

The Role of Digital Finance in Transforming the India's MSMEs: A Systematic Literature Review and Thematic Analysis

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Abstract: The main aim of this paper is to assess the role of financial digitalization in India's transformation by understanding the key drivers for adopting digital finance, challenges in using digital finance, and its impact on MSMEs. In order to achieve this objective, a systematic literature review (SLR) along with thematic analysis has been conducted to analyze the data. Using PRISMA guidelines, by screening 310 articles between 2014-2025 and 140 have been finalized for the review. The papers for study have been chosen from various academic databases, including Scopus, Google Scholar, ScienceDirect, and ResearchGate. MSME performance has been improved meticulously by better and easier access to credit, improvised operational efficiency, and open new avenues of market for small businesses. The five most influential factors in determining whether MSMEs will adopt digital financial services include: 1) level of digital literacy within a business, 2) the technology skills possessed by staff members, 3) the level of perceived benefits and usefulness of the service, 4) heterogeneity of the firm, and 5). support provided by the Government. Even with these factors, there are still some challenges, such as problems of trust, absence of technological facilities, cybersecurity fears, and insufficient knowledge about digitalization, which mostly concern small firms as well as those working in the rural sector. This paper offers a thorough synthesis of the fragmented literature and suggests a conceptual framework that connects MSME performance, fintech adoption, and digital literacy, providing insightful information for academics and policymakers

Keywords: Digital Finance, Digital Literacy, Financial Inclusion, Fintech Adoption, PRISMA, MSMEs, UPI

1. Introduction

Developing nations rely heavily on the MSMEs as a vital pillar of economic growth. In India, Micro, Small, and Medium Enterprises form about 30% of the GDP and about 50% of the country's total exports. Their role in generating employment and promoting equitable regional development is imperative. However, traditional challenges in accessing formal finance, limited economies of scale, and inadequate integration with digital ecosystems have historically constrained their growth. In addition to supporting women-led businesses and concentrating on regional diversity and demographic representation, the Ministry of MSME is committed to promoting inclusive growth by supporting well-established businesses, developing cutting-edge technology, and motivating new endeavors.

Technological innovations, such as digital currency via cards, the internet, and mobile devices, have drastically changed the financial sector and altered a range of financial services, goods, and customer interaction strategies. Digital finance is using new technology and channels to offer and use financial services. This spans a wide array of offerings like UPI, mobile wallets, QR code payments, and apps like insurtech. It also includes digital banking, P2P lending, blockchain and all digital iterations of existing financial products.

Transforming how financial services are delivered changes how accessible, affordable, and efficient those services are, especially for the most underserved, like MSMEs. According to National Payment Corporation of India



(NPCI 2024) , India ranks no.1 in digital finance usage, with a considerable increase in UPI usage at 85% approximately (18.39 bn by total payment volume and 24.03 trillion in Value)

Source: (NPCI- <https://www.npci.org.in/product/upi/product-statistics>).

Digital finance and MSME development are fundamental for India's economic development. The advent of digital finance helped MSMEs to overcome numerous challenges and obstacles that existed before its adoption. Digitalization of financial services like digital payments helps MSMEs to speed up their day-to-day business transaction, offers instant lending services with less paperwork, and can also manage their financial records more effectively. MSMEs can use e-commerce services to expand their markets, and with the use of real-time financial tracking, their cash flow management improves (Verma et al., 2025). Digital finance also allowed MSMEs to formalize their businesses, build their credit history and obtain financial services that were only accessible to larger businesses. The rapid digital adoption that took place post-COVID is what makes this transformation so significant.

Recognizing the importance of digital finance to MSMEs, the Government of India has taken various steps to support it. The Ministry of MSME has taken the lead on digital transformation by promoting digital literacy, technology adoption subsidy, and government e-market integration (Ministry of MSME, 2024). Together, the Digital India campaign, micro-enterprise financing to the PMMY, and digital grievance redressal via the MSME Samadhaan portal provide an adequate focus on MSME digitalization. Moreover, the combination of innovation and consumer protection has developed, with some perseverance on the implementation side, the regulatory structure governing fintech, data protection, and digital lending.

Scholarly interest has increased from the early 2000s, especially beyond 2020, reflecting the industry's increasing digital alliance. . MSMEs can overcome conventional obstacles like restricted credit availability and unofficial operations with the help of digital finance(Maiti & Kayal, 2017). For instance, formalizing microenterprises and a surge in transaction efficiency have been noticed after adopting digital payment

Regardless of these developments, MSMEs continue to struggle to utilize digital financing properly. Disparities in information, infrastructure gaps, and inadequate digital knowledge pose barriers to accessing finance.. Digital maturity among MSMEs remains varied across regions and organization sizes, even as digital finance adoption rises. Many microbusinesses still lack sufficient digital knowledge and confidence when using digital banking solutions. . Hence, understanding the dynamics of the adoption of digital finance by MSMEs becomes important for framing inclusive economic policy.

2. Background

2.1 *Genesis of digital finance in India*

The evolution of digital finance in India is divided into four distinct phases driven by changes in adoption pattern, technology and platforms and regulations.

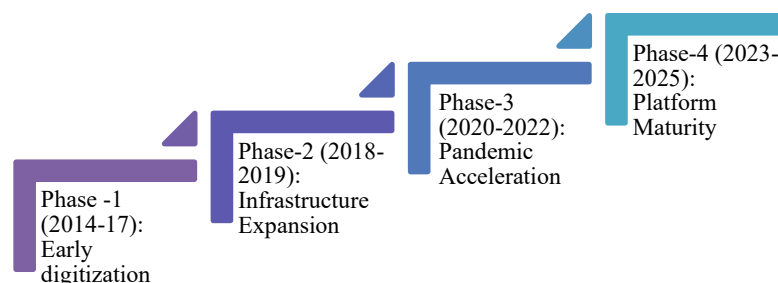


Figure 1: Evolution of the Digital Finance ecosystem

2.2 *Digital Finance and Financial Inclusion*

Digital finance represents a paradigm shift in inclusive banking and payment systems. Experiences from Kenya's M-Pesa to India's UPI showcase how fintech can extend services to unbanked populations (Awinja and Fatoki 2021). Developing countries are increasingly embracing electronic payments for local and global transactions, thus valuing financial digitalization. It also focuses on the possibility of a transformative shift in the understanding of financial inclusion.. Digital transactions generate imputable financial data, which helps augment credit scores, thereby reducing information asymmetry. The study shows that adopting financial digitalization supports firm growth.

2.3 MSMEs and Financial Access

Access to finance has long been a structural barrier for MSMEs. Despite such policy initiatives, Indian MSMEs continue to face a credit gap of more than INR 25 trillion. . Banks are often hesitant to provide credit due to the informal nature of many businesses, along with the limited collateral and credit history. As a result, many micro, small, and medium-sized enterprises (MSMEs) are forced to seek financing outside of formal financial institutions. Digital financial tools—such as online lending, e-wallets, and UPI-based payments—offer potential to bridge these gaps by reducing transaction costs and improving transparency.

2.4 Digital and Financial Literacy of MSMEs in India

The level of financial literacy among entrepreneurs significantly impacts the success of the MSME sector. For their businesses to expand and survive in the cutthroat world, entrepreneurs must possess and understand fundamental financial literacy, including accounting, budgeting, and costing . Lack of digital skills and financial knowledge among MSME owners and employees hinders effective technology adoption and financial management. Limited resources and limited financial knowledge also hinder competitiveness in a digital economy. Regardless of all challenges facing by MSMEs, can improve their performance. . Adequate training and guidance need to be provided to Micro Small and Medium Enterprises owners to increase their inclination towards digital transformation. This training should strongly focus on equipping MSME owners with a deeper understanding of ICT before encouraging them to apply that knowledge in practice. They must tailor themselves to the era of digital innovation.

2.5 Digital Adoption among MSMEs in India

While fintech platforms have improved accessibility, adoption remains asymmetric. Larger firms and those managed by digitally literate entrepreneurs are more likely to integrate digital systems. Conversely, rural and microenterprises face barriers such as poor connectivity, fear of taxation, and lack of awareness. . The 2016 demonetization and the COVID-19 pandemic served as catalysts for digital adoption, yet the long-term sustainability of this shift depends on institutional support and trust-building mechanisms. . The ingress of the fintech sector has simplified banking for MSMEs, like fair financial inclusion, instant and easy transfer of funds, better customer service, quick loan approval, and disbursement.

3. Theoretical Background

The study is based on four theoretical framework which helps in understanding the adoption of digital finance and its impact.

1. Technology Acceptance Model (TAM)
2. Diffusion of Innovations Theory
3. Technology- Organization-Environment (TOE) Framework (Tornatzky, L. G., & Fleischer, M. 1990).
4. UTAUT Theory

3.1 Technology Acceptance Model (TAM):

This model was proposed by Fred D Davis in 1989. This model suggested that the adoption of any technology basically relies on two presumptions.

1. Perceived Usefulness- This presumption explains the degree to which a user perceives that adopting the particular system would enhance their work performance.
2. Perceived Ease of Use – This presumption explains the degree to which the user believes that the system would be easy and convenient to use.

3.1.1 Application of Theory to MSMEs' Digital Finance Adoption: On the basis of this theory, the chance that MSMEs may adopt digital financial services is only if they find it useful for improving the performance of their business, and have a user-friendly interface, easy to use, and requiring minimal training. The use of the Technology Acceptance Model (TAM) for digital adoption by users (MSME Owner/employee) in India demonstrates that Perceived Usefulness (PU) and Perceived Ease of Use (PEOU) continue to be primary predictors for adoption intentions, particularly in situations where borrowing entails formal credit provision. Nevertheless, in an environment defined by first-time borrowers, limited digital skills, and little previous exposure, Trust, Perceived Security, Perceived Risk, Subjective Norms (SN), and Facilitating Conditions (FC) are critical elements to be considered in the adoption structure.

3.2 Diffusion of Innovation Theory :

This theory was proposed by Everett Roger . The theory states how, why, and how quickly new concepts and innovations permeate societal structures. There are five features of innovation to make innovation successful

Table 2: Features of Innovation

SL No	Features	Explanation
1	Relative Advantage	The extent to which an innovation is seen as superior to the concept it replaces.
2	Compatibility	The extent to which an innovation is seen as aligned with current needs, values, and experiences.
3	Complexity	The extent to which innovation is seen as difficult to understand and use
4	Trialability	The extent to which a novel idea can be tested on a small scale.
5	Observability	The extent to which an innovation's effects are apparent to others

Source : Author's own compilation

3.2.1 Application of Theory to MSMEs' Digital Finance Adoption: This shift can be understood using Rogers'; Diffusion of Innovation Theory:

- 1) Relative Advantage: MSMEs adopt the digital tools when they perceive the benefits from them like cost reduction, sales growth and speedy business transaction.
- 2) Compatibility: Faster adoption is seen with digital tools that are in harmony with the traditional Indian business organizational structure, culture, and workflows.
- 3) Complexity: Technologies that are new and perceived to be complex are an even greater challenge, especially with low digital literacy.
- 4) Trialability: MSMEs are more likely to accept technology that is adoptable and usable at a smaller scale, such as test (e.g., free trial versions of ERP software).
- 5) Observability: Adoption of digital tools, (e.g., e-commerce) by a peer and competitor MSME ensures that others adopt it as well.

3.3 Technology-Organization-Environment (TOE) Framework

This framework was propounded by Tornatzky and Fleischer in 1990. This framework pinpoints three aspects which influence the adoption rate of technology at organizational level.

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Figure 2: TOE Framework developed by Tornatzky & Fleischer (1990) Source: (Baker, 2012)

The TOE framework provides a robust foundation for technological adaptation at the firm level and is well-suited for assessing technological innovation. The technological context explains how the firm's perceived benefits depend on the availability of technology. In a similar vein, firm kinds, size, scope, managerial level, and other relevant concerns are the focus of the organizational context. The environmental context discusses the external environment in which the company operates, including government agencies, commercial rivals, and industrial requirements. (Idayuwati Binti Ahmad et al, 2023)

3.3.1 Application of Theory to MSMEs' Digital Finance Adoption: The TOE framework serves as a theoretical foundation for studying the adoption behavior of digital finance technology among MSMEs, using three theory-driven dimensions. The technology dimension indicates that MSMEs appraise the technology used in terms of its utility and consider other technologies that may offer greater benefits, focusing on trialability, simplicity, and direct/indirect advantages. The organizational dimension examines the availability of resources within the organization, particularly financial, human, and managerial (top) resources, as well as support resources. The environmental context illustrates the speed with which the organization can adapt in response to external forces, such as competitive pressures, emerging technologies, and the presence and support of governmental regulations and initiatives.

3.4 Unified Theory of Acceptance and Use of Technology (UTAUT)

This theory was developed by Categorize four primary elements by combining the eight earlier models of technology acceptance: Performance Expectancy, Effort Expectancy, Social Influence, and Facilitating Conditions.

Table 3 Factors of technology acceptance

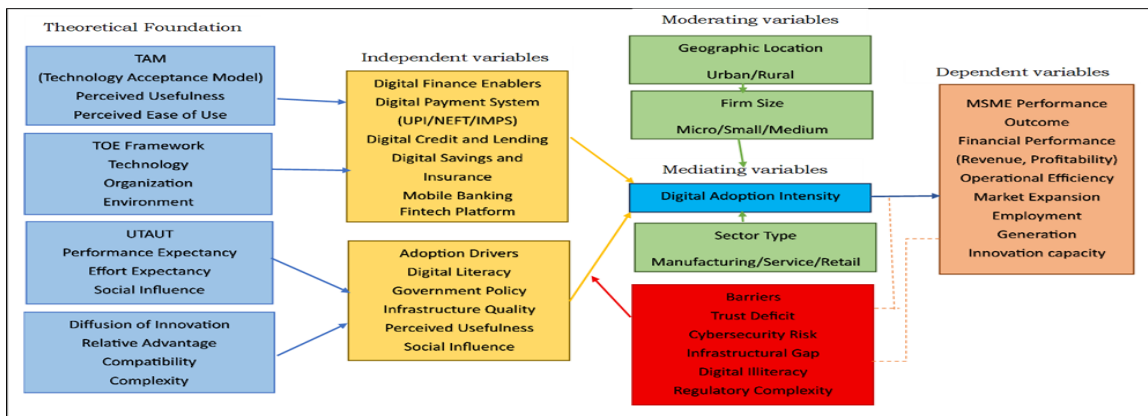
Factors	Definition	Construct
Performance Expectancy	The degree to which a person thinks that utilizing the system would enable them to improve their job performance	1. Perceived Usefulness (Davis, 1989) 2. Extrinsic Motivation (Davis et al., 1992) 3. Job fit (Thompson et.al. 1991) 4. Relative Advantage (Moore and Benbasat 1991) 5. Outcome expectations (Higgins, 1995), Compeau et al. 1999
Effort Expectancy	The extent of ease allied with the use of system.	1. Perceived ease of use (Davis, 1989) 2. Complexity (Thompson et.al. 1991) 3. Ease of use (Moore & Benbasat, 1991)
Social Influence	The extent to which a person feels that significant individuals think they should utilize the new system	1. Subjective Norm(Ajzen 1991; Davis et al. 1989; Fishbein and Azjen 1975; Mathieson 1991; Taylor and Todd 1995a, the 1995b) 2. Social factors (Thompson et.al. 1991) 3. Image (Moore & Benbasat, 1991)
Facilitating Conditions	The extent to which a person thinks that the system is supported by an organizational and technical infrastructure	1. Perceived Behavioral Control (Ajzen 1991; Taylor and Todd 1995a, 1995b) 2. Facilitating conditions (Thompson et.al. 1991) 3. Compatibility (Moore & Benbasat, 1991)

Source: (Venkatesh et al., 2003)

3.4.1 Application of Theory to MSMEs' Digital Finance Adoption: UTAUT expands upon TAM by incorporating social and contextual factors. MSMEs may adopt digital financing not only due to its usefulness and ease of use, but also because of social influences, such as peer adoption, and facilitating conditions, such as access to smartphones and internet connections. MSMEs in urban areas are influenced by both peer adoption and by industry

norms and government regulation. In contrast, MSMEs in other areas require facilitating conditions like infrastructure development, resource availability, and support.

3.5 Integrated Conceptual Framework



Building on these four theories, we propose an integrated conceptual framework (Figure 3) that maps the relationships among digital finance enablers, adoption drivers, moderating variables, mediating mechanisms, MSME performance outcomes, and barriers.

Source: Author's Own Work Figure 3: Conceptual Framework

3.5.1 Framework Logic:

This conceptual framework proposes how digital finance may be related to MSMEs. The framework is based on the well-established theoretical models such as TAM, TOE, UTAUT, and DOI. These theories provide a foundation by explaining various factors, procedures helping in the adoption of technology.

Based on these theoretical grounds, the framework underscores the drivers and enablers of adoption as independent variables. The enablers of digital finance comprises of Digital payment system, digital lending, saving, insurance, mobile banking and other fintech platforms. The drivers of adoption like digital literacy, government regulatory policy, better infrastructure etc., assist in smooth and easy adoption of technology.

The mediating variable serves as the link between the independent variable and MSMEs' performance to show the intensity, like extent, frequency, and depth of the digital finance usage by MSMEs. This intensity describes the degree of tangible benefits that the MSMEs realizes after the adoption of digital finance. Increased digital adoption helps businesses improve access to financial services, streamline operations, lower transaction costs, and enhance decision-making, all of which positively impact performance.

Moreover, the framework also employed the moderating variables, which specify when and for whom the relationship holds. In this framework, the moderating variable such as sector, firm size and location shows the contextual difference in adoption and performance pattern of MSMEs. For example, MSME's located in urban settings having access to superior physical infrastructures will be more likely to take advantage of digital finance as opposed to their counterparts in rural settings. In addition, similar to how the variable nature of sectors affects the effectiveness of digital tools, larger scale enterprises (medium) may have greater ability to adopt technology over smaller enterprises (micro) because they have greater resources available.

Additionally, the model identifies the barriers to using this new technology and also how these barriers could reduce the positive effects on performance. The model lists four major areas where problems with using digital technology can occur, including; lack of trust (both by consumers and small business owners) cybersecurity risks (such as hacking), inadequate support systems (e.g., internet access, mobile phone service), low levels of "digital

literacy," and complex regulatory frameworks. If these barriers are present then the ability to use digital financing will be reduced and therefore limit the benefits it has to offer to MSME's.

Thus, the influence of digital finance on MSMEs is explained by this proposed framework, while it also depends on other elements that fall under the category of moderating and mediating variables. By integrating multiple theoretical perspectives, the model provides a thorough understanding of how the use of digital finance improves business outcomes in the MSME sector.

4. Contextualization of Theory into Indian MSMEs

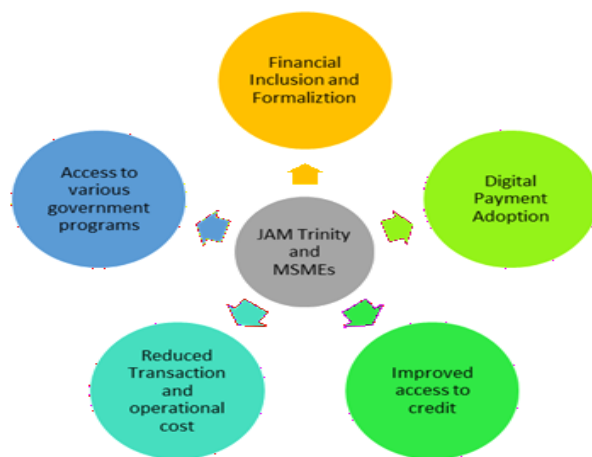
4.1 On the basis of the Indian Financial Ecosystem:

The transition of India from a cash-based economy to a leading player in real-time digital transactions set a new milestone in the adoption of digital finance. The digital public infrastructure has made this transformation possible. So, the Digital Public Infrastructure is a regulated framework built on open standards, is safe, open, and compatible.

The pillars of India's Digital Public Infrastructure:

1. **JAM Trinity:** The rapid expansion of DPI in India resulted from the JAM Trinity: J for JanDhan Bank Account, A for Aadhaar enrolment, and M for mobile phone penetration. The combination of these three components created a robust digital infrastructure that provided the cashless movement of funds to the intended beneficiaries. .
 - a) **JAM Coverage:** As of December 2025, the report shows that more than 550 million Jan Dhan accounts have been opened, out of which 67% belongs to rural and semi-urban areas. Aadhaar identification usage touched 1.14 bn, and the mobile penetration stood at 1258.7 million.
 - b) **Impact of JAM Trinity on Indian MSMEs:** JAM Trinity has completely revolutionized the MSMEs through formalization, digitization and access to credit. The figure below shows the impact of JAM Trinity on Indian MSMEs.

Figure 4 JAM Trinity and MSMEs



Source: Own representation

2. **India Stack:** India Stack is a technology that integrates the Application Programming Interface (API) with other software programs. This allows stakeholders such as government entities, businesses, startups, and developers to offer financial services.. The India Stack consists of three layers.

Figure 5 India Stack

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Source : Manjunath Gundupagi & Paramashivaiah P, 2024

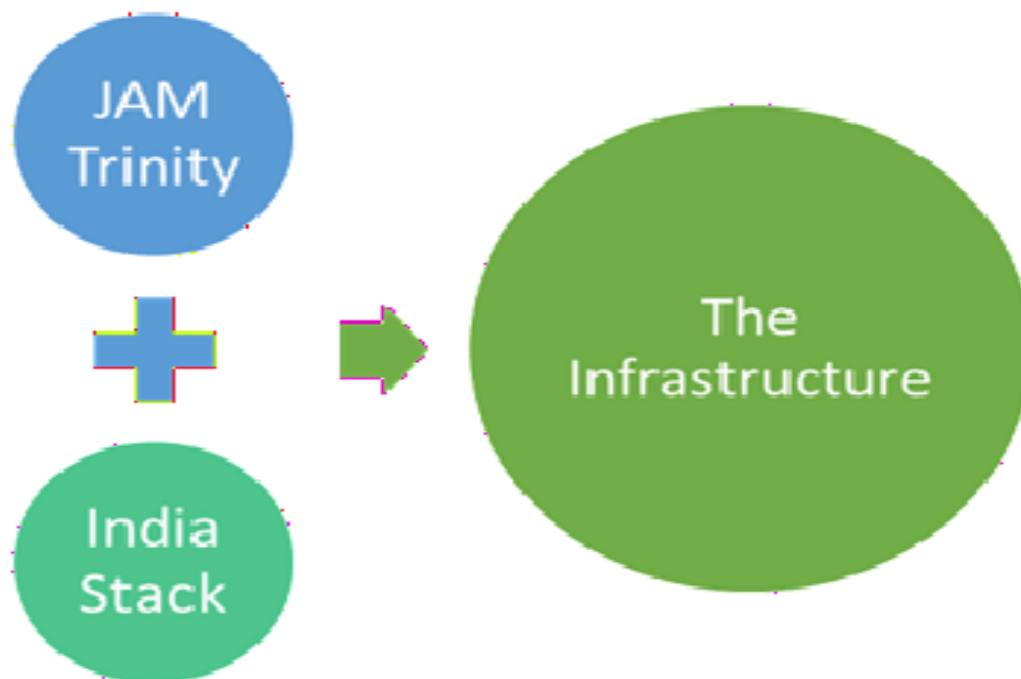
3. Regulatory Framework: The main regulatory agency for regulating fintech in India is the Reserve Bank of India (RBI) as it regulates payments systems; digital lending; and banking technology. In addition to the regulatory framework, the Consumer Experience, India, RBI, SEBI, Digital Payments, Financial Inclusion, Data Privacy, Consumer Protection, Innovation, Cyber Security and Financial Regulation Introduction The Securities Exchange Board of India (SEBI) provides oversight to those fintech companies that have the ability to offer investment advice or act as a robo advisor. IRDAI provides oversight to fintech companies that provide online insurance platforms. Finally, the Ministry of Electronics and Information Technology (MEITY) has an important responsibility for ensuring cyber security and protecting digital information.

4.1.1 Contextualization of theory:

The JAM Trinity is a building block of the India Stack as it creates the physical underpinning for its digital identity, payments, and data systems. Together, the JAM Trinity (the building blocks) and the India Stack (the structure created by these building blocks) are described as a mega and macro-scale government-led technological development that will provide financial inclusion.

Core Components:

Figure 6 Core Components of Digitalization



Source: Author's own work

4.1.2 Application of the Adoption theory on Indian Digital Financial Ecosystem

Table 4: Application of Theory on Digital Finance Ecosystem

SLNo	Theory	Focus	Application
1	TAM	Perceived Usefulness and Perceived Ease of Use	Aspects of the study focus on users' perceptions. Examples include QR codes (PEOU) and usefulness of immediate money transfers (PU) if these are used each day, the likelihood of their use will be greater.
2	TOE	Organization adoption influenced by Technological context, organizational readiness and external environment	The environment is why organizations (banks and fintech) choose to implement India's Stack. The environment includes government requirements such as regulatory pressure to create a cashless society, while the technology provides open API tools.
3	UTAUT	Performance expectancy, effort expectancy, social influence, facilitating conditions	Factors that determine whether or not to implement JAM are based on performance/effort, social influence (norms and trust), facilitating conditions (government support and initiatives) that help to explain why JAM has been adopted rapidly by people.
4	DOI	How innovation spread through a social system over time	The rate of implementation helps to understand how quickly JAM technology was implemented throughout India's population. In addition, it highlights some of the relative advantages (e.g., convenience/cost savings) of using digital payments rather than cash which affects users' decisions to use JAM over time.

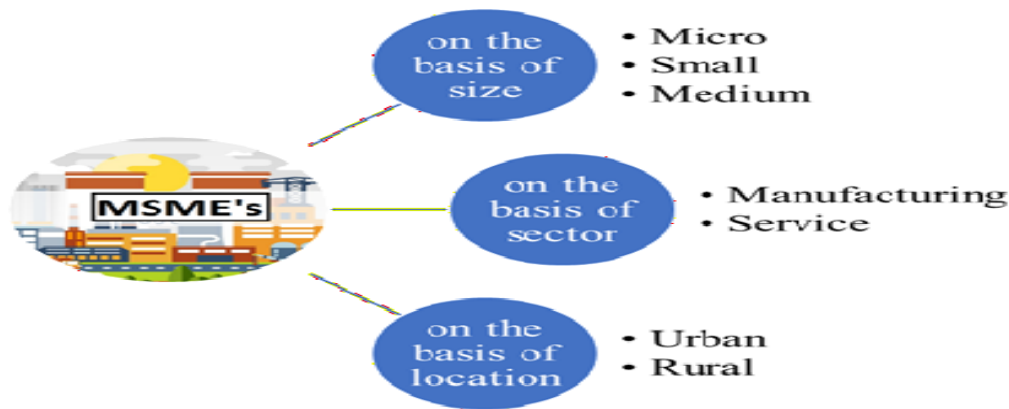
Author's representation; Source (Amini & Javid, 2022.; Samarth et al., 2022)

The JAM Trinity represents the tools needed to create a digital economy. India Stack represents the platform upon which the digital economy is built. Theories are used to determine the users (individuals), organizations (businesses), and environmental (government, etc.) factors that impact the adoption and diffusion of the digital revolution. However, these theories alone do not fully account for the large-scale systemic, population-wide changes (macro-scale transformations) being seen in India.

4.2 On the basis of heterogeneity:

The MSMEs are highly heterogeneous in nature. They are of various types according to their size, sector, and location. This heterogeneity moderates how technology is adopted by different MSMEs, depending on their sector, size, and location. These moderating variables apply the adoption theory differently to capture the unique drivers and barriers of adoption.

Figure 7 Key dimensions of MSME Heterogeneity



Source: Author's own work

Application of the Adoption theory on the heterogeneity of MSMEs:

Table 5 Application of Adoption Theory on Heterogeneity of MSMEs

SL No	Theory	Focus	Core Relation to MSME Heterogeneity	Heterogeneous factors
1	TAM	Individual Perception	Heterogeneity in digital literacy affects "Perceived Ease of Use." Micro-enterprises with low technical skills often perceive higher complexity.	Owner education, prior tech experience.
2	TOE	Technology, organization, and environmental context	Variances in organizational resources (manpower, capital) mean that small firms face different organizational barriers than medium ones.	Firm size, budget, top management support.
3	UTAUT	Social and infrastructure	Social influence and facilitating conditions affect the industry differently. For example, the competitive pressure of a textile company is different from that of a tech company. The adoption and barrier reasons of micro units are different as they have limited resources of all kinds. Similarly, companies in rural and urban locations have different requirements regarding technology adoption as infrastructure is limited in rural areas as compared to urban locations.	Industry sector, regional infrastructure.
4	DOI	Innovation Trait	The competitive advantage of innovation depends on the diversity of the firm, such as its business model or technical readiness.	Firm age, current tech stack, export focus.

Source : The author's own representation

5. Research Methodology

Sustainable Digital Finance is currently an area of growing academic interest. The aim of this review was to consolidate the existing literature related to sustainable digital finance. We also aimed to provide a conceptual framework for sustainable digital finance, while focusing specifically on digital finance. This study employed a qualitative systematic literature review (SLR), along with thematic analysis, to assess how MSMEs have adopted digital finance in India. This study utilized multiple data bases and used specific inclusion criteria based on relevance to Indian MSMEs and digital finance. Additionally, we present a comprehensive examination of the history of the adoption of digital finance by MSMEs, evaluate the effects of those factors that impact MSME development, and analyze obstacles to and potential policy recommendations for developing MSMEs.

Following the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) 2020 guidelines, peer-reviewed publications (2014–2025) were retrieved from databases such as Scopus, ScienceDirect,

Google Scholar, and ResearchGate. Government reports from the Ministry of MSME, RBI, and NPCI were also consulted. For thematic analysis, to identify, analyze, and synthesize themes across the literature included in the study, we employed reflexive thematic analysis framework given by .

5.1 Research Objectives:

- RO1 To determine the key enablers and drivers of digital finance adoption by Indian MSMEs.
- RO2 To understand the major barriers and challenges hindering digital adoption.
- RO3 To assess the impact of digital finance on the performance of MSMEs in India.
- RO4 To understand policy interventions enhance MSME participation in the digital economy.

5.2 Search Strategy and Strings

We undertook a systematic review and thematic analysis to explore the use of digital finance by Indian MSMEs. Then we applied inclusion and exclusion criteria to each keyword to find the relevant papers from the robust and continuously growing database. In this process, we identified 250 papers.

5.2.1 Search Strings: We divided our search strategy into four groups to identify the important variables and then reconstructed them into a conceptual framework.

Table 6: Search String table

Sl No	Database and source	Group 1: Drivers of Digital Finance Adoption	Group 2: Barriers of Digital Finance Adoption	Group 3: Impact of Adoption on MSMEs Performance	Group 4: Policy and ecosystem
1	Scopus, Google Scholar, ResearchGate, Science Direct	TITLE-ABS-KEY ("fintech adoption" OR "technology acceptance model" OR "adoption" OR "digital transformation" OR "technology" AND "MSMEs") AND (LIMIT-TO (AFFILCOUNTRY , "India")) TITLE-ABS-KEY ("financial inclusion" OR "financial literacy" OR "digital financial literacy" OR "digital literacy" AND "MSME")	TITLE-ABS-KEY ("challenges" OR "adoption barriers" AND "digital finance" OR "fintech" AND "MSMEs") AND (LIMIT-TO (AFFILCOUNTRY , "India"))	TITLE-ABS-KEY ("performance" OR "msme performance" OR "digitalization" OR "digital finance" AND "MSMEs") AND (LIMIT-TO (AFFILCOUNTRY , "India"))	TITLE-ABS-KEY ("Regulatory Framework" OR "Government Policy" OR "Government support" AND "Digital Finance" AND "MSME")

5.3 Data Extraction and Analysis:

The data used in this study have been collected through an assessment of all the studies that fall under the scope of what would be suitable for conducting this particular study in light of its purpose and objectives. The question of

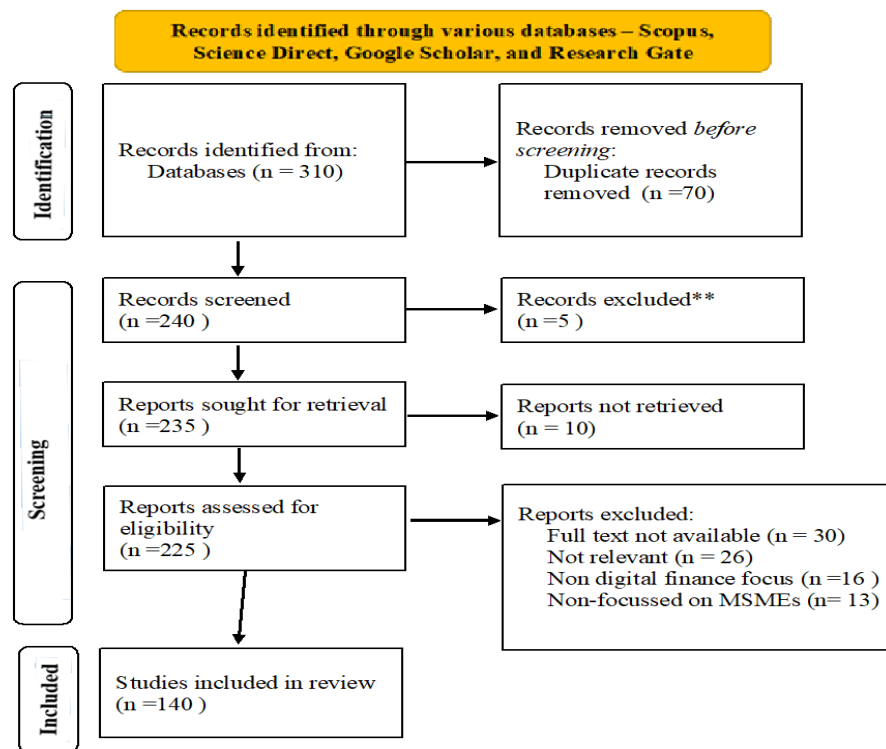
which studies are most pertinent to this study is directly tied to the relevance of the study to the research problem. A review of the title, author(s), method, keywords and/or abstract from each identified study was conducted to determine its relevance.

5.4 Inclusion and Exclusion Criteria:

Table 7 Inclusion- Exclusion Criteria

Inclusion Criteria	Exclusion Criteria
1. Studies focusing on digital finance (broadly defined to include digital payments, digital credit, mobile banking, fintech platforms, digital financial inclusion) and MSMEs.	1. Studies not focused on digital finance
2. Empirical studies (quantitative, qualitative, or mixed-methods), systematic reviews, meta-analyses, and conceptual papers with empirical grounding.	2. Studies on digital finance in contexts other than business/enterprise (e.g., household finance, personal banking.).
3. Studies published in peer-reviewed journals, conference proceedings, working papers, and reputable institutional reports.	3. Opinion pieces, editorials, and non-peer-reviewed blog posts without empirical data
4. Studies published between January 2014 and December 2025.	4. Duplicate publications.
5. Studies in English.	5. Non- Availability of full-text

Figure 8 Prisma Flow Diagram



6. Data Analysis Methodology

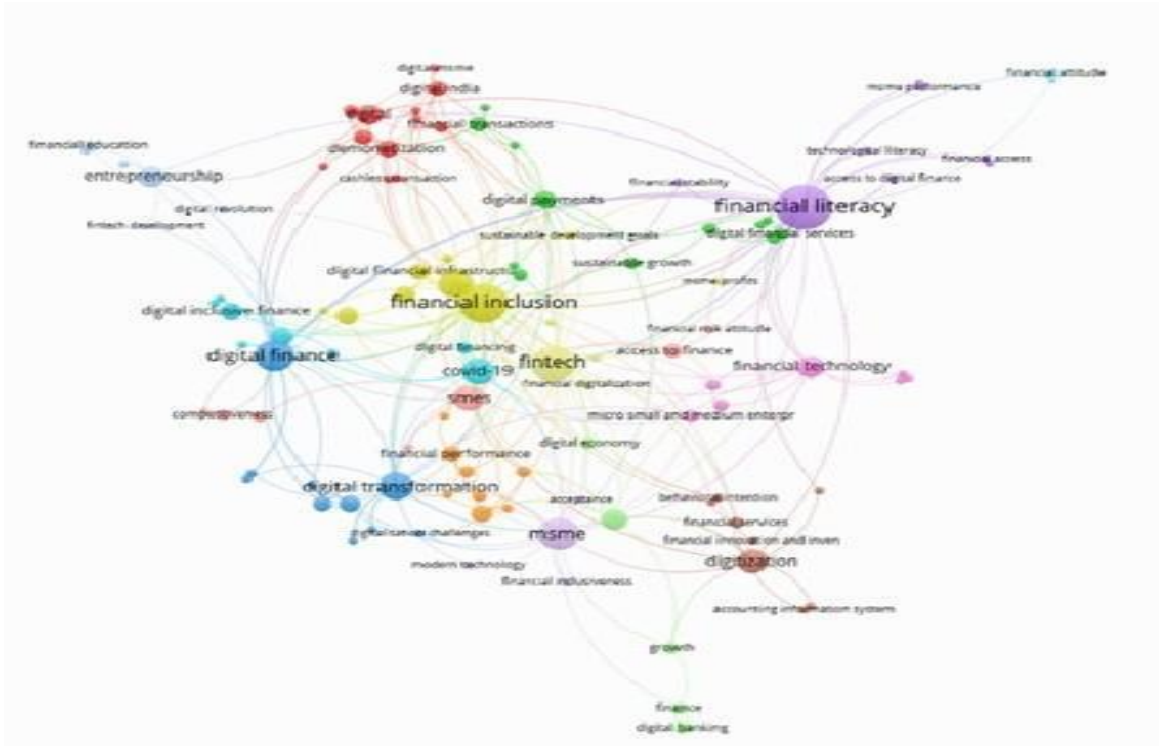
We have divided our data analysis into 4 parts. The first part is keyword analysis, which helps us understand keyword occurrence and its relationships with other keywords. The second part of the analysis is publication trends. The third component includes a temporal analysis of digital finance in India that demonstrates how gradually digital finance has been developed and adopted. Fourth, this study will perform an overall thematic analysis using Braun and Clarke's Thematic Framework for the purpose of meeting the overall research goals. Fifth, the research output trends

follow the evolution of digital finance infrastructure and policy attention; therefore, the volume of research increased when the system became more established and COVID-19 increased usage of these systems.

6.1 Keyword Analysis:

The keyword co-occurrence relationship as it relates to the study of Digital Finance and Micro/Small/Medium Enterprises (MSME) are illustrated through the keyword co-occurrence network map that was developed using VOSviewer. This illustrates how all selected studies relate to one another based on co-occurring keywords represented by each node, and the size of each node denotes its frequency of occurrence. The network displays several related thematic clusters that highlight the most important topics in this field.

Figure 9 Keyword Analysis



Source Vos Viewer

Digital Finance, Financial Inclusion, Fintech, Digital Transformation and Financial Literacy are the four main and most common key terms. Considering the need for financial inclusion, much of the current research being published is focused on how digital financial technologies will provide greater access to financial services for Micro, Small, Medium-Sized Enterprises (MSME's). The fintech and digital finance industries also show how digital payment systems and other forms of digital financial platforms may increase accessibility and operational efficiencies of MSME's. There has been an increasing focus on the adoption of digital technology by MSME's in relation to their business performance is also reflected in the digital transformation cluster. Overall, the network indicates that both sustainable MSME development and financial inclusion have a strong link with digital finance through improved financial literacy and increased technological innovation.

6.1.1 Cluster-wise Themes and Keywords from the Map

Table 8 Keyword Map

Cluster	Cluster Name	Representative Keywords
Cluster 1 (Red)	Digital Payments	Digital Payment, Internet and Mobile Banking, Financial Transactions, UPI
Cluster 2 (Blue)	Fintech	SME Financing, Digital Revolution, Digital Technology, Business Sustainability, Financial Technology, Access to Finance, Government Support, Behavioural Factors
Cluster 3 (Green)	MSME and its Performance	Firm Performance, Sustainable Growth, Financial Literacy, Financial Inclusion, Digital Transformation
Cluster 4 (Brown)	Financial Literacy	Financial Literacy, Technological Literacy, Financial Access, Financial Attitude, MSME Performance
Cluster 5 (Purple)	Digitalization and Digital Infrastructure	Digital Financial Infrastructure, Financial Policy, Blockchain, Accounting Information System, Challenges
Cluster 6 (Orange)	Digital Economy and Financial Inclusion Drivers	Digital Innovation, Digital MSME, Cyber Frauds, Economic Growth, Inclusion
Cluster 7 (Cyan)	Digital Technology and Sustainability	Digital Technology, Performance, Sustainability
Cluster 8 (Light Blue)	Digital Transformation and Technology Adoption	Digital Transformation, Technology Adoption, Business Resilience, Barriers, Income Improvement

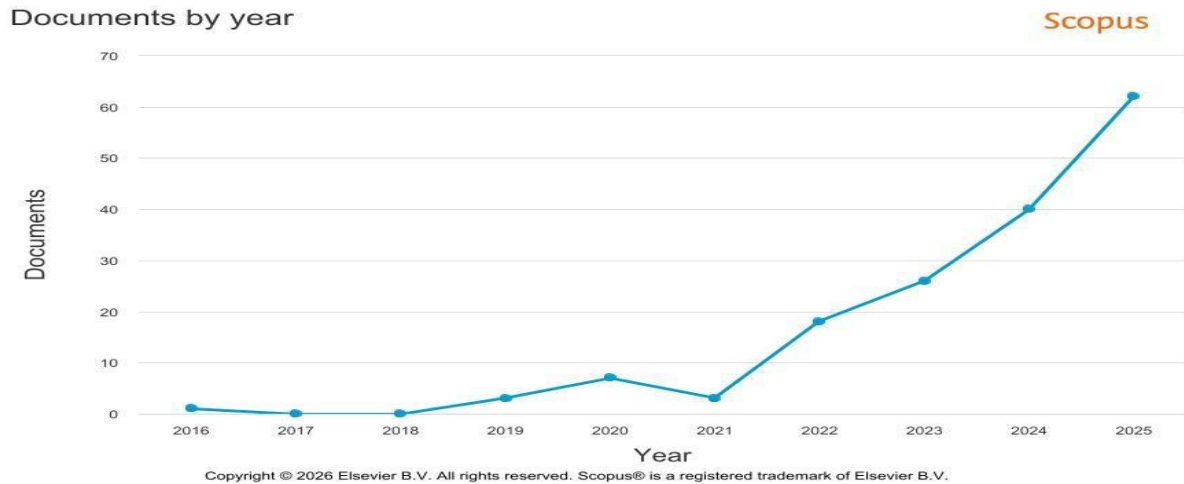
6.2 Publication Trends Analysis:

The recent development and growth of digital finance makes researcher, policymakers and practitioners to get more informed about the various aspects of digital finance and its impact on sustainable growth of MSMEs. The surge in publication indicates the academic interest on digital finance and the drivers and challenges in the adoption. The graph shows a consistent increase in research output with a notable increase after 2020. The surge after 2020 is aligned with the adoption of digital finance accelerated by the pandemic.

6.2.1 Search String to analyze publication trend:

TITLE-ABS-KEY (“digital finance” OR “fintech” OR “digitalization” AND “msme”) AND PUBYEAR > 2013 AND PUBYEAR < 2026

Figure 10 Publication Analysis



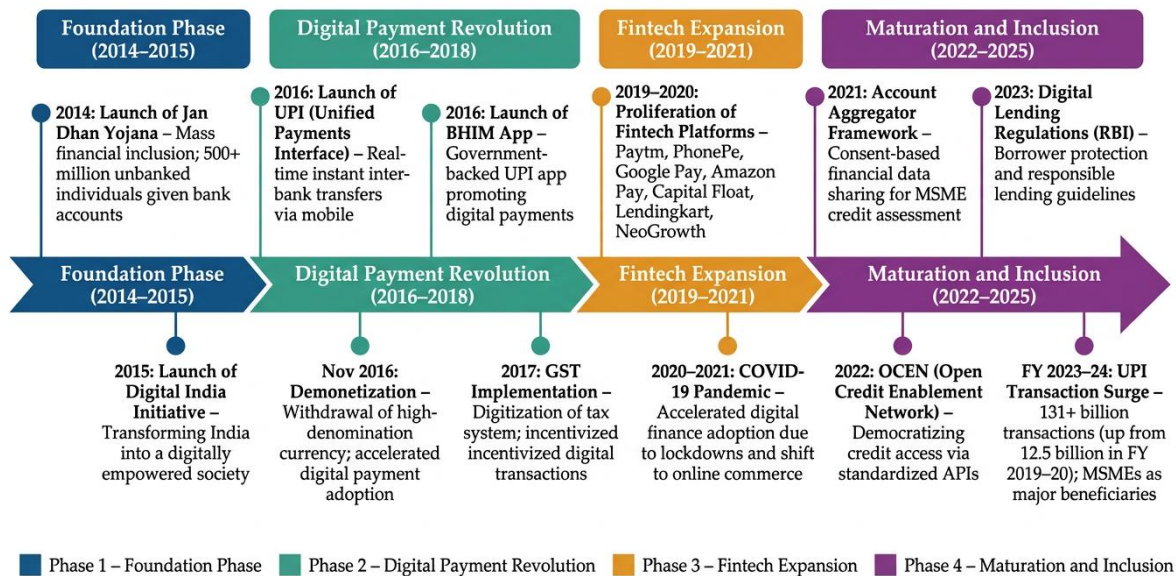
Source: Scopus Database

6.3 Temporal Trend Analysis:

6.3.1 Evolution of Digital Finance Ecosystem

The phylogeny of digital payment in India has been a phased progress driven by changes in consumers' behavior, regulations, and technology. It has gone through four distinct phases, each with important policy initiatives and milestones. . The temporal evolution of the digital finance ecosystem in India is divided into four phases:

Evolution of Digital Finance Ecosystem in India



Source : Author's own compilation, Figure 11 Evolution of Digital Finance in India

The *foundation phase (2014-2015)* involved the development of financial inclusion and the creation of digital infrastructure. PMJDY was instrumental in the provision of formal banking services to millions of Indians who did not have any bank accounts. Thus, the first step towards a digital financial system was taken. Additionally, the implementation of the Digital India project resulted in better Internet infrastructure in India, and also increased awareness about using technology, laying the ground for digital finance system in the country. Alongside the growth

of the digital finance market in India, the use of Artificial Intelligence and regulations help India to become a top player of digital finance globally in the future.

The second phase, **(2016-2018) named infrastructure expansion** considered the period of digital payment revolution. The UPI payment system with real-time, affordable cost and cross- platform payment features was introduced at this stage. Demonetization in November 2016 somewhat pushed individuals towards the adoption of digital finance, thereby promoting a cashless economy . Furthermore, the launch of the BHIM app and digitization of the indirect tax GST fortified digital keeping of records, thus contributing to the formalization of economy.

During the **expansion phase (2019-2021)** the digital finance landscape witnessed the swift upward trend. This phase embraces features like payment through QR code, enhanced security features, in addition to Aadhaar, biometric authentication, and KYC compliance. Fintech platforms like PhonePe, Google Pay, Amazon Pay, etc., offer multiple financial services to users beyond payments. The dedicated digital lenders like LendingKart, NAVI, KreditBee, PSBloanin59minutes, are bridging the credit gap by offering quick , instant, and collateral-free loans to MSMEs. COVID-19 acted as a catalyst that accelerated the adoption of digital finance at a faster rate

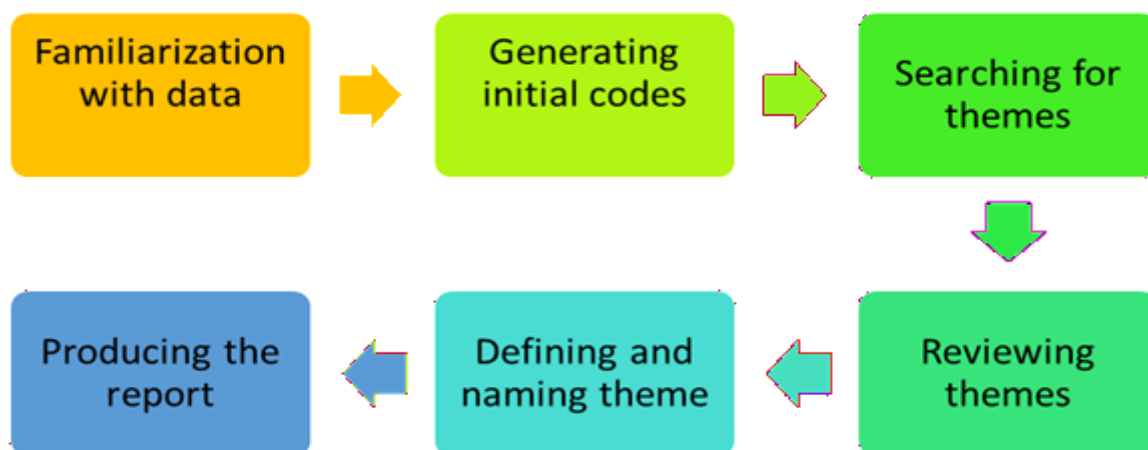
The maturation phase (2022-2025) showed up as fully grown and developed digital finance ecosystem. The digital financial platform became more powerful and trustworthy with advance and integrated regulatory framework. TReDs, OCEN like lending infrastructure has strengthen the MSMEs financial needs. GeM Sahay, Gem Samadhan like digital platforms empowered MSMEs and made them more sustainable and resilient. Digital platforms such as UPI and mobile wallets show a strong relationship with financial inclusion outcomes, whereas infrastructure and assisted models like AePS are currently undergoing a transformation, with their usage rates rising rapidly.

Overall, the digital transformation in financial sector and its adoption by MSMEs ensured the strong implication for inclusive growth along with economic sustainability. Top of Form

6.4 Thematic Map and Analysis:

6.4.1 Thematic Analysis

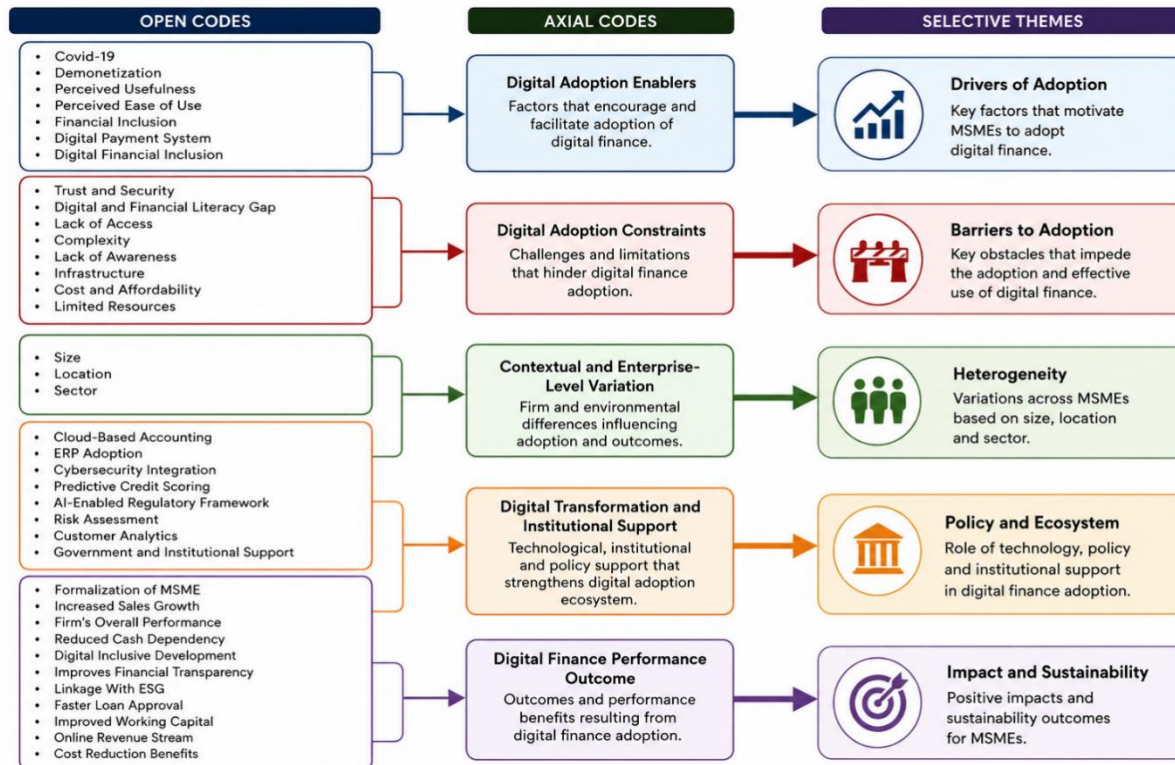
One of the widely utilized methodologies within qualitative research analysis is thematic analysis. To construct a unified framework, it generates thematic categories from individual studies to discern prevalent themes (Parminder Varma et al., 2022). Thematic analysis was conducted using Six-phase thematic framework. During this process, the codes were identified through a deductive approach.



6.4.2 Validity and reliability: In order to maintain the rigor and validity of the qualitative analysis, several criteria were considered in conducting the research, namely credibility, dependability, and confirmability. The criterion of credibility was met through thorough examination of the collected data and re-reading of responses, so

that it would be possible to reflect the true perception of respondents. Representative quotations from respondents were provided in the findings in support of the established themes. The dependability criterion was maintained because a systematic approach to analyzing themes was utilized according to the approach described by Braun & Clarke (2006). Confirmability was ensured through data-driven approach to developing the findings and minimizing researcher bias in interpreting responses. Transferability was provided through a rich description of context.

Figure 12 Thematic Map Source: Author's own work



6.4.3 Literature review of derived theme

Table 9 Thematic Literature Review

SL No	Theme	Narrative	Representative Studies
1	Drivers of adoption	Based on the Technology Acceptance Model (TAM) and the Unified Theory of Acceptance and Use of Technology (UTAUT), current research unequivocally demonstrates that Perceived Usefulness (PU) and Perceived Ease of Use (PEOU) are the primary forces behind MSMEs' adoption of digital banking. Adoption is significantly influenced by psychological factors such as social influence and trust in addition to functional benefit. Convenience and quick digital transactions are important motivators in the Indian setting, especially after the external shock of demonetisation and epidemic, which	(Dubey & Dwivedi, 2021), (Asif et al., 2023), (Hermawan et al., 2022), (Wijaya et al., 2024), (Jain et al., 2024), (Subramanyachary P & Raja Shekhar B.M, 2021), (Badria & Hasanah, 2024), (Ahmad et al., 2023), (Amini & Javid, 2023), (Bryan & Zuva, 2021), (Nazir et al., 2025), (Februadi et al., 2025), (Faiz et al., 2024), (T. Gulati et al., 2025), (Colline et al., 2022), (Fauzi et al., 2023), (Hardik, 2024), (Syifa Hendri & Sudarmilah, 2024), (Chand & Kansal, 2025), (Al-Sharafi et al., 2025), (Ketut et al., 2023), (Kajol et al., 2022), (kaur, 2025)

		hastened the transition to a cashless economy. Additionally, banks are now strategically motivated to enhance SME credit evaluation through the "hardening" of soft information, which is the process of transforming qualitative company data into verifiable digital footprints.	
2	Barriers and Challenges	Due to ingrained structural hurdles, there is a notable contradiction in India where high levels of digital knowledge do not always convert into adoption. Unreliable electricity and internet connectivity, especially in rural regions, are examples of infrastructure deficiencies that continue to be obstacles. The biggest structural obstacle is probably informality; over 85% of Indian MSMEs are unregistered, which prevents them from accessing official digital finance systems and government assistance. Psychological and cognitive barriers are also quite important. Many small business owners are discouraged from moving online due to digital illiteracy (which can reach 70% in some areas) and worries about cybersecurity and data protection. Additionally, there is still a "digital patriarchy" that places particular limitations on female entrepreneurs, such as restricted autonomy and social norms regarding gadget use.	(Kandpal & Mehrotra, 2019), (Shukla, 2023), (A. Pandey & Jaiswal Varsha, 2020), (Devi, 2023), (Miguel, 2023), (Telukdarie et al., 2022), (Maiya Sahana, 2024), (Widayani et al., 2022), (Fanelli, 2021), (Borana et al., 2024), (Rupeika-Apoga & Petrovska, 2022), (Buteau, 2021)
3	Heterogeneity	The primary causes of the disparity in adoption among Indian MSMEs include enterprise size, location, digital preparedness, infrastructure access, and owner-manager traits. Younger, smaller, less formal, and less linked enterprises adapt later or less intensively than their more resource-rich colleagues, which is the strongest evidence that heterogeneity matters. Firm size is important, but not usually in a straight line. Digital proliferation increases with firm age, size, and formal constitution, according to a big WBES study. A distinct separation is created by geography. Convenience, self-efficacy, and external shocks like demonetisation and the pandemic are major factors in rural MSMEs' adoption of digital banking, which lags behind urban enterprises. More comprehensive analyses also point to persisting barriers to digital financial access, such as regional differences and unequal internet and device access.	(A. Verma et al., 2025), (Buteau, 2021), (Ahmed & Sur, 2023), (Shamim & Ahmad, 2025), (Murari et al., 2025)
4	Policy and Ecosystem	To aid MSME formalisation, the Indian government has developed a strong Digital Public Infrastructure (DPI), sometimes known as the "India Stack." The Unified Payments Interface (UPI), which has	(Sanga & Aziakpono, 2023), (Jun & Ran, 2024), (Ministry of MSME, 2024), (Rajamani & Rekha, 2023), (Pellegrino & Abe, 2022), (Fauzi et al., 2023),

		transformed transactional efficiency, and the Udyam Registration platform, which has registered over 41 million businesses, are important pillars. By using real-time data for alternative credit scoring, emerging frameworks like the Account Aggregator model and the Open Credit Enhancement Network (OCEN) seek to democratise credit access. Despite these systemic improvements, the effectiveness of policies is limited by a significant awareness gap. About 77% of MSMEs are still ignorant about certain digital programs, such as the "Digital MSME" program. Although programs like the Government e-Marketplace (GeM) and TReDS offer vital market and liquidity support, their advantages are frequently biased toward larger, properly constituted, metropolitan businesses. As a result, it is acknowledged that in order to close the digital gap, focused grassroots education and regulatory harmonization are necessary.	
5	Impact and Sustainability	Empirical data suggests that increased operational effectiveness, transparency, and revenue growth are the results of digital transformation. According to reports, "Digital MSMEs" can increase their earnings and sales up to twice as quickly as their offline counterparts. By enabling businesses with short credit histories to obtain official finance through fintech technologies and digital footprints, digitalisation also acts as a route to financial inclusion. The effects of digital finance, however, vary widely. While micro and nano-enterprises frequently find it difficult to convert digital technologies into competitive advantages, larger, older, and officially registered businesses see the most productivity benefits. Beyond financial measures, digital finance is becoming more closely associated with environmental, social, and governance (ESG) performance because it facilitates financing for sustainable innovation and enhances internal control.	(Ghimire et al., 2023), (Maiti & Kayal, 2017; S. Verma & Shome, 2025), (Bansal et al., 2025), (M. T. Gulati et al., 2025), (Amelia Setyawati et al., 2023), (satpathy et al., 2025)

7. Discussion

7.1 Adoption Rate Metrics

Studies suggest that Indian MSMEs have quickly moved towards using digital payment systems (e.g., UPI, fintech) but while micro-units and informal units are still lacking, older larger and urban units have shown much higher adoption rates than their younger counterparts. While government support and the provision of digital infrastructure can both be important factors in the adoption of digital financial technologies other factors including

perception of utility, ease of use and peer influence can all act to drive this process. Fintech has provided an alternative method of access to credit through crowdfunding and peer-to-peer lending platforms — especially to those MSMEs who do not possess the collateral needed to access traditional forms of credit. There appears to be wide variation in the geographic areas of India where there is a high degree of digital finance usage — largely because of the constraints caused by infrastructure (and literacy) differences across various parts of the country. The rapid spread of digital finance during the COVID-19 pandemic was likely driven by the fact that traditional financial institutions were severely limited in their ability to provide services to MSMEs — with respect to payments and lending.

7.2 Barriers and Enablers

Despite the increased availability of affordable digital financial instruments, several of the most common challenges associated with the effective utilization of these technologies by MSMEs persist. Specifically, continued financial and digital illiteracy on the part of many MSME owners/operators remains a barrier to digital finance adoption. Additionally, the lack of digital technology devices and reliable Internet connectivity continues to hinder widespread digital finance adoption — particularly in rural/semi-rural geographies. Trust deficits and cybersecurity concerns also present considerable hurdles to digital finance adoption — particularly for rural/marginalized MSMEs. On the other hand, governmental initiatives, peer influence, fintech innovations, and favorable regulatory environments have all helped facilitate digital finance adoption. Finally, cost-related concerns and organizational resistance to change continue to limit the scale of digital transformation among MSMEs.

7.3 Impact on Firm Growth

There is a consistent body of research demonstrating a significant relationship between the utilization of digital financial instruments by MSMEs and certain key performance indicators e.g., sales, profitability, productivity and market expansion. For example, the use of digital payment systems increases MSME financial performance and transactional efficiencies which enables them to formalize their businesses and reduce complexity in their operations. Moreover, accessing fintech-based lending platforms and digital credit products enhances MSME liquidity which allows them to pursue longer term growth strategies. Interestingly, while the effects of sales growth have been documented, effects on employment and productivity have proved inconsistent, implying that there may be differences due to firm sizes or industries. Digitalization has also helped boost the resilience of MSMEs, which has enabled them to survive and thrive in the post-COVID era.

7.4 Policy Effectiveness

Government policies such as the Startup India scheme, Digital India campaign, and financial literacy programs have played an important role in digital finance adoption and financial inclusion. The success of government policies, however, differs greatly from one geographic location to another; geographically customized policies would be the way to go to bridge the knowledge gap and poor infrastructure. Proper cybersecurity and fintech governance frameworks would play a vital role in ensuring trust and the growth of digital banking. Financial literacy programs would complement government policies by equipping MSMEs with skills on digital financing.

7.5 Regional and Sectoral Variations

Several researches have established the existence of significant differences among regions in the adoption and performance of digital finance initiatives. Urban MSMEs outperform their rural and regional counterparts in their adoption and performance in digital finance. Each of the manufacturing, service, and unorganized sectors have different levels of integration with digital finance initiatives. In addition, tier II cities and northeastern regions offer a different perspective as far as digital finance adoption and performance is concerned. Digital finance inclusion will be particularly important to women and marginalized entrepreneurs but support is needed to overcome access barriers.

8. Implications of the Study

8.1 Theoretical Implications

The analysis elucidates that the use of digital finance depends mainly on three major factors: financial literacy, institutional support, and technological preparedness. The incorporation of contextual influences such as peer pressure and governmental backing extends existing Technology Acceptance Models (TAM), thereby enriching theoretical frameworks for understanding digital finance adoption. The findings support a positive theoretical relationship between digital finance utilization and MSME growth (encompassing sales and productivity); however, the heterogeneity of MSMEs and its impact on the adoption of digital finance are evident across firm sizes and maturity levels, encountering a one-size-fits-all approach. This underlines the need for a multifaceted framework to address the diversity of MSMEs.

8.2 Practical Implications

While digital microfinance and alternative forms of finance have provided significant additions to the existing theories on financial inclusion through their ability to reduce information asymmetries and transaction costs associated with technology-based platforms, it is unclear how much of this will translate into real-world practice given rising digital inequality and increasing cyber threats which may compromise the assumption of ubiquitous digital access. Therefore, the study of digital financial behavior among MSMEs would benefit from the inclusion of both trust and risk in models of behavior. Additionally, while there is an increasingly apparent relationship between digital financial inclusion (DFI) and socio-economic disparities, including gender, geography and the nature of the informal economy; it is clear that DFI has a social/cultural component as well as an economic one. As such, the incorporation of these social and cultural aspects into our understanding of DFI's impact is crucial if we hope to capture the full extent of its potential impacts. There is considerable theoretical gap within our understanding of digital finance's long term sustainability implications for MSMEs. In addition, longitudinal comparative research across regions/areas is scarce in the literature.

8.3 Policy Implications

Policymakers should create kinds of digital literacy and financial education programs for small and medium sized businesses. These programs should be made for types of businesses. When business owners know more about money they are more likely to use finance. Digital payments can help businesses make money and be more profitable. So policymakers should work on making it easier for people to use payments. They should make sure everyone has access to the internet and can use payments even in rural areas where it is harder to get online. Fintech companies and banks should make financial products that are easy to use and work for small and medium sized businesses. These products should be made for businesses of all sizes and types and for businesses that're not very good, at using digital technology. The goal is to help more businesses use finance and to make things easier for them to operate.

9. Conclusion

Digital finance has metamorphosed the functional realm for Indian MSMEs, by creating new avenues to grow, formalize, and encourage them to contribute in economic development. However, the digital divide again is a major concern in the adoption of digital finance because the small or tiny or rural enterprises faces many challenges like literacy, knowledge, skill, and infrastructure etc which acts as an entry barriers. In order to foster inclusivity and reducing disparities various policy interventions, strategic infrastructure development, and specialized support for women entrepreneurs and marginalized groups across the sector should be promoted.

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