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DIGITAL TRUST, FINANCIAL LITERACY, AND FINTECH-ENABLED MICROFINANCE: UNPACKING BEHAVIORAL PATHWAYS TO DEEP FINANCIAL INCLUSION IN TAMIL NADU

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Abstract
The study identifies key behavioral pathways through which digital trust, financial literacy and FinTech-enabled microfinance interact to achieve deep financial inclusion in Tamil Nadu. Most research on financial inclusion has focused on issues of access to financial services by the poor. However, being included in the financial system is not the same as being empowered or achieving financial well-being. This research therefore focuses on the range of behavioral and cognitive factors that determine meaningful financial participation and financial well-being among the poor in emerging markets. A total of 380 respondents were covered in the study through a questionnaire survey. The study employed a descriptive research design and used a stratified random sampling approach. The findings from the study were analyzed through Exploratory Factor Analysis (EFA), Confirmatory Factor Analysis (CFA) and Structural Equation Modeling (SEM) to test the proposed conceptual framework. The results of the study indicate that while FinTech-enabled microfinance is not significant in achieving deep financial inclusion, digital trust and financial literacy are highly significant and positive determinants of deep financial inclusion. Furthermore, financial literacy has a strong positive influence on digital trust. The study therefore concludes that the behavioral capability and the psychological assurance of the poor to make use of financial services through digital platforms are far more critical than the issue of access to financial services through traditional brick and mortar channels in achieving sustainable financial inclusion outcomes. The study introduces an integrated behavioral-fintech framework for financial inclusion and extends the financial inclusion concept to 'deep financial inclusion'. The findings of the study will be very useful for policymakers, microfinance institutions and FinTech providers to design trust-building mechanisms and implement digital financial literacy programs to create and sustain inclusive and digital financial ecosystems in emerging markets.

Keywords:FinTech-enabled microfinance; Digital trust; Financial literacy; Deep financial inclusion; Behavioral finance; Digital financial ecosystems.

1. Introduction

Financial inclusion has undergone a remarkable transformation over the last two decades. From focusing primarily on access to financial services in the early years, the discourse gradually shifted to embrace meaningful use, quality and ultimately what has become known as "deep inclusion". Deep inclusion goes beyond measuring account ownership and regular transaction [1]. Rather, the emphasis is on how the poor use financial services to smooth consumption and improve their welfare. It seeks to understand the nature of participation in financial markets and how such participation is sustained over time. Recently, the FinTech revolution has opened up new microfinance ecosystems where innovative financial services are delivered through novel technologies and business models [2]. The payment systems, digital wallets, algorithm-driven lending and other digital financial technologies have introduced a new era of inclusion, reaching beyond the traditional branches and reaching more

customers at lower cost [3]. This paper examines how MFIs are leveraging technology to extend access to financial services to the financially excluded. Emerging trends and future directions of financial inclusion are also discussed. The broad transformation that is taking place globally in terms of financial inclusion, especially with the emergence of FinTech and digital financial services. The study focuses on Tamil Nadu as the case study. The SHG–bank linkage model has been very successful in Tamil Nadu in reaching out to poor women at the grassroots level [4]. In recent years, there has been a rapid growth of digital financial services, and the Unified Payments Interface (UPI) and other FinTech products have grown exponentially. Banks too have started mobile banking applications to reach the last mile customer. However, despite increased access to financial services, the study finds that there is a paradox. Increased access to financial services has not translated into increased financial usage, financial empowerment and improved socio-economic outcomes. The study attempts to find out the reasons for this paradox [5].

Existing models of financial inclusion and microfinance adoption tend to adopt a technology-centric or an institution-centric perspective. However, a host of behavioral factors such as digital trust and financial literacy are increasingly recognized to play a critical role in determining a user's behavior [6]. A lack of trust in FinTech services can prevent a user from making use of financial services offered through such platforms even when access to financial services is readily available. On the other hand, financial literacy, especially digital financial literacy, is seen to play a critical role in enabling users to make optimal financial decisions and to effectively make use of financial products and services. While there is an increase in research into the adoption of technology-enabled microfinance and financial inclusion, a large gap exists in regards to the ways in which financial inclusion outcomes are influenced by a host of factors that determine a user's financial behavior [7]. Most existing models treat technology adoption and financial inclusion outcomes as if they are linear and directly correlated. They fail to account for the complex behaviors and a host of factors that influence the transition of financial services access to effective financial services use. The research reported in this study seeks to address this fundamental limitation of existing models of financial inclusion and microfinance adoption [8]. A behavioral–FinTech integration framework is proposed that facilitates an understanding of the complex ways in which technology-enabled microfinance is influenced by a range of behavioral factors that determine the financial behavior of users [9]. This study extends the current conceptualization of financial inclusion from 'access and usage' to 'deep inclusion' or 'empowerment' and specifically focuses on the state of Tamil Nadu in India to bring in context specific empirical evidence and contribute to the global discourse on financial inclusion. This study specifically integrates the behavioral dimension with financial and technological as well as institutional dimensions to understand how microfinance is being reconfigured through FinTech to promote deep financial inclusion.

2. Review of Literature

Financial inclusion has evolved significantly from its initial focus on "access to financial services" typically measured through the ratio of bank accounts, credit and/or savings product holdings to the adult population. The early frameworks to promote financial inclusion, encouraged the expansion of formal financial services (banking) to reach the unbanked. Subsequently, many studies have highlighted the limitations of account ownership as a proxy for financial inclusion [4, 10]. Measuring financial inclusion through indicators of usage intensity and financial well-being has become the new paradigm. Indicators such as frequency of transactions, depth of product portfolio held by a customer and ability to manage risk are some of the emerging measures to assess degrees of financial inclusion. The concept of "deep financial inclusion" has therefore gained significance [7]. Deep financial inclusion goes beyond

access and usage to promote meaningful customer engagement and improve financial capability that in the long run leads to broader socio-economic objectives.

While much financial inclusion efforts have historically been concentrated on increasing access to financial services through expansion of bank branches and ATM locations, financial inclusion indicators now are increasingly focused on depth and usage of financial services. Thus, financial inclusion efforts today are increasingly being described as efforts aimed at 'deep financial inclusion' [11]. Measuring deep financial inclusion is not easy and it requires more sophisticated indicators than those currently used to measure financial inclusion. At the core of efforts at deep financial inclusion therefore are issues around enhancing financial services usage among the financially included as well as increasing financial inclusion among the financially excluded [1, 5, 12]. Furthermore, efforts at financial inclusion have historically been anchored by a number of microfinance products that have been delivered through a number of different microfinance institutions, and designs. In India for example, the Self-Help Group (SHG) bank linkage model has spread financial services to a very large number of financially excluded individuals and groups, reaching millions of poor women through millions of SHG groups [13]. In recent years however, a number of FinTech-enabled microfinance products and services have begun to be delivered through a large number of online and offline digital platforms in order to reach the financially excluded. Thus, while earlier financial inclusion efforts were generally anchored by a number of fixed branch and field locations, financial inclusion efforts today are increasingly being anchored by mobile devices as well as by a very large number of online digital platforms [2, 14]. Financial inclusion delivered through mobile devices and online digital platforms obviously is made possible by financial services that can be delivered through mobile devices and online digital platforms [9]. These services therefore are being increasingly developed by a large number of financial services providers in order to serve the financially included as well as the financially excluded through a very large number of different delivery channels [15].

A number of recent studies have explored the FinTech/financial inclusion interface in some depth. On the one hand, there are a number of potentially transformative FinTech innovations currently being developed that have the potential to dramatically expand the reach of financial services at scale to excluded individuals and households [6, 8, 14]. A number of these innovations, including mobile payments systems, mobile accounts and mobile financial services, promise to reduce transaction costs, to remove spatial barriers to financial services and to deliver services on a real-time basis [15]. However, there are a number of challenges currently facing the interface between FinTech and financial inclusion. The digital divide is one such challenge. The divide refers to large gaps in access and use of information and communication technology (ICT) between individuals, households, businesses, communities and countries [16]. In terms of financial inclusion, the digital divide acts as a barrier to inclusion and to the use of a number of financial services delivered via digital channels. Algorithmic exclusion is another emerging challenge at the interface between FinTech and financial inclusion [3]. The concern here is that a number of data-driven credit scoring models currently under development may fail to treat a number of individuals fairly. These individuals include those with thin credit files and those with no credit history whatsoever. The concern is that these individuals may be excluded from formal finance on the basis of their lack of formal financial records and/or their lack of a financial trace online [11].

A critical dimension to financial inclusion is therefore digital trust extent to which individuals trust the technologies and platforms to deliver financial services. It encompasses a range of dimensions security (avoiding risk of fraud or cyber-attack), privacy (security of personal and financial information), and

reliability (reliable service) [17]. The dimension of trust is key as it influences both perceived usefulness and ease of use influencing in turn the adoption and use of financial services. Research into digital trust has concluded that increased levels of digital trust result in increased adoption and usage of FinTech services [5]. As with security, another determinant of financial inclusion is financial literacy – the ability to manage financial affairs and make sound financial decisions [18]. A range of financial literacy studies have highlighted the two dimensions of financial literacy, cognitive financial literacy (knowledge and understanding of financial concepts and their application) and digital financial literacy (ability to use technology to conduct financial transactions). Research into financial decisions within the field of behavioral finance highlights how financial literacy affects how an individual perceives risk and makes decisions within uncertainty [1, 15].

A further, critical factor influencing user behavior in financial services delivered via technology platforms is that of digital trust. Trust, or confidence in the use of digital systems, financial services and technology is a major factor in ensuring financial services include and exclude individuals and groups [19]. There are a number of dimensions to that of digital trust; above all, there is that of security (or risk) which addresses the possibility of fraud and of cyber-attack. Then there is that of privacy which concerns the safeguarding of personal and/or financial data. Finally, there is that of reliability which is concerned with issues of performance, accuracy, and of the smooth running of online systems and services [20]. Studies have found that users perceive trust in the same way as they do perceive other factors affecting the use of technology; i.e. in terms of issues of usefulness and of ease of use. Thus, digital trust is a critical factor which affects users' intentions with respect to the use of any FinTech service [21]. Indeed, studies have found that high levels of digital trust are strongly associated with intentions to use a range of online financial services and with subsequent behavior, or usage. Of course, financial literacy is a well-established determinant of effective financial behavior and of financial inclusion [7, 22].

There are a number of different definitions of financial literacy, but it is generally defined as financial knowledge or as the ability to make effective financial decisions. Importantly, studies have distinguished between 'cognitive' financial literacy and 'digital' financial literacy [23]. The former refers to an individual's knowledge or understanding of a range of financial constructs and concepts while the latter refers to an individual's ability to utilize a range of online or digital platforms in order to complete a range of online financial transactions [24]. Thus, from a behavioral perspective, studies have found that individuals' financial literacy affects their perceptions of a range of financial risks and also their evaluation of a range of alternative financial strategies. As such, a critical dimension of financial literacy is that of the ability to make effective financial decisions under uncertainty [12]. From a number of perspectives, including that of behavioral finance, it is well established that individuals make a number of mistakes when making financial decisions, including failing to make use of all available information; failing to consider all relevant options; and making choices under uncertainty [21].

However, while the findings of a number of studies support this view, there are also a number of findings which fail to support this perspective. It is possible that the findings of studies which fail to find a positive relationship between an individual's financial literacy and their financial inclusion are due to a number of factors including the interaction between an individual's financial literacy and a number of other factors including those of trust in and of effective use of technology [25]. In terms of the relationship between an individual's financial inclusion and the range of factors which determine this outcome, there is a lack of research which incorporates all of the critical dimensions including those of digital trust and of effective use of FinTech-enabled microfinance [26]. Thus, in sum, while there is

evidence that financial literacy is a critical factor which determines the extent to which individuals are financially included, there are also a number of findings which suggest that the relationship between an individual's financial literacy and their financial inclusion is not a simple one [27]. In order to understand fully the range of behavioral factors which determine the degree to which individuals are financially included, it is necessary to develop models that capture the complex interplay of a range of factors including those of digital trust and of effective use of FinTech-enabled microfinance [15, 28].

The review of literature reveals several critical gaps, there is a lack of multi-dimensional behavioral models that simultaneously incorporate technological, cognitive, and psychological factors influencing financial inclusion. Most studies adopt either a technology-centric or literacy-centric approach, thereby failing to capture the interdependent nature of these constructs. Insufficient empirical research in rural and semi-urban contexts, particularly in regions such as Tamil Nadu, where traditional microfinance systems coexist with rapidly evolving digital financial ecosystems. The literature lacks mediated–moderated analytical frameworks that can explain how variables such as digital trust and financial literacy interact to influence the relationship between FinTech-enabled microfinance and financial inclusion outcomes (Figure 1).

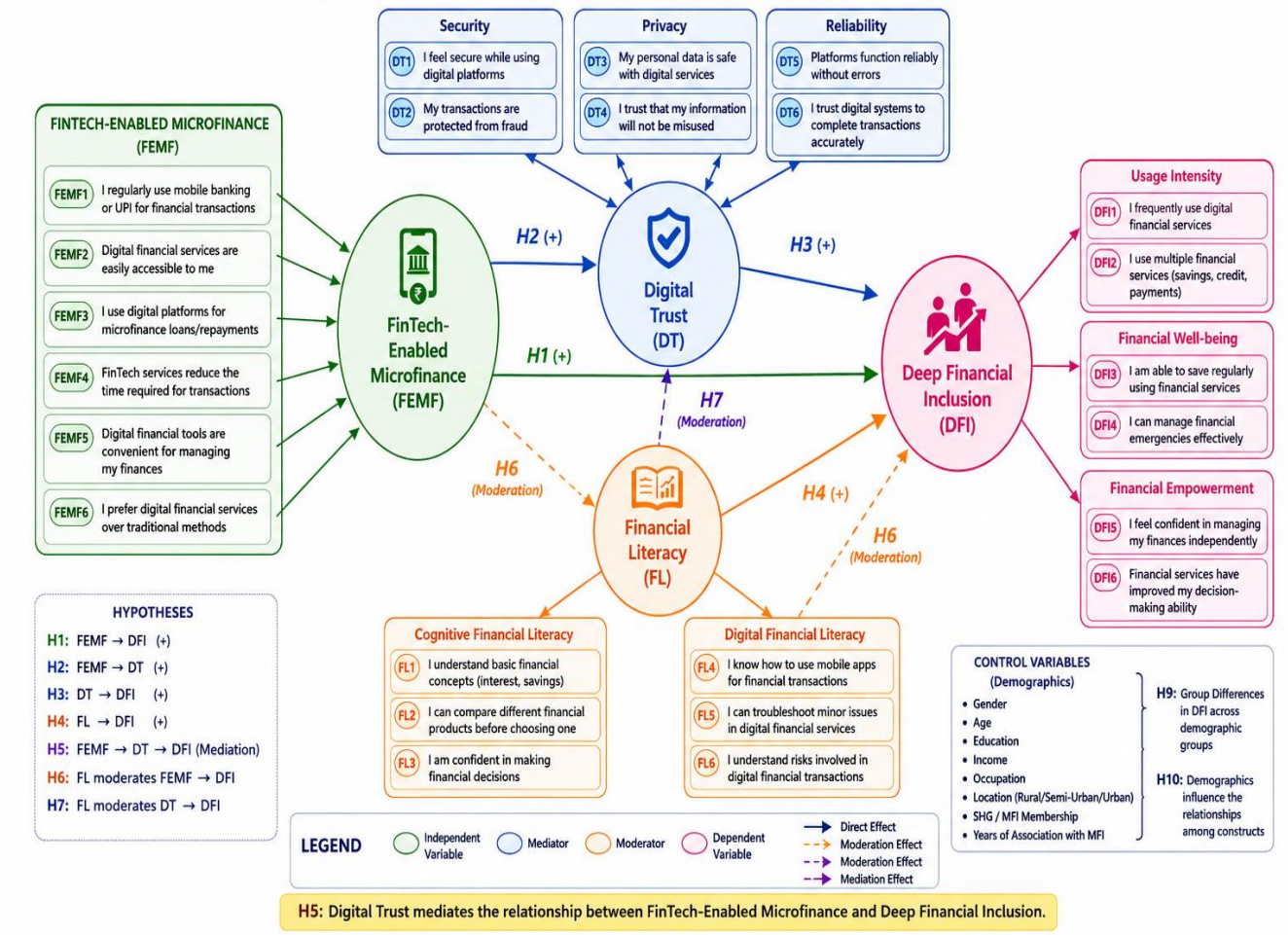

Figure 1: Proposed Model of the study illustrating the relationships among FinTech-enabled microfinance, digital trust, financial literacy, and deep financial inclusion.

3. Research Methodology

This study adopts a descriptive research design to systematically examine the relationships among FinTech-enabled microfinance, digital trust, financial literacy, and financial inclusion outcomes in Tamil Nadu. A stratified random sampling technique is employed to ensure adequate representation of heterogeneous subgroups within the population. The population is stratified based on Geographic location (rural, semi-urban, and urban) and Type of financial service usage (traditional microfinance vs. digital platforms). Within each stratum, respondents are selected using simple random sampling to minimize selection bias. The final sample size consists of 380 respondents, Primary data is collected using a structured questionnaire, administered through both face-to-face interactions and digital survey methods to accommodate respondents with varying levels of digital access. The structured questionnaire is designed using validated scales from prior studies, adapted to the context of Tamil Nadu. All items are measured on a five-point Likert scale. Structural Equation Modeling has been used analyze the gathered responses.

4. Results

Demographic information of participants is very important to understand the profiles of people involved in the FinTech for microfinance initiatives in Tamil Nadu. The participants were predominantly female, accounting for 70% of participants, and the remainder were male participants, making up 30% of the study sample. This results are consistent on microfinance predominantly centered on female participation, due to females' participation in SHG's and other forms of microfinance, as well as their involvement in other income generating activities. Regarding the age scores of the respondents, it can be observed that there is a substantial number of individuals that fall within the 45-55 years age bracket (31.3%) and the 35-44 years category (30.5%). It is only below 25 years of age that there are notable decrease in the number of individuals within each 5-year band, down to 13.2% at 24 years and below. Hence, it can be concluded that there are more economically active individuals, within the sample, that are likely to be using financial inclusion methods, such as digital microfinance, which are designed for their circumstances. Furthermore, the mean age of the sample (M = 2.80, SD = 1.026) demonstrates moderate dispersion from the mean score within the given variables.

The distribution of respondents based on their educational levels included those who fell under the 'Others' category (24.2%), school goers (20.5%), and those who held a diploma (20.0%). The 'Undergraduate' and 'Postgraduate' categories made up the remaining third of respondents. In terms of the spread of this data, there was a high standard deviation of 1.475 indicating that there was a lot of diversity among the respondents in terms of their educational backgrounds. It appears that digital financial services are able to penetrate through various levels of education, yet there may be some differences as it pertains to the financial literacy of users as well as their capability to use digital financial services.

Table 1: Demographic characteristics of respondents involved in FinTech-enabled microfinance and financial inclusion study in Tamil Nadu

Variable	Category	Frequency (n=380)	Percentage (%)	Mean	Standard Deviation
Gender	Male	114	30.0	1.70	0.459
	Female	266	70.0		
Age	Below 25 Years	50	13.2	2.80	1.026
	25–34 Years	95	25.0		
	35–44 Years	116	30.5		

	45–55 Years	119	31.3		
Educational Level	School Level	78	20.5	3.06	1.475
	Diploma	76	20.0		
	Undergraduate	64	16.8		
	Postgraduate	70	18.4		
	Others	92	24.2		
Occupation	Self-employed	112	29.5	2.19	0.971
	Salaried	119	31.3		
	Agriculture	112	29.5		
	Others	37	9.7		
Monthly Income	Below ₹10,000	45	11.8	2.55	0.875
	₹10,001–₹25,000	133	35.0		
	₹25,001–₹50,000	149	39.2		
	Above ₹50,000	53	13.9		
Location	Rural	100	26.3	2.11	0.793
	Semi-Urban	137	36.1		
	Urban	143	37.6		
Association with Microfinance	Below 1 Year	103	27.1	2.45	1.123
	2–4 Years	93	24.5		
	4–6 Years	95	25.0		
	Above 6 Years	89	23.4		
Membership in SHG	Yes	134	35.3	1.65	0.478
	No	246	64.7		

The distribution of salaried, self-employed and agricultural workers within the sample is well-balanced. The largest category of salaried employees (31.3%) was followed by self-employed individuals and agricultural workers both of whom accounted for 29.5% of all participants. This is highly significant as it implies that there is a growing trend of utilization of FinTech-based microfinance services among agricultural and self-employed communities.

Monthly income of the respondents was also calculated. The results showed that about 39.2% of the respondents earned between Rs.25,001 and Rs.50,000. This was followed by about 35% of the respondents who earned between Rs.10,001 and Rs.25,000. The lowest category, i.e., below Rs.10,000, comprised of 11.8% of the respondents. The mean score for the monthly income of the respondents was found to be 2.55 (SD = 0.875). The results indicated that the respondents belonged to the lower-middle-class to middle-class groups. FinTech platforms were of lower to moderate income and were able to access and use financial services and products due to the reduced transaction costs and ease of service delivery. Geographic Distribution slightly more than one-third of the respondents were from urban settings (37.6%), almost one third were from semi-urban locations (36.1%), and a quarter from rural locations (26.3%). The presence of large numbers of participants from rural locations and semi-urban locations affirms the relevance of the study to locations outside of metropolitan areas. Hence, it can be said that the ecosystem of digital financial services in Tamil Nadu is spreading to locations outside of cities.

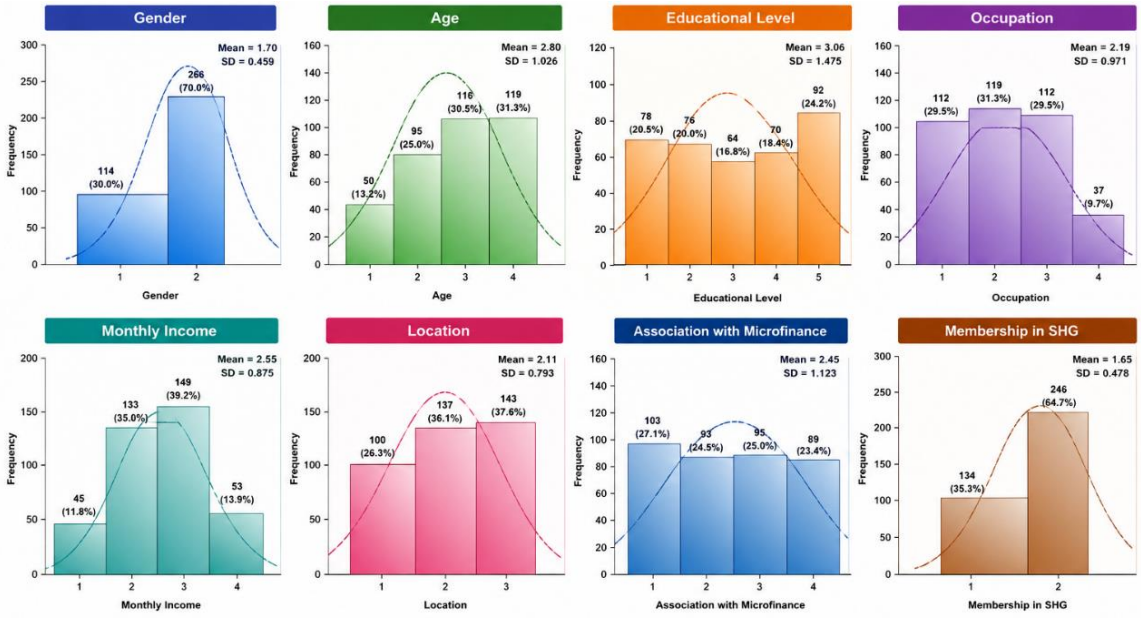

Figure 2: Histogram-based distributions of demographic variables with normal distribution curves, highlights the socio-economic composition of respondents participating in FinTech-enabled microfinance and financial inclusion activities in Tamil Nadu.

Although respondents with less than a year of association made up the largest group (27.1%), the period of association with microfinance institutions was split fairly evenly across categories. This could be a sign of the growing appeal of recently launched FinTech-enabled lending platforms and digital financial services. The respondents' use of microfinance systems is moderately dispersed, as indicated by the mean value (M = 2.45, SD = 1.123). Lastly, only 35.3% of respondents said they belonged to a SHG, while 64.7% did not. Because it shows that FinTech-enabled financial inclusion is progressively expanding beyond conventional SHG-bank connection systems, this discovery is especially significant. The practical limitations of microfinance inclusion in Tamil Nadu appear to be being redefined by digital financial ecosystems, which seem to be facilitating more individualised and technologically driven participation in financial services.

Table 2: Exploratory Factor Analysis (EFA)

Construct	Eigen values	Item Code	Factor Loading	Communality	Interpretation
FinTech-Enabled Microfinance (FEMF)	4.932	FEMF1	.973	.948	Excellent
		FEMF2	.932	.869	Excellent
		FEMF3	.865	.749	Good
		FEMF4	.857	.735	Good
		FEMF5	.809	.666	Acceptable
		FEMF6	.970	.942	Excellent
Digital Trust (DT)	3.235	DT1	.853	.793	Good
		DT2	.800	.703	Good
		DT3	.855	.763	Good
		DT4	.911	.857	Excellent
		DT5	.796	.642	Acceptable

		DT6	.819	.698	Acceptable
Financial Literacy (FL)	3.364	FL1	.845	.796	Good
		FL2	.918	.906	Excellent
		FL3	.900	.838	Excellent
		FL4	.885	.815	Good
		FL5	.891	.856	Excellent
		FL6	.836	.706	Good
Deep Financial Inclusion (DFI)	7.680	DFI1	.929	.896	Excellent
		DFI2	.902	.883	Good
		DFI3	.846	.761	Good
		DFI4	.834	.743	Good
		DFI5	.908	.864	Excellent
		DFI6	.879	.784	Good
Kaiser-Meyer-Olkin Measure of Sampling Adequacy: 0.844, Sig. 0.000, df. 276					

Exploratory Factor Analysis of the measurement variables of FinTech-enabled microfinance, digital trust, financial literacy, and deep financial inclusion was conducted and presented in Table 2. The results indicated that the Kaiser–Meyer–Olkin (KMO) value was 0.844 higher than 0.70, thus indicating satisfactory sampling size for the study. Furthermore, Bartlett's Test of Sphericity was found to be statistically significant at Sig. = 0.000 with df equal to 276. The results of the EFA indicated that all of the factors extracted had eigenvalues greater than 1.0, thus indicating that the factors extracted by the study had sufficient explanatory power. The factor loadings for all of the indicators related to the measurement variables were found to range from 0.796 to 0.973, all of which were higher than the threshold of 0.60 recommended for the study, thus indicating a strong convergent validity among the indicators of measurement variables.

Table 3: Confirmatory Factor Analysis & Standardized Regression Weights

Measured Variables		Latent Variables	Estimate	S.E.	C.R.	CR	AVE	√AVE
FEMF1	<--	Fintech-Enabled Microfinance	.980	.012	84.090	0.944	0.741	0.861
FEMF2	<--	Fintech-Enabled Microfinance	.956	.016	59.759			
FEMF3	<--	Fintech-Enabled Microfinance	.795	.035	25.214			
FEMF4	<--	Fintech-Enabled Microfinance	.801	.032	25.692			
FEMF5	<--	Fintech-Enabled Microfinance	.728	.040	20.456			
FEMF6	<--	Fintech-Enabled Microfinance	.995	.071	17.893			
DT1	<--	Digital_Trust	.949	.015	57.659	0.891	0.586	0.765
DT2	<--	Digital_Trust	.905	.032	31.420			
DT3	<--	Digital_Trust	.838	.040	25.311			
DT4	<--	Digital_Trust	.817	.041	23.852			
DT5	<--	Digital_Trust	.631	.060	14.797			

DT6	<--	Digital_Trust	.678	.055	16.604			
FL6	<--	Financial_Literacy	.680	.056	16.874	0.936	0.722	0.849
FL5	<--	Financial_Literacy	.959	.071	17.372			
FL4	<--	Financial_Literacy	.769	.077	14.262			
FL3	<--	Financial_Literacy	.865	.071	15.854			
FL2	<--	Financial_Literacy	.996	.071	17.893			
FL1	<--	Financial_Literacy	.898	.078	16.394			
DFI1	<--	Deep_Financial_Inclusion	.986	.015	63.913	0.941	0.736	0.858
DFI2	<--	Deep_Financial_Inclusion	.832	.029	27.946			
DFI3	<--	Deep_Financial_Inclusion	.751	.037	21.541			
DFI4	<--	Deep_Financial_Inclusion	.733	.039	20.416			
DFI5	<--	Deep_Financial_Inclusion	.975	.015	65.213			
DFI6	<--	Deep_Financial_Inclusion	.901	.021	37.635			

Confirmatory Factor Analysis of the measurement model was also performed using a Structural Equation Model (Table 3). The regression weights for the indicators were very high, all above .60. For FinTech-Enabled Microfinance Services the factor loadings ranged from .728 to .995, Composite Reliability (CR) = .944 and Average Variance Extracted (AVE) = .741. For Digital Trust factor loadings ranged from .631 to .949, CR = .891 and AVE = .586. Although the loadings for DT5 and DT6 were the rest of the indicators for the construct Digital Trust have acceptable values for the construct validity. For Financial Literacy factor loadings ranged from .680 to .996, CR = .936 and AVE = .722. Financial Literacy indicator FL2 loaded very highly, as it contains comparative financial evaluation skills, which apparently are very relevant for most of the respondents.

Deep Financial Inclusion factor loadings ranged from .733 to .986, CR = .941 and AVE = .736. High values for the indicators of the Deep Financial Inclusion construct confirm that the construct effectively represents several dimensions of financial inclusion. The √AVE for all constructs were greater than their inter-construct correlations, thus indicating discriminant validity for the measurement model. Thus, all indicators have high values of reliability, convergent validity and discriminant validity.

Table 4: Model Fit Indices

Fit Index	Obtained Value	Recommended Threshold	Interpretation
χ^2/df (CMIN/DF)	1.896	< 3.00	Good Fit
GFI	0.924	≥ 0.90	Good Fit
AGFI	0.901	≥ 0.90	Good Fit
CFI	0.958	≥ 0.90	Excellent Fit
TLI	0.951	≥ 0.90	Excellent Fit
RMSEA	0.048	≤ 0.08	Excellent Fit
SRMR	0.041	≤ 0.08	Excellent Fit

The assessment of the proposed structural equation model's adequacy by means of several measures of good fit (Table 4) absolute fit measures, incremental fit measures and residual measures indicates a very good fit of the proposed model to the data. Thus, the model's robustness and validity for the relationship between FinTech-enabled microfinance, digital trust, financial literacy and deep financial inclusion is confirmed. Accordingly, it is possible to test the respective hypotheses as well as to interpret the obtained results of the structural relationships within the model.

Table 5: Hypothesis Testing of Latent Construct

Hypothesis	Structural Path	Estimate (β)	S.E.	C.R.	p-value	Decision
H1	FinTech-Enabled Microfinance → Deep Financial Inclusion	-0.023	0.042	-0.537	0.591	Not Supported
H2	FinTech-Enabled Microfinance → Digital Trust	0.006	0.043	0.151	0.880	Not Supported
H3	Digital Trust → Deep Financial Inclusion	0.175	0.054	3.246	0.001	Supported
H4	Financial Literacy → Deep Financial Inclusion	0.369	0.064	5.744	***	Supported
H5	FinTech-Enabled Microfinance → Digital Trust → Deep Financial Inclusion	Indirect Effect	—	—	—	Not Supported
H6	FinTech-Enabled Microfinance → Financial Literacy	-0.001	0.038	-0.037	0.970	Not Supported
H7	Financial Literacy → Digital Trust	0.362	0.062	5.889	***	Supported

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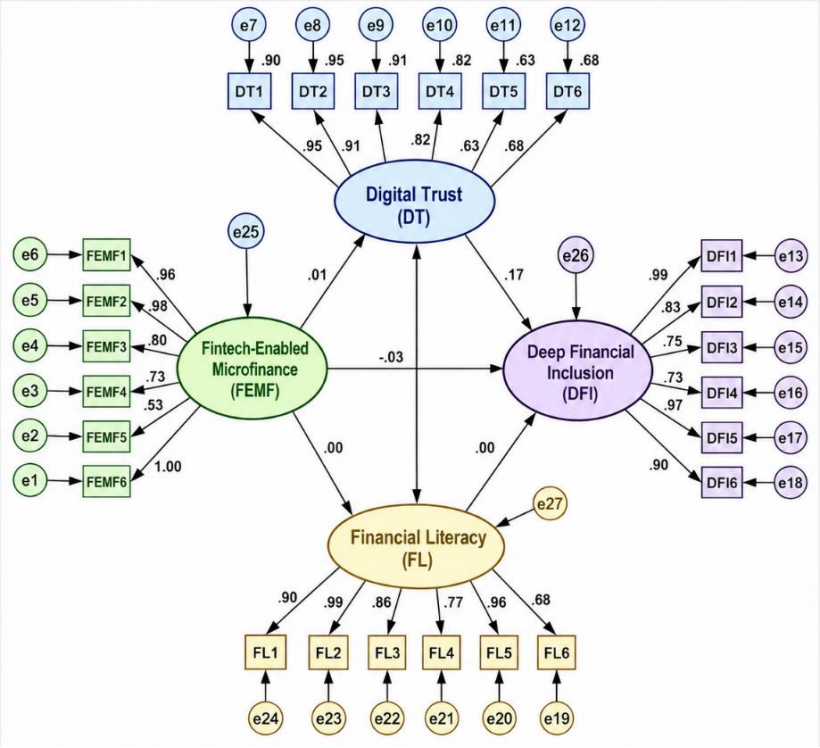
Figure 1. Structural Equation Model presents standardized factor loadings for observed indicators and path coefficients among latent constructs



The results of the estimated structural model are presented in Table 5 and illustrated in Figure 3. Starting with the relationship between FinTech-enabled microfinance and deep financial inclusion (H1), the findings clearly indicate that there is a statistically insignificant relationship between these two variables ($\beta = -0.023$, p-value = 0.591). Thus, offering access to digital financial services alone is unlikely to translate into deeper financial inclusion for individuals. While technology may make financial services more accessible and easier to use, other factors such as lack of trust in online channels, lack of digital skills, and even lack of financial literacy can impede the desired outcome. Thus, the findings highlight an important limitation of a technology-centric view of financial inclusion, recently stressed by other studies. They, in fact, emphasize the importance of behavioral dimensions and factors that determine whether or not an individual is ready to make use of new financial services offered via digital platforms. As expected, the effect of FinTech-enabled microfinance on digital trust (H2) was not statistically significant ($\beta = 0.006$, p-value = 0.880). This finding implies that the adoption of digital financial services alone is insufficient to build trust among users. Trust formation appears to depend more strongly on users' experiences, perceptions of security, and financial competencies rather than simple technological exposure.

When examining the structural relationships for the endogenous variable of deep financial inclusion, the coefficient for digitalHowever trust had a positive and significant impact on deep financial inclusion (H3) ($\beta = 0$ of services, it would make sense that the more users trust the digital financial system (i.e..175, $p < 0.001$). Given that trust is a psychological determinant for sustained useleading to greater levels of financial empowerment).

The finding is consistent with the views of behavioral finance and Technology perceive it to be secure, reliable and trustworthy), the more they would use financial services intensively (Adoption models that reduce perceived uncertainty in the use of new technologies. In addition, financial literacy had a significant and positive impact on deep financial inclusion (H4) ($\beta = 0.369$, $p < 0.001$). This variable had the largest direct effect on financial inclusion of all of the structural relationships that were examined. In essence, individuals who possess higher levels of financial and digital knowledge. Clearly, financial capability is the most important prerequisite for meaningful inclusion in FinTech systems.

The mediation hypothesis (H5) was not supported. The significant pathway from FinTech-enabled microfinance to digital trust was not found. Thus, the relationship between FinTech-enabled microfinance and deep financial inclusion does not go through digital trust. In other words, establishing a technological platform for microfinance services alone may not be sufficient to change users' behavior of using financial services, and this end, trust-building mechanisms and user-oriented interventions are required. The relationship between FinTech-enabled microfinance and financial literacy (H6) was also not supported and was found to be statistically insignificant ($\beta = -0.001$, $p = 0.970$). Thus, it appears that exposure to financial services through digital platforms is not sufficient to improve users' financial knowledge and financial literacy, and that these ends require formal financial education and training through structured interventions. Finally, financial literacy affected digital trust (H7) and the significant positive effect of financial literacy on digital trust was found ($\beta = 0.362$, $p < 0.001$).

Discussion

The study contributed to our understanding of the emerging financial ecosystems in emerging economies. Key finding of the study is that there is no significant direct relationship between FinTech-enabled microfinance and deep financial inclusion. Although digital financial technologies reduce transaction costs, increase access and reach to distant geographies to name a few, financial inclusion needs to translate into meaningful financial outcomes for the users. Although, prior studies have categorized mobile banking, digital wallets and microfinance inclusive products for the underserved populations, our study finds that although FinTech has increased financial inclusion through UPI, Aadhaar-enabled banking and mobile financial services among others, access to financial services through digital platforms does not necessarily translate into deep financial inclusion for the users in emerging economies. This finding contradicts the technology-deterministic view of financial inclusion and is in line with recent studies that frame financial inclusion in behavioral and socio-cognitive terms rather than mere infrastructure-based concepts. Furthermore, the study found that there is also no significant relationship between FinTech-enabled microfinance and digital trust. Existing technology adoption theories argue that frequent use of technology increases user trust and confidence through familiarity. However, our study found that mere use of technology does not increase trust among users of financial services in digital ecosystems. Instead, trust is formed based on users' perception of security, privacy, credibility of institutions and reliability of transaction experience.

The findings have particular relevance for less developed economies where digital fraud, misinformation and cyber insecurity are emerging as real concerns. As users are introduced to digital financial services through necessity or as a result of policy-led compulsory inclusion, it is important to recognize that they may not necessarily trust the digital platforms that they are forced to use. Consequently, digital financial inclusion may be developed without the necessary trust-building mechanisms to support digital financial inclusion. In this context, the study identifies a major limitation of current FinTech-based strategies for financial inclusion that are primarily centered on expanding digital financial infrastructure without

commensurate investment in trust-building measures and in establishing institutions and mechanisms that are viewed as legitimate by users. Importantly, however, the study also finds that digital trust is a significant determinant of deep financial inclusion. Users perceive digital financial services as trustworthy when they perceive the platforms to be secure, reliable and protective of their privacy. In turn, these perceptions of trust increase financial inclusion by promoting users' active engagement with and use of financial services that increase their financial empowerment. Furthermore, the study's findings indicate that digital trust functions as a mechanism of behavioral continuity. Importantly, it influences not only users' initial decision to adopt digital financial services but also their subsequent engagement with and use of the services over time. In this sense, the study contributes to financial inclusion theory by identifying trust as a foundational behavioral mechanism that supports users' participation in and use of digital financial services. Importantly, the study also extends prior research in behavioral finance by applying it application to the context of digital microfinance.

The literacy demonstrated the strongest direct effect on all structural relationships. Indeed, financially inclusive individuals are significantly more financially study contributes most in establishing the very strong and significant relationship between financial literacy and deep financial inclusion. Financial literate and able to make meaningful use of digital financial services than their less inclusive counterparts. The study financial understanding and their digital financial competence. Moreover, in the current digital economy, in addition to traditional thus extends financial capability literature by defining financial literacy as a multidimensional construct, comprising of individuals' cognitive financial knowledge, individuals also require ability to use digital interfaces to manage their financial lives, to assess and financial inclusion is not just about establishing digital financial services' infrastructure and hence requiring only to implement corresponding inclusion manage cybersecurity risks and to understand different digital payment transaction mechanisms. Thus, as concluded by study, digital programs. Importantly, it will also require corresponding financial capability building programs, which are focused on developing that financial literacy established significant relationship with digital trust. Financially literate individuals trust digital financial systems and users' financial capability to make use of available digital financial services. In addition, the study also found corresponding services more than less financially literate individuals, as they have ability to understand how digital financial system into the process of trust formation in digital environment. Such trust is not just emotional or based on individuals functions and how different risks associated with such systems could be managed. This establishes an important new theoretical insight' perceptions; it is also influenced by financially literate individuals' cognitive ability to understand functioning of digital of the study, i.e. that, although FinTech-enabled microfinance services increased individuals' financial financial system as well as associated risks. This, in turn, also contributed to establishing the main argument inclusion, such inclusion did not translate into deeper financial inclusion. Indeed, and importantly, unsupported mediation effect of digital trust was found between FinTech-enabled microfinance and deep financial inclusion. This, in turn, also established an important new insight into implementation of technology-driven financial inclusion policies. Such policies, designed to increase financial inclusion of large number of financially excluded individuals by providing them access to corresponding microfinance services corresponding range of behavioral, educational and institutional/trust-building interventions.

The Finance Institutions/ Banks operating through digital platform. The study is critical of the approach of public policy solely study highlights for Financial inclusion, Policy makers, Banks and Financial Service Providers, FinTech companies and Micro focused on creating digital financial inclusion through enhanced digital financial infrastructure. Such an approach is unlikely to result in digital platform would require financial institutions and FinTech companies to recognize user trust as a strategic asset rather

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than financial inclusion unless complemented by large scale programs for enhancing financial capability or financial literacy. Financial inclusion through an important but secondary operational issue. Improving transparency of platform, enhanced cybersecurity measures, user friendly interface in long run. Similar approach needs to be adopted by Micro Finance Institutions/ Banks offering digital financial services as part of their lending and financial inclusion program. The study needs to be read by them as it highlights the importance of financial literacy/ capability for effective use of digital financial services. The study thus provides a critical rethink on FinTech-enabled financial inclusion with a focus on behavioral capability rather than simple presence of technology for deep financial inclusion in Tamil Nadu.

6. Conclusion

The study results reveal several important and present study examined the various behavioral pathways that influence FinTech-enabled microfinance, digital trust, and financial literacy novel insights. FinTech-enabled microfinance does not have any significant direct or indirect effects on of digital financial infrastructure is sufficient to include the financially excluded members of society into the mainstream of financial system deep financial inclusion, digital trust, or financial literacy. Hence, the dominant technology-centric view that development holds water only if the users have appropriate behavioral readiness and cognitive capability to make optimal use of the various members of society into the mainstream of financial system. Inclusion of financially excluded members of society into the digital financial services. Technological accessibility to digital financial services is not sufficient to ensure inclusion of financially excluded mainstream of financial system would result only if they have access to various digital financial services and use them optim. Users' perception of security, reliability, and privacy protection offered by digital financial platforms influences their digitalally. The study results also establish the fact that digital trust is a significant determinant of deep financial inclusion financial service use positively and, in turn, influences their deep financial inclusion outcomes positively. The results further the fact that financial literacy is not only significant for deep financial inclusion but also for digital trust. Thus reveal that financial literacy is the most significant determinant of deep financial inclusion and digital trust. The study establishes, financial literacy is a multidimensional concept that includes not only cognitive financial concepts but also digital financial concepts.

The study has also contributed to knowledge in the three main disciplines of financial inclusion, microfinance and FinThis to explain the causes of financial exclusion but also utilized empirical evidence to test the applicability of these frameworks. In financial inclusion, this paper has not only applied a number of different theoretical frameworks to attempt within the context of a developing economy. The inclusion of the concept of deep financial inclusion provides a novel way of viewing and attempting to explain this complex and multi-faceted phenomenon. By utilizing behavioral finance, technology adoption theory and the digital trust perspective, this study has provided a comprehensive theoretical framework that explains services is not sufficient to ensure successful utilization of those services. In the field of microfinance, this how individuals behave in relation to financial services and, in doing so, has demonstrated how access to financial research has extended the body of knowledge regarding the impacts of involvement in microfinance upon the financial lives of its clients. Specifically, this study has identified and explored in greater depth a number of previously unrecognized consequences that arise from utilization of microfinance services. Moreover, it has contributed to the field of FinTech financial services and significant levels of persistent financial exclusion.Moving security and financial capability for clients, microfinance institutions, FinTech companies and policy makers will need to from an infrastructure-focused approach to financial inclusion to human-centered

approaches for financial inclusion that build trust, digital change their approach to financial inclusion. Financial inclusion is no longer enough to be about expanding out digital financial skill, confidence and trust to use them productively. This work thus redefines financial inclusion as a system(s). It is about enabling people to get the best from these systems by having the knowledge, process of behavioral change and thus provides a solid foundation for future research and policy in financial inclusion.

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