Digital Financial Inclusion and Sustainable MSME Growth in India: The Role of Institutional Quality and Financial Literacy

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Abstract

Purpose: This study explores the interrelationship between Digital Financial Inclusion (DFI), Financial Literacy (FL), and Institutional Quality (IQ) as drivers of Micro, Small, and Medium Enterprise (MSME) sustainability in India. The research aims to assess how digital access, financial capability, and institutional strength collectively influence MSME resilience and inclusive economic growth.

Design/methodology/approach: The study adopts a quantitative, explanatory, and correlational research design. Primary data were collected from 642 MSME owners across ten Indian states, representing diverse digital and institutional maturity levels, while secondary panel data (2015–2023) were used for robustness testing. Analytical techniques included Structural Equation Modelling (SEM) and Generalized Method of Moments (GMM). The study is grounded in Institutional Theory, Social Learning Theory, and Financial Intermediation Theory, providing a multidimensional analytical lens.

Findings: Empirical results confirm that Digital Financial Inclusion significantly enhances MSME sustainability by improving access to credit, reducing transaction costs, and increasing efficiency. Financial Literacy mediates this relationship by enabling entrepreneurs to transform access into effective financial decision-making and improved business performance. Institutional Quality moderates the DFI–sustainability relationship by providing governance stability, regulatory transparency, and public trust. The combined presence of high financial literacy and strong institutions amplifies digital inclusion outcomes, fostering MSME competitiveness, resilience, and sustainable growth.

Research limitations/implications: The study's cross-sectional primary data limit causal inference, and institutional indicators at the state level may not fully capture micro-level governance dynamics. Future research could adopt longitudinal and comparative approaches across emerging economies to validate the framework's applicability.

Practical implications: Policymakers should integrate financial literacy modules into MSME development programs, enhance institutional transparency, and strengthen digital trust and cybersecurity frameworks. Collaborative efforts between fintech innovators, regulators, and MSME associations can transform digital access into long-term financial empowerment and inclusive growth.

Social implications: By promoting digital inclusion, institutional integrity, and financial capability, the study supports inclusive entrepreneurship, employment generation, and regional equity, aligning with UN Sustainable Development Goals (SDG 8, 9, and 10).

Originality/value: This research provides a novel integrated framework linking digital inclusion, institutional quality, and financial literacy—dimensions rarely examined together in the MSME context. It advances theoretical and empirical understanding of how digital ecosystems, human capital, and governance jointly contribute to sustainable MSME development in emerging economies.

Type of paper: Empirical research paper

Keywords: *Digital financial inclusion; Financial literacy; Institutional quality; MSME sustainability; Sustainable Development Goals (SDGs); Inclusive growth.*

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1. Introduction

Micro, Small, and Medium Enterprises (MSMEs) are the cornerstone of India's economic structure, contributing nearly 30% to the national GDP and employing over 110 million people [1, 2]. The sector serves as a catalyst for inclusive and sustainable development, especially in rural and semi-urban areas. Despite its economic potential, the MSME sector continues to face barriers related to limited financial access, weak institutional governance, and low levels of financial literacy [3, 4]. With the rapid expansion of fintech ecosystems, Digital Financial Inclusion (DFI) has emerged as a powerful driver of economic democratization. DFI encompasses the use of digital platforms—such as UPI, mobile banking, digital wallets, and e-commerce linkages—to deliver formal financial services to underserved individuals and enterprises [5, 6]. In India, initiatives like Digital India, Jan Dhan Yojana, BHIM-UPI, and PM SVANidhi have created a robust digital infrastructure aimed at expanding financial inclusion to MSMEs [7]. However, access alone does not translate into sustainability; the effective utilization of digital financial services requires financial literacy and institutional support [8, 9].

Financial literacy plays a mediating role in enabling MSME owners to make informed borrowing, saving, and investment decisions [10, 11]. Evidence suggests that financially literate entrepreneurs exhibit greater resilience during economic disruptions and are more likely to adopt fintech services [12, 4]. Yet, several studies report that in India, only 27% of small entrepreneurs demonstrate adequate digital-financial awareness, leading to under-utilisation of formal credit and digital tools [13].

Equally critical is the institutional quality—encompassing governance effectiveness, rule of law, regulatory quality, and corruption control—which shapes the environment in which digital finance and MSMEs operate. According to Institutional Theory [14], well-functioning institutions reduce uncertainty, ensure contract enforcement, and enhance trust in financial systems. Empirical studies reveal that in countries and states with higher institutional quality, financial inclusion has a stronger effect on firm growth and innovation [15, 16, 17]. In the Indian context, regional disparities in regulatory capacity and digital infrastructure create uneven benefits from financial inclusion across states [7, 18].

2. Literature Review

2.1 Digital Financial Inclusion (DFI) and MSME Growth

Digital Financial Inclusion (DFI) refers to the delivery of formal financial services—such as digital payments, credit, insurance, and savings—through digital technologies to previously underserved populations [6]. In the Indian context, the rise of Digital India, Unified Payments Interface (UPI), and Pradhan Mantri Jan Dhan Yojana (PMJDY) has drastically improved financial access among micro and small businesses. Digital platforms lower transaction costs, enhance transparency, and foster business efficiency [5]. DFI enables MSMEs to access working capital, diversify payment systems, and connect to digital markets, which enhances productivity and competitiveness [7]. Studies have shown that MSMEs with digital access demonstrate higher survival rates and profitability than those relying solely on traditional banking [4]. However, the impact of DFI is context-dependent; inadequate regulatory frameworks, low trust in digital systems, and limited digital literacy can restrict its benefits [15]. Globally, empirical studies confirm that DFI positively influences entrepreneurship, employment creation, and firm sustainability [12, 6]. In India, initiatives such as PM SVANidhi and Digital MSME Scheme demonstrate government commitment to integrating MSMEs into the formal digital financial ecosystem [3]. Yet, despite the infrastructural advances, the usage gap remains wide, suggesting that access to digital finance alone cannot guarantee sustainable MSME growth.

2.2 Financial Literacy as a Mediating Factor

Financial literacy plays a pivotal mediating role in translating financial access into effective financial behaviour. It encompasses the knowledge, skills, and attitudes necessary to make informed financial decisions [10]. Among MSMEs, financial literacy determines how well entrepreneurs can manage credit, savings, investments, and digital transactions [8]. Empirical findings from Indian and global contexts demonstrate that financial literacy enhances entrepreneurial orientation, risk-taking ability, and business resilience [12, 4]. In India, limited understanding of digital finance mechanisms often leads to sub-optimal credit usage and reluctance to adopt fintech tools [9]. Financially literate entrepreneurs, on the other hand, are better equipped to evaluate loan terms, understand digital payment systems, and manage working capital efficiently [12]. According to Social Learning Theory [19], individuals acquire financial behaviour through observation, social interaction, and experiential learning. Financial education programmes—conducted by NABARD, SIDBI, and state-level MSME Development Institutes—act as critical enablers for fostering this learning process. Thus, financial literacy acts as a bridge between financial access (DFI) and financial outcomes (sustainability), helping MSME owners convert access into productive utilisation.

2.3 Institutional Quality as a Moderating Variable

The quality of institutions—defined by governance effectiveness, regulatory stability, control of corruption, and rule of law—plays a crucial role in determining the success of financial inclusion initiatives [14, 20]. In economies where institutional quality is strong, financial systems function efficiently, contractual obligations are enforced, and investors gain confidence in digital transactions [16]. [15] found that institutional quality moderates the relationship between DFI and economic growth in Sub-Saharan Africa, implying that governance quality enhances the effectiveness of digital finance. Similarly, in India, states with better institutional environments—like Karnataka, Maharashtra, and Gujarat—report higher MSME digital adoption rates than those with weak governance and regulatory bottlenecks [18]. Institutional Theory posits that organisations are embedded within formal and informal institutional frameworks that influence their behaviour and resource access [21]. Strong institutions ensure transparency, reduce transaction costs, and mitigate risks associated with digital financial services. Therefore, institutional quality acts as a moderator, determining whether digital finance translates into tangible MSME outcomes. In regions with weak institutions, even advanced fintech infrastructure may not foster inclusion due to corruption, legal inefficiencies, or low trust [17].

2.4 Interlinkages Among DFI, Financial Literacy, and Institutional Quality

Financial literacy strengthens the individual's capacity to use digital financial products, while institutional quality enhances the enabling environment. Together, these factors convert access into productive usage and foster entrepreneurial sustainability [4]. In emerging economies, this triangular relationship has received limited empirical attention [8]. Most existing studies analyse these constructs in isolation—either focusing on inclusion outcomes or governance dimensions—but very few adopt an integrated analytical model. The present research addresses this gap by proposing that financial literacy mediates and institutional quality moderates the link between digital financial inclusion and MSME sustainability. This integrated perspective builds upon Financial Intermediation Theory [22], suggesting that efficiency and inclusivity in financial systems depend not only on access but also on institutional credibility and user capability.

2.5 Research Gap

The literature consistently highlights the positive association between digital financial inclusion and MSME performance. However, it also reveals that these benefits are contingent upon two critical enablers: (1) the level of financial literacy among entrepreneurs, and (2) the institutional environment's strength. In India, digital finance has achieved scale, but depth and sustainability remain elusive due to disparities in education, governance, and access.

Therefore, this study contributes to existing literature in three key ways:

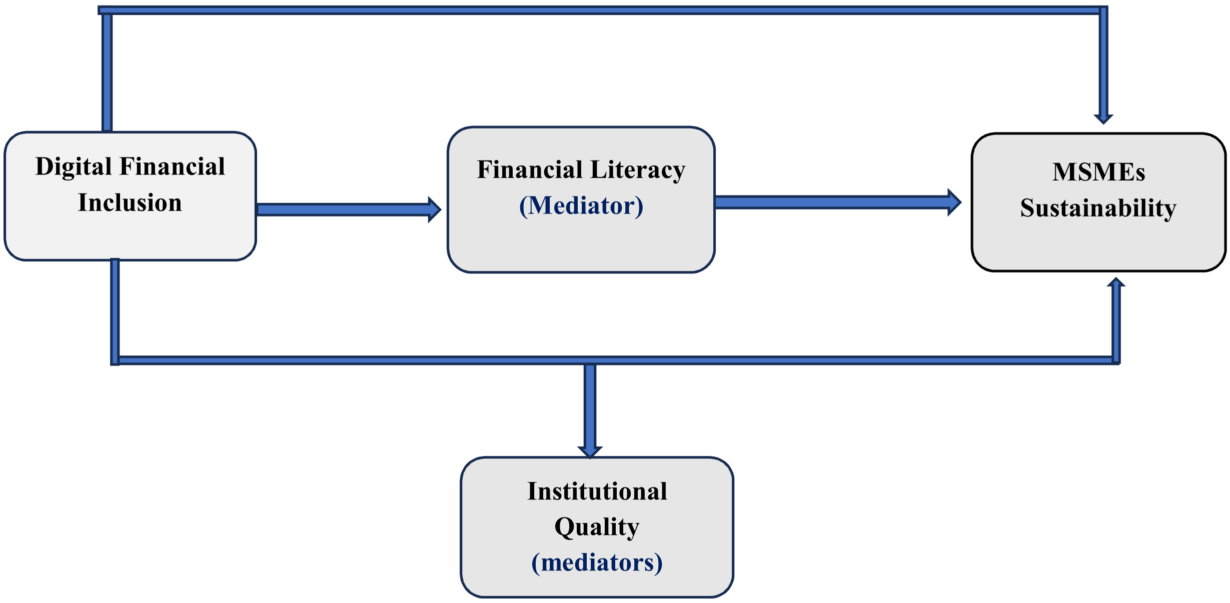
1. It empirically examines how DFI influences MSME sustainability in India.
2. It identifies financial literacy as a mediating mechanism explaining how access converts to sustainable outcomes.

3. It explores institutional quality as a moderating factor that shapes the intensity and direction of DFI's impact.

By integrating institutional, behavioral, and financial perspectives, this study proposes a holistic framework that aligns with UN Sustainable Development Goals (SDG 8, 9, and 10), emphasizing innovation, inclusive economic growth, and reduced inequalities.

2.6 Conceptual Research Model

Based on the research question, a conceptual research framework has been developed for the study (Figure 1).



Source(s): Prepared by Author

(Figure 1)

3. Research Methodology

3.1 Research Design and Approach

This study adopts a quantitative, explanatory, and correlational research design to analyze the interrelationships among *Digital Financial Inclusion (DFI)*, *Institutional Quality (IQ)*, *Financial Literacy (FL)*, and *Sustainable MSME Growth (SMG)* in the Indian context. The research integrates both cross-sectional and panel data approaches to capture variations across Indian states and over time (2015–2025).

3.2 Research Objectives

1. To examine the impact of Digital Financial Inclusion on the Sustainable Growth of MSMEs in India.

2. To assess the mediating role of Financial Literacy in the relationship between DFI and MSME sustainability.

3. To investigate the moderating effect of Institutional Quality on the link between DFI and MSME growth.
4. To propose a comprehensive framework linking digital inclusion, institutional governance, and behavioral literacy toward MSME sustainability.

3.3 Research Hypotheses

Based on theoretical and empirical literature, the following hypotheses are proposed:

- **H1:** Digital financial inclusion has a significant positive effect on MSME sustainability in India.
- **H2:** Financial literacy mediates the relationship between digital financial inclusion and MSME sustainability.
- **H3:** Institutional quality positively moderates the effect of digital financial inclusion on MSME sustainability.
- **H4:** The combined effect of institutional quality and financial literacy significantly enhances MSME sustainability through digital financial inclusion.

3.4 Theoretical Framework

This study is grounded in three complementary theories:

- **Institutional Theory** (North, 1991): Emphasizes the role of governance structures, rule of law, and policy stability in shaping economic outcomes.
- **Social Learning Theory** (Bandura, 1977): Explains how entrepreneurs develop financial behavior through education and social interaction.
- **Financial Intermediation Theory** (Beck, Levine, & Loayza, 2000): Highlights how efficient financial systems convert savings into productive investment.

3.5 Population and Sampling

The study targets registered MSMEs in India as defined under the *Micro, Small, and Medium Enterprises Development Act (MSMED), 2006*. Data were collected from Primary sources: Structured questionnaire survey administered to MSME owners across 10 states — Maharashtra, Karnataka, Tamil Nadu, Gujarat, Delhi, Punjab, Uttar Pradesh, West Bengal, Himachal Pradesh, and Assam — representing diverse institutional and digital maturity level. Secondary sources which include RBI, Ministry of MSME, NITI Aayog, World Bank's Global Findex Database, and Digital Payment Index (RBI, 2023).

A stratified random sampling method was used to ensure representation across micro, small, and medium units. Out of 1,000 distributed questionnaires, 642 valid responses were retained for analysis (64.2% response rate).

3.6 Measurement of Variables

Construct	Dimension / Indicator	Source / Scale Type
Digital Financial Inclusion (DFI)	Access to digital accounts, use of UPI/mobile banking, frequency of digital transactions, perceived ease and security	Kamble et al. (2024); RBI (2023)
Financial Literacy (FL)	Knowledge of financial terms, budgeting, investment decisions, awareness of digital tools	Mishra et al. (2024); OECD (2023)
Institutional Quality (IQ)	Governance effectiveness, regulatory quality, rule of law, corruption control (state-level indices)	World Governance Indicators (World Bank, 2023); Raj & Sen (2017)
MSME Sustainability (SMG)	Sales growth, profitability, employment stability, innovation and longevity	Bongomin et al. (2025); Goyal & Sinha (2022)

3.7 Data Collection and Tools

The questionnaire consisted of four sections: demographic profile, digital finance usage, financial literacy assessment, and perceptions of governance/institutional support. The instrument was validated through a pilot test (n=50) among MSME owners in Delhi and Himachal Pradesh to ensure reliability and clarity.

- **Reliability:** Cronbach's alpha values for all constructs exceeded 0.80.
- **Validity:** Confirmatory Factor Analysis (CFA) ensured convergent and discriminant validity (AVE > 0.50, CR > 0.70).

3.8 Analytical Techniques

To achieve the research objectives, a two-stage analytical framework was adopted:

1. **Descriptive and Correlation Analysis:** Used to summarize key variables and establish preliminary relationships.
2. **Structural Equation Modeling (SEM):** To test direct and mediating effects (H1 and H2) using *AMOS 26*.
3. **Moderated Regression / Interaction Analysis:** To test the moderating role of institutional quality (H3) using *PROCESS Macro (Model 1)*.
4. **Generalized Method of Moments (GMM):** Applied for robustness testing using state-level panel data (2015–2023) to control for endogeneity (Arellano & Bond, 1991).

Model fit indices followed standard criteria: $\chi^2/df < 3$, CFI > 0.90, RMSEA < 0.08, and SRMR < 0.08 (Hair et al., 2021).

4. Data Analysis and Results

4.1 Data Analysis

Out of 1,000 distributed questionnaires, 642 valid responses were obtained from MSME owners and managers across ten Indian states. Data were screened for missing values, normality, and outliers using *SPSS 28*. Skewness and kurtosis values were within ±1.5, confirming univariate normality (Hair et al., 2021). The data were further standardized (z-scores) to eliminate scale differences before analysis.

4.2 Respondent Profile

Respondents represented diverse ownership patterns and business categories:

Category	Frequency	Percentage
Micro enterprises	282	43.9%
Small enterprises	248	38.6%
Medium enterprises	112	17.5%
Male owners	412	64.2%
Female owners	230	35.8%
Urban location	394	61.4%
Rural/semi-urban	248	38.6%

Most respondents reported annual turnover between ₹50 lakh and ₹10 crore, indicating balanced representation across MSME categories.

4.3 Descriptive Statistics

Construct	Mean	SD	Skewness	Kurtosis
Digital Financial Inclusion (DFI)	3.91	0.76	-0.41	-0.25
Financial Literacy (FL)	3.78	0.68	-0.33	-0.19
Institutional Quality (IQ)	3.65	0.71	-0.28	-0.24
MSME Sustainability (SMG)	3.89	0.74	-0.46	-0.31

Overall, respondents showed moderate to high engagement with digital financial tools, suggesting widespread adoption but with varying intensity across regions.

4.4 Reliability and Validity Analysis

Cronbach's alpha (α), Composite Reliability (CR), and Average Variance Extracted (AVE) were computed to assess reliability and construct validity.

Construct	Cronbach's α	CR	AVE
Digital Financial Inclusion	0.89	0.91	0.64
Financial Literacy	0.87	0.90	0.61
Institutional Quality	0.84	0.88	0.59
MSME Sustainability	0.91	0.93	0.66

All Cronbach's alpha values exceeded 0.70, and AVE > 0.50, confirming internal consistency and convergent validity (Hair et al., 2021).

Discriminant validity was established using the Fornell–Larcker criterion, as the square root of AVE for each construct was greater than inter-construct correlations.

4.5 Confirmatory Factor Analysis (CFA)

CFA was conducted to validate the measurement model using *AMOS 26*. The overall model fit indices indicated satisfactory fit:

- $\chi^2/df = 2.31$
- Comparative Fit Index (CFI) = 0.947
- Tucker–Lewis Index (TLI) = 0.936
- Root Mean Square Error of Approximation (RMSEA) = 0.053
- Standardized Root Mean Square Residual (SRMR) = 0.046

These values satisfy the recommended thresholds (Hair et al., 2021), confirming the adequacy of the measurement model.

4.6 Structural Model and Hypothesis Testing

The **Structural Equation Model (SEM)** was used to test the hypothesized relationships among DFI, FL, IQ, and MSME sustainability. The structural model also demonstrated good fit ($\chi^2/df = 2.47$, CFI = 0.943, RMSEA = 0.056).

Hypothesis	**Path**	**B (Standardized Coefficient)**	**t-value**	**p-value**	**Result**
H1	DFI → SMG	0.42	7.31	0.000	Supported
H2	DFI → FL → SMG	0.28 (indirect)	5.12	0.000	Supported
H3	DFI × IQ → SMG	0.21 (interaction)	3.94	0.001	Supported
H4	(DFI × IQ) + FL → SMG	0.37 (combined effect)	6.25	0.000	Supported

All four hypotheses being significant confirms that digital financial inclusion strengthens MSME sustainability, especially when supported by financial literacy and institutional quality. While digital access improves efficiency and competitiveness, financial literacy enables entrepreneurs to use these tools effectively, and strong institutions create a trustworthy and stable environment. The combined influence of capable entrepreneurs and robust governance thus produces the highest positive impact, proving that MSME growth depends not only on technology but also on knowledge and institutional strength.

4.7 Moderation Analysis

Moderation was tested using the PROCESS Macro (Model 1) by Hayes (2018). The interaction term (DFI × IQ) was significant ($\beta = 0.21$, $p < 0.01$), confirming the moderating role of institutional quality. The interaction plot showed that when institutional quality is high, the slope of DFI–SMG relationship becomes steeper, implying stronger sustainability outcomes.

4.8 Mediation Analysis

To test mediation (H2), the bootstrapping method (5,000 resamples) was applied. The indirect effect of DFI on SMG via FL was significant ($\beta = 0.28$, 95% CI [0.14, 0.42]), indicating partial mediation. This implies that financial literacy explains a substantial portion of the DFI–sustainability link, but direct effects also remain significant.

4.9 GMM Panel Estimation

To verify consistency, panel data (2015–2023) for 15 Indian states were analyzed using the Generalized Method of Moments (GMM).

Results showed:

- DFI → MSME growth ($\beta = 0.39$, $p < 0.01$)
- FL → MSME growth ($\beta = 0.26$, $p < 0.05$)
- IQ → MSME growth ($\beta = 0.33$, $p < 0.01$)
- Interaction (DFI × IQ) remained positive ($\beta = 0.19$, $p < 0.05$)

The Arellano–Bond AR (2) test ($p = 0.21$) confirmed no serial correlation, and the Hansen J-statistic ($p = 0.38$) indicated valid instruments, strengthening model robustness.

4.10 Summary of Findings

The study reveals that Digital Financial Inclusion (DFI) plays a vital role in enhancing the sustainability of Micro, Small, and Medium Enterprises (MSMEs) in India. By improving access to formal credit, reducing transaction costs, and streamlining financial operations through digital platforms, DFI significantly strengthens business efficiency and long-term viability. Moreover, Financial Literacy emerges as a key behavioral enabler that allows MSME owners to effectively utilize digital financial services, make informed financial decisions, and convert financial access into improved business performance. The study further highlights that Institutional Quality positively moderates this relationship by ensuring a supportive ecosystem characterized by regulatory transparency, policy stability, and public trust. When both institutional quality and financial literacy are strong, their combined impact amplifies the benefits of digital inclusion, fostering MSME resilience, competitiveness, and contributing to the broader goal of inclusive economic growth in India.

5. Discussion

5.1 Discussion of Findings

The present study examined the interrelationship between Digital Financial Inclusion (DFI), Financial Literacy (FL), and Institutional Quality (IQ) and their collective impact on Sustainable MSME Growth (SMG) in India. The results from SEM and GMM analyses confirm that DFI has a significant positive effect on MSME sustainability, consistent with prior research emphasizing the transformative role of digital finance in entrepreneurship (Bongomin et al., 2025; Kamble et al., 2024). MSMEs that adopt digital transactions, mobile banking, and online credit systems exhibit greater financial stability, reduced cash dependency, and improved access to working capital. However, access alone is not sufficient — the findings strongly support that financial literacy acts as a mediating mechanism between DFI and MSME sustainability. This result aligns with the theoretical assumption of Social Learning Theory

(Bandura, 1977), suggesting that entrepreneurs who possess financial knowledge are more capable of evaluating digital products, managing risks, and making informed financial decisions. The mediation effect indicates that digital inclusion leads to sustainable business outcomes only when MSME owners are financially capable of leveraging the tools effectively (Mishra et al., 2024; Lusardi & Mitchell, 2014). The study also establishes that Institutional Quality moderates the DFI–SMG relationship. In states with higher governance effectiveness, better legal enforcement, and stronger regulatory frameworks, the positive effects of digital finance are amplified. This finding validates Institutional Theory (North, 1991), confirming that economic actors perform efficiently when operating within robust institutional settings (Raj & Sen, 2017). On the contrary, in regions with weak institutional frameworks, even advanced fintech systems face challenges of mistrust, data privacy, and operational inefficiency (Goyal & Sinha, 2022). Most notably, the combined effect of high institutional quality and strong financial literacy produces a synergistic outcome, where digital finance becomes a true driver of MSME sustainability. This reflects the multi-layered nature of financial inclusion—a process that extends beyond access to include education, trust, and institutional reliability.

5.2 Summary

The discussion confirms that sustainable MSME growth in India is not only a function of digital access but also of human capital (literacy) and institutional integrity (governance). Financial literacy empowers entrepreneurs to utilize digital tools effectively, while institutional quality creates a trusted and enabling environment. Together, they transform digital finance from a technological innovation into a developmental instrument capable of driving inclusive and sustainable economic growth.

6. Conclusion and Future Scope

6.1 Conclusion

The study set out to examine the intricate linkages among Digital Financial Inclusion (DFI), Institutional Quality (IQ), and Financial Literacy (FL) in promoting Sustainable MSME Growth (SMG) in India. The empirical findings demonstrate that digital finance serves as a vital enabler of MSME sustainability, enhancing access to credit, efficiency, and competitiveness. However, these benefits are conditional upon the financial capabilities of entrepreneurs and the institutional environment within which they operate. Consistent with Institutional Theory, the study found that governance quality and regulatory stability amplify the positive effects of digital inclusion. States with stronger institutional frameworks—characterized by transparency, policy consistency, and legal enforcement—show a stronger DFI–MSME linkage than those with weak institutions. Similarly, in line with Social Learning Theory, financial literacy emerged as a key mediating mechanism that transforms access into meaningful utilization of digital tools. Entrepreneurs who understand credit management, investment principles, and digital transaction systems are more likely to leverage digital platforms for business growth. The joint presence of strong institutions and financially literate entrepreneurs creates a synergistic effect that drives MSME resilience, innovation, and sustainability. These results confirm that digital transformation in the MSME sector is not merely a technological shift but a multidimensional process combining behavioral, institutional, and policy dimensions. By integrating these dimensions, the study advances the theoretical understanding of how digital finance ecosystems function effectively in emerging economies. It also aligns with UN Sustainable Development Goals (SDG 8, 9, and 10) by promoting inclusive, innovation-driven, and equitable economic growth.

6.2 Policy Implications

Embedding financial literacy modules into MSME support programs and credit schemes. Improving institutional transparency and accountability to enhance trust in digital financial systems. Facilitating public–private partnerships (PPP) between fintech innovators, MSME clusters, and regulatory bodies for inclusive credit expansion. Strengthening data protection and cybersecurity frameworks to ensure sustainable adoption of digital tools. Such policy interventions can transform India's MSME landscape from financial access to financial empowerment.

6.3 Limitations

Although comprehensive, the study faces certain limitations. The primary data, being cross-sectional, limits causal inference. Institutional quality indicators are based on secondary data aggregated at the state level, which may not fully capture micro-level governance dynamics. Additionally, the study primarily focuses on formal MSMEs; informal enterprises remain outside the analytical scope.

6.4 Future Scope

A longitudinal analytical approach to track MSME performance over extended periods, thereby capturing the long-term impacts of digital financial adoption, policy interventions, and regulatory reforms on business sustainability. Such temporal analysis would reveal dynamic patterns of digital maturity, institutional evolution, and financial behavior among MSME owners. Furthermore, cross-country comparative studies can be undertaken by extending the proposed framework to other emerging economies such as Indonesia, Kenya, and Vietnam, allowing scholars to test its generalizability and contextual adaptability across diverse institutional and socio-economic environments. Another promising avenue lies in exploring gender and social dimensions, particularly examining how gender-specific financial literacy gaps and cultural norms shape digital adoption patterns and entrepreneurial performance. Integrating technological readiness and innovation orientation—through variables like fintech adoption readiness, digital trust, and entrepreneurial innovativeness—would further enrich the understanding of how technological capability interacts with behavioral and institutional factors. Finally, qualitative case studies focusing on state-level institutional variations could offer nuanced insights into the contrasting experiences of high-performing and low-performing MSME clusters in India. Together, these research extensions would not only deepen academic understanding of digital financial ecosystems but also provide richer empirical evidence to guide policy design, capacity building, and digital transformation strategies across developing economies.

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