

An Integrative Model of Financial Inclusion and Digital Literacy in Promoting Sustainable Economic Growth

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ABSTRACT

Sustainable economic growth has become a central issue in development policy, particularly in developing countries that face challenges related to poverty, inequality, and limited access to financial services. Financial inclusion and digital literacy have increasingly been recognized as key drivers in supporting inclusive and sustainable economic systems. However, previous studies often examine these two factors separately, resulting in limited understanding of their integrated role in promoting sustainable development. Therefore, this study aims to analyze the relationship between financial inclusion and digital literacy and to formulate an integrative conceptual model that explains how these variables jointly contribute to sustainable economic growth. This research employs a qualitative approach using a systematic literature review method. Data were collected from peer-reviewed journal articles indexed in reputable academic databases published between 2021 and 2025, focusing on studies related to financial inclusion, digital literacy, and sustainable development. The data were analyzed using thematic and conceptual synthesis to identify patterns and theoretical linkages among the key variables. The findings indicate that financial inclusion expands access to financial services and promotes MSME development, while digital literacy enhances individuals' ability to adopt and effectively utilize digital financial technologies. The integration of these two factors contributes to poverty reduction, economic participation, and environmentally sustainable investment. In conclusion, sustainable economic growth can be strengthened through an integrative framework that combines financial inclusion, digital literacy development, supportive ICT infrastructure, and inclusive regulatory policies.

Keywords: Digital Literacy, Financial Inclusion, Inclusive Growth, Sustainable Development

INTRODUCTION

Sustainable economic growth has become a central objective in global development discourse, particularly in the context of persistent poverty, economic inequality, and environmental degradation faced by many developing countries. In recent decades, policymakers and scholars have increasingly emphasized the importance of inclusive economic systems that enable broader participation in financial and digital ecosystems. Among the various approaches proposed to achieve inclusive and sustainable development, financial inclusion and digital literacy have emerged as two interrelated pillars that can significantly influence economic transformation. Financial inclusion refers to the accessibility and usage of affordable financial services by individuals and businesses, particularly those who are traditionally underserved by formal financial institutions. Meanwhile, digital literacy refers to the capacity of individuals to effectively access, understand, and utilize digital technologies, including digital financial services. The intersection between these two dimensions has become increasingly relevant in the era of digital transformation, where financial services are progressively delivered through digital platforms. Consequently, the integration of



financial inclusion and digital literacy is widely viewed as a strategic pathway to promote sustainable economic development, reduce poverty, and enhance social equity in developing economies (Chavriya et al., 2023; Hussain et al., 2023).

The growing relevance of financial inclusion in development policy is closely linked to its potential to improve macroeconomic performance and social welfare. A substantial body of empirical research indicates that expanding access to financial services contributes to economic growth by facilitating capital accumulation, supporting entrepreneurial activities, and improving financial stability. When individuals and small businesses are able to access credit, savings accounts, and digital payment systems, they gain opportunities to invest in productive activities and expand their economic capacity. In this regard, financial inclusion has been recognized as a critical mechanism for reducing poverty and income inequality while simultaneously strengthening economic resilience. Empirical evidence from various developing economies demonstrates that inclusive financial systems are associated with higher employment generation, improved business productivity, and greater economic participation among marginalized populations (Chavriya et al., 2023; Hussain et al., 2023; Tay et al., 2022). These findings suggest that financial inclusion not only supports individual welfare but also contributes to broader macroeconomic stability and sustainable development.

More recently, the rapid expansion of digital financial technology has transformed the landscape of financial inclusion by enabling financial services to reach previously excluded populations through digital platforms. Digital financial inclusion, which encompasses mobile banking, fintech services, and electronic payment systems, has significantly accelerated the accessibility and efficiency of financial services in many developing countries. Through digital channels, financial institutions are able to overcome geographical and infrastructural barriers that traditionally limited financial outreach in rural and remote areas. Empirical studies indicate that digital financial inclusion has a strong positive relationship with regional economic growth, particularly through its role in supporting micro, small, and medium enterprises (MSMEs), facilitating access to credit, and enhancing market participation. Furthermore, digital financial systems can promote environmentally sustainable investments by facilitating financing mechanisms for green technologies and supporting resource efficiency initiatives (Becha et al., 2025; Yang et al., 2025; Parveen et al., 2025; Gutu et al., 2025). Through these mechanisms, digital financial inclusion contributes not only to economic expansion but also to the broader goals of sustainable development.

Evidence from cross-country studies further confirms the macroeconomic relevance of financial inclusion when combined with information and communication technology (ICT) infrastructure. Research involving more than one hundred developing countries indicates that financial inclusion, when supported by strong digital infrastructure, is positively associated with both short-term and long-term economic growth. ICT infrastructure enhances the effectiveness of financial inclusion policies by enabling digital financial transactions, improving financial service delivery, and expanding access to financial information. As a result, economies that successfully integrate financial inclusion with digital infrastructure tend to experience higher levels of economic productivity and development sustainability (Hussain et al., 2023; Pradhan et al., 2021). These findings highlight the importance of viewing financial inclusion not merely as a financial policy but as part of a broader digital transformation strategy that supports sustainable economic development.

Despite the promising role of digital financial inclusion, its effectiveness is highly dependent on the level of digital literacy among the population. The rapid expansion of fintech platforms, mobile payment systems, and digital banking services requires users

to possess adequate digital competencies in order to fully benefit from these innovations. Digital literacy enables individuals to understand digital financial products, evaluate financial risks, and make informed financial decisions. In this context, digital financial literacy functions as an essential enabler of the digital financial ecosystem, ensuring that technological innovations translate into meaningful economic benefits. Several empirical studies have shown that higher levels of digital literacy significantly increase the adoption of digital financial services, particularly among low-income households and rural communities (Yang et al., 2023; Khatri et al., 2025; Koskelainen et al., 2023; Gulati et al., 2025). Without adequate digital literacy, the expansion of digital financial services may fail to reach vulnerable groups, thereby limiting the overall effectiveness of financial inclusion initiatives.

In addition to improving the adoption of financial technology, digital financial literacy also contributes to broader socio-economic outcomes. Individuals with higher levels of financial and digital knowledge tend to demonstrate better financial planning behavior, increased savings, and stronger entrepreneurial capacity. These capabilities enhance household economic resilience and support local economic development through the growth of small businesses and community enterprises. Furthermore, digital financial literacy plays an important role in strengthening social stability and reducing poverty by empowering individuals to manage financial resources more effectively and participate actively in the digital economy (Patra et al., 2025; Muthoifin et al., 2025; Nazim et al., 2025; Syahrizal et al., 2025; M et al., 2024). In this sense, digital literacy can be understood as a foundational competence that enables individuals to benefit from the opportunities created by financial inclusion and digital innovation.

However, despite the increasing integration of digital technologies in financial systems, significant challenges remain in ensuring equitable access to digital financial services. One of the most prominent barriers is the persistent digital literacy gap across different socio-economic groups. Populations in rural areas, low-income communities, and marginalized social groups often lack the digital skills required to navigate digital financial platforms effectively. In addition, disparities in digital infrastructure, internet connectivity, and regulatory frameworks continue to limit the expansion of digital financial ecosystems in many developing countries. These structural barriers create a digital divide that prevents certain groups from fully participating in the digital economy and benefiting from financial inclusion initiatives (Khatri et al., 2025; Patra et al., 2025; Tay et al., 2022; Srinate et al., 2025; Gutu et al., 2025; Gulati et al., 2025). As a result, addressing digital literacy gaps has become a critical priority in efforts to achieve inclusive and sustainable economic development.

Although the literature on financial inclusion and digital literacy has grown rapidly, most previous studies still tend to position these variables in parallel rather than in an integrated analytical framework. A large number of studies discuss financial inclusion as a determinant of access to credit, savings, and digital payment systems, while other studies separately examine digital literacy as a determinant of technology adoption and financial capability. This separation creates an important conceptual limitation because sustainable economic growth in the digital era is not produced merely by the expansion of financial access, nor solely by the improvement of digital competence, but by the interaction between both dimensions within a broader institutional and technological ecosystem. In addition, many previous studies focus on direct effects, such as the effect of financial inclusion on growth or the effect of digital literacy on fintech adoption, without sufficiently explaining the enabling, mediating, and reinforcing mechanisms that connect these variables to sustainability outcomes. As a result, the literature still lacks a comprehensive explanation of how digital literacy strengthens the

effectiveness of financial inclusion and how both variables jointly contribute to inclusive and environmentally sustainable economic development.

This study addresses that gap by providing a structured systematic literature review that synthesizes recent evidence on the interrelationship between financial inclusion, digital literacy, and sustainable economic growth. The main contribution of this research lies in the development of an integrative conceptual model that places digital literacy not only as an accompanying variable, but as a strategic enabling factor that determines the inclusiveness, effectiveness, and sustainability of digital financial ecosystems. In contrast to previous studies that analyze these relationships in fragmented ways, this study integrates financial inclusion, digital literacy, ICT infrastructure, regulatory support, targeted literacy interventions, and sustainability outcomes into a single conceptual framework. Accordingly, this article contributes theoretically by clarifying the mechanism linking digital capability and financial access, methodologically by organizing recent studies through a more systematic SLR approach, and practically by offering a policy-oriented framework for designing inclusive and sustainable economic strategies.

Based on these considerations, this study proposes a conceptual synthesis that integrates financial inclusion and digital literacy within a sustainable development framework. The novelty of this research lies in the development of an integrative model that positions digital literacy as a key enabling factor that strengthens financial inclusion and amplifies its impact on sustainable economic growth. Unlike previous studies that treat financial inclusion and digital literacy as separate determinants of economic development, this research conceptualizes them as mutually reinforcing components within a unified analytical framework. The proposed model also incorporates supporting elements such as ICT infrastructure, targeted literacy programs for vulnerable groups, and the integration of green finance and environmental sustainability considerations within financial inclusion strategies (Becha et al., 2025; Yang et al., 2025; Parveen et al., 2025; Gutu et al., 2025; Patra et al., 2025; Muthoifin et al., 2025; Nazim et al., 2025).

Therefore, the main objective of this study is to analyze and synthesize the interrelationship between financial inclusion and digital literacy in promoting sustainable economic growth and to formulate an integrative conceptual model that explains how these two factors interact to support inclusive and environmentally sustainable development. Through this integrative perspective, the study aims to contribute to the academic discourse on digital economy and sustainable development while providing conceptual guidance for policymakers seeking to design more effective financial inclusion and digital literacy strategies.

Literature Review

Financial Inclusion and Economic Development

Financial inclusion refers to the accessibility, availability, and effective use of formal financial services by individuals and businesses, particularly those traditionally excluded from the banking system. In the development literature, financial inclusion is widely considered an essential mechanism for promoting inclusive economic growth because it allows households and small enterprises to access financial instruments such as savings accounts, credit facilities, insurance, and digital payment services. These financial instruments enable individuals to manage financial risks, accumulate capital, and invest in productive economic activities. Empirical research indicates that expanding financial inclusion contributes significantly to macroeconomic stability, employment creation, and poverty reduction. Inclusive financial systems also facilitate entrepreneurial activities by providing financial support to micro, small, and medium

enterprises (MSMEs), which play a crucial role in economic development in many emerging economies (Chavriya et al., 2023).

Beyond improving household welfare, financial inclusion also plays an important role in strengthening national economic performance. Studies have demonstrated that when individuals and businesses gain access to formal financial services, they are more likely to invest in productive sectors, leading to increased productivity and economic growth. In addition, financial inclusion can reduce income inequality by providing marginalized populations with opportunities to participate in formal economic activities. From a macroeconomic perspective, inclusive financial systems enhance financial stability by diversifying financial participation and expanding the domestic financial base. Consequently, financial inclusion is increasingly recognized as a key policy instrument for achieving sustainable economic development, particularly in developing countries where large segments of the population remain financially excluded (Hussain et al., 2023).

Digital Financial Inclusion and Financial Technology

The rapid advancement of digital technology has significantly transformed the financial sector and accelerated the expansion of digital financial inclusion. Digital financial inclusion refers to the delivery of financial services through digital platforms such as mobile banking, fintech applications, and electronic payment systems. These digital financial services reduce operational costs, increase transaction efficiency, and expand financial access to previously underserved populations, especially those living in rural or remote areas. By utilizing digital platforms, financial institutions can overcome geographical barriers and provide financial services to broader segments of society. As a result, digital financial inclusion has emerged as an effective strategy for expanding financial outreach and strengthening financial ecosystems in developing economies (Tay et al., 2022).

Recent studies also highlight the role of digital finance in promoting regional economic development and financial system efficiency. Digital financial platforms facilitate faster financial transactions, improve transparency, and enhance access to credit for small businesses. These technological innovations enable MSMEs to expand their operations, improve productivity, and integrate into broader market networks. Moreover, digital financial inclusion has been associated with improved financial participation and economic resilience, particularly during periods of economic uncertainty. By improving financial accessibility and efficiency, digital financial systems contribute to more inclusive economic structures and support sustainable development objectives (Becha et al., 2025; Yang et al., 2025).

Digital Literacy in the Digital Financial Ecosystem

While the expansion of digital financial services has increased financial accessibility, the effectiveness of digital financial inclusion largely depends on the level of digital literacy among users. Digital literacy refers to the knowledge and skills required to access, understand, evaluate, and utilize digital technologies effectively. In the context of digital finance, digital literacy includes the ability to operate digital banking applications, understand online financial services, evaluate digital financial information, and perform secure digital transactions. Without adequate digital literacy, individuals may face difficulties in using financial technologies, which can limit the impact of financial inclusion initiatives (Koskelainen et al., 2023).

Several studies emphasize that digital literacy plays a critical role in encouraging the adoption of financial technology. Individuals who possess higher levels of digital

literacy are more likely to use mobile banking services, digital payment platforms, and other financial technology applications. Digital literacy also improves individuals' ability to evaluate financial products, manage financial risks, and make informed economic decisions. As a result, digital literacy has become an essential enabling factor for ensuring that digital financial innovations generate meaningful socio-economic benefits rather than simply expanding technological access (Yang et al., 2023).

In addition to facilitating technology adoption, digital financial literacy contributes to improved financial behavior and economic empowerment. Individuals who possess both financial knowledge and digital skills tend to demonstrate better financial management practices, including savings behavior, investment planning, and responsible borrowing. These capabilities strengthen household financial resilience and support local economic development through the growth of small businesses and entrepreneurial activities. Research has shown that improving digital financial literacy can significantly enhance individuals' participation in the digital economy and increase the effectiveness of financial inclusion policies (Patra et al., 2025; Gulati et al., 2025).

Financial Inclusion, Digital Literacy, and Sustainable Development

In recent years, scholars have increasingly emphasized the importance of integrating financial inclusion and digital literacy within the broader framework of sustainable development. Sustainable economic growth requires not only increased economic productivity but also inclusive participation, environmental responsibility, and long-term economic resilience. Financial inclusion supports these goals by expanding economic participation and enabling access to financial resources for marginalized populations. At the same time, digital literacy ensures that individuals possess the necessary capabilities to utilize digital financial services effectively and responsibly.

Research suggests that the interaction between financial inclusion and digital literacy can generate multiple development outcomes, including poverty reduction, MSME growth, and improved socio-economic stability. When individuals are able to access financial services and possess the digital competence required to utilize them, they are more likely to engage in productive economic activities, invest in business development, and adopt sustainable financial practices. Moreover, digital financial systems can facilitate the distribution of green financing instruments that support environmentally sustainable investments and resource-efficient economic activities (Parveen et al., 2025).

Despite these positive developments, several structural challenges continue to limit the effectiveness of digital financial ecosystems. Studies have identified disparities in digital literacy, infrastructure gaps, and institutional barriers as key obstacles to achieving inclusive digital financial systems. In many developing countries, rural communities and low-income households still face limited access to reliable internet infrastructure and digital education programs. These structural inequalities create a digital divide that restricts the potential benefits of financial inclusion initiatives. Therefore, achieving sustainable economic development requires an integrated policy approach that simultaneously strengthens financial inclusion, improves digital literacy, and enhances supporting institutional environments (Khatri et al., 2025; Srinate et al., 2025; Gutu et al., 2025).

METHODS

This study employed a Systematic Literature Review (SLR) design to identify, evaluate, and synthesize the body of knowledge concerning the relationship between financial inclusion, digital literacy, and sustainable economic growth. The SLR approach

was selected because this study does not aim merely to summarize previous findings, but to systematically map conceptual trends, compare empirical insights, identify research gaps, and formulate an integrative conceptual model based on recent scholarly evidence.

The review procedure followed four main stages: identification, screening, eligibility assessment, and synthesis. In the identification stage, the researchers searched publications indexed in major academic databases, namely Scopus, Web of Science, and Google Scholar. The search was conducted using combinations of keywords such as “financial inclusion”, “digital financial inclusion”, “digital literacy”, “digital financial literacy”, “fintech adoption”, “sustainable economic growth”, “inclusive growth”, and “sustainable development”. To maintain relevance to the recent digital transformation context, the search was limited to studies published between 2021 and 2025.

In the screening stage, duplicate documents, non-academic publications, opinion pieces, editorials, theses, proceedings with limited peer review, and articles not directly related to the core variables were removed. The inclusion criteria were as follows: first, the study had to discuss at least one of the main variables, namely financial inclusion, digital literacy, or sustainable economic growth; second, the study had to provide empirical, conceptual, or review-based insight relevant to the interaction among these variables; third, the article had to be published in a peer-reviewed journal or a reputable indexed scholarly source; and fourth, the full text had to be accessible for analysis. Exclusion criteria included publications outside the selected time range, studies with weak relevance to the topic, and articles focusing exclusively on technical financial systems without broader developmental implications.

In the eligibility stage, all selected articles were read in full and assessed in terms of thematic relevance, conceptual contribution, methodological clarity, and usefulness for model construction. Each article was then coded according to several analytical categories, including study focus, research design, main findings, key variables, supporting factors, and sustainability implications. This coding process made it possible to classify the literature into major thematic clusters, such as financial inclusion and growth, digital literacy and fintech adoption, ICT and regulatory support, and green finance or sustainability outcomes.

The final stage involved thematic and conceptual synthesis. Thematic synthesis was used to identify recurring patterns across the literature, while conceptual synthesis was used to connect fragmented findings into a coherent integrative framework. Rather than statistically aggregating results, this study interpreted the literature qualitatively in order to explain the mechanisms through which digital literacy strengthens financial inclusion and how their interaction contributes to sustainable economic growth. The synthesis ultimately informed the construction of a conceptual model that incorporates core variables, enabling conditions, and developmental outcomes. Through this procedure, the SLR method provides a transparent and academically rigorous basis for deriving theoretical and policy implications.

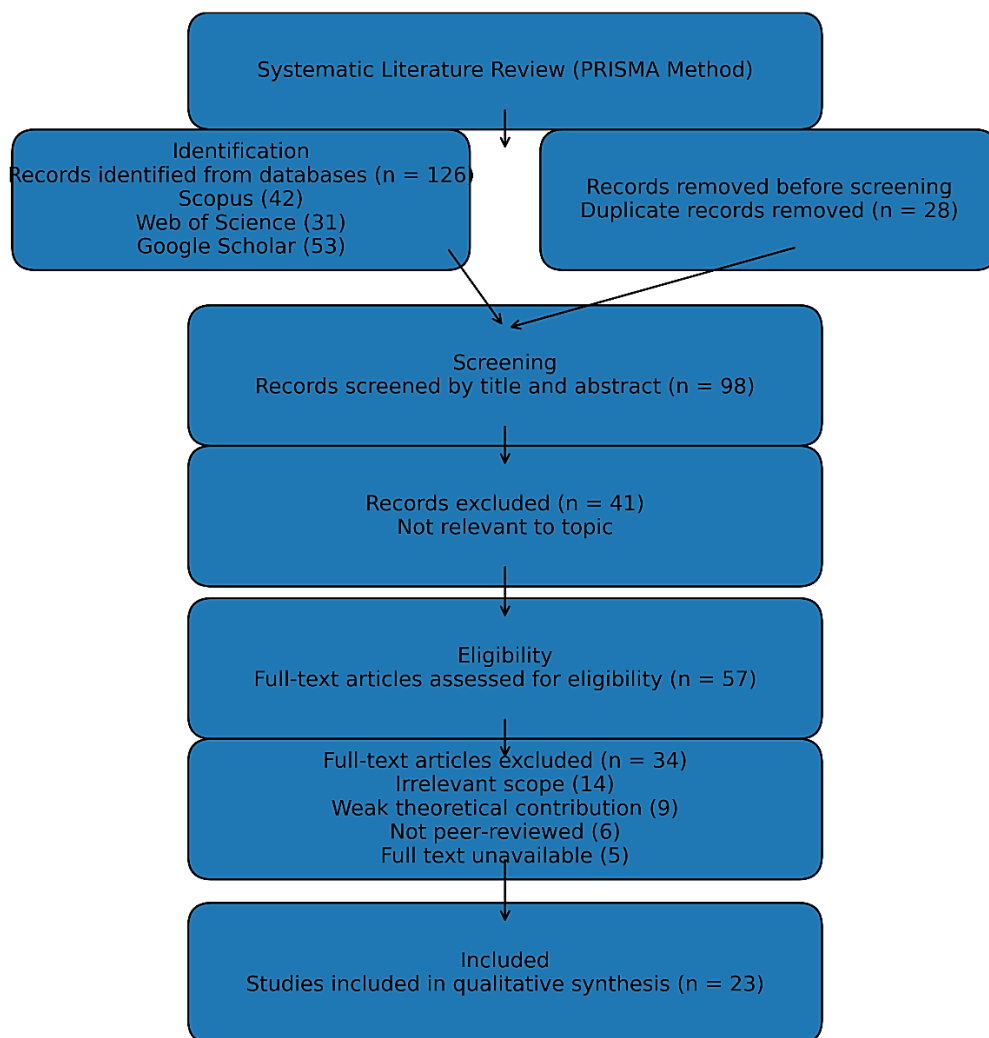


Figure 1. Prisma Diagram Research

RESULTS AND DISCUSSION

Based on the systematic literature review conducted in this study, several key findings were identified regarding the relationship between financial inclusion, digital literacy, and sustainable economic growth. The reviewed studies consistently indicate that financial inclusion provides broader access to financial services, while digital literacy enhances the ability of individuals and communities to effectively utilize digital financial technologies. The interaction between these two factors contributes to inclusive economic participation, supports the growth of micro, small, and medium enterprises (MSMEs), and promotes environmentally sustainable economic activities. In addition, the literature highlights several supporting factors, including ICT infrastructure, regulatory frameworks, and targeted literacy programs, which strengthen the effectiveness of financial inclusion and digital literacy initiatives. The synthesis of the reviewed literature is summarized in Table 1.

Table 1. Synthesis of the Relationship between Financial Inclusion, Digital Literacy, and Sustainable Economic Growth

Key Dimension	Main Indicators	Impact on Economic and Social Outcomes	Supporting References
Financial Inclusion	Access to credit, digital payment	Expansion of MSMEs, job creation, increased	Chavriya et al. (2023);

	systems, fintech services, banking outreach	productivity, reduction of income inequality	Hussain et al. (2023); Pradhan et al. (2021)
Digital Financial Inclusion	Mobile banking, online financial services, digital transaction platforms	Acceleration of regional economic growth, increased financial participation, improved resource efficiency	Becha et al. (2025); Yang et al. (2025); Parveen et al. (2025); Gutu et al. (2025)
Digital Literacy	Digital skills, financial knowledge, technology adoption capability	Improved financial decision-making, increased savings, entrepreneurial development, poverty reduction	Yang et al. (2023); Khatri et al. (2025); Koskelainen et al. (2023); Gulati et al. (2025)
Socioeconomic Outcomes	Financial stability, business expansion, social inclusion	Strengthening community resilience and inclusive economic participation	Patra et al. (2025); Nazim et al. (2025); Syahrizal et al. (2025)
Supporting Factors	ICT infrastructure, regulatory environment, targeted literacy programs	Strengthening digital financial ecosystems and improving policy effectiveness	Tay et al. (2022); Srinate et al. (2025); Gutu et al. (2025)
Sustainability Outcomes	Green finance adoption, efficient resource use, inclusive development	Sustainable economic growth, environmental sustainability, poverty alleviation	Becha et al. (2025); Yang et al. (2025); Parveen et al. (2025)

The results summarized in Table 1 demonstrate that financial inclusion and digital literacy function as complementary drivers of sustainable economic development. Financial inclusion expands access to financial resources, enabling individuals and businesses to participate more actively in economic activities. At the same time, digital literacy enhances the capacity of individuals to effectively utilize digital financial technologies, thereby increasing the efficiency and inclusiveness of financial systems. The interaction between these two dimensions generates multiple positive outcomes, including improved financial decision-making, increased entrepreneurial activity, and greater economic resilience.

Furthermore, the analysis indicates that digital financial inclusion serves as an important mechanism linking financial access with sustainable development outcomes. By facilitating digital payments, online lending, and fintech services, digital financial platforms help expand financial access to previously underserved populations. This expansion not only stimulates business growth but also supports environmentally sustainable investments through green finance initiatives. However, the effectiveness of digital financial inclusion largely depends on supporting factors such as ICT infrastructure, regulatory frameworks, and targeted digital literacy programs.

Overall, the findings highlight that the integration of financial inclusion and digital literacy within a supportive institutional and technological environment can significantly contribute to sustainable economic growth. These results reinforce the argument that policymakers should adopt integrative strategies that simultaneously promote financial inclusion, strengthen digital literacy, and improve digital infrastructure in order to achieve inclusive and sustainable development outcomes.

Discussion

The objective of this study is to analyze the interrelationship between financial inclusion and digital literacy in promoting sustainable economic growth and to formulate an integrative conceptual model that explains how these two factors interact to support inclusive and environmentally sustainable development. Based on the synthesis of the literature presented in the results section, the findings indicate that financial inclusion and digital literacy operate as mutually reinforcing mechanisms that contribute to economic participation, poverty reduction, and sustainable development outcomes. The discussion elaborates on how these variables interact through several pathways, including access to financial services, digital capability development, technological infrastructure, and environmentally oriented financial practices. The integration of these elements forms the basis of an integrative model that explains the role of digital financial ecosystems in achieving sustainable economic growth.

Financial inclusion has been widely recognized as a strategic driver of economic development because it enables individuals and small businesses to access formal financial services that were previously unavailable to them. The availability of financial services such as savings accounts, credit facilities, insurance, and digital payment systems allows individuals to manage financial risks, invest in productive activities, and expand entrepreneurial initiatives. As shown in the results table, financial inclusion contributes to macroeconomic stability and economic participation by increasing access to capital and financial instruments. Empirical research indicates that inclusive financial systems stimulate job creation, improve productivity, and reduce economic inequality. In developing economies, where large segments of the population remain excluded from formal financial institutions, financial inclusion becomes particularly important for enabling economic mobility and social empowerment. Studies have shown that expanding financial outreach can significantly reduce poverty levels and income disparities by providing opportunities for marginalized populations to participate in economic activities (Chavriya et al., 2023; Hussain et al., 2023).

The role of financial inclusion becomes even more significant in the context of digital transformation. The emergence of digital financial technologies has expanded the capacity of financial institutions to reach underserved populations through mobile banking, fintech platforms, and digital payment systems. Digital financial inclusion enables financial services to be delivered more efficiently and at lower costs compared to traditional banking systems. This technological transformation is particularly beneficial for rural communities and small businesses that face geographical barriers in accessing financial institutions. Through digital channels, individuals can perform financial transactions, access microcredit, and participate in digital marketplaces without relying on physical banking infrastructure. Research has demonstrated that digital financial inclusion accelerates regional economic growth by supporting the development of micro, small, and medium enterprises (MSMEs) and enhancing market participation (Becha et al., 2025; Yang et al., 2025; Parveen et al., 2025; Gutu et al., 2025).

One of the most significant economic impacts of digital financial inclusion is its contribution to the development of MSMEs, which represent a major source of

employment and economic productivity in many developing countries. Access to credit and digital payment systems enables small businesses to improve their operational efficiency, expand market reach, and access new sources of financing. As indicated in previous studies, digital payment platforms facilitate faster transactions and reduce transaction costs, allowing small enterprises to integrate more effectively into national and global value chains. In addition, digital financial services provide opportunities for entrepreneurs to obtain microloans, crowdfunding, and peer-to-peer lending, which are critical sources of capital for business expansion. These mechanisms collectively contribute to job creation and income generation, thereby strengthening the economic resilience of local communities (Becha et al., 2025; Hussain et al., 2023; Pradhan et al., 2021).

Beyond economic productivity, financial inclusion also plays a critical role in supporting environmental sustainability through the expansion of green finance mechanisms. Green finance refers to financial instruments and investment strategies that support environmentally sustainable projects, including renewable energy development, energy efficiency improvements, and climate mitigation initiatives. Digital financial platforms enable financial institutions to distribute green financing products more efficiently and reach a broader range of beneficiaries, including small businesses and community organizations engaged in environmentally friendly activities. Studies have shown that digital financial inclusion can facilitate investments in clean technologies and support resource efficiency initiatives, which contribute to the achievement of net-zero emission targets and sustainable development goals. By enabling broader participation in green finance initiatives, inclusive financial systems can strengthen the link between economic growth and environmental sustainability (Becha et al., 2025; Yang et al., 2025; Parveen et al., 2025; Gutu et al., 2025).

While financial inclusion expands access to financial services, the effectiveness of digital financial ecosystems largely depends on the level of digital literacy among users. Digital literacy refers to the knowledge and skills required to access, evaluate, and utilize digital technologies effectively. In the context of financial services, digital literacy includes the ability to use mobile banking applications, understand digital payment systems, evaluate online financial products, and manage digital financial transactions securely. Without sufficient digital literacy, individuals may face difficulties in adopting digital financial services, which limits the overall impact of financial inclusion initiatives. Empirical studies have consistently demonstrated that individuals with higher levels of digital literacy are more likely to use mobile payment systems, online banking platforms, and digital investment services. This suggests that digital literacy functions as a critical enabling factor that facilitates the adoption of financial technology (Yang et al., 2023; Khatri et al., 2025; Koskelainen et al., 2023; Gulati et al., 2025).

Digital financial literacy also contributes to improved financial decision-making and economic behavior. Individuals who possess adequate financial knowledge and digital skills are better equipped to manage their financial resources, plan long-term investments, and mitigate financial risks. This capacity leads to higher levels of savings, increased entrepreneurial activity, and improved household financial stability. As individuals gain confidence in using digital financial platforms, they are more likely to participate in the formal financial system and engage in productive economic activities. Research indicates that digital financial literacy enhances financial planning behavior and encourages individuals to adopt responsible financial practices, which ultimately contributes to poverty reduction and economic empowerment (Patra et al., 2025; Muthoifin et al., 2025; Nazim et al., 2025; Syahrizal et al., 2025; M et al., 2024).

Despite these positive outcomes, significant challenges remain in ensuring that digital financial inclusion benefits all segments of society. One of the most critical challenges identified in the literature is the persistent gap in digital literacy and technological infrastructure. Many rural and low-income communities lack the necessary digital skills and access to reliable internet connectivity required to utilize digital financial services effectively. These disparities create a digital divide that limits the reach of financial inclusion initiatives and exacerbates existing socio-economic inequalities. Studies have identified digital literacy gaps as one of the primary barriers to achieving inclusive digital economies, particularly in developing countries where technological infrastructure remains unevenly distributed (Khatri et al., 2025; Patra et al., 2025; Tay et al., 2022; Srinate et al., 2025; Gutu et al., 2025; Gulati et al., 2025).

In addition to digital literacy gaps, institutional and regulatory factors also influence the effectiveness of financial inclusion policies. The availability of supportive ICT infrastructure and regulatory frameworks is essential for enabling the development of digital financial ecosystems. Governments play a crucial role in creating regulatory environments that encourage financial innovation while ensuring consumer protection and financial stability. Effective regulations can promote the development of fintech industries, enhance digital payment systems, and improve the security of financial transactions. Studies examining multiple developing economies have shown that countries with stronger ICT infrastructure and supportive regulatory frameworks tend to experience greater improvements in financial inclusion and economic development outcomes (Tay et al., 2022; Hussain et al., 2023; Pradhan et al., 2021).

Given these interrelated dynamics, many scholars have proposed integrative frameworks that link digital literacy, financial inclusion, and sustainable economic development. These frameworks emphasize that digital literacy serves as a foundational capability that enables individuals to utilize digital financial services, which in turn facilitates broader financial inclusion. The expansion of inclusive financial systems then generates a range of socio-economic and environmental outcomes, including poverty reduction, MSME development, gender equality, and environmentally sustainable investment. This sequential relationship suggests that digital literacy and financial inclusion should not be treated as isolated policy domains but rather as interconnected components of a broader development strategy (Becha et al., 2025; Khatri et al., 2025; Patra et al., 2025; Muthoifin et al., 2025; Nazim et al., 2025; Syahrizal et al., 2025; Pradhan et al., 2021; Gutu et al., 2025).

The integrative model proposed in this study builds upon these conceptual insights by positioning digital literacy as a key enabling factor that strengthens financial inclusion and amplifies its impact on sustainable development outcomes. Within this model, digital literacy enhances individuals' capacity to access and utilize digital financial services, which increases the effectiveness of financial inclusion initiatives. Financial inclusion then contributes to sustainable economic growth by expanding economic participation, supporting MSME development, and facilitating environmentally responsible investment practices. Supporting factors such as ICT infrastructure, regulatory frameworks, and targeted digital literacy programs further reinforce these relationships by creating an enabling environment for digital financial ecosystems.

Targeted digital literacy programs represent an especially important component of this integrative model. Educational initiatives that focus on vulnerable groups, including women, rural communities, and small business owners, can significantly improve the effectiveness of financial inclusion policies. By equipping individuals with the necessary digital and financial skills, these programs help ensure that technological innovations translate into tangible economic benefits. Research indicates that targeted

literacy programs can enhance financial capability, increase technology adoption, and strengthen entrepreneurial capacity among marginalized populations (Patra et al., 2025; Muthoifin et al., 2025; Nazim et al., 2025; Uzoamaka et al., 2024; M et al., 2024; Srinate et al., 2025; Koskelainen et al., 2023).

A critical examination of the literature reveals that the positive relationship between financial inclusion and sustainable economic growth is not universally automatic. Several studies tend to assume that broader financial access will directly generate welfare improvement, yet this assumption may overlook the unequal capacity of social groups to use financial services productively. Access without capability can produce shallow inclusion, where individuals are formally connected to financial systems but remain unable to maximize developmental benefits. In this regard, digital literacy should not be treated as a secondary complement, but as a structural condition that determines whether financial inclusion leads to real empowerment or merely expands technical access.

Moreover, the literature shows an imbalance between enthusiasm for digital finance expansion and attention to exclusion risks within the digital ecosystem. Many studies celebrate fintech as a solution for underserved populations, but fewer critically examine issues such as digital vulnerability, cybersecurity risks, misinformation, algorithmic exclusion, and unequal access to devices and internet connectivity. This suggests that digital financial inclusion can reproduce inequality when implemented in settings where digital literacy and infrastructure remain weak. Therefore, the relationship between digital finance and sustainable growth is conditional rather than deterministic.

Another critical issue concerns the limited theoretical integration found in prior studies. Most empirical works focus on isolated causal paths, for instance the effect of digital finance on MSME growth or the effect of digital literacy on technology adoption. While these findings are valuable, they often fail to explain the broader developmental mechanism linking human capability, financial access, institutional support, and sustainability outcomes. This fragmentation weakens the explanatory power of the literature and creates difficulty for policymakers seeking integrated interventions. The model proposed in this study responds to this limitation by synthesizing these fragmented strands into a more coherent framework.

In addition, the literature still gives limited attention to the normative dimension of sustainability. Economic growth is often treated as the primary output of financial inclusion, while environmental sustainability and social justice are positioned as secondary consequences. In fact, sustainable economic growth requires not only increased participation and productivity, but also equitable access, resilience, and support for environmentally responsible investment. Therefore, future research should move beyond narrow efficiency-based perspectives and examine how digital financial ecosystems can be designed to support long-term ecological and social sustainability.

Taken together, these critical reflections indicate that the contribution of financial inclusion to sustainable development depends on the quality of integration between financial access, digital capability, infrastructure readiness, and public policy design. For this reason, the integrative model developed in this study offers a more realistic analytical lens, because it recognizes that sustainable growth emerges from interaction among multiple enabling conditions rather than from a single policy instrument.

Overall, the findings of this study demonstrate that sustainable economic development requires an integrated approach that simultaneously promotes financial inclusion, digital literacy, and supportive technological infrastructure. Financial inclusion alone is insufficient if individuals lack the digital competencies required to utilize digital

financial services effectively. Similarly, digital literacy initiatives may have limited impact if financial services remain inaccessible or poorly regulated. Therefore, an integrative model that combines these elements provides a more comprehensive framework for understanding how digital financial ecosystems contribute to sustainable economic growth. By integrating financial inclusion strategies with digital literacy development and green finance initiatives, policymakers can create more inclusive, resilient, and environmentally sustainable economic systems.

CONCLUSIONS

This study concludes that financial inclusion and digital literacy function as interconnected and mutually reinforcing drivers of sustainable economic growth, particularly in developing economies. The synthesis of the literature demonstrates that financial inclusion expands access to financial services such as credit, savings, and digital payment systems, which support entrepreneurship, strengthen MSMEs, and enhance economic participation among marginalized groups. At the same time, digital literacy plays a critical enabling role by equipping individuals with the skills necessary to access and effectively utilize digital financial technologies, thereby increasing the efficiency and inclusiveness of financial systems. The findings also indicate that the integration of financial inclusion and digital literacy becomes more effective when supported by adequate ICT infrastructure, appropriate regulatory frameworks, and targeted digital literacy programs aimed at vulnerable populations. Through this integrative relationship, financial inclusion and digital literacy jointly contribute to broader development outcomes, including poverty reduction, improved financial decision-making, increased entrepreneurial activity, and the promotion of environmentally sustainable investments. Therefore, the integrative conceptual model proposed in this study highlights that sustainable economic growth can be more effectively achieved when financial inclusion policies are implemented in conjunction with digital literacy development and supported by strong digital infrastructure and inclusive regulatory environments.

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