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An Exploratory Analysis of Financial Inclusion Technologies: Effects on Governance Structures and Sustainability Commitments

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Abstract: *The present study investigates the influence of digital financial technology adoption, financial inclusion infrastructure, and the effectiveness of the governance structure to commit to sustainability, especially in the regions that are underdeveloped. A quantitative method based on Structural Equation Modeling (SEM) was used and data was gathered over a total of 648 individuals from over six districts in northern Karnataka representing both rural and urban thought. The findings indicate that the use of digital financial technology and financial inclusion infrastructure has a greater positive impact on sustainability commitments, but the effectiveness of governance structure has a greater direct impact. There are also positive influences of digital adoption and financial infrastructure on governance effectiveness. The mediation analysis validates that the governance mediates these relationships to a certain extent, and the cultural factors indicate the small and significant moderating effects. The model describes 43.3 percent of the variance in sustainability commitments. Such results emphasize the necessity to match technological development with the governance capacity and cultural background to enhance sustainable financial results. The paper has important implications to policymakers noting the significance of a combined digital, cultural, and governance approach toward sustainability development. It also determines some critical strengths and areas which require improvement like cultural alignment and financial literacy. The study as a whole gives a practical basis on the front of designing inclusive, technology-based financial systems that facilitate long-term sustainability.*

Keywords: cultural moderation, digital financial inclusion, governance effectiveness, PLS-SEM, sustainability

I. INTRODUCTION

Over the past few years technological innovation and financial inclusion have emerged as a potent force of revolutionary change in the governance system and sustainability environment. With societies increasingly turning to digital solutions, the ability of the technology to generate financial inclusion and inclusive growth seems to be widely understood in the global context. Whether through mobile banking, blockchain technologies, to artificial intelligence-driven financial services, such devices are not only opening up financial systems to more people but also transforming institutional procedures and sustainability pledges (Akanfe et al., 2025; Almaqtari et al., 2025). Financial inclusion as a developmental goal has become a strategic tool of influencing decision-making and ethical designing, especially in developing economies, where fintech is a convergence factor connecting basically underserved communities and formal financial systems (Danladi et al., 2023; Salleh et al., 2025).

In this dynamic eco system, there is a slight but deeper change in governance. Transparency in digital finance, as well as its monitoring through IT and blockchain is also helping deliver better accountability, risk reduction, and sustainable performance results (Almaqtari 2024; Tian et al., 2024). In addition, the financial technologies are helping governments and institutions to be closer to Sustainable Development Goals (SDGs) with reference to those relating to poverty reduction, gender equality, and climate resilience (Gupta & Kiran, 2024; Yap et al., 2023). These reforms are not limited to domestic spheres, and instead, they reverberate across the geographical boundaries, with European states, say, serving as an embodiment of how fintech and financial inclusion contribute to global sustainability by streamlining load capacity mechanisms (Samour et al., 2024).

More importantly, the interaction between technology and inclusion is transforming Environmental, Social, Governance (ESG) performance frameworks and enhancing corporate responsibility and serves to establish more inclusive forms of governance (Xue et al., 2023; Zhao & Xing, 2024). Be it the slums of a city or the electronic cities, these developments are cultivating a novel pattern of economic fairness, institutional customization, and sustainable participation not only in response to the financial needs but also to the corporate moral ideals of the globalized people (Bhatia & Singh, 2019).

The current research aims to analyse the mutually influential relationship between digital financial technology adoption, financial inclusion infrastructure and governance structure effectiveness and sustainability commitments in various social contexts. It also explores the role of governance mechanisms as an intervening process between technological and financial inclusion and sustainability. Moreover, the study assesses the role of policy frameworks, financial literacy and trust in the financial system in enhancing governance efficiency. The study also acknowledges the multi-faceted nature of financial behaviors and institutional outcomes in different contexts, so the moderation effect of cultural factors on all relationships is explored. This integrated inquiry will enable a broad understanding of the technological, institutional and the socio-cultural conditions that condition sustainable financial ecosystems.

II. LITERATURE REVIEW

There can be no overstatement of the importance of investigating the intersection of financial inclusion technologies and governance structures and sustainability. The study provides insightful support (Becha et al., 2025; Doddanavar et al., 2024; Mishra et al., 2024; Ravikumar et al., 2022) of how the extensive use of digital financial instruments including mobile payments, blockchain, and artificial intelligence helps to increase access to financial support of marginalized groups of people, which also enhances the transparency of said institutions and ecological responsibility (Vuković et al., 2025). The retrospective effect of Technology Acceptance Model (TAM) (Davis, 1986) and Unified Theory of Acceptance and Use of Technology (UTAUT) (Venkatesh et al., 2003) model enrich this digital and technological interface, that helps users to adopt Digi-Fin (digital finance) based perceived usefulness, ease of use, social impact and facilitating conditions. This interlinkage is an in-situ investigation of the ability of underserved groups to establish more secure financial grounds using available technologies (Mhlanga, 2022), and how this income is reflected through government channels.

Moreover, concentrating on modulating roles of IT governance and fintech adoption helps this study to fill a gap that existed in a research field. The previous study demonstrates that the structured IT governance has a potential to increase sustainability impact of fintech, but very little is understood about the way such arrangements work across various socio-economic backgrounds (Almaqtari, 2024; Almaqtari et al., 2025). This in-depth study is preparing research and policymakers with evidence-based measures to reinforce the institutional arrangements and increase the positive effects of digital finance.

Sustainability views, the study throws light on how technology-supported financial inclusion can comply with and even fasten the attainment of the ecological, social and governance (ESG) objectives. In this context, Stakeholder theory, opines sustainability engagement arise when institution or related bodies respondents to the interest of multiple stakeholders. Fintech-supported inclusion empowers marginalized groups and reshapes institutional accountability. In empirical investigations, the benefits of fintech in the regions exceeded the expectations of washers (Sun et al., 2025), and digital firms had greater ESG performance (Hasan et al., 2024). The appreciation of these dynamics will place the stakeholders in a position to develop policies that will exploit financial innovation in sustained development.

Lastly, the research will be of practical relevance. This study will inform programs whose mission is to create more inclusive and sustainable economies thanks to the practical examples of case studies that specifically address the topics of self-help groups in India (Kadaba et al., 2023; Malhotra & Saravanan, 2025) and financial empowerment of women (Gupta & Kiran, 2024). All in all, the given insights prove the necessity of a systematic investigation of the central interaction between fintech, governance, and sustainability. Consequently, the study aimed has been meticulously formulated to explore the impacts of technological financial inclusion on the structures of governance and sustainability obligations in diverse situation contexts in society.

With the aim of investigating how complex determinants influence the outcome of sustainability, the importance of governance and culture as an intervention factor of both mediation as well as moderation.

Conceptual framework & hypothesis development. The growing interactions of technological advancement, institutional structure, and societal expectations can be more explained in terms of a combination of the complementary theoretical perspectives. The Institutional Theory can be used to understand how the regulatory and governance norms, as well as cultural settings, influence the spread and effect of digital financial to*ols (DiMaggio & Powell, 1983*), whereas TAM and UTAUT can be used to understand why people choose to adopt such tools depending on their perceived usefulness, trust, and accessibility. At the organizational level, the Resource-Based View provides the understanding of the role of technological capabilities, financial infrastructure, and governance competencies in performing sustainability over the long-term (Barney, 1991). The Stakeholder Theory goes further along this perspective focusing on expectations of citizens, communities, regulators, and financial actors that require open, inclusive, and environmentally friendly practices (Freeman, 1984). All these views help to understand that the integration of technological uptake, institutional ability, and social forces intersect to affect sustainable financial performance, and offers a consistent intellectual background with which to analyze the interactions identified in the research.

At this juncture, the three aspects of digital technologies, financial inclusion, and governing structures come together in a complex way and are understood to better adapt to the current social and economic reality that is changing by the minute. The processes through which the adoption of technology and accessibility to it by finance impact on the quality governance and environmental responsibility become more relevant as countries search after achievement of sustainable development goals. A recent body of research indicates that financial technologies are not only an enabler of the economic participation but also an enabler in terms of the transparency of the institutions and long-term sustainability planning (Garg & Kumar, 2024; Mhlanga, 2024). Additionally, the establishment of strong financial infrastructure, coupled with a fair accessibility level and financial literacy, promotes the more open practice of governance, which is more aligned with environmental and social requirements (Bhatia & Singh, 2019; Gupta & Kiran, 2024).

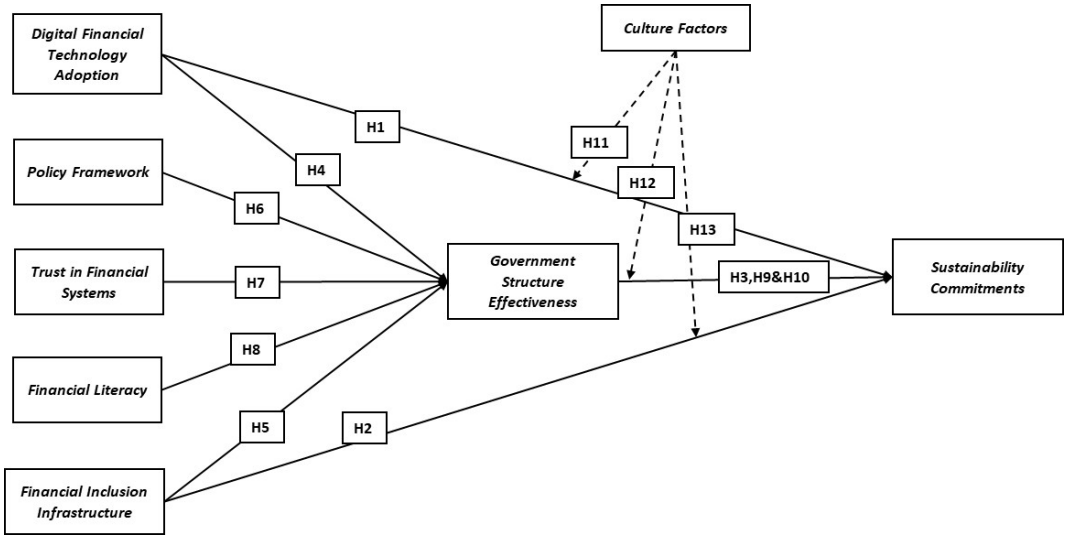
The success of government institutions frequently depends on underlying facilitating things such as rules, financial system trust, and technological readiness, which will define policy and institutional governance (Saxena et al., 2022; Vukovic et al., 2025). The digital finance technologies, specifically, the blockchain and cloud ecologies, are gaining prominence as the means of improving ESG performance and developing trust with the wider audience (Tian et al., 2024; Zhao & Xing, 2024). At the same time, financial inclusion powered by fintech is a way to provide unrepresented groups with an opportunity to access sustainable money, supporting the social imperative of transparency and equity on the societal level (Danladi et al., 2023; Kadaba et al., 2023). It is out of this synthesized knowledge that I have come up with the following four hypotheses aimed at testing the direct impacts of

digital financial adoption, digital financial infrastructure factor and the aspect of digital financial governance on the outcome of sustainability.

Direct effect

H1: Digital Financial Technology Adoption positively influences Sustainability Commitments.
H2: Financial Inclusion Infrastructure positively influences Sustainability Commitments.
H3: Governance Structure Effectiveness positively influences Sustainability Commitments.
H4: Digital Financial Technology Adoption positively influences Governance Structure Effectiveness.
H5: Financial Inclusion Infrastructure positively influences Governance Structure Effectiveness.
H6: Policy Framework positively influences Governance Structure Effectiveness.
H7: Trust in Financial Systems positively influences Governance Structure Effectiveness.
H8: Financial Literacy positively influences Governance Structure Effectiveness.

Figure 1
Conceptual model of proposed study



Mediation hypotheses. The correlation between finance technological advancement and sustainability is growing with the manner in which the governing structure is mediating this correlation. With digital financial tools and the spread of inclusive infrastructures opening up opportunities in terms of access, the real difference they make in terms of sustainability is usually highly dependent on the capacity and responsiveness of the institutions (Almaqtari et al., 2025; Becha et al., 2025). Making the digital developments operational with regard to the environment and society, successful governance can bring those social and environmental changes into practice (Gupta & Kiran, 2024; Zhao & Xing, 2024). Besides, trust, regulation, and accountability represent one of the primary avenues between innovation and sustainable commitments (Mhlanga, 2024; Saxena et al., 2022). In

such a way, this paper considers the importance of governance effectiveness as a significant mediator in such processes (Danladi et al., 2023; Tian et al., 2024).

H9: Governance Structure Effectiveness mediates the relationship between Digital Financial Technology Adoption and Sustainability Commitments.

H10: Governance Structure Effectiveness mediates the relationship between Financial Inclusion Infrastructure and Sustainability Commitments.

Moderation hypotheses. The cultural processes are contributing immensely toward the process of adopting financial technologies and achieving the sustainability objectives in society. Values, norms and social behavior will weaken or strengthen the positive impact of fintech and governance reforms on sustainable development (Yap et al., 2023; Salleh et al., 2025). The effects of financial inclusion on the sustainability are greater in cultures where collectivist trust and digital literacy are important aspects (Gupta & Kiran, 2024; Kadaba et al., 2023). On the other hand, these effects can be watered down due to the resistance to the digital change in some cultures (Mhlanga, 2022; Bhatia & Singh, 2019). The given study, thus, examines the role of cultural moderators in these changing relationships (Danladi et al., 2023; Malhotra & Saravanan, 2025).

H11: Cultural Factors moderate the relationship between Digital Financial Technology Adoption and Sustainability Commitments.

H12: Cultural Factors moderate the relationship between Governance Structure Effectiveness and Sustainability Commitments.

H13: Cultural Factors moderate the relationship between Financial Inclusion Infrastructure and Sustainability Commitments.

III. RESEARCH METHODOLOGY

This study adopts a quantitative and exploratory research design, using Structural Equation Modeling (SEM) to examine the relationships among digital financial adoption, governance effectiveness, and sustainability commitments. The exploratory nature is justified as the study integrates multiple dimensions technology, governance, culture, and sustainability within a single framework, an area where empirical evidence remains limited, particularly in underdeveloped regional contexts.

A multi-stage disproportionate stratified random sampling technique was employed to ensure representation across diverse socio-economic settings. The population comprised individuals from six economically underdeveloped districts of northern Karnataka: Bidar, Gulbarga, Raichur, Yadgir, Koppal, and Ballari. Each district was treated as a stratum, and within each, respondents were selected from both rural and urban areas to ensure balanced representation.

Under a purely proportional approach, districts such as Gulbarga (2,566,326) and Ballari (2,452,595) would dominate the sample, whereas comparatively smaller districts such as Yadgir (1,172,985) and Koppal (1,389,920) would receive substantially lower representation. Since, the study objective was explanatory and comparative rather than prevalence estimation. Therefore, disproportionate stratified allocation was intentionally adopted to prevent overrepresentation of larger districts and underrepresentation of smaller districts, thereby ensuring analytical balance and adequate subgroup representation.

Data were collected using a structured questionnaire, designed based on validated constructs from prior studies. All items were measured using a 5-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). The questionnaire captured key constructs including Digital Financial Technology Adoption, Financial Inclusion Infrastructure, Governance Structure Effectiveness, Financial Literacy, Trust in Financial Systems, Policy Framework, Cultural Factors, and Sustainability Commitments.

Data collection was conducted through field-based surveys and assisted responses, ensuring clarity for respondents where required. Prior to full deployment, a pilot test was conducted to ensure reliability and clarity of items.

Data analysis used in the study were SPSS (Statistical Package for the Social Sciences) and SEM (Structural Equation Modeling). SEM was used to evaluate measurement and model structural components of the proposed model. The evaluation of the measurement model involved the Composite Reliability (CR), Average Variance Extracted (AVE), Heterotrait–Monotrait Ratio (HTMT) and the Fornell–Larcker criterion to show the reliability, convergent validity, and discriminant validity. For structural model analysis the test of path coefficients (beta values), t values, confidence intervals and effect sizes (f^2) were performed to investigate the hypothesised relationships. In addition, mediation analysis, moderation analysis, and the explanatory and predictive power of the model were performed using the R^2 (coefficient of determination) and Q^2 (predictive relevance) values, respectively, in SEM. These analytical procedures will provide ample analysis of the relationships between the study variables.

Table 1
Sampling determination

District	Population*	Population Characteristics	Sampling Strata	Sample Size
Bidar	1,703,300	Rural & Urban	Disproportionate Stratified Sampling	108
Gulbarga	2,566,326			110
Raichur	1,928,812			104
Yadgir	1,172,985			102
Koppal	1,389,920			110
Ballari	2,452,595			114
		Total		648

**Source:* Karnataka Census report

Table 2

Constructs and measurement overview

Construct	No. of Items	Scale Used	Source Basis
Digital Financial Technology Adoption	5	5-point Likert	Akanfe et al. (2025); Mhlanga (2024); Vuković et al. (2025)
Financial Inclusion Infrastructure	5	5-point Likert	Samour et al. (2024); Becha et al. (2025); CII Report (2024)
Governance Structure Effectiveness	5	5-point Likert	Almaqtari (2024); Menicucci & Paolucci (2023); Zhao & Xing (2024)
Financial Literacy	5	5-point Likert	Gupta & Kiran (2024); Bhatia & Singh (2019); CII Report (2024)
Trust in Financial Systems	5	5-point Likert	Danladi et al. (2023); Vuković et al. (2025)
Policy Framework	5	5-point Likert	Almaqtari et al. (2025); Saxena et al. (2022)
Cultural Factors	5	5-point Likert	Salleh et al. (2025); Malhotra & Saravanan (2025)
Sustainability Commitments	5	5-point Likert	Yap et al. (2023); Hasan et al. (2024); Xue et al. (2023)

IV. RESULTS AND DISCUSSION

This section presents the empirical findings of the study in a structured manner, beginning with descriptive statistics, followed by measurement model assessment, and finally the structural model evaluation. The objective is to systematically examine the relationships among digital financial technology adoption, financial inclusion infrastructure, governance structure effectiveness, and sustainability commitments.

Table 3

The demographic profile of respondents is presented to understand the composition and representativeness of the sample

Demographic Characteristics	Category	Frequency	Percentage (%)
Gender	Male	356	54.9
	Female	292	45.1
Age Groups	18-30 years	194	29.9
	31-45 years	227	35.0
	46-60 years	162	25.0
	Above 60 years	65	10.1
Education Level	Illiterate	78	12.0
	Primary (1-5th)	136	21.0
	Secondary (6-10th)	181	27.9
	Higher Secondary (11-12th)	142	21.9
	Graduate & above	111	17.2

Occupation	Agriculture/Farming	246	38.0
	Small Business/Trade	97	15.0
	Government Employee	52	8.0
	Private Employee	84	13.0
	Daily Wage Labor	123	19.0
	Unemployed/Student	46	7.0
Monthly Income (₹)	Below 10,000	181	27.9
	10,001-25,000	227	35.0
	25,001-50,000	149	23.0
	50,001-1,00,000	71	11.0
	Above 1,00,000	20	3.1
Residence Type	Rural	421	65.0
	Semi-Urban	149	23.0
	Urban	78	12.0
District Distribution	Bidar	108	16.7
	Gulbarga (Kalaburagi)	110	16.9
	Raichur	104	16.0
	Yadgir	102	15.7
	Koppal	110	16.9
	Ballari	114	17.5
Smartphone Ownership	Yes	487	75.2
	No	161	24.8
Banking Status	Account Holder	571	88.1
	No Bank Account	77	11.9
Digital Payment Usage	Regular User	292	45.1
	Occasional User	194	29.9
	Non-User	162	25.0
Internet Access	Regular Access	324	50.0
	Limited Access	227	35.0
	No Access	97	15.0
Family Size	1-3 members	123	19.0
	4-6 members	389	60.0
	7+ members	136	21.0
Social Category	General	162	25.0
	OBC	259	40.0
	SC/ST	227	35.0

Note: Field survey

The demographic profile presented in the table reflects a diverse and representative sample across key socio-economic dimensions. In terms of gender, males constitute 356 (54.9%), while females account for 292 (45.1%), indicating a relatively balanced participation. The dominant age group is 31–45 years with 227 respondents (35.0%), followed by 18–30 years at 194 (29.9%), suggesting a strong representation of economically active individuals. Educationally, the largest group falls under secondary education with 181 respondents (27.9%), while only 78 (12.0%) are illiterate. Occupationally, 246 respondents (38.0%) are engaged in agriculture, highlighting the rural-economic base of the sample. Income distribution shows that 227 respondents (35.0%) earn between ₹10,001–25,000, indicating moderate income levels. A significant majority reside in rural areas 421 (65.0%), and smartphone ownership is high at 487 (75.2%), with 571 respondents (88.1%) holding bank

accounts. However, only 292 (45.1%) are regular digital payment users, and 324 (50.0%) have consistent internet access. These patterns align well with the study's focus on financial inclusion and digital adoption in semi-developed regions.

Figure 2

Analysed model for proposed study

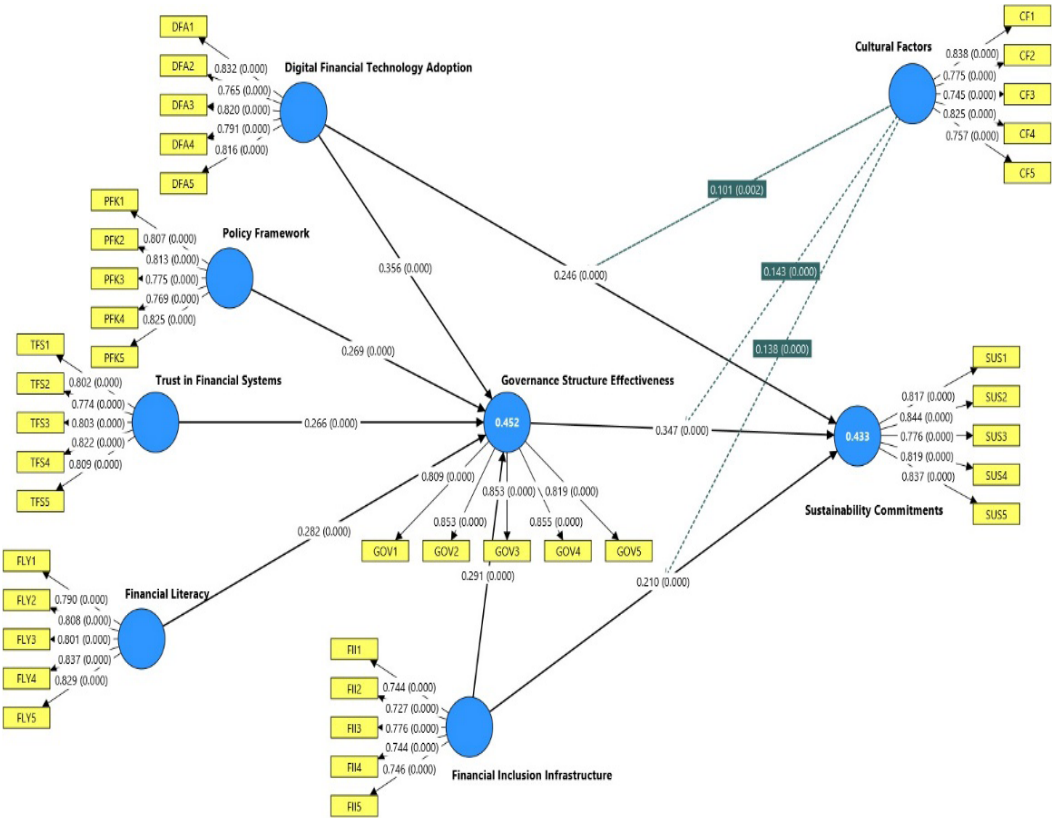


Table 4

The measurement model was evaluated to ensure reliability and validity of the constructs before testing the structural relationships.

Construct	Item	Details	Loading
Cultural Factors	CF1	In my community, most people still prefer cash over digital payments.	0.84
	CF2	Cultural traditions in my region affect how people perceive digital banking.	0.78
	CF3	People in my locality are hesitant to adopt new financial technologies.	0.75
	CF4	Family and social circles influence my decisions on using digital financial services.	0.83
	CF5	There is a general lack of trust in digital systems in my cultural environment.	0.76
	Cronbach's alpha = 0.849, Composite reliability = 0.865, Average variance extracted = 0.622		
Digital Financial Technology Adoption	DFA1	I frequently use UPI or mobile payment applications for transactions.	0.83
	DFA2	I feel confident using digital wallets and online banking.	0.77
	DFA3	I prefer digital transactions over cash for most of my expenses.	0.82
	DFA4	I use internet banking services for financial management.	0.79
	DFA5	I have access to multiple digital financial platforms (e.g., UPI, mobile banking, wallet apps).	0.82
	Cronbach's alpha = 0.864, Composite reliability = 0.867, Average variance extracted = 0.648		
Financial Inclusion Infrastructure	FII1	There are banking services available within a short distance of my residence.	0.74
	FII2	I have uninterrupted internet access required to use digital financial services.	0.73
	FII3	ATM and mobile banking units are available in my locality.	0.78
	FII4	Mobile networks in my area support digital transactions effectively.	0.74
	FII5	Power supply in my region supports consistent access to digital finance tools.	0.75
	Cronbach's alpha = 0.803, Composite reliability = 0.805, Average variance extracted = 0.559		

Financial Literacy	FLY1	I understand how to use mobile and internet banking securely.	0.79
	FLY2	I am aware of my rights and responsibilities when using digital financial platforms.	0.81
	FLY3	I can identify fraudulent or risky financial apps and links.	0.80
	FLY4	I know how to protect my digital financial credentials (PIN, passwords, etc.).	0.84
	FLY5	I feel confident navigating new digital financial technologies.	0.83
Cronbach's alpha = 0.872, Composite reliability = 0.877, Average variance extracted = 0.661			
Governance Structure Effectiveness	GOV1	Digital finance has increased transparency in public service delivery.	0.81
	GOV2	Corruption has decreased with the use of digital financial transactions.	0.85
	GOV3	Public schemes reach intended beneficiaries more efficiently through digital transfers	0.85
	GOV4	Citizens have better access to government services via digital channels.	0.86
	GOV5	Participation in governance (e.g., grievance redressal) has improved due to digital tools.	0.82
Cronbach's alpha = 0.894, Composite reliability = 0.895, Average variance extracted = 0.702			
Policy Framework	PFK1	Government policies support the expansion of digital financial services.	0.81
	PFK2	Aadhaar integration has made access to financial services easier for me.	0.81
	PFK3	I believe that data privacy regulations protect my financial information.	0.78
	PFK4	Fintech initiatives are well supported by national or state-level policies.	0.77
	PFK5	I feel safe because of the government's consumer protection laws in digital finance	0.83
Cronbach's alpha = 0.858, Composite reliability = 0.864, Average variance extracted = 0.637			

Sustainability Commitments	SUS1	Digital payments reduce my dependence on paper-based transactions.	0.82
	SUS2	I support businesses that promote digital and eco-friendly financial practices.	0.84
	SUS3	My use of digital finance has helped me save resources (time, cost, paper).	0.78
	SUS4	I believe digital finance contributes to broader environmental conservation goals.	0.82
	SUS5	I have adopted more sustainable financial habits due to digital platforms.	0.84
	Cronbach's alpha = 0.877, Composite reliability = 0.881, Average variance extracted = 0.670		
Trust in Financial Systems	TFS1	I trust my bank or financial service provider to handle my digital transactions securely.	0.80
	TFS2	I believe digital financial systems are reliable.	0.77
	TFS3	I trust that my financial data is safe when I use online financial services.	0.80
	TFS4	I am confident that issues with digital transactions will be resolved promptly.	0.82
	TFS5	I feel safe using government-backed digital payment platforms (e.g., BHIM, UPI).	0.81
	Cronbach's alpha = 0.862, Composite reliability = 0.865, Average variance extracted = 0.643		

Note: SPSS (Authors Analysis using survey data)

The measurement model in this study reflects a high level of reliability and validity across all constructs. As outlined in Table 4, Cronbach's alpha values range from 0.803 for Financial Inclusion Infrastructure to 0.894 for Governance Structure Effectiveness, all surpassing the accepted benchmark of 0.70, which indicates strong internal consistency. Similarly, composite reliability values fall between 0.805 and 0.895, further validating consistency across items. The Average Variance Extracted (AVE) values, ranging from 0.559 to 0.702, meet the 0.50 threshold, confirming adequate convergent validity. Most factor loadings exceed 0.70, with minor exceptions like FII2 at 0.73, still within acceptable bounds. These results affirm the robustness of constructs such as Cultural Factors, Digital Financial Technology Adoption, Financial Inclusion Infrastructure, Financial Literacy, Governance Structure Effectiveness, Policy Framework, Sustainability Commitments, and Trust in Financial Systems, ensuring their reliability for further structural analysis.

Table 5

Discriminant validity was assessed using both HTMT and Fornell–Larcker criteria to confirm that constructs are empirically distinct.

HTMT matrix for discriminant validity

Construct	CF	DFA	FII	FL	GOV	PFK	SUS	TFS
Cultural Factors								
Digital Financial Technology Adoption	0.038							
Financial Inclusion Infrastructure	0.062	0.059						
Financial Literacy	0.053	0.059	0.047					
Governance Structure Effectiveness	0.067	0.421	0.345	0.309				
Policy Framework	0.049	0.059	0.038	0.040	0.338			
Sustainability Commitments	0.213	0.414	0.378	0.117	0.551	0.135		
Trust in Financial Systems	0.080	0.051	0.062	0.051	0.324	0.090	0.098	

Fornell–Larcker criterion for discriminant validity

Construct	CF	DFA	FII	FL	GOV	PFK	SUS	TFS
Cultural Factors	0.789							
Digital Financial Technology Adoption	-0.007	0.805						
Financial Inclusion Infrastructure	-0.036	0.030	0.748					
Financial Literacy	-0.043	-0.006	-0.023	0.813				
Governance Structure Effectiveness	-0.054	0.371	0.294	0.276	0.838			
Policy Framework	0.006	0.001	0.008	0.026	0.299	0.798		
Sustainability Commitments	0.189	0.365	0.319	0.104	0.490	0.114	0.819	
Trust in Financial Systems	-0.060	0.027	-0.013	-0.019	0.286	0.074	0.085	0.802

Note: SEM (SmartPLS)

The HTMT matrix presented in Table 5 was used to assess discriminant validity by comparing the strength of correlations between different constructs relative to those within the same construct. In line with the guideline by Henseler et al. (2015), HTMT values should remain below 0.85, and in this analysis, all values meet this conservative threshold, with the highest observed at 0.551 between Governance Structure Effectiveness and Sustainability Commitments. This indicates that the constructs are empirically distinct. Additionally, Table 5 applies the Fornell and Larcker criterion, which states that the square root of each construct's AVE, shown on the diagonal, should be higher than any inter-construct correlation. In this case, values such as 0.805 for Digital Financial Technology

Adoption, 0.748 for Financial Inclusion Infrastructure, 0.838 for Governance Structure Effectiveness, and 0.819 for Sustainability Commitments exceed the correlations with other constructs in their respective rows and columns. These results strongly affirm that all constructs maintain clear discriminant validity based on both the HTMT and Fornell–Larcker approaches, ensuring the uniqueness and integrity of each measured variable in the model.

Table 6

After establishing measurement validity, the structural model was assessed to test the hypothesised relationships.

Hy	Path	Beta	SE	t-value	Confidence Interval (%)		f 2	Effect size	VIF
					2.50	97.50			
H1	DFA -> SUS	0.246**	0.032	7.752	0.183	0.308	0.090	Small	1.181
H2	DFA -> GOV	0.356**	0.028	12.720	0.303	0.412	0.232	Medium	1.002
H3	FII -> SUS	0.21**	0.033	6.456	0.145	0.273	0.070	Small	1.111
H4	FII -> GOV	0.291**	0.028	10.278	0.233	0.346	0.155	Medium	1.002
H5	GOV -> SUS	0.347**	0.034	10.253	0.283	0.416	0.165	Medium	1.288
H6	PFK -> GOV	0.269**	0.030	9.100	0.211	0.325	0.132	Small	1.006
H7	TFS -> GOV	0.266**	0.029	9.235	0.207	0.320	0.128	Small	1.007
H8	FL -> GOV	0.282**	0.030	9.521	0.223	0.339	0.145	Small	1.002

Note: SEM (SmartPLS)

The results shown in Table 6 clearly confirm that all eight proposed hypotheses (H1–H8) hold both statistical and theoretical significance. Digital Financial Technology Adoption demonstrates a meaningful positive impact on Sustainability Commitments ($\beta = 0.246$, $f^2 = 0.090$, $t = 7.752$, CI [0.183, 0.308]) and also strongly influences Governance Structure Effectiveness ($\beta = 0.356$, $f^2 = 0.232$, $t = 12.720$, CI [0.303, 0.412]). Similarly, Financial Inclusion Infrastructure contributes positively to both Sustainability Commitments ($\beta = 0.210$, $f^2 = 0.070$, $t = 6.456$, CI [0.145, 0.273]) consistent to the results obtained by (Akanfe et al., 2025) and Governance Structure Effectiveness ($\beta = 0.291$, $f^2 = 0.155$, $t = 10.278$, CI [0.233, 0.346]). Governance Structure Effectiveness itself emerges as a strong enhancer of Sustainability Commitments ($\beta = 0.347$, $f^2 = 0.165$, $t = 10.253$, CI [0.283, 0.416]) (Almaqtari et al., 2025). Moreover, Policy Framework ($\beta = 0.269$), Trust in Financial Systems ($\beta = 0.266$), and Financial Literacy ($\beta = 0.282$) each show statistically significant and positive influences on Governance Structure Effectiveness (Danladi et al., 2023). These findings confirm that technological innovation, inclusive infrastructure, and informed citizen engagement collectively foster stronger governance, which in turn promotes sustainable financial behavior.

Table 7

The study further examines whether governance structure effectiveness mediates the relationship between key predictors and sustainability commitments.

Path	Beta	SE	t-value	Confidence Interval (%)		Supported
				2.50	97.50	
Total Effect						
DFA -> SUS	0.37**	0.029	12.698	0.311	0.425	Yes
FII -> SUS	0.312**	0.031	9.935	0.252	0.374	Yes
Indirect Effect						
DFA -> GOV -> SUS	0.124**	0.015	8.006	0.095	0.156	Yes
FII -> GOV -> SUS	0.101**	0.015	6.931	0.073	0.126	Yes
Direct Effect						
DFA -> SUS	0.246**	0.032	7.752	0.183	0.308	Yes
FII -> SUS	0.21**	0.033	6.456	0.145	0.273	Yes

	Path	Mediation Type
H9	DFA -> GOV -> SUS	Partial Mediation
H10	FII -> GOV -> SUS	Partial Mediation

Note: SEM (SmartPLS)

The mediation analysis highlights that Governance Structure Effectiveness plays a meaningful and statistically significant mediating role in both hypothesised relationships, confirming partial mediation for H9 and H10. For H9, Digital Financial Technology Adoption shows a strong total effect on Sustainability Commitments (β = 0.370, SE = 0.029, t = 12.698, CI [0.311, 0.425]), with a significant indirect effect through Governance (β = 0.124, SE = 0.015, t = 8.006, CI [0.095, 0.156]) and a still-significant direct effect (β = 0.246, SE = 0.032, t = 7.752, CI [0.183, 0.308]) (Bhatia & Singh, 2019). Similarly, H10 demonstrates that Financial Inclusion Infrastructure positively impacts Sustainability Commitments (β = 0.312, SE = 0.031, t = 9.935, CI [0.252, 0.374]), with its indirect path through Governance also significant (β = 0.101, SE = 0.015, t = 6.931, CI [0.073, 0.126]), while the direct path remains impactful (β = 0.210, SE = 0.033, t = 6.456, CI [0.145, 0.273]) (Almaqtari et al., 2025).

Table 8

The moderating role of cultural factors was analysed to understand contextual variations in these relationships.

Hyp	Path	Beta	SE	t-value	Confidence Interval (%)		f 2	Effect size
					2.50	97.50		
H11	CF x DFA -> SUS	0.101**	0.032	3.155	0.040	0.166	0.033	Small
H12	CF x GOV -> SUS	0.143**	0.033	4.294	0.078	0.210	0.014	No Effect
H13	CF x FII -> SUS	0.138**	0.030	4.681	0.081	0.197	0.031	Small

Note: SEM (SmartPLS)

The moderation analysis presented in Table 8 explores how Cultural Factors influence the strength of the relationships between Digital Financial Technology Adoption, Governance Structure Effectiveness, and Financial Inclusion Infrastructure with Sustainability Commitments. All three interaction terms are statistically significant, confirming the presence of moderation effects. For H11, the interaction between Cultural Factors and Digital Financial Technology Adoption is significant ($\beta = 0.101$, $f^2 = 0.033$, $t = 3.155$, CI [0.040, 0.166]), reflecting a small but meaningful impact. H13 also shows a significant interaction between Cultural Factors and Financial Inclusion Infrastructure ($\beta = 0.138$, $f^2 = 0.031$, $t = 4.681$, CI [0.081, 0.197]), again indicating a modest moderation. In the case of H12, the interaction with Governance Structure Effectiveness is statistically significant as well ($\beta = 0.143$, $f^2 = 0.014$, $t = 4.294$, CI [0.078, 0.210]), but the effect size is minimal, suggesting a limited practical role (Gupta & Kiran, 2024). These findings suggest culture modestly shapes the influence of fintech and inclusion efforts on sustainability.

Table 9

An importance–performance analysis

Construct	Impact	Performance
Cultural Factors	0.209	58.619
Digital Financial Technology Adoption	0.370	62.140
Financial Inclusion Infrastructure	0.312	65.288
Financial Literacy	0.098	59.843
Governance Structure Effectiveness	0.347	64.691
Policy Framework	0.094	64.773
Trust in Financial Systems	0.092	60.525

Note: SEM (SmartPLS)

Figure 3

Importance–Performance Map of Constructs Related to Sustainability Commitments

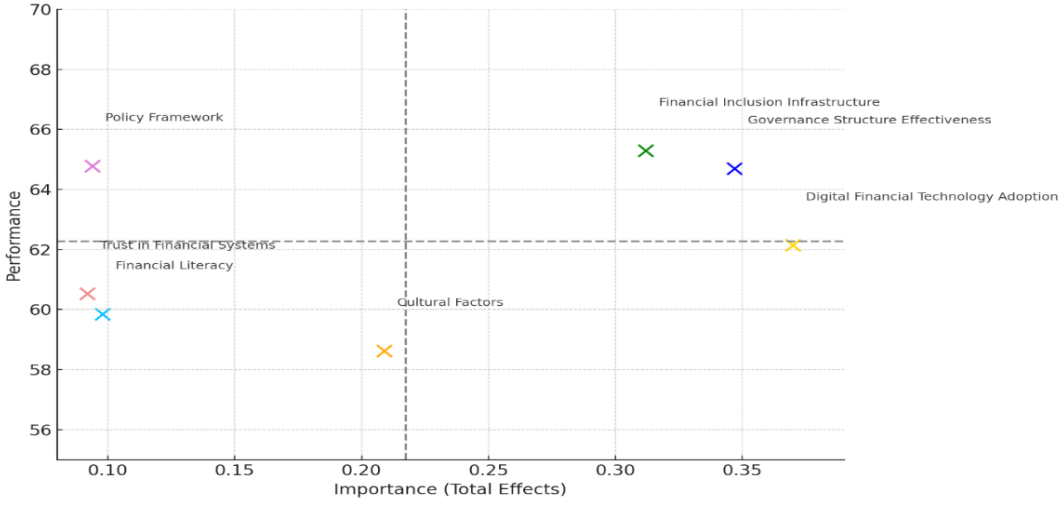


Table 9 and Figure 3 offer a clear and strategic view of how different constructs contribute to sustainability commitments by comparing their overall impact and performance levels. Digital Financial Technology Adoption (Importance = 0.370, Performance = 62.14), Financial Inclusion Infrastructure (0.312, 65.29), and Governance Structure Effectiveness (0.347, 64.69) emerge as key strengths, positioned in the top-right quadrant where both impact and performance are high indicating areas that are working well and should be reinforced. Cultural Factors (0.209, 58.62), though highly important, show lower performance, highlighting a need for focused improvement. On the other hand, constructs like Financial Literacy (0.098, 59.84), Trust in Financial Systems (0.092, 60.53), and Policy Framework (0.094, 64.77) fall into lower-importance zones, suggesting they may not require immediate attention but could benefit from selective resource planning. This analysis provides a practical roadmap to guide decision-makers in strengthening sustainability outcomes within the evolving digital finance landscape.

The results indicate that the model demonstrates satisfactory predictive strength, with meaningful R^2 values explaining a substantial portion of variance in governance and sustainability outcomes. Additionally, positive Q^2 values confirm that the model has strong out-of-sample predictive relevance, reinforcing its practical applicability in real-world contexts.

Table 10

The predictive capability of the model was assessed to evaluate how well the proposed framework can forecast key endogenous constructs.

Endogenous Construct	R-square	Q^2predict
Governance Structure Effectiveness	0.452	0.439
Sustainability Commitments	0.433	0.343

Note: SEM (SmartPLS)

The values presented for the coefficient of determination (R^2) and predictive relevance (Q^2) suggest that the structural model holds a solid degree of explanatory and predictive strength. Governance Structure Effectiveness shows an R^2 of 0.452, meaning that 45.2% of its variance is explained by the model's predictors, while Sustainability Commitments have an R^2 of 0.433, indicating 43.3% of the variance is accounted for. Hair et al. (2021) note that such values indicate the moderate but significant level of explanatory power in the research in the behavioural field. In addition, Q2predict values of both Governance Structure Effectiveness (0.439) and Sustainability Commitments (0.343) are well above zero and confirm the power of the model to drive prediction. The positive Q2 scores support the argument that not only is the model structured well to perform calculations and statistics but also capable of being applied to the real world, and therefore useful in context with applied research and policies design in respect to sustainability and digital financial ecosystems.

V. CONCLUSION AND IMPLICATIONS

This work illuminates the relationship between digital financial technology, inclusive financial infrastructure, and effective systems of governance and its overall effect of sustainability promises across socio-economically different (various) settings (Ravikumar et.al., 2022). The results point to the fact that good governance should be seen as a significant connector, and it should be between financial innovation and infrastructure and long-term sustainable results (Mishra et.al.,2024; Gupta, & Kiran, 2024). Discreet cultural influences are also moderating forces that determine the manner of the fulfillment of these relationships. With an effective analytical model and actual data, the research gives a significant basis on the source of the policy, innovation, and community-based approaches in constructing inclusive sustainable financial ecosystems (Malhotra & Saravanan, 2025; Menicucci & Paolucci, 2023).

This research result has practical implications to the policymakers, financial institutions, and development planners toward reinforcing sustainability using inclusive financial systems. The study demonstrates that integrated digital and policy solutions must be holistically approached because all the three pillars of fintech adoption, quality of governance and beneficial financial infrastructure contribute to the outcomes of sustainability (Samour et.al., 2024). It highlights the relevance of spending in financial literacy and interventions indigenous to meet the culture to increase trust and participation (Tian et al., 2024). The robust predictive ability of the model implies that it will assist in drawing focal endeavours in economically deprived territories, which makes it a resourceful tool in planning comprehensive, technology-based economical frameworks in promoting long-term ecological and social agendas.

Potential limitations. Although this study is of good interest, there are not many limitations. This data geographically ties itself to one area of India that is six districts in north Karnataka, India which might limit the full applicability of the results. The cross-sectional design also takes perceptions at one particular time in way that did not provide much knowledge on long term changes. Outcomes may depend on cultural and contextual differences that are not included in the study region. Lastly, dependence on self-report data could introduce some biases that would affect the objectiveness of the answers.

Future scope of study. Continued studies have the opportunity to extend with the investigation of comparable models in many different places and cultural contexts to increase generalizability. Longitudinal might provide more extensive knowledge of what role the adaptation and control of fintech play in the fulfilment of sustainability pledges over time. Additional researches may also be done on industry-wise effects, i.e. in agriculture or female-owned businesses, to find specific approaches. The knowledge of the behavioral and institutional dynamics underlying financial inclusion and sustainability may be deepened with integration of qualitative techniques within the community setting in the real-life context.

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