigates translation in the area of microfinance, concentrating on how low levels of literacy, especially financial literacy, lead to misinterpretation and exploitation, which could undermine the effectiveness of the objectives of providing microfinance.

H3: There is a significant and positive relationship between Financial literacy and Microfinance Services availed by urban borrowers.

2.4 Financial literacy, fintech, and microfinance services

The widespread use of cutting-edge information and communication technologies in SMEs may encourage commercial banks to offer services to the underserved and assist microfinance institutions in increasing the efficiency of transactions. However, there are times when providing a wide range of services can be challenging when the client is unaware of the service and financial literacy is a concern (Hasan et al. 2020). Because of the increasing use of technology, (Brown et al. 2010) identified financial education as one of the most popular financial and economic terms of the twenty-first century. In this case, it took technical training to find new ways to operate new financial technologies. Every type of financial communication is based on technology, resulting in tech education and financial education in the financial communication of the twenty-first century. In a study (Hasan et al. 2021) empirical findings demonstrated that financial literacy improves access to finance. Financial literacy one of the most powerful forces in increasing financial inclusion through microfinance. It is expected to make a significant contribution to promoting

financial communication with low-income individuals through fintech. Proper knowledge of various financial services had a significant impact on obtaining financial access and extending other financial services.

H4: There is a significant and positive relationship between Fintech Adoption, Financial literacy, and Microfinance Services availed by urban borrowers.

2.5 Hypothesized research model

Based on the research findings from the previous literature and discussions, a hypothesized research model is constructed. The proposed research model, shown in Fig. 3, includes the mediating effect of financial literacy between fintech adoption and microfinance services.

3 Materials and methods

3.1 Research design and approach

A semi-structured questionnaire was used to gather data for the study's cross-sectional research design. The cross-sectional research design was chosen because it allowed for the collection of a significant amount of data in a brief amount of time. Additionally, the design has the advantage of removing recurring errors in the study questionnaire, which are typical of longitudinal research designs. To determine the mediating role of financial literacy in the relationship between fintech adoption and microfinance quantitative data was collected from a total sample of 231 borrowers of microfinance from NBFCs, Small Finance

Banks, and Public Sector Banks in India. The time taken to get the questionnaire filled by microfinance borrowers was from October 2022 to March 2023.

3.2 Measurement scales and variables

Fintech adoption was used as an independent variable which was adopted from (Solarz and Swacha-Lech 2021), microfinance services from (Periasamy & Dinesh 2020) and financial literacy was adopted from (BANCIU et al. 2022).

3.3 Population and sample size

The study for the population consisted of poor living in urban areas in India. More than 25% of Indians live in urban poverty; 81 million of them make less than the federal poverty level. Rural poverty continues to be higher than urban poverty on a national scale, but the difference is narrowing. In India, urbanization is anticipated to reach 50% by 2030 (Poverty and Urbanisation, n.d). According to (Africa et al. 2010a, b), the population for the study was specifically selected from low-income households located along the digital banking map. A stratified random sampling technique was used to select the survey respondents. The beneficiaries from microfinance in urban areas were the study's participants. Participants were selected using stratified random sampling to obtain the most information possible (Adom and Williams 2012; Williams and Gurtoo, 2012).

Data entry errors, missing values, outliers, and normality were checked after the field data were sorted, coded, and input into the statistical analysis program SPSS. To look

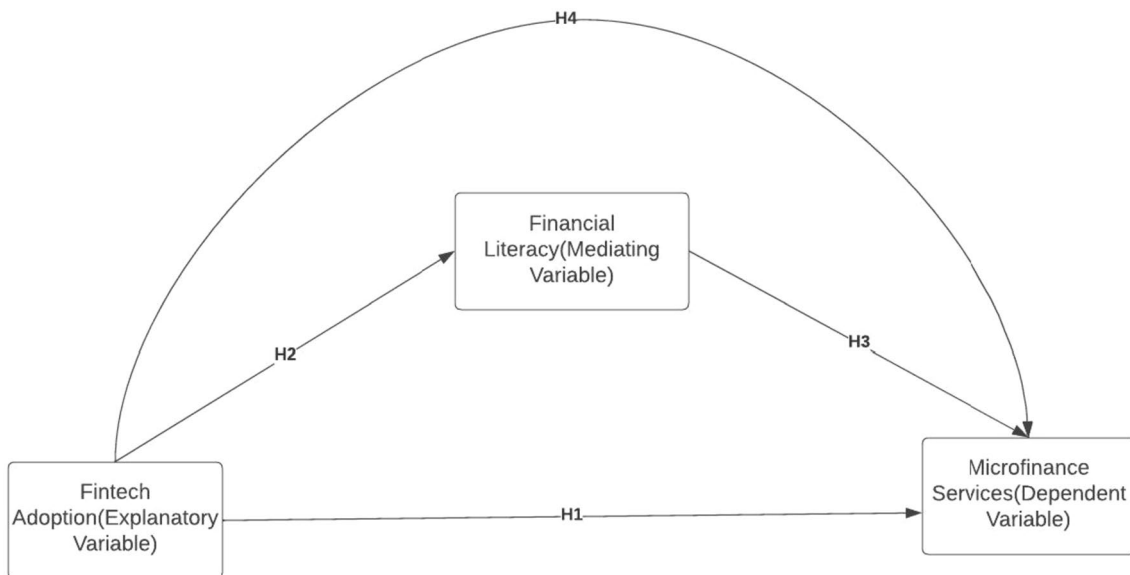


Fig. 3 Hypothesized research model

for data entry errors and missing values, frequencies, and descriptive statistics were generated. To determine the number and pattern of missing values in the data, Little's MCAR test was used. Little's MCAR test results showed that there were only a few minor data entry errors and that the data were completely missing at random with a p-value of less than 5%, which was acceptable for replacement (Field, 2005).

3.4 Establishing the mediation effect

The mediation effect is the degree to which the direct effect changes as a result of including the mediating variable, as shown in Fig. 1. When a predictor variable has an impact on an outcome variable through a mediator, the mediation effect is present. Therefore, to determine the mediation effect of a third variable in a relationship, two methods have been suggested and used in earlier studies. Baron and Kenny (1986) and Jose (2008) both advised using Sobel's z test and the MedGraph Excel program. As advised by Hair et al. (2010), structural equation modeling (SEM) using the Bootstrap approach also exists to test for the mediation effect.

To determine the mediating role of financial literacy in the relationship between Fintech adoption and microfinance services of poor people living in urban areas, the SEM Bootstrap approach through AMOS was adopted for this study. The SEM Bootstrap method was chosen because it outperformed Sobel's z test and the MedGraph Excel program. To begin, SEM enables the researcher to construct complex relationships between multiple variables. Second, for indirect effects, SEM provides bootstrap confidence intervals and associated statistical significance tests, particularly when normality assumptions are violated. Hair et al. (2010) propose using goodness-of-fit (GOF) indices to determine how well the observed data fit the measurement model and structural model. The goodness-of-fit indices are measures of how well a given model reproduces the covariance matrix between the indicator variables. Hair et al. (2010) recommend using three to four fit indices to establish adequate evidence of model fit. Thus, for the purposes of this study, the chi-square (χ^2), along with degrees of freedom and probability, the incremental fit index (IFI), the Tucker-Lewis index (TLI), the comparative fit index (CFI), and the Root Mean Square Error of Approximation (RMSEA) were used to explain how well the observed data fit the models.

Furthermore, Hair et al. (2010) contend that when investigating the mediation effect, two competing models should be constructed for comparison purposes in order to determine the direct and indirect effects of the independent variable on the dependent variable. They argue that the mediating model, which includes both direct and indirect effects, should have a higher GOF than the non-mediated

model. Similarly, Hayes and Preacher (2010) recommend that the p-value in the SEM-mediated model be significant at $p < 0.05$ for full mediation to exist.

As a result, the AMOS software was used to create the measurement and structural models for this study. To establish the mediating effect of social networks in the relationship between financial literacy and financial inclusion of the poor by microfinance banks in developing countries, bootstrapping was performed at 95 percentile level of confidence with 5000 samples.

4 Results

4.1 Sample characteristics

In this study, descriptive and inferential statistics were used. The demographic profile is shown in Table 1. According to the findings, all 231 of the targeted households residing in urban area participated in the study, yielding a 100% response rate. According to the demographic profile presented in Table 1, the majority of the participants were female, with the greatest age range being between 28 and 35 years. The majority of the female participants in this study work in unorganized small and medium enterprises but some of them run informal businesses such as selling vegetables, jewelry, groceries, etc., and so on. Furthermore, the majority of participants were salaried, but the number of participants who were entrepreneurs was also adequate. Entrepreneurs run informal and unorganized small or medium businesses that rely heavily on financial assistance from microfinance institutions. Furthermore, all the participants were from urban areas.

Pearson correlation analysis was performed to test for the existence of relationships between Fintech Adoption, Financial Literacy and Microfinance Services.

The correlation results in Table 2 indicated that Fintech Adoption, Financial Literacy and Microfinance Services are significantly and positively related with each other. A change in one variable brings a change in another. Moreover

Table 1 Summary of the demographic profile ($N=231$)

Variable		<i>N</i>	%
Age	25–28 years	42	18
	28–35 Years	120	52
	35–39 Years	42	18
	39–45 Years	27	11
Gender	Male	110	48
	Female	121	52
Occupation	Salaried	141	61
	Entrepreneur	90	39

Table 2 Mean, standard deviation and correlation between the constructs

Variables	Mean	SD	FTA	FL	MFS
Fta	3.86	1.02	1		
Fl	3.90	0.951	0.457***	1	
MFS	3.83	0.939	0.612***	0.635***	1

FTA Fintech adoption, *FL* Financial literacy, *MFS* Micro finance services

***Correlation is significant at the 0.05 level (two-tailed); $N=231$

the highest correlation was found to be between financial literacy and micro finance service.

4.2 Measurement model assessment

The results showed that the standardised parameter estimates of the initial measurement model for latent and manifest fintech adoption were all significant ($p < 0.05$), and the model provided good model fit statistics for the construct measures i.e. $TLI = 0.96$; $CFI = 0.91$; $RMSEA = 0.012$; $IFI = 1.03$, and all these indices were found to be within the acceptable range. The findings also indicate the importance of financial literacy as a channel through which fintech adoption in microfinance services becomes easy and it helps microfinance borrowers to make wise and sound financial decisions and choices.

The main aim of this paper is to examine the role of financial literacy in affecting the decision of microfinance borrowers in adoption of fintech. The primary goal of this research is to determine the role of financial literacy as a moderator in the relationship between financial adoption and microfinance services for the poor provided by urban borrowers. To establish the mediating effect, Baron and Kenny (1986) propose that relationships exist between the independent, mediator, and dependent variables, as shown in Figure. First, there must be a relationship between the independent and dependent variables. Second, there must be a link between the mediator variable and the dependent variable. Third, the independent and mediator variables should be linked. Finally, there should be a relationship between the independent, mediator, and dependent variables. The findings revealed that all three constructs, fintech adoption, financial literacy, and microfinance services, generated satisfactory factor loadings that were greater than the Hair et al. (2010) recommended minimum cut-off standardised regression weights of 0.7. The results showed that the model fit statistics for this construct measure between the model and the observed data were excellent.

The Table 3 indicates the direct effects of independent variable on dependent variable. Fintech adoption has positive and significant role of financial literacy. Further,

Table 3 Hypotheses test result (direct effects)

Hypotheses	β	P values	Decision
Fintech adoption—> financial literacy	0.710	0.000	Accepted
Financial literacy—> micro-finance services	0.075	0.000	Accepted
Fintech adoption—> micro-finance services	0.833	0.000	Accepted

financial literacy has significant positive impact on the adoption of fintech adoption in microfinance services.

The Table 4 indicates the indirect effects of the mediating variable between independent variable and dependent variable which includes the product of direct effect of fintech adoption on financial literacy, and financial literacy on micro-finance borrowers. Fintech literacy has positive and significant mediating effects between fintech adoption and micro-finance borrowers ($\beta = 0.053$, $p \geq 0.000$). Hence, financial literacy is an important role in adoption of fintech in micro-finance services.

The Table 5 indicates the total effects of independent variable on dependent variable which includes the sum of direct and indirect effect of fintech adoption on micro-finance borrowers. Fintech adoption has positive and significant effects on micro-finance services ($\beta = 0.866$, $p \geq 0.000$).

5 Discussions

Mediators, according to Baron and Kenny (1986), function to mediate any correlated relationship between endogenous and exogenous latent. This is done to see if financial literacy can act as a bridge between fintech adoption and microfinance services. Figure 4 depicts the modelling path of a significant total effect of fintech adoption on microfinance services in order to test the mediation effect of financial literacy ($\beta = 0.88$, $p = 0.000$). This confirms first hypothesis (H1) which states that there is a significant and positive relationship between Fintech adoption and Microfinance Services by urban borrowers correspondingly a study by (Africa 2018) indicated that MFIs see Fintech solutions as a significant opportunity rather than a growing threat from Fintech players entering their markets, such as digital lending platforms; Fintech is viewed as an enabler rather than a disruptor. Using digital finance, MFIs can efficiently offer a variety of products. As a result, MFIs can provide complementary financial and nonfinancial products and services that they would not have been able to provide otherwise. MFIs can improve large innovative technology projects and delivery channels by leveraging markets where mobile services are widely used. MFIs can

Table 4 Hypotheses test result (indirect effects)

Hypotheses	β	P values	Decision
Fintech adoption—> financial literacy—> micro-finance services	0.053	0.000	Accepted

Table 5 Hypotheses test results (total effects)

Hypotheses	β	P values	Decision
Fintech adoption—> micro-finance services	0.866	0.000	Accepted

integrate mobile banking into their business processes (for example, loan disbursements, loan repayments, savings, and insurance) or act as mobile money providers’ agents (Badruddin 2017). (Mader, 2018) as large MFIs scale up to obtain formal banking licenses, mainstream companies may now downscale into the "micro" segment; a slew of “fintech-microfinance partnerships” are emerging. Examples of technology integration with MFI include National Payments Corporation of India (NPCI) digitizing Microfinance Institutions’ transactions using its Aadhar Payment Bridge System (ABPS). When comparing Microfinance Institutions’ accounts before and after the introduction of innovative devices, one can determine the impact of technology. (Moro Visconti and Quirici 2014) To the extent that technology can lower fixed costs and increase the scalability and flexibility of the business model, economic margins are likely to increase and cash flows should rise, which will have a positive impact on sustainability and potential outreach.

Structural model combining all the variables under study was constructed to establish the mediating effect of financial literacy in the relationship between Fintech Adoption and Microfinance Services for the urban poor.

The final structural model was constructed through AMOS 22.0 using bootstrapping procedure to relate the variables of financial literacy, Fintech Adoption, and Microfinance Services (Fig. 5). Furthermore, results also revealed that Fintech Adoption and Financial Literacy are significantly and positively related ($\beta=0.710, p=0.000$), therefore, lending support to hypothesis (H2), which states that there is a significant and positive relationship between Fintech adoption and Financial literacy of urban borrowers availing microfinance services. The most important characteristics of adopting FinTech products and services appear to be perceived trust and reliability, transparency, and financial literacy (Jünger and Mietzner 2020). To improve entrepreneurs’ long-term financial resilience, it is necessary to redefine traditional financial literacy to include digital financial literacy. This has significant implications for nations that are considering financial and digital literacy as complementary approaches (Basar et al. 2022). Low digital and financial literacy among underserved and financially excluded leads to mistaken transactions this challenge must be tackled through financial education to prevent digital products from creating financial exclusion (Report, n.d. 2018).

Similarly, the findings showed that there is a significant and positive relationship between financial literacy and microfinance ($\beta=0.08, p=0.000$). According to Lusardi (2008) financial literacy benefits the poor by empowering and educating them about finance in a way that is relevant to their lives. According to the OECD (2009a, b, c, d), financial literacy is important for the poor because they

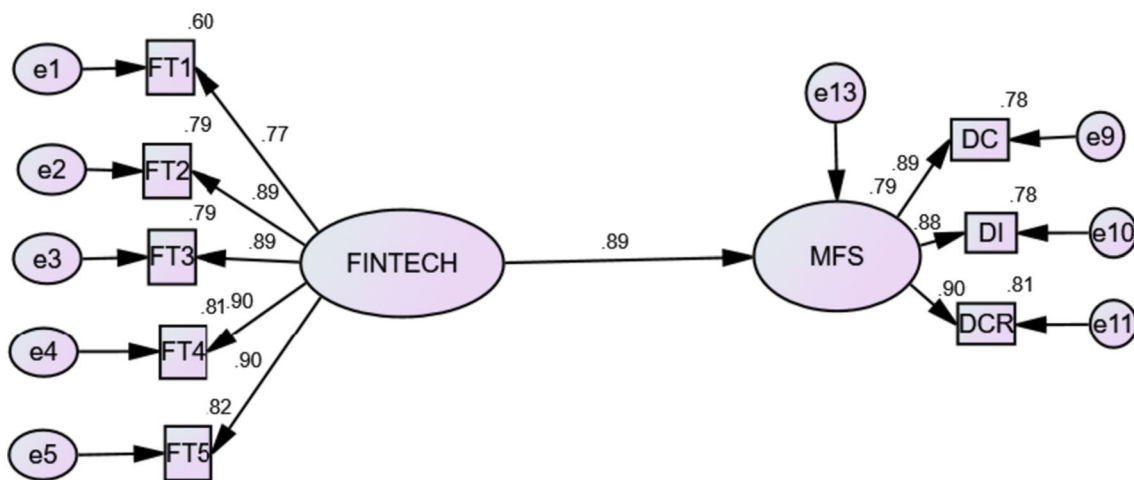


Fig. 4 Path Analysis between fintech adoption and microfinance services

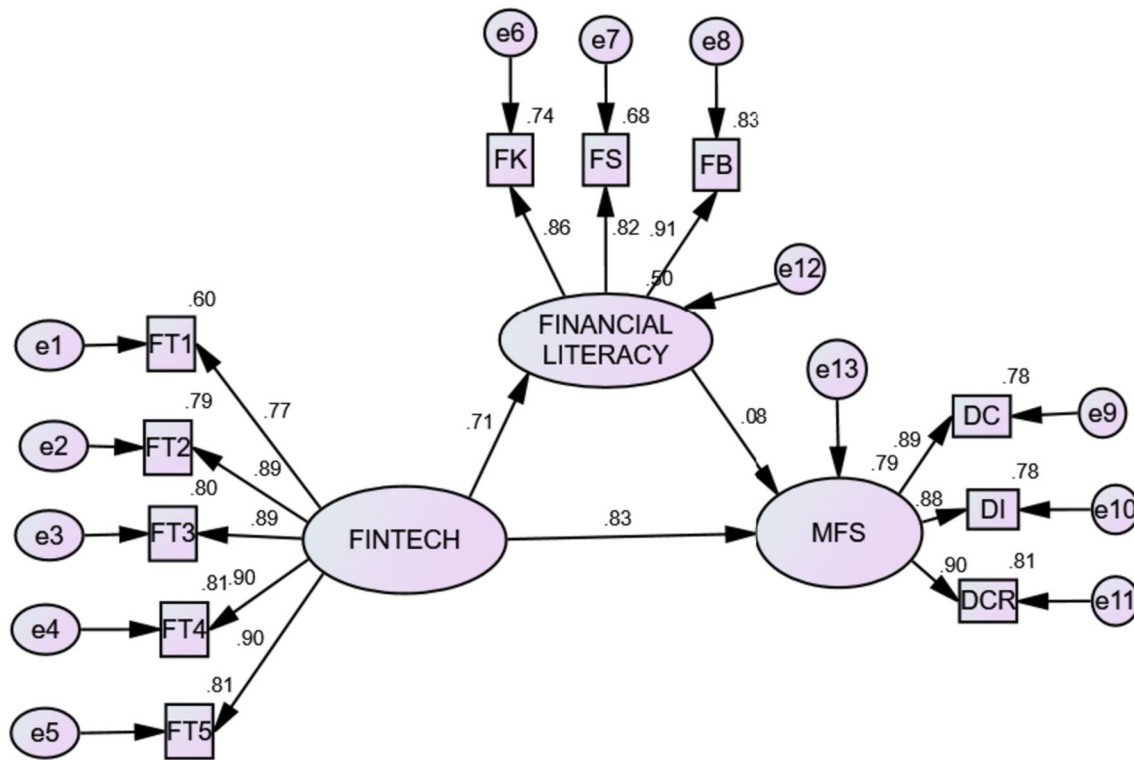


Fig. 5 Structural equation model for mediating effect of financial literacy

live on the edge and are vulnerable to persistent downward financial pressure. Furthermore, according to Braunstein and Welch (2002), financial literacy can provide a better understanding of mainstream financial services, encouraging the unbanked to avoid non-standard financial services. This finding lends support to hypothesis (H3), which states that there is a significant and positive relationship between Financial literacy and Microfinance Services availed by urban borrowers. The findings indicated that the indirect path from fintech adoption to microfinance services through financial literacy was found to be significant ($\beta = 0.053$, $p = 0.000$). It was also found that direct effect of fintech adoption to microfinance services in the presence of mediator financial literacy is found to be statistically significant ($\beta = 0.833$, $p = 0.000$) it shows that there is partial mediation, which supports the H4, which posits that financial literacy significantly and positively mediate the relationship between fintech adoption and microfinance services by urban borrowers. (Banciu et al. 2022). Microfinance has many dimensions, and empirical evidence shows that the penetration and absorption of digital financial services and products leads to poverty reduction. It was suggested that the establishment of financial literacy centers and the promotion of financial literacy advisors will help underprivileged communities understand the benefits of microfinance. (Hasan MM, et al.,

2020) The use of innovative information and communication technologies in a large number of transactions may assist microfinance institutions in making transactions more efficient; however, it may sometimes create critical situations when the customer is not aware of the service, and when financial literacy is a concern. Stack (2008) observes that most financial literacy programs, particularly in developing countries, entail interactive learning within social networks and help the poor to make sound financial decisions. According to Braunstein and Welch (2002), financial literacy can provide a better understanding of mainstream financial services, encouraging the unbanked to avoid non-standard financial services. Figure 3 also demonstrates the results of financial literacy with financial knowledge, financial skills and financial behaviour the beta values ($\beta = 0.86, 0.82$, and 0.91) which signifies financial literacy as a channel through which financial knowledge, skills and behaviour flow to assist the poor in making wise and sound financial decisions and choices. The results are similar to Refera et al. (2016), having better financial literacy and financial capacity leads to better personal financial management, which in turn produces better financial outcomes and behaviour. The impact of digital financial literacy on underprivileged communities has been studied by assessing respondents' financial knowledge and financial behaviour. The world is flat in terms of financial knowledge, that the availability

of complex financial products and high income levels do not automatically translate into a more financially literate populace. Therefore, financial knowledge is required for adding to the financial literacy of an individual. Their poor financial literacy has an effect on how microfinance borrowers save, invest, and handle debt. They are most typically low-income or unstable earners who are more susceptible to economic shocks; hence, financial literacy is critical to their survival. The presence of financial literacy in the relationship boosts the effect of fintech adoption on microfinance services by 5.3%. Overall, a combination of fintech adoption and financial literacy explains 7.9% of microfinance services by the urban poor in Uttar Pradesh (India).

6 Conclusion

Financial literacy advocates and managers of microfinance institutions in urban areas should make use of existing local structures such as community and urban poor. Indeed, financial literacy training programs for the urban poor living in cities and slum areas can be delivered by organizing workshops, seminars, and business clinics. Financial literacy modules could be delivered through the distribution of leaflets, handouts, and manuals to group members during training sessions. Self-Regulatory Organisations (SROs) in the Microfinance Industry can also act as a facilitator for players' technological adoption. Although technological adoption/upgradation has significant benefits, SROs can create a regulatory environment for microfinance institutions by bringing together MFIs to develop common technological best practices, a code of conduct, and platforms that can provide open Application Programme Interfaces (APIs) ensuring that regulatory measures are implemented by market participants. The RBI also suggests that SROs implement initiatives to foster collaboration, foster partnerships, and drive innovation. As MFIs continue to innovate and expand their customer reach through partnerships with FinTechs, stakeholders will put even more emphasis on raising awareness of digital technologies and financial product nuances among last-mile customers. SROs conduct awareness campaigns for industry participants as well as customers, and these campaigns catalyze increasing customer awareness and protection. MFIs frequently work with stakeholders who have little formal education and financial literacy. They have a special challenge in that they must upskill their workforce, including banking correspondents, for efficient last-mile delivery in addition to educating their customers on digital and financial literacy. MFIs can address this by implementing initiatives like structured talent development programs and rewarding banking correspondents and customers for learning and

adapting to the changing business environment. In order to help the poor to make informed decisions about consuming sophisticated financial products and services offered by microfinance service providers, this study emphasizes an alternative theoretical position that explains how financial knowledge and skills can be increased through technology adoption.

7 Limitations and future scope of the work

Results using SEM can be harder to interpret than those from conventional statistical methods. This intricacy may be problematic in microfinance, where it is frequently necessary to have insights that are both clear and actionable. Larger sample sizes are typically needed for SEM in order to get accurate and consistent results. Meeting these sample size requirements can be very difficult in microfinance, because data may be limited due to the specific target demographic or the availability of data. A common assumption in SEM, including AMOS, is multivariate normality. The validity of the findings in microfinance research can be impacted by the fact that financial and economic data may not always follow a normal distribution.

Since the direct path between fintech adoption and microfinance services is found to be significant there is scope for including more variables in the indirect path between fintech adoption and financial literacy. Additionally, this study only included data from low-income households who reside in an urban area, it excluded the poor from the rural area. Future research could therefore make use of the remaining segment of the population that resides in rural areas. Further the study is restricted to Uttar Pradesh, there is scope for future study in states like West Bengal, Tamil Nadu, Bihar and Karnataka which have the highest concentration of microfinance services. The research can also be taken further with inclusion of blockchain technology in microfinance services. (Alketbi et al. 2020) blockchain holds the potential to be a substantial enabler of trust and a crucial tool that will enable the digital transformation and optimization of public services. Government service delivery models are being inspired by innovative ways that blockchain is transforming government operations. Although governments have expressed interest in implementing blockchain technology, the implementation and use cases for government services are still in their infancy and development.

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Declarations

Conflict of interest All authors have no conflicts of interest.

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Informed consent Informed consent was obtained from all individual participants included in the study.

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