



# Advancing sustainability through financial inclusion and sustainable finance: a systematic literature review

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## Abstract

This study conducts a systematic literature review to examine the nexus between financial inclusion and sustainable finance, with a particular emphasis on emerging risks in the digital financial ecosystem. Employing the PRISMA methodology and bibliographic network analysis techniques, including citation network analysis and co-occurrence network of keywords, the review synthesises insights from 54 peer-reviewed publications indexed in Scopus. The findings reveal that financial inclusion significantly advances sustainability by enhancing access to financial services for underserved populations and promoting equitable economic participation. Digital innovations such as fintech, blockchain, and artificial intelligence are shown to facilitate this process, yet they concurrently introduce vulnerabilities, including cyber-crime, fraud, and regulatory fragmentation. Islamic finance models, characterised by ethical and transparent financial practises, offer promising solutions for inclusive and secure financial systems. Two thematic clusters are identified: one centred on inclusive and ethical finance and the other on digital innovation in green and sustainable finance. The study underscores the need for integrated strategies that balance accessibility, technological advancement, and risk mitigation. Whilst the exclusive use of the Scopus database represents a limitation, this review contributes to a deeper understanding of how secure, inclusive, and sustainable digital financial systems can support global development goals.

**Keywords** Financial inclusion · Sustainable finance · Fintech · Financial crime · Digital risks · Sustainable development goals

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## 1 Introduction

Financial inclusion and sustainable finance have gained recognition in recent years as key drivers of sustainable development. Financial inclusion is increasingly recognised for promoting growth, reducing poverty, and advancing equity (Ellili, 2024; Guan & Zhao, 2024; Semwal et al., 2024). Expanding access to financial services, particularly for marginalised populations, stimulates economic activity and investment whilst helping to reduce poverty and narrow socio-economic disparities (Valencia et al., 2021).

In addition to economic and social benefits, financial inclusion contributes to environmental sustainability by supporting green finance initiatives and investments in eco-friendly projects (Ozili, 2023; Wang et al., 2022). Its importance is further underscored by its direct links to several sustainable development goals (SDGs), including SDG 1 (No Poverty), SDG 5 (Gender Equality), and SDG 8 (Decent Work and Economic Growth) (Tejasmayee et al., 2023; Yap et al., 2023).

Sustainable finance refers to financial practises that align private-sector investments with long-term environmental and social goals. It includes tools such as green bonds, social banking, microcredit, and impact bonds aimed at generating positive sustainability outcomes (Wang et al., 2022). By complementing financial inclusion, sustainable finance mobilises capital for inclusive and environmentally responsible development efforts.

The relationship between financial inclusion and sustainable finance is inherently complementary. Financial inclusion lays the foundation by expanding participation in financial systems, whilst sustainable finance channels those systems towards achieving environmental, social, and economic sustainability objectives (Huang et al., 2024; Oanh, 2024; Semwal et al., 2024).

As both concepts gain increasing prominence in global development agendas, it becomes essential to understand their interaction and collective contribution to sustainability. This systematic literature review synthesises current research to explore how financial inclusion and sustainable finance work together to support sustainable development and to offer insights for future research and policymaking.

## 2 Materials and methods

This study employed a systematic literature review (SLR) methodology to comprehensively explore and synthesise existing research on financial inclusion and sustainable finance and their combined contribution to advancing sustainability. Following the SLR guidelines, this review adhered to a structured research protocol to ensure replicability, transparency, and reliability. This structured approach involved formulating clear research questions, selecting relevant articles, extracting data systematically, understanding their methodological characteristics, synthesising key findings, and analysing results (Serafini et al., 2022). Systematic literature reviews

have been recognised for providing an objective, unbiased, and methodical evaluation of existing knowledge (Roever, 2017).

## 2.1 Research question

To guide the systematic review process, the Population, Intervention, Comparison, Outcome (PICO) strategy was adopted (Serafini et al., 2022). Based on this framework, the following research questions were formulated:

RQ1: How does financial inclusion contribute to sustainable finance and sustainability outcomes in the context of increasing digital financial risks and vulnerabilities?

RQ2: What digital strategies and technologies have been implemented to integrate financial inclusion with sustainable finance, and how do they address or expose financial crime risks?

RQ3: What challenges exist in aligning financial inclusion with sustainable finance whilst mitigating financial crime in the digital era, and what strategies have been proposed to address these challenges?

These research questions aim to capture the evolving dynamics at the intersection of financial inclusion, sustainable finance, and the growing threat of financial crime in an increasingly digital financial landscape. By framing the inquiry through the PICO lens, this study not only investigates the enabling role of financial inclusion in promoting sustainability but also critically examines the dual impact of digital financial innovations, both as facilitators of inclusion and as potential conduits for illicit financial activities. The systematic review, therefore, seeks to provide a comprehensive understanding of existing strategies, emerging risks, and practical solutions that contribute to the development of secure, inclusive, and sustainable financial ecosystems.

## 2.2 Research strategy

### 2.2.1 Systematic literature review

This study employed a SLR methodology based on the PRISMA 2020 framework (Page et al., 2021) to maintain a high standard of methodological transparency and reliability. The Scopus database was chosen as the sole source for literature collection due to its broad interdisciplinary coverage, standardised indexing, and advanced citation analytics capabilities (Powell & Peterson, 2017; Prancutè, 2021). In comparison to the Web of Science, Scopus offers a broader journal scope, more detailed author and institutional information, and superior bibliometric metrics (Falagas et al., 2008). To ensure the dataset reflected the most current and pertinent academic work, Scopus was accessed and updated multiple times during the research process, with the final dataset fully downloaded on March 28, 2025.

The Scopus database was selected as the primary source for literature identification due to its comprehensive coverage, rigorous indexing, and robust citation analysis capabilities (Powell & Peterson, 2017; Pranckutė, 2021). Compared to the Web of Science, Scopus provides superior impact indicators, more excellent author, institution, and source profiling capabilities, and broader journal coverage (Falagas et al., 2008).

An initial search was conducted using a structured keyword string based on the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines outlined by Page et al. (2021). The search string incorporated Boolean operators and truncation symbols, constructed as follows:

“(financial inclusion” AND “sustainable finance”).

The PRISMA protocol guided each step of the selection and screening process, which involved identification, screening of titles and abstracts, eligibility assessment through full-text review, and final inclusion. Following the PRISMA framework, this systematic literature review’s selection and screening process followed a transparent and rigorous approach. The initial identification phase involved a targeted search within the Scopus database, yielding 56 records relevant to the keywords “financial inclusion” and “sustainable finance.” No records were removed by automation tools or excluded for other pre-screening reasons. During the screening stage, two non-English articles were excluded to maintain consistency in language scope, limiting the dataset to English-language sources only. As a result, 54 records were sought for full-text retrieval, all successfully accessed (Fig. 1).

All 54 articles were confirmed to meet the inclusion criteria in the eligibility assessment phase and were published between 2017 and 2025. No articles were excluded during the eligibility review, as each publication provided relevant insights into the interplay between financial inclusion and sustainable finance. Ultimately, 54 studies were included in the final analysis. This structured and comprehensive selection process ensures the methodological rigour, transparency, and reproducibility of the review findings, aligning with best practises for systematic literature reviews.

### 2.2.2 Bibliographic network analysis and visualisation

After completing the SLR, bibliographic network analysis and visualisation (BNAV) were performed to explore the intellectual structure of the research domain in greater detail. Unlike traditional narrative reviews, this approach emphasises methodological transparency, inclusiveness, clarity of interpretation, and practical insight (Tranfield et al. 2003), all of which contribute to reducing bias and increasing the objectivity of the findings (Clark 2010). The BNAV method was employed to uncover dominant and emerging research trends. This involved several techniques, including citation network analysis (CNA), global citation score (GCS), and the CONK.

CNA maps explicitly the connexions between publications based on citation patterns. It assumes that scholarly influence and knowledge development can be traced through citation links, as researchers typically reference work within their academic or institutional communities (Hummon & Dereian, 1989). This method is particularly valuable for analysing large bodies of interrelated research, as it reveals how ideas evolve and how conceptual boundaries are formed over time

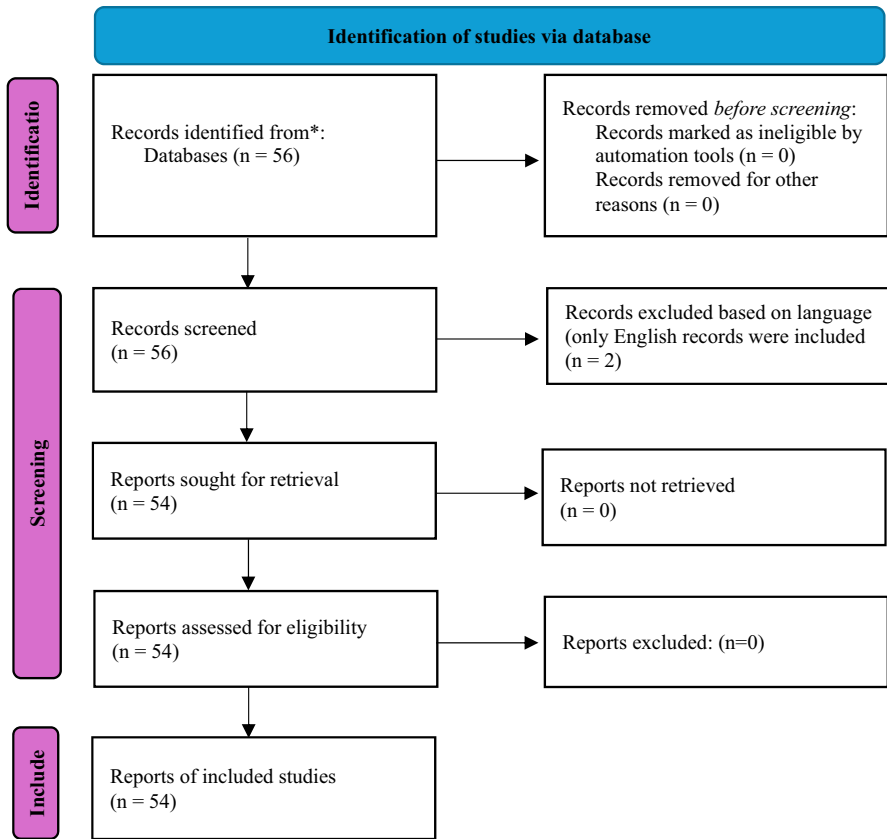


Fig. 1 PRISMA flow diagram, selection, and analysis of articles

(Fahimnia et al. 2015). The approach used here is consistent with established methodologies applied in high-impact literature reviews, such as those in entrepreneurship and innovation studies.

A qualitative content analysis was also conducted to complement the quantitative mapping. Titles, abstracts, and keywords were systematically coded to ensure greater construct validity and reduce potential interpretive bias. For the visualisation component, the study used VOSviewer (version 1.6.18) to generate citation and keyword co-occurrence maps using Scopus-indexed records. The software's Visualization of Similarities (VOS) algorithm places items spatially based on the strength of their co-occurrence relationships, where items positioned closer together are more thematically related. Keywords or nodes that appear centrally tend to be those that bridge multiple research themes (Waaiker et al. 2011). This analysis allowed for the identification of influential scholars, journals, and thematic clusters, providing a deeper understanding of the academic landscape in this field.

### 3 Results

To present the findings clearly and systematically, this study adopted a structured analytical framework to organise and synthesise the reviewed literature. The results are divided into two main sections: (i) Analysis of Scientific Production and (ii) BNAV. Each selected article was reviewed independently, allowing for a detailed understanding of the relationship between financial inclusion and sustainable finance.

#### 3.1 Scientific production analysis

The volume of research on financial inclusion and sustainable finance has steadily grown since 2017, with a notable surge from 2022 onward, reflecting increased global awareness of their role in sustainable development (Fig. 2).

Amongst the document types, journal articles represent the largest share (42.6%), followed by book chapters (29.6%), books (13.0%), review articles (11.1%), and conference papers (3.7%). This distribution indicates a dominant reliance on peer-reviewed literature and structured knowledge contributions.

Geographically, the most active contributors include India, the United Kingdom, Italy, Malaysia, and the United States. These top five countries highlight widespread interest across both developed and emerging economies.

Regarding institutional support, major funding sponsors include the Ministerio de Economía y Competitividad, Agencia Estatal de Investigación, and the

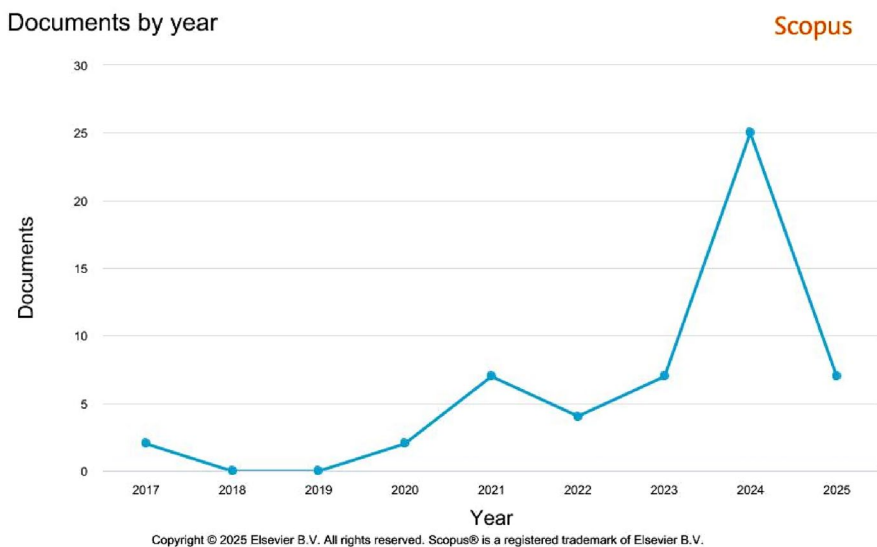


Fig. 2 Publications by year

European Commission through Horizon 2020, pointing to strong engagement from international development and policy institutions.

Authorship analysis identifies influential scholars such as I.H.Y. Chiu, A. Zaimovic, T. Zaimovic, D. Aassouli, P. Abdo-Peralta, and R. Abraham, whose repeated contributions have advanced discourse in the field.

Key journals publishing in this area include the *International Journal of Finance and Economics*, *Sustainability Switzerland*, *Asian Journal of WTO and International Health Law and Policy*, *Annals of Public and Cooperative Economics*, and *Law and Contemporary Problems*. These outlets reflect the interdisciplinary nature of the field, bridging finance, law, public policy, and sustainability.

Subject area analysis shows that economics, business and management, and social sciences dominate the research landscape, comprising over 70% of publications. Environmental Science, computer science, and energy studies also contribute meaningfully, underscoring the field's broad interdisciplinary appeal.

In summary, the results point to a vibrant and expanding scholarly community focussed on financial inclusion and sustainable finance. The field is marked by global participation, diverse subject coverage, and strong institutional support, reinforcing its growing importance in advancing sustainable development goals.

## 3.2 Bibliographic network analysis and visualisation

### 3.2.1 Citation network analysis

CNA is an analytical technique where academic papers are represented as nodes, and citations act as the connecting links between these nodes. This method allows researchers to track citation networks, providing deeper insights into how earlier studies influence later research and facilitating the identification of knowledge transfer paths. Consequently, it isolates smaller clusters of related papers, each within a cluster sharing at least ten mutual references. CNA helps identify highly influential papers that garnered significant citations within the broader author network (Hummon & Dereian, 1989).

The effectiveness of CNA is particularly pronounced in larger clusters with numerous nodes, as the amount of data and insights derived from these extensive networks significantly exceed those from smaller clusters (Ejsmont et al. 2020). The CNA, as shown in Table 1 and outlined by Máté et al. (2024), presents the primary thematic clusters identified through CNA, highlighting essential research topics within the literature on financial inclusion and sustainable finance. The CNA identified 26 distinct thematic clusters, each representing a key area of research within financial inclusion and sustainable finance. These clusters provide insights into how academic literature addresses digital strategies, sustainability outcomes, and financial crime risks.

Several clusters, such as “Fintech Business Models,” “Blockchain in Finance,” “Green Digital Finance,” “AI Sustainable Finance,” and “Fintech ESG Goals,” relate directly to digital innovations that support financial inclusion whilst also posing new risks—such as fraud or regulatory gaps—highlighting their relevance

**Table 1** Research topics on the most significant clusters in the CNA

Cluster	Nodes	Topics	Top cited paper <sup>a</sup>	Period	Size <sup>b</sup> (%)
1	1	Islamic Bank Performance	Sultan et al. (2024)	2024	3.85
2	1	Credit Access Law	Akseli (2021)	2021	3.85
3	1	Fintech Business Models	Moro-Visconti et al. (2020)	2020	3.85
4	1	Fintech ESG Goals	Shala and Berisha (2024)	2024	3.85
5	1	Renewable Energy Finance	Erdoğan et al. (2022)	2022	3.85
6	1	Sustainable Finance Review	Singhania et al. (2024)	2024	3.85
7	1	Islamic Sustainable Finance	Hassan et al. (2025)	2021	3.85
8	1	Islamic Finance Instruments	Rosman et al. (2024)	2024	3.85
9	1	Fintech Law Handbook	Chiu (2021)	2021	3.85
10	1	Green Digital Finance	Vikas et al. (2022)	2022	3.85
11	1	SRI Sukuk Sustainability	Delle Foglie and Keshminder (2022)	2024	3.85
12	1	Money Laundering Regulation	Rose (2020)	2020	3.85
13	1	Women's Financial Gap	Saviano et al. (2017)	2017	3.85
14	1	Landscape Finance	Louman et al. (2022)	2022	3.85
15	1	Capital Market Regulation	Chiu and Deipenbrock (2021)	2021	3.85
16	1	Green Growth Stability	Sajid et al. (2023)	2023	3.85
17	1	Consumer Credit Protection	Aldohni (2021)	2021	3.85
18	1	Savings Cooperatives Role	Segovia-Vargas et al. (2023)	2023	3.85
19	1	AI Sustainable Finance	Pashang and Weber (2023)	2023	3.85
20	1	Industrial Green Productivity	Yue et al. (2024)	2024	3.85
21	1	Economic Growth Sustainability	Ziolo et al. (2017)	2017	3.85
22	1	Blockchain in Finance	Sharma et al. (2024)	2024	3.85
23	1	Financial Inclusion Definition	Schwarzc and Leonhardt (2021)	2021	3.85
24	1	Fintech Inclusion Network	Ahelegbey et al. (2023)	2023	3.85
25	1	Fintech Sector Analysis	Choudhary and Thenmozhi (2024)	2024	3.85
26	1	Fintech Sustainable Development	Mhlanga (2024)	2024	3.85

Source: Authors

<sup>a</sup>Minimum Citation: 2

<sup>b</sup>Nodes = 26 (100%)

to digital strategy implementation. These clusters emphasise the role of financial technology in enhancing accessibility and the need for safeguards against misuse.

Clusters focussed on Islamic finance, such as “Islamic Bank Performance,” “Islamic Sustainable Finance,” and “Islamic Finance Instruments,” illustrate how ethical finance practises contribute to socially responsible development and inclusive access, aligning closely with the goals of sustainable finance.

Regulatory and governance-related clusters, including “Credit Access Law,” “Capital Market Regulation,” “Consumer Credit Protection,” and “Money

Laundering Regulation,” address the institutional and legal frameworks needed to mitigate financial crime in an increasingly digital landscape.

Environmental themes are prominent in clusters like “Renewable Energy Finance,” “SRI Sukuk Sustainability,” “Landscape Finance,” and “Industrial Green Productivity,” which underscore how financial inclusion mechanisms can be used to drive green investments.

In addition, clusters such as “Women’s Financial Gap” and “Savings Cooperatives Role” highlight the social inclusion dimension, revealing how targeted financial strategies can close equity gaps and broaden access to underserved groups.

Collectively, these findings demonstrate how scholarly work is addressing the integration of financial inclusion with sustainable finance, the application of digital tools, and the importance of regulation in managing emerging risks.

### 3.2.2 Global citation score and normalised citation score analysis

The global citation score (GCS) and corresponding analyses can identify influential publications within the scholarly community. The GCS represents a publication’s overall number of citations throughout the entire database, irrespective of its connectivity within citation networks (Knoke & Yang, 2019). This normalised GCS evaluation highlights the ten most prominent articles currently receiving substantial attention in the scientific community. In addition, this approach can help recognise emerging research contributions that have gained attention since their publication (Strozzi et al., 2017).

Máté et al. (2024) indicate that Table 2 outlines the ten most cited articles ranked by their normalised citation score (NCS), calculated via VOSviewer. The NCS is a standardised measure that adjusts citation counts by accounting for variations in citation behaviours across different disciplines and publication years. By doing so, this metric enables equitable comparisons of citation impacts between diverse studies, assessing each article’s citation performance relative to its academic context.

Table 2 highlights the ten most influential articles in the dataset based on their NCS, which adjusts for variations across publication years and disciplines. The top-ranked article is by Yue et al. (2024), published in *Energy Reports*, with an NCS of 6.5341, reflecting strong citation performance relative to its peers. Other highly cited works include Delle Foglie and Keshminder (2022) and Choudhary and Thenmozhi (2024), which also appear prominently in the CNA, underscoring their influence in linking financial inclusion, sustainability, and financial technologies. Most of the top-cited papers are recent (2023–2024), suggesting a growing research interest in the field. These findings help identify emerging thought leaders and foundational studies within the evolving discourse on sustainable finance and financial inclusion in the digital era.

### 3.2.3 Co-occurrence analysis

A co-occurrence (or co-word) network was applied to analyse the relationships between frequently appearing keywords within the selected literature. In this network, nodes represent keywords identified by the authors, whilst the links illustrate

**Table 2** Top 10 most cited articles ranked by normalised citations score

Rank	Authors	Publication year	Journal	Appear- ance in CNA	Citation score	Normalised citation score
1	Yue et al. (2024)	2024	<i>Energy Reports</i>	Yes	23	6.5341
2	Delle Fogle and Keshminder (2022)	2024	<i>International Journal of Emerging Markets</i>	Yes	17	4.8295
3	Choudhary and Thenmozhi (2024)	2024	<i>International Review of Financial Analysis</i>	Yes	15	4.2614
4	Singhania et al. (2024)	2024	<i>International Journal of Finance and Economics</i>	Yes	14	3.9773
5	Ahelegbey et al. (2023)	2023	<i>Socio-Economic Planning Sciences</i>	Yes	13	2.9355
6	Hassan et al. (2025)	2021	<i>Islamic Finance and Sustainable Development (Book)</i>	Yes	14	2.5128
7	Moro-Visconti et al. (2020)	2020	<i>Sustainability (Switzerland)</i>	Yes	95	1.9
8	Louman et al. (2022)	2022	<i>Land</i>	Yes	10	1.7391
9	Sharma et al. (2024)	2024	<i>Journal of Business Research</i>	Yes	6	1.7045
10	Sajid et al. (2023)	2023	<i>Environmental Science and Pollution Research International</i>	Yes	7	1.5806

Source: Authors

the frequency with which these terms co-appear across different publications (Callon et al. 1991). The repeated presence of specific terms may indicate their relevance to the research field and help reveal underlying patterns and emerging trends (Ding et al. 2001).

The co-occurrence analysis was conducted using VOSviewer, which supports network visualisation through three mapping techniques. After filtering abstracts in the Scopus database, 54 documents were selected. Keywords were extracted from the titles, abstracts, and author-provided keywords. Before analysis, the data underwent standardisation, where synonymous terms, abbreviations, and whole phrases were merged to ensure consistency. The cleaned dataset was then formatted for batch analysis. To be included in the co-occurrence network, a keyword must appear in at least five publications (Khitous et al. 2020). Keywords with higher frequency and greater co-occurrence with other terms were considered more significant. In the visualisation, larger and more prominent nodes represented keywords that appeared more frequently (Ejsmont et al. 2020).

Figure 3 presents the co-occurrence network of eight key terms identified from the reviewed literature. “Sustainable finance” appears as the most central and frequently connected keyword, reflecting its fundamental role in linking financial inclusion, technological innovation, and sustainable development themes.

The red cluster includes “financial inclusion,” “Islamic finance,” “sustainability,” and “sustainable finance.” This grouping highlights the literature’s focus on the role of inclusive and ethical financial systems in achieving sustainability outcomes. It demonstrates how expanding access to financial services, particularly through frameworks like Islamic finance, supports social equity, resilience, and poverty reduction. These connexions align with the idea that financial inclusion contributes to sustainable finance, especially in settings exposed to digital risks and economic vulnerability.

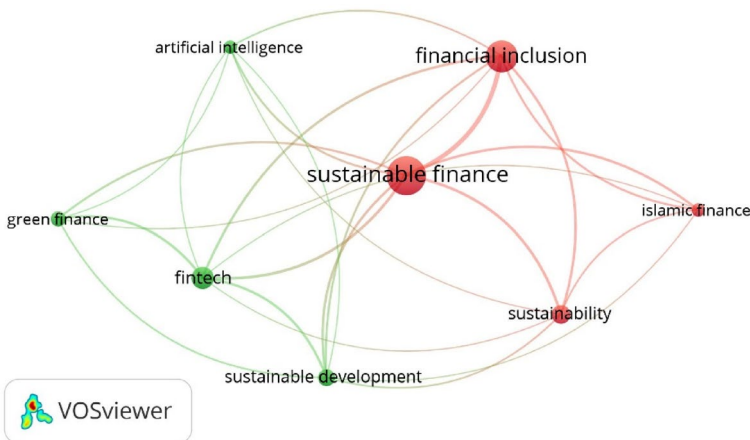


Fig. 3 Co-occurrence network of keywords visualization

The green cluster contains “fintech,” “artificial intelligence,” “green finance,” and “sustainable development.” This set of keywords reflects the use of digital technologies to advance both financial inclusion and sustainability goals. Fintech and AI are increasingly applied to deliver efficient, data-driven financial services that support green investments and broader development outcomes. At the same time, their presence highlights emerging risks such as digital fraud, algorithmic bias, and regulatory challenges, showing that these innovations may also expose systems to financial crime.

The separation between the red and green clusters illustrates a central challenge in the literature. Whilst ethical finance promotes inclusion and sustainability, digital finance introduces new complexities that require careful oversight. The co-occurrence patterns suggest a growing need for integrated strategies that align inclusive finance with technological tools whilst addressing risks through improved regulation and institutional safeguards.

In summary, the keyword network captures two dominant themes. The first is the role of financial inclusion in promoting sustainability, and the second is the increasing reliance on digital finance and artificial intelligence, which introduces both opportunities and financial crime risks in the digital era.

The co-occurrence analysis presented in Table 3, following the approach outlined by Máté et al. (2024), highlights the main research themes identified through the CONK. This method maps how often key terms appear together across the literature, enabling the formation of thematic clusters that represent distinct scholarly focus areas. Each cluster comprises core keywords that frequently co-occur, offering insight into the conceptual structure of research on financial inclusion and sustainable finance. The analysis was conducted using a SLR and bibliometric techniques via VOSviewer, which generated the network and clusters based on the frequency and linkage of author-defined keywords.

**Table 3** Main research topics based on CONK

Cluster	Keywords	Total link strength	Occurrences <sup>a</sup>	Main research topics
1	Sustainable Finance	37	22	Inclusive and Ethical Sustainable Finance
	Financial Inclusion	30	17	
	Sustainability	15	8	
	Islamic Finance	11	5	
2	Fintech	20	10	Digital Innovation in Green and Sustainable Finance
	Sustainable Development	17	7	
	Green Finance	11	6	
	Artificial Intelligence	9	5	

Source: Authors

<sup>a</sup>Ranking order, minimum number of occurrences of a keyword: 5

Table 3 identifies two dominant clusters in the co-occurrence network of keywords (CONK). Cluster 1 focuses on “Inclusive and Ethical Sustainable Finance,” driven by high-frequency keywords such as sustainable finance, financial inclusion, sustainability, and Islamic finance. This indicates a strong research interest in ethical financial systems that promote equity and inclusion. Cluster 2, titled “Digital Innovation in Green and Sustainable Finance,” emphasises the role of fintech, green finance, AI, and sustainable development, highlighting how digital technologies are transforming sustainability-focussed finance. Together, the clusters reflect the dual focus in the literature: inclusive access through ethical models and technological innovation aimed at sustainability.

## 4 Discussion and implications

This SLR emphasises the evolving and interdependent relationship between financial inclusion and sustainable finance, particularly within the context of digital transformation and escalating financial crime risks. The reviewed literature reveals that financial inclusion plays a foundational role in promoting economic participation amongst underserved populations, including women, rural communities, and small-scale entrepreneurs, thereby advancing inclusive development and reducing social inequality (Sultan et al., 2024; Segovia-Vargas et al., 2023). At the same time, access to digital financial services is linked to investment in green infrastructure, climate-smart agriculture, and low-carbon innovation, which supports environmental sustainability objectives (Sajid et al., 2023; Yue et al., 2024).

Whilst these benefits are evident, the findings also underscore emerging threats that accompany the digitisation of financial systems. New vulnerabilities such as cyber fraud, identity theft, digital money laundering, and data breaches have become pressing concerns. These risks are particularly prominent in low-income or digitally underdeveloped regions, where weak institutional capacity and low digital literacy increase user exposure to financial exploitation (Aldohni, 2021; Rose, 2020).

The bibliographic network analysis identified clusters that highlight how digital strategies are being used to support financial inclusion whilst simultaneously posing risks. For instance, the presence of clusters such as “Fintech Business Models,” “Blockchain in Finance,” and “AI Sustainable Finance” reflects the rising academic attention on how technology-driven financial tools enable access to services whilst introducing regulatory and security challenges (Moro-Visconti et al., 2020; Pashang & Weber, 2023; Sharma et al., 2024). These findings suggest a need for digital finance innovations to be developed with embedded safeguards and oversight mechanisms.

Islamic finance emerges as a crucial approach that balances inclusion with ethics and transparency. Clusters such as “Islamic Finance Instruments” and “Islamic Sustainable Finance” show how Sharia-compliant mechanisms like sukuk and waqf-based models offer platforms that promote both financial equity and governance integrity (Hassan et al., 2025; Rosman et al., 2024). These tools are not only inclusive by design but also reduce financial crime exposure through strong accountability frameworks.

The co-occurrence analysis further clarifies the intellectual structure of the field. One thematic cluster focuses on sustainable finance, financial inclusion, sustainability, and Islamic finance, reflecting a research agenda that prioritises inclusive, ethical financial systems. Another cluster includes fintech, artificial intelligence, green finance, and sustainable development, indicating a strong scholarly interest in digital strategies. This dual focus points to the increasing need for policy integration that bridges ethics and innovation.

The findings support several actionable implications for policymakers and financial sector actors. Regulators should design adaptive legal frameworks that accommodate emerging technologies whilst addressing digital risks through tools like digital identity verification, cross-border anti-money laundering protocols, and real-time fraud detection. Public–private partnerships can support the development of inclusive fintech ecosystems through regulatory sandboxes that facilitate experimentation and supervised scaling. National financial literacy strategies should be expanded to include cybersecurity education to empower users in mitigating digital risks. Investment in digital infrastructure is also necessary to ensure equitable access and resilience against cyber vulnerabilities.

By clearly linking these recommendations to the findings of the bibliographic network and keyword co-occurrence analyses, this review contributes not only to academic discourse but also to real-world financial governance. Coordinated efforts amongst central banks, fintech developers, civil society, and international institutions are essential to ensure that financial inclusion and sustainable finance work together to support a secure and equitable financial future.

## 5 Conclusions

This review highlights the critical role of financial inclusion as both a driver and an outcome of sustainable finance in the context of digital transformation. Financial inclusion enables broader access to financial services, supports the reduction of socio-economic disparities, and contributes to community resilience, particularly amongst underserved populations. These outcomes align closely with global efforts to advance the sustainable development goals (SDGs).

Digital innovations such as fintech platforms, blockchain technologies, and artificial intelligence have expanded financial access and facilitated green and ethical investments. However, the use of these technologies also raises concerns related to financial crime, cybersecurity, and regulatory oversight. Addressing these challenges requires stronger legal frameworks, coordinated cross-border regulations, and increased digital literacy. The analysis also emphasises the growing significance of Islamic finance as an inclusive and ethical financial model. Instruments such as Sukuk and Waqf-based mechanisms offer transparency, promote social responsibility, and help prevent financial misconduct (Hassan et al., 2025; Rosman et al., 2024; Sultan et al., 2024).

Persistent structural challenges, including digital divides, limited infrastructure, and inadequate regulatory capacity, remain particularly evident in developing economies. These barriers call for multi-stakeholder collaboration, investments in digital

infrastructure, regulatory sandboxes, and public education programmes that combine financial literacy with cybersecurity awareness.

One limitation of this study is its reliance on the Scopus database, which may have excluded relevant sources from other databases or grey literature. Future research should consider integrating multiple databases and conducting region-specific analyses better to capture contextual nuances in financial inclusion and sustainable finance.

In sum, advancing sustainability through financial inclusion and sustainable finance in the digital era requires expanding secure financial access, applying ethical financial practises such as Islamic finance, and promoting innovations supported by effective regulation. These elements are essential to building inclusive, transparent, and resilient financial ecosystems that contribute to long-term sustainable development.

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**Data availability** No datasets were generated or analysed during the current study.

## Declarations

**Conflict of interest** The authors declare no competing interests.

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