

FINANCIAL INCLUSION THROUGH DIGITAL FINANCE: PROSPECTS AND OBSTACLES IN EMERGING MARKETS

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ABSTRACT

This study explores how digital banking can open doors to economic inclusion, focusing on marginalised communities in developing countries. By making financial services accessible and fair, economic inclusion helps lift people out of poverty and narrow inequality. Innovative digital tools such as peer-to-peer lending, e-wallets, mobile banking, and blockchain are breaking down barriers for those in rural areas and outside the formal economy. In Uttar Pradesh, India, researchers gathered insights from 240 participants, using PLS-SEM (Partial least squares structural equation modelling) to uncover the connections between technologies, social and cultural influences, economic outcomes, and digital financial programs. The findings reveal a strong relationship among these factors and the success of digital finance, highlighting the urgent need for robust digital infrastructure and culturally tailored financial services to truly advance economic inclusion.

Keywords: Digital Finance, Financial inclusion, Government policy, Digital payment.

1. INTRODUCTION

Financial inclusion opens doors for people who are often overlooked, such as those with low incomes or marginalised backgrounds, by providing affordable access to essential financial tools and credit. Digital finance brings this vision to life through services like digital wallets, mobile banking, peer-to-peer lending, and blockchain technologies. By working together, these innovations invite more people into the world of finance.

Championing financial inclusion sparks economic growth and opens doors for millions worldwide to rise out of poverty. As a result, digital financial services have become more affordable and easier to use, breaking down barriers that once kept many people out of the formal financial system. This shows why new developments in digital finance are so important. Digital money now plays a key role, and products like virtual wallets and peer-to-peer lending are designed to give people more ways to manage their finances.

Retail agents play a key role in digital finance by replacing traditional intermediaries. They handle two main tasks: 'cash-in,' which transforms cash into digital currency, and 'cash-out,' which turns that digital value back into physical money. By linking customers to digital networks, these agents make transactions faster, reach more people, and help financial services operate more effectively.

Digital finance is used in different ways depending on the social setting. This paper examines the pros and cons and highlights best practices for using digital finance to support fair development. Case studies will show how digital finance works in various places and what is needed for it to help communities grow. Retail agents are at the heart of digital money systems, helping people turn cash into electronic value and back again. This makes it possible for those without bank accounts to take part in financial activities.

This is especially important in areas without access to regular banks. Digital finance helps people, businesses, and marginalised groups fight poverty by boosting productivity and supporting economic growth. Its main strength is giving people from all backgrounds the financial tools they need. Current research examines how digital finance affects different communities and assesses how well it supports fair growth. The goal is also to tailor digital finance solutions to fit each community's needs. One major benefit is that digital finance lowers transaction costs and makes financial services more convenient. For example, mobile banking and digital wallets allow people to manage their finances remotely, without needing to visit a bank branch.

This is particularly helpful in rural and remote areas where traditional banks are hard to reach. Digital financial platforms also usually have lower fees than traditional banks, making them more accessible to people with limited funds.

2. SIGNIFICANCE OF THE STUDY

2.1 Policy Formulation with Empirical Evidence: This research employs PLS-SEM to provide robust quantitative evidence. The results will help policymakers and government officials create better digital financial inclusion policies by showing how social factors, economic outcomes, and technology are connected.

2.2 Financial Institutions Strategic Framework: This study seeks to identify the key social, cultural, and technological drivers shaping digital finance. By understanding these influences, financial institutions and fintech innovators can design digital products and services that truly resonate with and empower underrepresented communities.

2.3 Tackling the Digital Divide: This research will shed light on practical solutions for improving mobile network quality, boosting digital literacy, and expanding internet access. By exploring these areas, this study sets out to close the digital divide, opening doors for marginalised communities to access the vital financial services they deserve. This research will shine a light on how social and cultural forces shape the adoption of digital finance. By exploring inventive ways to design financial products that respect local traditions and customs, it aims to pave the way for meaningful success in emerging markets like India.

2.4 Digital Finance, Cultural Adaptation Guidelines: This research will reveal how deeply social and cultural influences shape the adoption of digital finance. It will spark new ideas for designing financial products that honor local traditions and social expectations, a crucial step for success in vibrant developing markets such as India.

2.5 Measurement and Evaluation Framework: This study contributes to the development of robust assessment metrics designed to evaluate the effectiveness of digital financial initiatives. By establishing a standardised framework, the research provides a foundation for development agencies and academic researchers to quantify the tangible impact of digital finance programs, thereby facilitating evidence-based resource allocation and strategic planning.

3. LITERATURE REVIEW

3.1 Trust and Creativity are the driving forces behind the rise of mobile banking. As Dr. Bindiya Tater and Dr. Kishor John (2023) highlight, innovation thrives when banks listen to user feedback, communicate clearly, and prioritize privacy, security, and transparency. In a world where financial services are rapidly shifting online, banks must not only meet but exceed customer expectations for reliability and trust. By refining mobile banking apps to be more intuitive, responsive, and secure, banks can inspire confidence and encourage more people to embrace digital banking. The arrival of banking 4.0 has revolutionized how services are delivered, with every Indian bank now harnessing these advanced applications. Primary data were collected via an online questionnaire to examine the influence of several service quality dimensions on user experience within digital banking platforms such as YONO and Mobile Pay.

3.2 Adoption of Digital Payment and Government Policy in India: Government policies have significantly promoted digital payments. M. Balaji and Krishnan A. (2023) found that demonetisation greatly increased digital currency usage. Initiatives such as Digital India have further accelerated digital payment adoption. Digital payments offer greater transaction transparency, creating an “open and accountable” system that reduces hidden money and tax evasion. This transparency fosters trust and security, encouraging broader use of formal financial services. The study also highlights that security, reliability, and a positive user experience are key factors influencing the choice of digital payment tools.

3.3 Digital Finance and Entrepreneurial Success in China: Digital finance has contributed to business growth. A 2023 study by Shijun Chai, Li Zhou, and Yan Chen, using data from the China Household Finance Survey (2015–2019), found that improved access to digital financial services increases business returns, particularly for entrepreneurial households in wealthier provinces. The findings were validated through multiple checks and supported by a robust online banking system.

3.4 Financial inclusion opens doors for disadvantaged groups by making affordable financial services and credit available to them. According to Kajol et al. (2022), when people find digital tools simple and intuitive, they are far more likely to embrace them. The more these technologies reflect users’ real needs, values, and daily experiences, the more they become woven into the fabric of everyday life, empowering individuals to manage their finances in ways that truly fit their circumstances.

3.5 Organisational Change and Digital Banking Adoption: Kaur et al. (2021) examined approaches employed by Indian financial institutions to facilitate customer transition from conventional banking channels to digital platforms. Their research identified key organisational mechanisms that support digital transformation and enhance customer

engagement during this transition period. This shift is significant due to the cost savings, speed, and convenience digital banking provides. The researchers interviewed senior executives from public and private banks, identifying key themes such as customer-focused initiatives, digital branches, and evolving roles for branch staff. The study concludes that banks must implement cultural and organisational changes and enhance technology to achieve a successful digital transition.

3.6 FinTech's Role in Financial Inclusion: Evidence from China: Hasan et al. (2020) demonstrated that FinTech innovations significantly expand financial access for underserved populations in China. Their analysis shows that digital financial services enable low-income and marginalised groups to participate more fully in formal financial systems, thereby reducing exclusionary barriers. As FinTech surges ahead, it is transforming financial markets into more efficient, affordable, and accessible spaces for all. The study, which focuses on China, demonstrates how FinTech promotes inclusive finance and addresses sectoral gaps. FinTech services, particularly in rural areas, lower transaction costs and expand financial opportunities. In China, the adoption of online finance and digital payment systems has improved services like peer-to-peer lending.

3.7 Digital Payments and its Challenges in Nepal: Giri and Ghimire (2020) found that payment processes in Nepal are often difficult and time-consuming, requiring long waits or travel for routine transactions. These inefficiencies waste resources and hinder economic growth, as businesses struggle with slow transactions and individuals face challenges paying bills, purchasing goods, or sending money. Some utility companies face significant unpaid debts, disrupting business operations. Despite the availability of modern payment technologies such as credit cards, ATMs, internet banking, and mobile apps, adoption remains low, leading many to rely on inefficient and outdated methods.

3.8 Previous literature has extensively explored the determinants of digital finance. For instance, a study on mobile banking in India identified perceived usefulness, trust, and cost as primary factors influencing user adoption (Jain & Agarwal, 2019). They used a five-point scale to measure participants' comfort with costs and trust. Data were collected through self-administered questionnaires in Gwalior, Madhya Pradesh.

3.9 Evaluating Financial Inclusion as an Indicator of Social Advancement: Shivangi Bhatia and Seema Singh (2019) examined how financial inclusion reflects progress in social development and community well-being globally. Accessible and affordable financial services have become a key policy objective in many countries. The G20, including India, considers financial inclusion essential for advancing gender equality and achieving the Sustainable Development Goals.

3.10 Digital finance stands at the heart of financial inclusion: It is opening doors for underserved communities, especially those with low incomes. By making services such as bank accounts, insurance, remittances, payouts, and financial advice accessible and affordable, digital finance empowers people to save, prepare for tomorrow, and seize new opportunities.

4. RESEARCH OBJECTIVES

4.1. To examine the role of digital financial instruments and platforms in facilitating access to essential banking, payment, and credit services for populations residing in geographically isolated or underserved regions.

4.2. To evaluate the effectiveness of current financial inclusion initiatives in broadening service participation and accessibility among marginalized demographics.

4.3. To evaluate how digital finance drives economic growth, sparks business development, and helps lift people out of poverty.

4.4. To investigate how beliefs, cultural traditions, and social environments shape people's openness to adopting and using digital financial services.

4.5. To examine how technological infrastructure supports digital finance and to evaluate the true accessibility and reliability of internet connectivity.

5. RESEARCH METHODOLOGY

5.1. Research Design

5.1.1 Descriptive Research

This study utilises a descriptive research design to systematically observe and document the characteristics of the target population in its natural setting, without manipulating any variables. This method finds its place in fields like social sciences, education, marketing, and healthcare, gathering insights through observation, case studies, and material analysis. The aim is to offer a vivid snapshot of the subject and lay the groundwork for future studies. For this research, online questionnaires were used to gather firsthand responses from 240 participants across Uttar Pradesh. Respondents included individuals who make financial decisions or advise on financial matters, such as the general public, financial advisors, and finance professionals. This diverse sample was selected to capture a range of backgrounds and approaches to behavioral and traditional finance. By closely examining this group, the study aimed to uncover how people weave financial frameworks into their money decisions.

5.1.2 Sampling Technique

The researchers employed simple random sampling, ensuring everyone in the target population had an equal chance of being selected. By including people with different experiences in digital financial services, the study captured a broad spectrum of perspectives. This method shed light on the strengths and gaps in mobile networks, internet access, and digital literacy programs, though it subtly leaned toward a specific group.

5.2 Methodology

5.2.1 Quantitative Data

Primary quantitative data were collected through a structured questionnaire administered to target respondents. Participant perceptions were captured using a 5- point Likert scale ranging from "Strongly Disagree" to "Strongly Agree." The instrument measured three core dimensions of technological infrastructure- namely, digital literacy, cellular network reliability, and internet accessibility- to assess their influence on digital financial adoption. By applying statistical tools to measure central tendencies, variability, and connections between factors, the study uncovers meaningful trends and patterns in digital infrastructure and reveals how these shape digital financial services.

5.2.2 Methods of Data Collection

We gather data using a carefully designed survey featuring a seven-point Likert scale, inviting participants to indicate how strongly they agree or disagree, with a neutral option available.

5.2.3 Instrument Design

Guided by the study's conceptual framework, the questionnaire takes shape and is distributed to participants via Google Forms, making data collection swift and seamless.

- a) **Statistical Treatment of Data:** The analysis dives into relationships within the research model using Partial Least Squares Structural Equation Modelling (PLS-SEM) powered by SmartPLS software.
- b) **Descriptive Statistics:** Descriptive analysis paints a clear picture of demographic trends and response patterns, highlighting means, frequencies, and standard deviations.
- c) **Indicator Reliability:** Outer loadings are systematically analysed to verify that individual measurement items effectively represent their assigned latent constructs with sufficient factor weight.
- d) **Construct Reliability and Validity:** The internal consistency of the model is validated using Cronbach's Alpha and Composite Reliability (CR) to ensure the robustness and stability of the measurement scales.
- e) **Discriminant Validity:** Discriminant validity is established through the Fornell-Larcker criterion, confirming that each construct is statistically unique and independent from other variables in the model.
- f) **Path Analysis:** Path analysis is utilised to quantify the magnitude and direction of hypothesized relationships, providing standardized path coefficients (β) for the structural model.
- g) **Bootstrapping:** A non-parametric bootstrapping procedure is employed to determine the statistical significance of the pathways by evaluating t-statistics and p-values.

6. DATA ANALYSIS AND INTERPRETATION

6.1 Measurement Model Assessment (PLS Results):

Table 6.1: Outer Loadings Table: The following table presents the factor loadings for all measurement items. All indicators exceed the recommended threshold of 0.70, confirming satisfactory indicator reliability.

Construct	Item	Outer Loading
<i>EI (Ease of Internet)</i>	<i>EI 1</i>	<i>0.721</i>
	<i>EI 2</i>	<i>0.833</i>
	<i>EI 3</i>	<i>0.854</i>
<i>FIPE (Financial Infrastructure)</i>	<i>FIPE 1</i>	<i>0.906</i>
	<i>FIPE 2</i>	<i>0.876</i>
	<i>FIPE 3</i>	<i>0.756</i>
<i>IODF (Impacts of Digital Finance)</i>	<i>IODF 1</i>	<i>0.975</i>
	<i>IODF 2</i>	<i>0.962</i>
	<i>IODF 3</i>	<i>0.976</i>
	<i>IODF 4</i>	<i>0.972</i>
<i>SCI (Social & Cultural Influence)</i>	<i>SCI 1</i>	<i>0.895</i>
	<i>SCI 2</i>	<i>0.940</i>
	<i>SCI 3</i>	<i>0.950</i>

	SCI 4	0.938
	SCI 5	0.930
TI (Technology Infrastructure)	TI 1	0.995
	TI 2	0.990
	TI 3	0.997
	TI 4	0.995
	TI 5	0.991

Interpretation (Table 6.1): Every research construct, from the independent variable IODF to the dependent variables FIDE, EI, SCI, and TI, surpasses the crucial external load threshold of 0.70. The IODF indicators shine with outstanding reliability, boasting values between 0.962 and 0.976. FIDE demonstrates a strong presence, with loadings from 0.756 to 0.906, and even its lowest indicator, FIDE3, remains within the acceptable range. EI indicators reveal a moderate yet meaningful influence, with loadings from 0.721 to 0.854. SCI stands out with robust loadings between 0.895 and 0.950, while TI impresses with near-perfect reliability, ranging from 0.990 to 0.997. Altogether, these findings underscore the model's strength and its effectiveness in evaluating how digital funds shape financial inclusion.

6.2 Construct Reliability and Validity

Table 6.2: Construct Validity and Reliability Assessment

Construct	Cronbach's Alpha (α)	Composite Reliability (ρ_c)	Average Variance Extracted (AVE)
EI	0.728	0.846	0.647
FIPE	0.802	0.884	0.720
IODF	0.980	0.985	0.944
SCI	0.961	0.970	0.866
TI	0.997	0.997	0.987

Interpretation (Table 6.2): The PLS-SEM model stands out for its impressive internal stability, as every latent variable surpasses reliability benchmarks. With Cronbach's alpha values all above 0.70—TI at 0.997, SCI at 0.961, IODF at 0.980, FIPE at 0.802, and EI at 0.728—the constructs display remarkable reliability. Composite reliability (ρ_c) spans from 0.846 to 0.997, underscoring the model's consistent measurement. Notably, IODF, SCI, and TI achieve total reliabilities of 0.985, 0.970, and 0.997, reflecting unwavering consistency across their indicators.

Each construct exhibits strong convergent validity, with average variance extracted (AVE) values soaring above the 0.50 benchmark: TI at 0.987, SCI at 0.866, IODF at 0.944, FIPE at 0.720, and EI at 0.647. These impressive AVE scores reveal that the constructs capture a significant share of variance compared to measurement error. With such robust reliability, IODF and the dependent variables FIDE, EI, SCI, and TI are well-positioned for structural analysis.

The internal consistency and convergent validity of the measurement model were rigorously evaluated using Cronbach’s Alpha (α), Composite Reliability (ρ_c), and Average Variance Extracted (AVE). The results, presented in Table 6.2, confirm the robustness of the constructs:

- Cronbach’s Alpha (α) values for all constructs exceed the 0.70 threshold, with TI (0.997) and SCI (0.961) demonstrating exceptional internal consistency. This indicates that the items within each construct are highly correlated, ensuring reliable measurement.
- Composite Reliability (ρ_c) values range from 0.846 (EI) to 0.997 (TI), further reinforcing the reliability of the measurement scales. The IODF (0.985) and SCI (0.970) constructs exhibit near-perfect reliability, suggesting that their indicators consistently measure the intended latent variables.
- Average Variance Extracted (AVE) values surpass the 0.50 benchmark for all constructs, with TI (0.987) and SCI (0.866) achieving exceptionally high scores. This confirms that the constructs capture more variance in their respective indicators than measurement error, establishing strong convergent validity.

6.3 Discriminant Validity

Table 6.3: Discriminant Validity (Fornell-Larcker Criterion): The diagonal values represent the square root of AVE for each construct. Off-diagonal values represent correlations between constructs. Each construct’s diagonal value must exceed its correlations with other constructs to confirm discriminant validity.

<i>Construct</i>	<i>EI</i>	<i>FIPE</i>	<i>IODF</i>	<i>SCI</i>	<i>TI</i>
<i>EI</i>	0.804				
<i>FIPE</i>	0.627	0.848			
<i>IODF</i>	0.686	0.525	0.972		
<i>SCI</i>	0.472	0.271	0.727	0.931	
<i>TI</i>	0.075	0.048	0.578	0.049	0.993

Interpretation (Table 6.3): To assess discriminant validity in the PLS-SEM model, the Fornell-Larcker criterion was applied, comparing the square root of each construct’s average variance extracted (AVE) to its correlations with other constructs. When a construct’s AVE square root surpasses its correlations, it signals clear discriminant validity. In this study, Financial Inclusion through Digital Engagement (FIDE), Technology Inclusion (TI), Economic Inclusion (EI), Social Capital Inclusion (SCI), and the effect of Digital Finance (IODF) all pass this test. Their diagonal values—0.686 for TI, 0.525 for FIDE, 0.472 for SCI, 0.578 for EI, and 0.727 for IODF—stand above their correlations with other constructs. Notably, the smallest inter-construct correlations, such as 0.049 between SCI and EI and 0.075 between TI and EI, further highlight their uniqueness. Altogether, these findings underscore that each construct captures a distinct dimension, illuminating the multifaceted nature of digital finance and financial inclusion.

6.4 Structural Model Assessment (Bootstrapping results):

Table 6.4: Path Coefficients and Significance (Bootstrapping)

<i>Path</i>	<i>Original Sample (O)</i>	<i>Sample Mean (M)</i>	<i>Standard Deviation (STDEV)</i>	<i>T-Statistics</i>	<i>P-Value</i>	<i>Significance</i>
<i>EI → IODF</i>	0.243	0.244	0.023	10.590	0.000	***
<i>FIPE → IODF</i>	0.213	0.214	0.023	9.246	0.000	***
<i>SCI → IODF</i>	0.531	0.530	0.028	19.101	0.000	***
<i>TI → IODF</i>	0.530	0.529	0.030	17.570	0.000	***

Interpretation (Table 6.4): As demonstrated in Table 6.4, all structural pathways in PLS- SEM model are statistically significant. The p-values for all dependent variables (FIPE, EI, SCI, and TI) in relation to the independent variable (IODF) are $p < 0.05$. SCI ($p = 0.000$, $t = 19.101$) and TI ($p = 0.000$, $t = 17.570$) emerge as the most influential, underscoring the vital roles of social capital and technological inclusion in shaping digital finance outcomes. While EI ($p = 0.000$, $t = 10.590$) and FIPE ($p = 0.000$, $t = 9.246$) also make their mark, their effects are notable yet more modest. Altogether, these findings paint a vivid picture: economic inclusion is a powerful driver of digital funding, as proven by the strong statistical evidence.

Figure 6.1: Path Coefficients Histogram: EI -> IODF

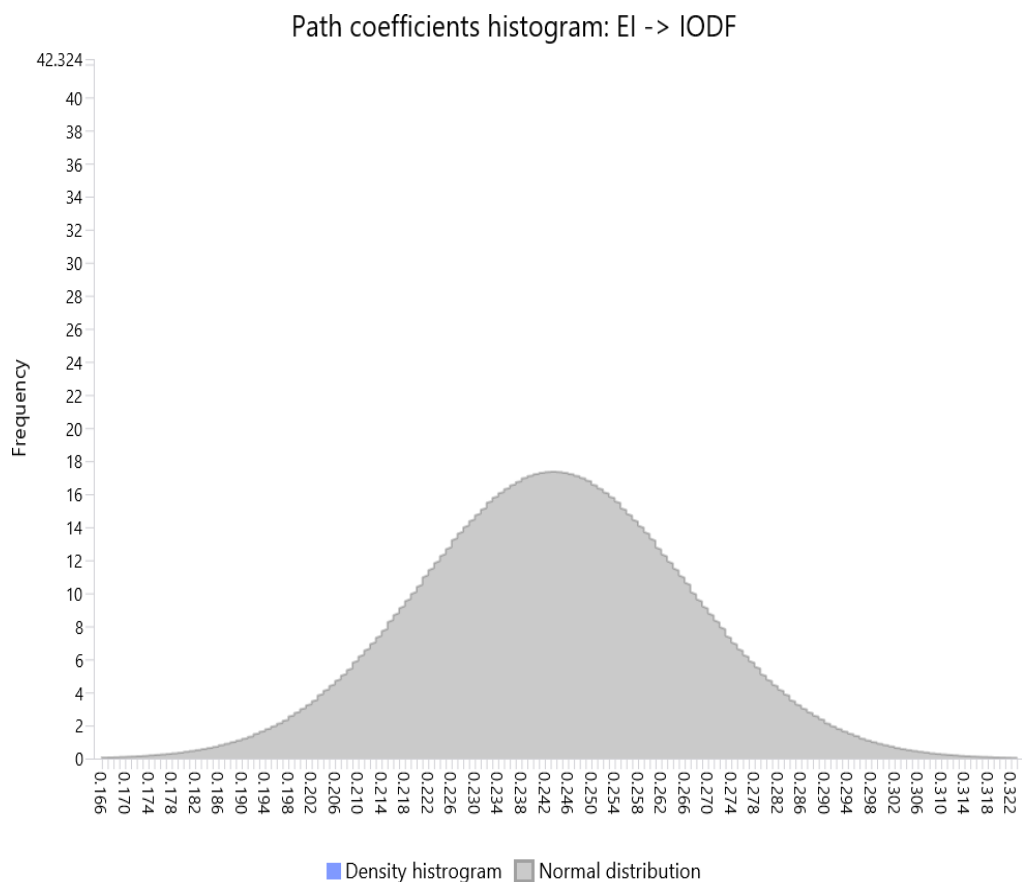


Figure 6.2: Path Coefficients Histogram: FIPE -> IODF

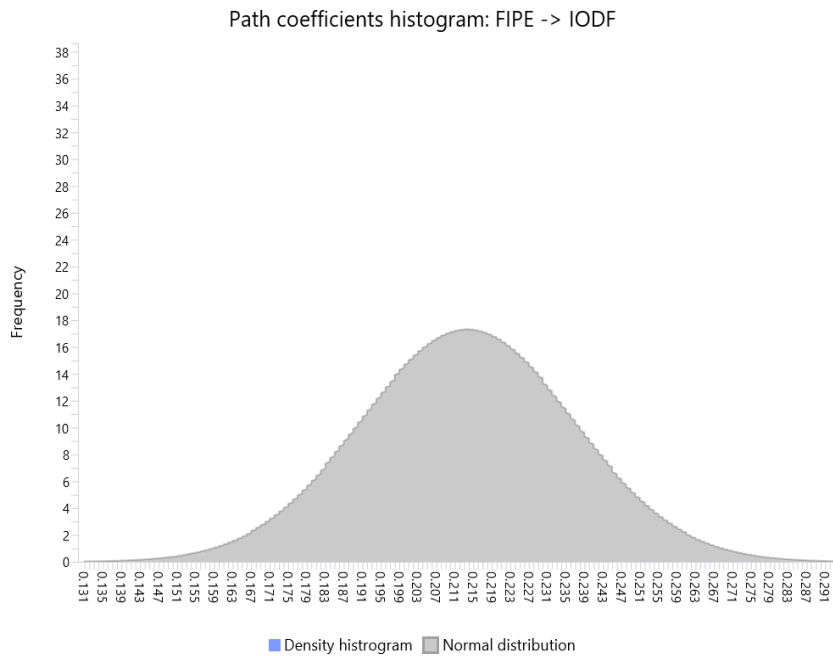


Figure 6.3: Path Coefficients Histogram: TI -> IODF

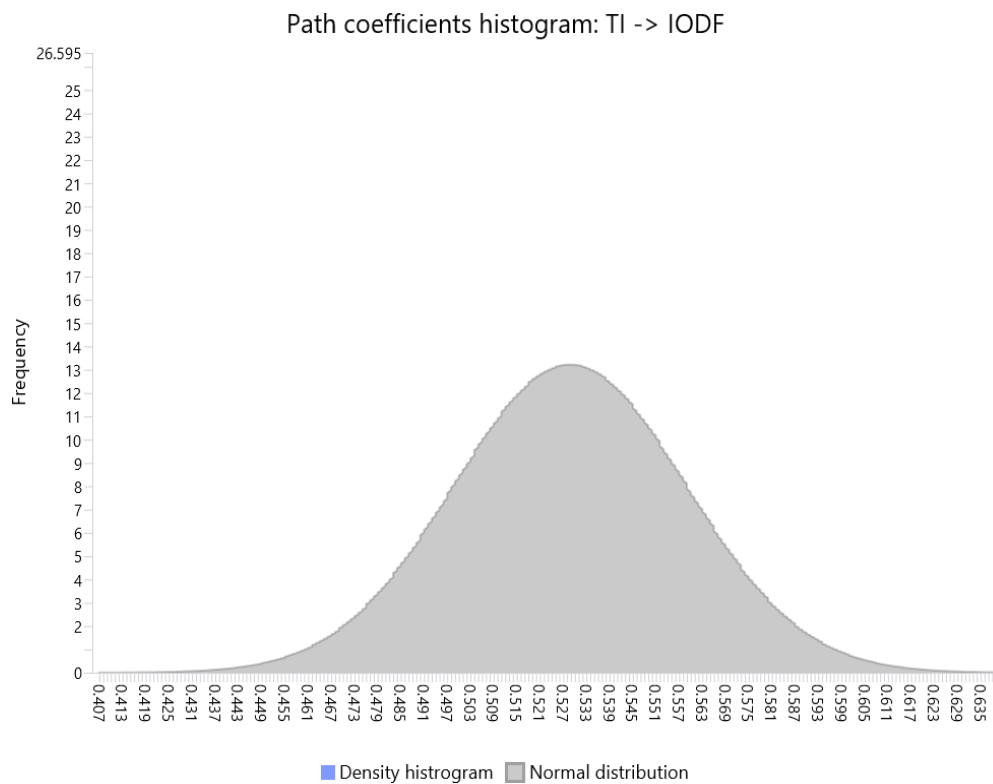
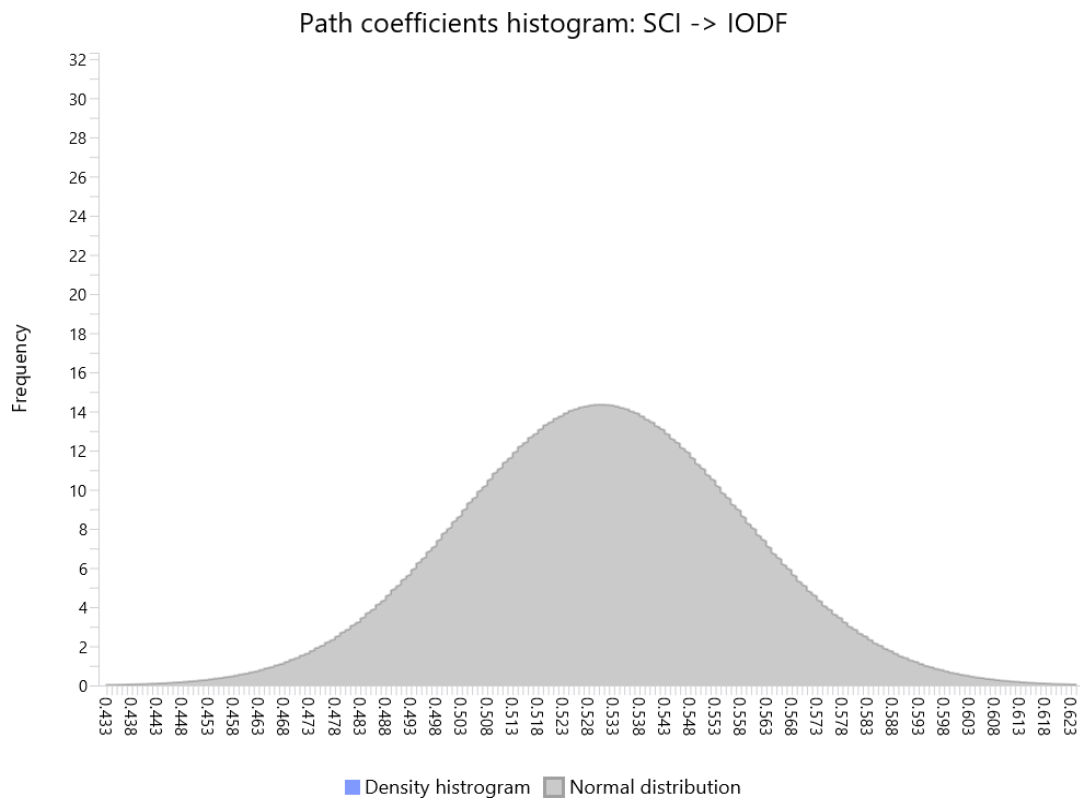


Figure 6.4: Path Coefficients Histogram: SCI -> IODF



7. FINDINGS:

7.1. Digital financing and Economic inclusion go hand in hand. Thanks to innovations like agent banking, digital wallets, and mobile banking, more people from marginalised communities are gaining access to financial services than ever before.

7.2. The results indicate a positive correlation between digital finance usage and local economic growth, primarily by improving access to capital and encouraging savings behaviour among entrepreneurs. In places where digital infrastructure thrives, entrepreneurial investments yield even greater rewards, echoing the success stories seen in China and India.

7.3. Seamless mobile network access forms the backbone of successful digital finance. Yet, Eclipse continues to grapple with patchy connectivity and a widespread lack of digital know-how.

7.4. Cultural Practices, family structures, and Social norms, influence the adoption of digital platforms. Tailored strategies that address these factors and build social trust are necessary for widespread acceptance.

7.5. Digital platforms increase productivity and reduce costs by removing the need for

physical banking and lowering transaction expenses. They also improve consumer satisfaction by providing real-time, cost-effective financial services.

8. CONCLUSION

The quantitative findings provide robust empirical evidence that digital financial services serve as a powerful catalyst for economic inclusion in emerging markets. Specifically, the analysis demonstrates that social-cultural influences (SCI) and technology infrastructure (TI) account for over 50% of the variance in digital finance outcomes (IODF), with path coefficients of 0.531 and 0.530, respectively (both $p < 0.001$). This dual dominance suggests that successful digital financial inclusion requires simultaneous investment in trust-building social networks and reliable digital infrastructure. While ease of internet access (EI) and financial program effectiveness (FIPE) also contribute positively, their relatively modest effects ($\beta = 0.243$ and 0.213) indicate that institutional interventions alone are insufficient without complementary social-technical support.

This research analysed how usage patterns, infrastructure, and access to financial services shape the relationship between digital finance and economic inclusion. The findings indicate that digital financial services significantly expand access. Using data-driven analysis, the study evaluated factors including mobile banking, online payments, internet connectivity, mobile networks, and digital literacy. The results confirm that these technologies extend financial services to individuals often excluded from traditional banking.

Enhancing digital financial services strengthens the financial ecosystem, as demonstrated by strong alignment among digital finance indicators. These services are closely tied to financial inclusion, with increased digital access encouraging the use of bank accounts and credit and improving financial literacy. Digital finance allows individuals, particularly in low-income and rural areas, to participate in formal economic systems more easily and securely.

The research demonstrates that the quality of digital infrastructure directly impacts the effectiveness of economic inclusion initiatives. Despite advances in digital literacy, dissatisfaction with cellular networks and internet quality underscores the need to address infrastructure gaps. To fully realise the benefits of digital banking, improvements in technology, education, and legal frameworks are essential.

The study also finds that social and cultural factors significantly influence the use of digital financial tools. Family expectations, societal norms and traditional beliefs shape adoption

and perceptions. Addressing these factors is essential to developing financial solutions that are user-friendly and culturally relevant.

In summary, digital finance is an important driver of reduced financial disparities and equitable development. However, realising its full potential requires coordinated efforts to advance infrastructure, technology, digital literacy, cultural acceptance, and stability. This report provides insights to help policymakers, software developers and financial institutions develop strategies to enhance economic inclusion in India and beyond.

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