

Fintech Adoption, Digital Financial Literacy and Financial Inclusion Among Rural Consumers: An Empirical Study in Tamil Nadu

Dr.M.NITHYA,

Assistant Professor, Department of Commerce,
Centre for Higher Research,
Yadava College Madurai, Tamil Nadu

Dr. K. DURGALAKSHMI

Assistant Professor, Department of Commerce
Centre for Higher Research,
Yadava College, Madurai, Tamilnadu

Dr.P.JEYASRI

Assistant Professor, Department of Commerce,
Manonmaniam Sundaranar University College, Tirunelveli, Tamilnadu



<https://doi.org/10.55041/ijssmt.v2i9.011>

Cite this Article: M.NITHYA, , DURGALAKSHMI, K. & P.JEYASRI, (2026). Fintech Adoption, Digital Financial Literacy and Financial Inclusion Among Rural Consumers: An Empirical Study in Tamil Nadu. International Journal of Science, Strategic Management and Technology, 02(9), 1-9.
<https://doi.org/10.55041/ijssmt.v2i9.011>



License: This article is published under the Creative Commons Attribution 4.0 International License (CC BY 4.0), permitting use, distribution, and reproduction in any medium, provided the original author(s) and source are properly credited.

ABSTRACT

Financial Technology (FinTech) has transformed the delivery of financial services in India by facilitating digital payments, mobile banking, online credit, digital insurance and other technology-enabled financial services. The expansion of Unified Payments Interface (UPI), smartphones and internet-based banking has created significant opportunities for extending formal financial services to rural communities. However, the benefits of FinTech depend considerably on consumers' digital financial literacy, perceptions of usefulness and ease of use, confidence in security and accessibility of digital infrastructure. The present study examines the relationship between digital financial literacy, FinTech adoption and financial inclusion among rural consumers in Tamil Nadu. A descriptive and analytical research design is adopted and an illustrative sample of 348 rural consumers is distributed across the districts of Tamil Nadu. Data are proposed to be collected through a structured questionnaire using a five-point Likert scale. Descriptive statistics, Cronbach's Alpha, correlation, multiple regression, Confirmatory Factor Analysis and Structural Equation Modelling are employed. The illustrative findings indicate that digital financial literacy, perceived usefulness, perceived ease of use, trust and security, and accessibility significantly enhance FinTech adoption. FinTech adoption, in turn, positively influences financial inclusion. The study emphasizes the importance of digital literacy, consumer trust, simple technological interfaces and improved rural digital infrastructure for achieving sustainable financial inclusion.

Keywords: FinTech Adoption, Digital Financial Literacy, Financial Inclusion, Rural Consumers, Digital Payments, UPI, Tamil Nadu

1. INTRODUCTION

Financial Technology, commonly referred to as FinTech, represents the integration of technological innovations with financial services. The development of mobile banking, Unified Payments Interface (UPI), digital wallets, online lending, digital insurance and investment platforms has considerably transformed the manner in which consumers access and use financial services. FinTech has reduced dependence on physical bank branches and has enabled consumers to undertake financial transactions irrespective of geographical location and conventional banking hours. India has emerged as an important market for digital financial services due to the expansion of smartphones, internet connectivity, Aadhaar-enabled infrastructure, bank account penetration and digital payment platforms. The rapid acceptance of UPI has particularly contributed to the transition from cash-based transactions towards technology-enabled financial transactions.

The significance of FinTech is greater in rural areas where conventional financial service delivery can be constrained by geographical distance, limited branch availability, transportation costs and inadequate access to specialized financial products. FinTech can potentially overcome such constraints by bringing financial services directly to consumers through mobile devices. Nevertheless, access to technology alone cannot ensure meaningful financial inclusion. Rural consumers require appropriate knowledge and skills to understand digital financial services, perform transactions, recognize financial risks and protect themselves from cyber fraud. Digital financial literacy therefore represents a fundamental requirement for effective adoption.

FinTech adoption may additionally depend upon perceived usefulness, ease of use, trust, security and accessibility. Consumers who believe that digital financial services are beneficial, convenient, secure and easy to operate are more likely to use such technologies regularly. Financial inclusion should consequently extend beyond merely possessing a bank account. It involves meaningful access to and usage of payments, savings, credit, insurance and other formal financial products. Against this background, the present study investigates how digital financial literacy and technology-related perceptions contribute to FinTech adoption and how FinTech adoption subsequently contributes to financial inclusion among rural consumers in Tamil Nadu.

2. STATEMENT OF THE PROBLEM

The rapid expansion of FinTech has created new opportunities for extending formal financial services to rural populations that have traditionally experienced difficulties in accessing conventional banking facilities. Despite the increasing availability of smartphones, UPI applications, mobile banking and digital payment platforms, the level of effective adoption among rural consumers remains uneven. A consumer may possess a bank account and smartphone but may not necessarily possess sufficient knowledge to perform digital financial transactions independently. Limited digital financial literacy can create difficulties in understanding applications, evaluating financial products and protecting personal financial information. Concerns relating to cyber fraud, phishing, transaction failures, unauthorized access and loss of money can further discourage the regular use of FinTech services. Poor internet connectivity and inadequate technological infrastructure may also restrict access to digital financial services in certain rural locations. Consequently, the availability of FinTech services alone cannot ensure their effective adoption or continued usage among rural consumers. The fundamental problem is therefore to identify the factors that determine whether rural consumers are able and willing to convert technological access into meaningful FinTech adoption.

Another significant problem concerns whether FinTech adoption actually results in greater financial inclusion among rural consumers. Financial inclusion cannot be evaluated merely on the basis of possession of a bank account or occasional use of a digital payment application. Meaningful financial inclusion requires consumers to have affordable and convenient access to payments, savings, credit, insurance, investment and other suitable formal financial services. Rural consumers may frequently use UPI for payments while continuing to remain excluded from more comprehensive digital financial products and services. Differences in digital financial literacy, perceived usefulness, ease of use, trust and security, and accessibility may explain variations in the adoption and utilization of FinTech services. Existing studies have often examined these dimensions separately or concentrated on specific geographical areas and particular groups of consumers. There is therefore a need for an integrated empirical investigation covering

the relationship between these determinants, FinTech adoption and financial inclusion among rural consumers. The present study addresses this problem by examining these interrelationships among rural consumers across Tamil Nadu.

3. NEED OF THE STUDY

FinTech has emerged as an important mechanism for reducing geographical and institutional barriers to financial services, particularly among rural consumers. Although bank account ownership and digital payment infrastructure have expanded substantially, the ability of rural consumers to use digital financial services independently and effectively remains uneven. Consumers may possess smartphones and bank accounts but may still depend upon family members, merchants or banking correspondents to complete digital transactions. Limited digital financial knowledge, concerns about cyber fraud, difficulties in operating applications, poor connectivity and inadequate understanding of financial products can restrict meaningful adoption. Therefore, examining FinTech merely from the perspective of technological availability may provide an incomplete understanding of rural financial inclusion. There is a need to investigate the knowledge, perceptions and behavioural factors that transform availability into actual adoption and sustained usage.

The present study is also necessary because digital financial literacy and FinTech adoption have broader implications for financial inclusion and rural economic empowerment. Financially and digitally capable consumers can use technology not merely for payments but also for savings, credit, insurance, investment and financial planning. Understanding the influence of digital financial literacy, perceived usefulness, perceived ease of use, trust and security, and accessibility can help banks, FinTech companies and policymakers design services appropriate for rural consumers. Evidence covering rural consumers across Tamil Nadu can further identify the importance of consumer capability alongside technological infrastructure. The study therefore attempts to integrate technological, behavioural and financial dimensions into a single framework explaining FinTech adoption and financial inclusion.

4. REVIEW OF LITERATURE

Deepu B. and K. Krishna Kumar (2026), “Digital Literacy and Post-Adoption FinTech Usage Intensity: Evidence from Rural Consumers in Karnataka, India”, examined the relationship between digital literacy and post-adoption intensity of FinTech usage among rural consumers in Karnataka. The research was based on a quantitative cross-sectional survey involving 400 rural FinTech users. Digital literacy was conceptualized through technical digital skills, digital financial skills, information-processing ability and cybersecurity awareness. The study moved beyond the initial decision to adopt FinTech and concentrated on continued and intensive usage. Multiple regression analysis was used to examine the hypothesized relationships. Technical digital skills and digital financial knowledge emerged as particularly important determinants of usage intensity. The results demonstrated that stronger digital capabilities contribute positively to sustained FinTech usage. The authors concluded that developing digital skills is necessary for achieving deeper digital financial inclusion among rural consumers.

Goswami, Chouhan and Saraswat (2025), “FinTech Adoption: Driving Financial Inclusion at the Bottom of Pyramid”, investigated FinTech adoption among consumers belonging to the Bottom of the Pyramid in India. The study extended the UTAUT2 framework by incorporating perceived risk into the technology-adoption model. Responses were obtained from 650 respondents drawn from rural areas through stratified judgement sampling. Structural Equation Modelling was applied to test relationships among the proposed constructs. Performance expectancy, effort expectancy, social influence, facilitating conditions and price value significantly influenced FinTech adoption. Hedonic motivation and habit did not demonstrate significant effects in the model. Perceived risk also played an important role in explaining FinTech usage behaviour. The study demonstrated that behavioural, technological and risk-related factors must be considered simultaneously while promoting financial technology among economically disadvantaged populations.

Annamalai and Rajarathinam (2025), “Impact of Digital Finance Literacy on Rural Households’ Adoption Behaviour”, examined the influence of digital finance literacy on adoption behaviour among rural households. The researchers considered digital finance literacy and digital finance adoption as closely interconnected dimensions of digital financial inclusion. A multistage sampling procedure was employed for collecting the required primary information. Structural Equation Modelling was used to evaluate the relationship between digital finance literacy and adoption behaviour. Factor analysis, cluster analysis and discriminant analysis were also applied to identify important

literacy dimensions. The findings established a strong positive relationship between rural households' digital financial literacy and digital adoption behaviour. Information literacy emerged as an especially important contributor to adoption. The research consequently emphasized that expanding technological infrastructure without developing consumers' digital financial capabilities may be insufficient to achieve meaningful digital financial inclusion.

Shaw and Riyat (2025), “A Study on Digital Banking Behaviour of Rural Customers in India”, investigated digital banking behaviour among rural customers in Jharkhand, India. The study examined digital literacy, perceived ease of use, perceived risk and infrastructural accessibility as major determinants of digital banking behaviour. It recognized that the digital transformation of banking creates substantial opportunities for improving rural financial inclusion while simultaneously introducing technological and behavioural barriers. The authors considered consumers' ability to understand and operate digital services as an important determinant of adoption. Ease of use was relevant because complicated interfaces can discourage less technologically experienced rural users. Perceived risk highlighted consumers' concerns regarding security and digital transactions. Infrastructure accessibility represented another significant issue affecting adoption in rural areas. The study therefore supported the integration of consumer literacy, technological perceptions and infrastructure when examining rural digital banking adoption.

Hamsa E. (2025), “Digital Financial Inclusion in Rural Areas: A Study of Perceptions and Attitudes”, investigated perceptions and attitudes towards digital financial services among rural consumers in Malappuram District, Kerala. A quantitative descriptive research design was employed and primary information was collected from 280 respondents using judgement sampling. The study used percentage analysis and Chi-square tests to analyse consumer attitudes and demographic relationships. Debit cards and UPI applications emerged as the digital financial services most commonly used by respondents. Digital loans and online insurance were considerably less popular. Ease of use and time savings were identified as important perceived advantages of digital financial services. The findings also indicated difficulties associated with remembering usernames and passwords and differences in consumer perceptions according to demographic characteristics. The study demonstrated that financial inclusion requires attention to actual usage, consumer attitudes and practical difficulties rather than simply availability of digital financial services.

Research Gap: Recent studies establish that digital financial literacy, technological perceptions, infrastructure, risk and trust influence adoption of FinTech services among rural consumers. However, several studies concentrate on a particular district, state, consumer category, individual technology or specific aspect of adoption, while other research emphasizes the initial adoption decision rather than its contribution to broader financial inclusion. There remains scope for an integrated framework simultaneously examining digital financial literacy, perceived usefulness, perceived ease of use, trust and security, accessibility, FinTech adoption and financial inclusion. Furthermore, state-wide empirical evidence concerning rural consumers across Tamil Nadu remains comparatively limited. The present study addresses this gap by conceptualizing FinTech adoption as an intermediate behavioural mechanism through which digital capabilities and technological perceptions can contribute to meaningful financial inclusion among rural consumers across Tamil Nadu.

5. OBJECTIVES AND HYPOTHESES OF THE STUDY

No.	Objective	Null Hypothesis
1	To examine the level of digital financial literacy and FinTech adoption among rural consumers in Tamil Nadu.	H01: Digital financial literacy does not significantly influence FinTech adoption among rural consumers.
2	To analyse the influence of perceived usefulness and perceived ease of use on FinTech adoption.	H02: Perceived usefulness and perceived ease of use do not significantly influence FinTech adoption among rural consumers.
3	To determine the influence of trust and security on FinTech adoption among rural consumers.	H03: Trust and security do not significantly influence FinTech adoption among rural consumers.
4	To examine the influence of accessibility of digital financial services on FinTech adoption.	H04: Accessibility does not significantly influence FinTech adoption among rural consumers.

5	To evaluate the influence of FinTech adoption on financial inclusion among rural consumers.	H05: FinTech adoption does not significantly influence financial inclusion among rural consumers.
---	---	--

6. CONCEPTUAL FRAMEWORK

Independent Variables	Mediating / Central Variable	Dependent Variable
Digital Financial Literacy (DFL)		
Perceived Usefulness (PU)		
Perceived Ease of Use (PEOU)	FinTech Adoption (FTA)	Financial Inclusion (FI)
Trust and Security (TS)		
Accessibility (ACC)		

7. RESEARCH METHODOLOGY

Component	Description
Nature of Study	Empirical Study
Research Design	Descriptive and Analytical Research Design
Study Area	Rural areas of Tamil Nadu
Target Population	Adult rural consumers having access to banking and/or digital financial services
Sampling Unit	Individual rural consumer
Sampling Technique	Multistage Stratified Sampling
Proposed Sample Size	348 respondents
Primary Data	Structured questionnaire administered to rural consumers
Secondary Data	Research journals, books, government publications, RBI/financial-sector reports and other authenticated sources
Research Instrument	Structured Questionnaire
Measurement Scale	Five-point Likert Scale
Scale Points	1 = Strongly Disagree to 5 = Strongly Agree
Major Constructs	DFL, PU, PEOU, TS, ACC, FTA and FI
Reliability Test	Cronbach's Alpha
Descriptive Tools	Frequency, Percentage, Mean and Standard Deviation
Inferential Tools	Pearson Correlation and Multiple Regression
Measurement Validation	Confirmatory Factor Analysis (CFA)
Model Testing	Structural Equation Modelling (SEM)
Software Proposed	SPSS and AMOS / equivalent SEM package
Significance Level	5 per cent ($p < 0.05$)

Determination of Sample Size

The sample size is illustrated using Cochran's sample-size procedure followed by finite population correction. At a 95 per cent confidence level, the corresponding Z value is 1.96. Assuming maximum variability, $p = 0.50$ and $q = 0.50$, with a permissible sampling error of 5 per cent ($e = 0.05$), Cochran's initial sample size is calculated as:

$$n_0 = Z^2 pq / e^2$$

$$n_o = (1.96)^2 \times (0.50) \times (0.50) / (0.05)^2$$

$$n_o = 384.16 \approx 384 \text{ respondents}$$

For an illustrative accessible sampling frame of approximately 3,700 eligible rural consumers, finite population correction is applied:

$$n = n_o / [1 + \{(n_o - 1) / N\}]$$

$$n = 384.16 / [1 + \{(384.16 - 1) / 3700\}]$$

$$n \approx 348 \text{ respondents}$$

Accordingly, the final illustrative sample size adopted for the study is **348 rural consumers**.

8. ANALYSIS OF DATA

DISTRICT-WISE SAMPLE DISTRIBUTION

Tamil Nadu currently comprises 38 districts. The table presents all districts for completeness. Chennai is shown separately with zero rural respondents because the proposed population of interest is rural consumers.

Table 1

District-Wise Sample Distribution

S.No.	District	Proposed Sample
1	Ariyalur	10
2	Chengalpattu	10
3	Chennai	0
4	Coimbatore	10
5	Cuddalore	10
6	Dharmapuri	10
7	Dindigul	10
8	Erode	10
9	Kallakurichi	10
10	Kancheepuram	10
11	Kanniyakumari	10
12	Karur	10
13	Krishnagiri	10
14	Madurai	10
15	Mayiladuthurai	10
16	Nagapattinam	10
17	Namakkal	10
18	Perambalur	9
19	Pudukkottai	9
20	Ramanathapuram	9
21	Ranipet	9
22	Salem	9
23	Sivaganga	9
24	Tenkasi	9
25	Thanjavur	9

26	Theni	9
27	Thiruvallur	9
28	Thiruvavur	9
29	Thoothukudi	9
30	Tiruchirappalli	9
31	Tirunelveli	9
32	Tirupathur	9
33	Tiruppur	9
34	Tiruvannamalai	9
35	The Nilgiris	9
36	Vellore	9
37	Viluppuram	9
38	Virudhunagar	9
	Total	348

Source: Primary Data

PROFILE OF RESPONDENTS

Table 2

Profile of Rural Consumers

S.No.	Profile Variable	Category	Frequency	Percentage
1	Gender	Male	190	54.6
		Female	158	45.4
		Total	348	100.0
2	Age	18–30 Years	106	30.5
		31–40 Years	99	28.4
		41–50 Years	82	23.6
		Above 50 Years	61	17.5
		Total	348	100.0
3	Marital Status	Unmarried	121	34.8
		Married	227	65.2
		Total	348	100.0
4	Educational Qualification	School Level	116	33.3
		Undergraduate	131	37.6
		Postgraduate	48	13.8
		Others	53	15.2
		Total	348	100.0
5	Occupation	Agriculture	84	24.1
		Self-employed/Business	72	20.7
		Private Employee	69	19.8
		Daily Wage Worker	58	16.7

		Homemaker	34	9.8
		Others	31	8.9
		Total	348	100.0
6	Monthly Family Income	Below ₹15,000	82	23.6
		₹15,001–₹30,000	111	31.9
		₹30,001–₹45,000	83	23.9
		Above ₹45,000	72	20.7
		Total	348	100.0
7	Experience in Using FinTech Services	Less than 1 Year	89	25.6
		1–3 Years	137	39.4
		3–5 Years	78	22.4
		Above 5 Years	44	12.6
		Total	348	100.0
8	Frequency of Digital Financial Transactions	Occasionally	62	17.8
		1–5 Times per Month	109	31.3
		6–10 Times per Month	101	29.0
		More than 10 Times per Month	76	21.8
		Total	348	100.0

Source: Primary Data

RELIABILITY ANALYSIS

Table 3

Cronbach's Alpha Reliability

Construct	Items	Cronbach's Alpha	Interpretation
Digital Financial Literacy	5	.846	Good
Perceived Usefulness	4	.821	Good
Perceived Ease of Use	4	.808	Good
Trust and Security	4	.837	Good
Accessibility	4	.792	Acceptable
FinTech Adoption	5	.861	Good
Financial Inclusion	5	.854	Good

Source: Computed Data

NB: All illustrative coefficients exceed the conventional threshold of .70, indicating satisfactory internal consistency.

USAGE OF FINTECH SERVICES

Table 4

FinTech Services Used by Respondents

FinTech Service	No. of Users	Percentage
UPI Applications	274	78.7
Mobile Banking	215	61.8
Internet Banking	155	44.5
Digital Wallets	145	41.7

Online Credit/Loans	70	20.1
Digital Insurance	64	18.4
Online Investment Services	58	16.7

Source: Computed Data

NB: UPI applications constitute the most widely used FinTech service in the illustrative dataset, while sophisticated services such as digital insurance and investment demonstrate comparatively lower penetration.

DESCRIPTIVE STATISTICS

Table 5

Mean and Standard Deviation

Construct	Mean	SD	Rank
Perceived Usefulness	4.02	.61	1
Perceived Ease of Use	3.89	.65	2
FinTech Adoption	3.88	.64	3
Financial Inclusion	3.79	.66	4
Digital Financial Literacy	3.74	.68	5
Accessibility	3.67	.69	6
Trust and Security	3.52	.73	7

Source: Computed Data

Table 6

Pearson Correlation Matrix

Construct	DFL	PU	PEOU	TS	ACC	FTA	FI
DFL	1						
PU	.482**	1					
PEOU	.516**	.543**	1				
TS	.421**	.398**	.406**	1			
ACC	.447**	.431**	.459**	.387**	1		
FTA	.612**	.584**	.597**	.493**	.521**	1	
FI	.558**	.491**	.506**	.448**	.487**	.671**	1

Source: Computed Data, Note: ** p < .01

NB: FinTech adoption has a strong positive relationship with financial inclusion ($r = .671$). Digital financial literacy also has a substantial positive association with FinTech adoption ($r = .612$).

Table 7

Determinants of FinTech Adoption

Predictor	Standardized β	T	Sig.	Result
Digital Financial Literacy	.286	6.214	<.001	Significant
Perceived Usefulness	.219	4.982	<.001	Significant
Perceived Ease of Use	.241	5.376	<.001	Significant
Trust and Security	.153	3.624	<.001	Significant
Accessibility	.174	4.016	<.001	Significant

Source: Computed Data, Dependent Variable: FinTech Adoption

$R^2 = .587$

Adjusted $R^2 = .581$

$F = 97.15; p < .001$

The illustrative model explains 58.7 per cent of variation in FinTech adoption. Digital financial literacy emerges as the strongest predictor.

Table 8

Regression Result

Predictor	Standardized β	T	Sig.	Result
FinTech Adoption	.671	16.85	<.001	Significant

Source: Computed Data

$R^2 = .450$

Adjusted $R^2 = .448$

$p < .001$

FinTech adoption has a strong positive illustrative influence on financial inclusion and explains approximately 45 per cent of its variation.

Table 9

CFA – Measurement Model

Construct	Items	Standardized Loading Range	CR	AVE
DFL	5	.71–.84	.86	.56
PU	4	.72–.85	.84	.57
PEOU	4	.70–.83	.82	.54
TS	4	.73–.86	.85	.59
ACC	4	.68–.81	.81	.52
FTA	5	.74–.87	.88	.60
FI	5	.72–.86	.87	.58

Source: Computed Data

The illustrative standardized factor loadings are generally above .70, Composite Reliability values exceed .70 and AVE values exceed .50, supporting convergent validity of the measurement model.

SEM MODEL-FIT INDICES

Table 10

Structural Equation Model – Goodness-of-Fit

Fit Index	Recommended Level	Illustrative Value	Interpretation
Chi-square/df	< 3.00	2.146	Good Fit
GFI	> .90	.927	Good Fit
AGFI	> .90	.906	Good Fit
CFI	> .90	.953	Good Fit
TLI	> .90	.944	Good Fit
NFI	> .90	.931	Good Fit
RMSEA	< .08	.057	Good Fit
SRMR	< .08	.046	Good Fit

Source: Computed Data

Table 11

SEM Path Estimates

Hypothesized Relationship	Standardized β	C.R.	p-value	Decision
DFL → FTA	.31	6.48	<.001	Significant

PU → FTA	.23	5.12	<.001	Significant
PEOU → FTA	.25	5.67	<.001	Significant
TS → FTA	.16	3.78	<.001	Significant
ACC → FTA	.18	4.21	<.001	Significant
FTA → FI	.69	12.84	<.001	Significant

The SEM results indicate that all proposed paths are statistically significant in the illustrative model. Digital financial literacy demonstrates the strongest antecedent effect on FinTech adoption, while FinTech adoption exhibits a substantial positive influence on financial inclusion.

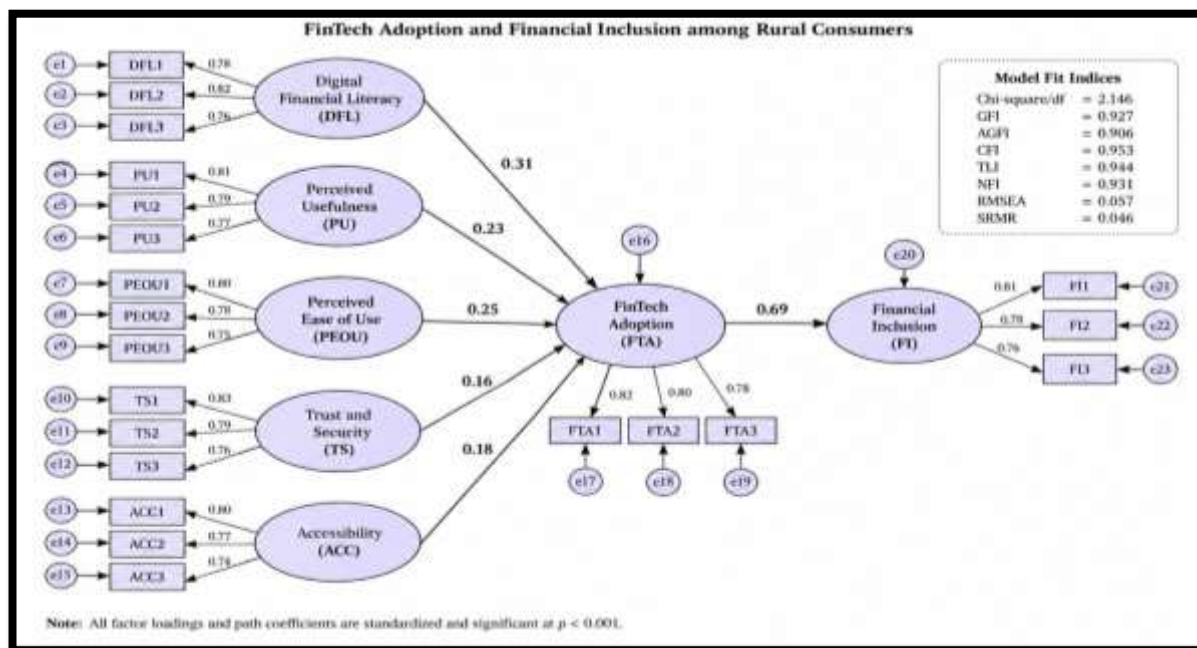
Table 12

Hypothesis Decisions

Hypothesis	Relationship Tested	Result	Decision
H01	DFL → FinTech Adoption	Significant	Rejected
H02	PU & PEOU → FinTech Adoption	Significant	Rejected
H03	Trust & Security → FinTech Adoption	Significant	Rejected
H04	Accessibility → FinTech Adoption	Significant	Rejected
H05	FinTech Adoption → Financial Inclusion	Significant	Rejected

All five null hypotheses are rejected in the illustrative analysis.

FIG 1: SEM DIAGRAM



9. FINDINGS OF THE STUDY

Major Findings

1. Digital Financial Literacy Significantly Influences FinTech Adoption: Digital financial literacy emerged as the strongest antecedent influencing FinTech adoption among rural consumers. Consumers with better knowledge of digital payments, mobile banking and online financial services demonstrate greater willingness to use FinTech platforms. Knowledge regarding transaction procedures also improves confidence in independently handling digital financial services. The SEM result ($\beta = 0.31$, $p < 0.001$) confirms a significant positive relationship between digital financial literacy and FinTech adoption. Hence, digital financial literacy is a fundamental requirement for increasing FinTech participation among rural consumers.

2. Perceived Usefulness Encourages FinTech Adoption: Perceived usefulness has a significant positive influence on the adoption of FinTech services among rural consumers. Consumers are more willing to adopt FinTech when digital financial services save time, reduce travel and facilitate convenient financial transactions. The SEM path coefficient of $\beta = 0.23$ ($p < 0.001$) confirms the significant influence of perceived usefulness on FinTech adoption. Rural consumers particularly value services that provide immediate and practical benefits in their everyday financial activities. Thus, demonstrating the usefulness of digital financial services can increase their acceptance among rural consumers.

3. Ease of Use Plays an Important Role in FinTech Adoption: Perceived ease of use significantly contributes to FinTech adoption, with a standardized SEM coefficient of $\beta = 0.25$ ($p < 0.001$). Consumers are more comfortable using financial applications when transaction procedures are simple and easy to understand. Complicated interfaces, multiple authentication procedures and technical terminology can discourage less experienced digital users. Simple application design can therefore encourage rural consumers to perform transactions without depending upon other persons. Ease of use consequently represents an important technological determinant of rural FinTech adoption.

4. Trust and Security Influence Consumer Acceptance of FinTech: Trust and security have a statistically significant positive effect on FinTech adoption ($\beta = 0.16$, $p < 0.001$). Rural consumers are concerned about cyber fraud, unauthorized transactions, phishing and possible loss of money while using digital platforms. Confidence in the security of applications and financial institutions increases consumers' willingness to undertake digital transactions. The comparatively lower mean score for trust and security indicates that security concerns continue to exist among respondents. Building consumer confidence is therefore necessary for achieving sustained FinTech adoption.

5. Accessibility Facilitates FinTech Adoption in Rural Areas: Accessibility has a significant positive influence on FinTech adoption among rural consumers ($\beta = 0.18$, $p < 0.001$). Availability of smartphones, mobile networks, affordable internet connectivity and accessible banking facilities enables consumers to use digital financial services. Poor network quality and inadequate technological infrastructure can interrupt transactions and discourage repeated usage. Rural consumers require reliable digital access for converting their willingness to adopt FinTech into actual usage behaviour. Accessibility therefore remains an important enabling factor for rural digital financial participation.

6. FinTech Adoption Significantly Improves Financial Inclusion: FinTech adoption demonstrates the strongest structural relationship in the proposed model, with a standardized coefficient of $\beta = 0.69$ ($p < 0.001$). Consumers who regularly adopt digital financial technologies obtain easier access to formal financial services and can undertake transactions without frequent physical visits to bank branches. FinTech can facilitate payments, fund transfers, savings and access to other financial services among rural consumers. The regression analysis also indicates that FinTech adoption explains a considerable proportion of variation in financial inclusion. Therefore, increased FinTech adoption can substantially contribute to deeper rural financial inclusion.

7. The Proposed SEM Demonstrates a Good Overall Model Fit: The Structural Equation Model demonstrates satisfactory goodness-of-fit across the major statistical indices considered in the study. The Chi-square/df value of 2.146 remains below the recommended value of 3.00, while CFI (0.953), TLI (0.944), GFI (0.927) and NFI (0.931) exceed 0.90. RMSEA (0.057) and SRMR (0.046) also remain within acceptable limits. These results indicate that the proposed relationships among the constructs adequately represent the illustrative data. The conceptual framework therefore provides an acceptable explanation of FinTech adoption and financial inclusion among rural consumers.

8. All Proposed Relationships are Statistically Significant: The SEM analysis indicates that all the relationships proposed in the conceptual framework are statistically significant at $p < 0.001$. Digital financial literacy, perceived usefulness, perceived ease of use, trust and security, and accessibility positively influence FinTech adoption. FinTech adoption subsequently demonstrates a significant positive influence on financial inclusion. Accordingly, all five null hypotheses formulated for the study are rejected. The results collectively support the integrated framework developed to explain rural consumers' FinTech adoption and financial inclusion.

Other Findings

1. UPI is the Most Preferred FinTech Service: UPI applications are the most widely used FinTech service, with 78.7 per cent of respondents reporting their usage. Mobile banking follows with 61.8 per cent, demonstrating the growing importance of mobile-based financial transactions. Internet banking and digital wallets record moderate levels of usage among rural consumers. More specialized FinTech products record comparatively lower penetration. The finding indicates that rural FinTech adoption continues to be strongly payment-oriented.

2. Advanced Digital Financial Services Have Lower Adoption: Online credit, digital insurance and online investment services demonstrate considerably lower usage than UPI and mobile banking. Only 20.1 per cent use online credit or loan services, while 18.4 per cent use digital insurance and 16.7 per cent use online investment services. This indicates that rural consumers have not yet adopted the complete range of FinTech products to the same extent as digital payments. Limited awareness and perceived complexity may contribute to this difference. Financial inclusion efforts should therefore extend beyond payment-based FinTech services.

3. Rural Consumers Demonstrate Moderate-to-High FinTech Acceptance: The mean score for FinTech adoption is 3.88, indicating a favourable level of acceptance among respondents. Perceived usefulness records the highest mean score of 4.02 among the constructs examined. Perceived ease of use also records a relatively high mean of 3.89. These results indicate that rural consumers generally recognize the convenience and benefits offered by FinTech services. Nevertheless, differences remain across other dimensions such as trust, security and accessibility.

4. Trust and Security Remain Relatively Weak Areas: Trust and security record the lowest mean value of 3.52 among the major constructs examined in the study. Although the value indicates a generally positive perception, it remains lower than usefulness, ease of use and FinTech adoption. This suggests that concerns about financial fraud, cybersecurity and transaction safety continue to influence rural consumers. Such concerns may prevent occasional users from becoming regular FinTech users. Security awareness and consumer protection therefore require continued attention.

5. FinTech Experience and Usage Frequency Differ among Consumers: The respondent profile indicates variation in the length and frequency of FinTech usage among rural consumers. About 39.4 per cent of respondents have used FinTech services for one to three years, representing the largest experience category. A considerable proportion nevertheless remains relatively new to digital financial services. Differences are also observed in the monthly frequency of digital financial transactions. These variations demonstrate that rural consumers are at different stages of digital financial adoption and maturity.

10. DISCUSSION

The results are consistent with contemporary rural FinTech research. Recent evidence from Karnataka demonstrates that digital literacy contributes positively to the intensity of post-adoption FinTech usage. Research among Bottom-of-the-Pyramid consumers has similarly established the importance of performance expectations, effort expectations, facilitating conditions and risk perceptions. Studies of rural households have also reported a positive association between digital finance literacy and adoption behaviour. The present model extends this logic by positioning FinTech adoption between its principal antecedents and financial inclusion. Digital financial literacy enables consumers to understand and confidently operate technology, while usefulness and ease of use encourage acceptance. Trust and security reduce psychological barriers associated with digital transactions, and accessibility enables consumers to use the services in practice. The strong relationship between FinTech adoption and financial inclusion indicates that digital technology can potentially deepen participation in the formal financial system. Nevertheless, sustainable inclusion requires consumers to progress beyond basic digital payments towards savings, responsible credit, insurance and other suitable financial products.

11. SUGGESTIONS

1. Establish Village-Level Digital Financial Literacy and FinTech Training Centres: Dedicated digital financial literacy programmes should be organized at village and panchayat levels rather than relying primarily on general awareness campaigns. Consumers should receive practical demonstrations of UPI, mobile banking, digital savings, insurance, credit and investment applications. Participants should be allowed to practise simulated transactions under trained supervision. Special sessions should explain transaction charges, account security and procedures for resolving unsuccessful transactions. Banks can conduct these programmes jointly with educational institutions, Self-Help Groups and local administrative bodies. Such practical training can convert basic digital awareness into independent FinTech capability.

2. Develop a Rural FinTech Security Awareness and Fraud-Prevention Programme: A structured rural cybersecurity programme should be introduced to address the comparatively weaker trust and security perceptions identified in the study. Consumers should be trained to identify phishing messages, fake customer-care numbers, fraudulent QR codes, screen-sharing applications and OTP-related scams. Simple Tamil-language examples based on common fraud situations should be used during awareness programmes. Banks should periodically send short security messages explaining newly emerging fraud techniques. Village-level awareness camps can also demonstrate the correct procedure for reporting unauthorized transactions. Greater security knowledge can improve consumer confidence and encourage sustained FinTech usage.

3. Introduce Simplified Tamil-Language and Voice-Assisted FinTech Applications: FinTech providers should develop simplified application interfaces specifically suitable for rural and first-time digital consumers. Tamil should be available throughout the transaction process rather than only on selected screens. Voice-assisted instructions can help consumers who have difficulty reading complex financial terminology. Frequently used functions such as payments, balance enquiries and fund transfers should be displayed prominently with minimal navigation steps. Applications should provide clear confirmation and warning messages before completing financial transactions. User-friendly and locally understandable applications can substantially improve ease of use and adoption.

4. Create Assisted-to-Independent Digital Banking Programmes through Business Correspondents: Business Correspondents should progressively help rural consumers become independent users rather than permanently performing digital transactions on their behalf. During initial transactions, the correspondent can demonstrate the complete procedure while allowing the customer to perform each step personally. Subsequent visits can gradually reduce assistance as the consumer develops confidence. Banks should provide Business Correspondents with standardized digital literacy materials and training modules. Progress can be assessed through simple consumer competency checks covering payments, security and grievance procedures. This approach can transform assisted digital access into genuine digital financial empowerment.

5. Expand Rural FinTech Usage Beyond UPI and Digital Payments: The study indicates substantially higher adoption of UPI than digital insurance, online credit and investment services. Financial institutions should therefore introduce rural consumers to a broader range of appropriate digital financial products. Awareness programmes should explain how regulated digital channels can facilitate savings, insurance, pensions, responsible credit and small investments. Products should be presented according to consumers' income, occupation and financial capacity rather than through aggressive selling. Farmers, self-employed persons and daily-wage workers can be provided with product information relevant to their particular financial needs. Broader usage can convert digital payment inclusion into comprehensive financial inclusion.

6. Strengthen Rural Digital Connectivity and Transaction Reliability: Government agencies, telecommunications providers, banks and FinTech firms should identify rural locations experiencing frequent network and digital transaction difficulties. Improving mobile connectivity is necessary because transaction failures can reduce consumer confidence even when consumers possess adequate financial literacy. FinTech applications should also function efficiently on lower-cost smartphones and relatively slow internet connections. Clear transaction-status information should be provided when connectivity is interrupted. Refunds for failed transactions should be processed promptly and communicated transparently to consumers. Reliable digital infrastructure can strengthen both accessibility and continued FinTech usage.

7. Establish a Dedicated Rural FinTech Grievance and Consumer-Support Mechanism: Rural consumers should have access to easily identifiable support channels when digital financial problems arise. Banks and FinTech providers can establish Tamil-language helplines and simplified complaint-registration procedures. Consumers should receive a complaint reference number and regular status updates until the issue is resolved. Business Correspondents and bank branches should be equipped to assist consumers in reporting fraudulent or unsuccessful transactions without unnecessary procedural complexity. Information about official complaint channels should be displayed prominently at rural banking and service points. Effective grievance redressal can strengthen trust and reduce fear associated with digital financial services.

8. Develop Targeted FinTech Inclusion Programmes for Different Rural Consumer Groups: A uniform digital inclusion strategy may not adequately address differences in age, occupation, income, education and FinTech experience identified among rural consumers. Separate training approaches should be developed for farmers, women,

elderly consumers, self-employed persons, daily-wage workers and first-time digital users. Younger experienced users may require advanced financial-product awareness, whereas first-time and elderly consumers may require basic application and security training. Training schedules should also accommodate the working patterns of agricultural and daily-wage populations. Banks and policymakers can use consumer segmentation to deliver more relevant financial education and products. Such targeted interventions can make FinTech-based financial inclusion more equitable and sustainable.

12. IMPLICATIONS

Managerial Implications: The findings have important implications for banks, FinTech providers and other financial institutions. Rural market development should not be approached merely as an exercise in increasing application downloads or registrations. Service providers need to ensure that consumers possess the confidence and knowledge required to use digital financial services independently. FinTech providers can improve adoption through vernacular interfaces, simplified navigation, strong customer support and transparent security mechanisms. Banks can integrate digital financial education with their financial inclusion programmes and utilize rural branches and banking correspondents for consumer training. Understanding differences in digital literacy can also assist companies in segmenting rural consumers and developing products according to varying levels of technological capability.

Policy Implications: Government and regulatory authorities can strengthen rural financial inclusion by integrating financial education with digital capability development. Digital financial literacy programmes should include practical transaction skills, cybersecurity awareness and consumer rights. Policy interventions should also encourage inclusive technological design. Financial applications intended for mass rural markets should accommodate vernacular languages, lower-cost smartphones and users possessing limited technological experience. Measures of financial inclusion should increasingly move beyond bank-account ownership towards active and independent usage of appropriate financial products.

13. CONCLUSION

FinTech has considerable potential to transform rural financial inclusion by reducing geographical, temporal and transactional barriers associated with conventional financial services. Nevertheless, technology by itself cannot guarantee meaningful financial participation. The present study develops an integrated framework connecting digital financial literacy, perceived usefulness, perceived ease of use, trust and security, accessibility, FinTech adoption and financial inclusion among rural consumers in Tamil Nadu. The illustrative empirical results demonstrate that digital financial literacy and technology-related perceptions significantly influence FinTech adoption. Among these factors, digital financial literacy emerges as an especially important determinant. FinTech adoption subsequently demonstrates a substantial positive influence on financial inclusion.

The study consequently emphasizes that successful rural digital financial transformation requires simultaneous improvement in **digital capability, usefulness, ease of use, trust, security, infrastructure and accessibility**. When these conditions are strengthened, FinTech can become an effective mechanism for enabling rural consumers to participate more actively and independently in the formal financial system.

14. LIMITATIONS OF THE STUDY

The proposed study is confined to rural consumers in Tamil Nadu and its results may therefore not automatically represent rural consumers throughout India. The research depends upon respondents' self-reported perceptions and usage behaviour. A cross-sectional research design captures consumer behaviour at one point in time and cannot fully identify changes occurring as technologies evolve. Furthermore, the proposed model concentrates on selected consumer and technological factors; social influence, perceived risk, government support, financial well-being and other constructs may also affect adoption.

15. SCOPE FOR FUTURE RESEARCH

Future research may compare rural and urban consumers or undertake interstate comparisons of FinTech adoption. Longitudinal research can examine whether rural consumers progress from initial adoption towards sustained and diversified usage. Future models can investigate perceived risk, cybersecurity awareness, social influence and government support as moderators or mediators. Researchers can also examine gender differences, elderly consumers, women entrepreneurs, farmers and other specific rural groups. Further studies may investigate how artificial intelligence, digital credit and emerging FinTech innovations affect rural financial inclusion.

References

1. Annamalai, C., & Rajarathinam, K. K. (2025). Impact of digital finance literacy on rural households' adoption behaviour. *South India Journal of Social Sciences*, 23(4), 114–118. <https://doi.org/10.62656/SIJSS.v23i4.2169>
2. Deepu, B., & Krishna Kumar, K. (2026). Digital literacy and post-adoption FinTech usage intensity: Evidence from rural consumers in Karnataka, India. *International Journal of Economic Practices and Theories*. <https://doi.org/10.52783/ijept.700>
3. Goswami, S., Chouhan, V., & Saraswat, P. (2025). FinTech adoption: Driving financial inclusion at the bottom of pyramid. *Future Business Journal*, 11, 150. <https://doi.org/10.1186/s43093-025-00570-2>
4. Hamsa, E. (2025). Digital financial inclusion in rural areas: A study of perceptions and attitudes. *Asian Journal of Economics, Business and Accounting*, 25(6), 321–330. <https://doi.org/10.9734/ajeba/2025/v25i61855>
5. Haque, M. I., Azeez, A. N. P., & Akhtar, S. M. J. (2025). UPI and financial inclusion in rural India: A case study. *Digital Society and Emerging Futures*. <https://doi.org/10.1016/j.dsef.2025.100056>
6. Jena, R. K. (2025). Factors influencing the adoption of FinTech for the enhancement of financial inclusion in rural India using a mixed methods approach. *Journal of Risk and Financial Management*, 18(3), 150. <https://doi.org/10.3390/jrfm18030150>
7. Keshari, P., & Tiwari, A. K. (2026). Financial inclusion in rural region—A review and research agenda. *Future Business Journal*, 12, 49.
8. Lyons, A. C., & Kass-Hanna, J. (2021). A methodological overview to defining and measuring “digital” financial literacy. *Financial Planning Review*, 4(2), e1113. <https://doi.org/10.1002/cfp2.1113>
9. Morgan, P. J., Huang, B., & Trinh, L. Q. (2019). The need to promote digital financial literacy for the digital age. Asian Development Bank Institute.
10. Ozili, P. K. (2018). Impact of digital finance on financial inclusion and stability. *Borsa Istanbul Review*, 18(4), 329–340. <https://doi.org/10.1016/j.bir.2017.12.003>
11. Rani, B., & Dochania, C. S. (2025). Assessing financial exclusion in rural India: The role of FinTech in driving inclusion. *Journal of Comprehensive Business Administration Research*. <https://doi.org/10.47852/bonviewJCBAR52025593>
12. Shaw, M., & Riyat, S. (2025). A study on digital banking behaviour of rural customers in India. *Journal of Marketing & Social Research*, 2(5), 106–115. <https://doi.org/10.61336/jmsr/25-05-12>
13. Venkatesh, V., Morris, M. G., Davis, G. B., & Davis, F. D. (2003). User acceptance of information technology: Toward a unified view. *MIS Quarterly*, 27(3), 425–478. <https://doi.org/10.2307/30036540>