Achieving the Sustainable Development Goals through Financial Inclusion: A Bibliometric and Content Analysis

Alcançando os Objetivos de Desenvolvimento Sustentável através da Inclusão Financeira: Uma Análise Bibliométrica e de Conteúdo

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Abstract

This article presents a bibliometric study that explores the connections between the literature on achieving Sustainable Development Goals (SDGs) through financial inclusion using a relational approach. The findings highlight key publication trends, the most prolific countries, leading contributors, highly cited articles, and the most impactful journals in this field. Additionally, content analysis reveals four emerging areas of research: “financial technology and SDGs,” “social capital,” “microfinance and women empowerment,” and “green finance.” Based on these insights, the study recommends that managers prioritise adopting digital technologies to foster financial inclusion, build robust networks to enhance resilience, empower women through tailored financial products, and integrate the Sustainable Agenda 2030 into financial strategies. Organisations can promote inclusion, resilience, and sustainable growth by aligning with these evolving research domains while advancing the SDGs. The results aim to inspire and guide management and economic researchers toward achieving the SDGs and serve as a foundation for realising Agenda 2030 objectives.

Keywords: Financial inclusion, microfinance, green finance, women empowerment, Sustainable Development Goals, R-studio.

Resumo

Este artigo apresenta um estudo bibliométrico que explora as conexões entre a literatura sobre a concretização dos Objetivos de Desenvolvimento Sustentável (ODS) através da inclusão financeira, utilizando uma abordagem relacional. Os resultados destacam as principais tendências de publicações, os países mais prolíficos, os principais contribuidores, os artigos mais citados e as revistas de maior impacto neste campo. Além disso, a análise de conteúdo revela quatro áreas emergentes de pesquisa: “tecnologia financeira e ODS,” “capital social,” “microfinanças e empoderamento das mulheres,” e “finanças verdes.” Com base nessas perceções, o estudo recomenda que os gestores priorizem a adoção de tecnologias digitais para promover a inclusão financeira, construam redes sólidas para reforçar a resiliência, empoderem as mulheres através de produtos financeiros personalizados e integrem a Agenda 2030 de Desenvolvimento Sustentável nas estratégias financeiras. As organizações podem promover inclusão, resiliência e crescimento sustentável ao alinhar-se com estas áreas de pesquisa em evolução, enquanto avançam nos ODS. Os resultados têm como objetivo inspirar e orientar os investigadores de gestão e economia a alcançar os ODS, servindo como base para a concretização dos objetivos da Agenda 2030.

Palavras-chave: Inclusão financeira, microfinanças, finanças verdes, empoderamento das mulheres, Objetivos de Desenvolvimento Sustentável, R-Studio.

1. Introduction

In 2000, the UN Millennium Summit adopted the Millennium Development Goals (MDGs), which later evolved into the Sustainable Development Goals (SDGs) (Morshed & Maharjan, 2023; Kara et al., 2021). Between 2000 and 2015, the MDGs achieved significant progress, including reducing extreme poverty by more than half. However, critiques noted that these advancements often left the most vulnerable and underprivileged populations behind (MDGs Report, 2015). Following the MDGs, the Sustainable Development Goals (SDGs) were introduced in 2015 to address the remaining targets and incorporate additional issues into the sustainability agenda. The SDGs are initiatives aimed at improving society and fostering sustainable development. These goals are part of an action plan to tackle critical global challenges, including climate change (UN, 2015).

Over time, the concept of "sustainable development" has evolved to encompass a broader perspective, linking the three pillars of sustainable development (Filho et al., 2021; Matijová et al., 2024): economic growth, social inclusion, and environmental sustainability. The SDGs’ core goal is to “leave no one behind,” but their implementation has been inadequate (ENB, 2019). An inclusive financial system is essential for a country to achieve sustainable development and growth (Kandpal et al., 2023). A comprehensive financial system ensures that all segments of society have timely and equitable access to financial services. It supports the availability of loans for various purposes, safeguards savings, diversifies risk through investments, and provides risk coverage via insurance products, thereby significantly improving people's quality of life (Dahiya & Kumar, 2020). One of the most promising strategies for fostering small businesses in rural areas is extending financial services to underserved and economically disadvantaged populations through microfinance (Parikh, 2006). Microfinance enables individuals living in poverty to enhance their household savings, income, consumption, and education levels, acquire assets, and initiate self-employment activities by providing financial facilities and accessibility (Tidjani, 2020), as well as extending credit to those at the bottom of the pyramid (Lopatta et al., 2017).

Enterprises form a key component of the social economy. Beyond their primary aim of increasing efficiency and profitability, enterprises also hold responsibilities toward social groups and the environment. Business objectives have evolved from solely pursuing financial gains to balancing financial, social, and environmental benefits (Khan et al., 2024; Xu et al., 2020). Financial inclusion is widely recognised as a powerful enabler for achieving specific targets within the Sustainable Development Goals, with the potential to directly contribute to eight out of the seventeen SDGs (UNCDF, 2015). The substantial economic and social benefits financial inclusion provides to individuals, businesses, and governments in their pursuit of sustainability offer compelling evidence of its connection to sustainable development (Ozili, 2022). This association becomes particularly clear when efforts to enhance financial inclusion are integrated within the established economic and social frameworks essential for sustainable development (Ozili, 2022). Given this potential linkage, promoting and fostering dialogue on the relationship between financial inclusion and sustainable development among scholars, practitioners, and policymakers is imperative to achieve the holistic realisation of the SDGs.

Earlier studies incorporating bibliometric analysis in this domain have explored specific aspects of financial inclusion and its connection to sustainable development. For instance, Gálvez-Sánchez et al. (2021) focused exclusively on financial inclusion research in the African context, Danladi et al. (2023) examined the adoption and utilisation of Fintech to achieve the SDGs, and Kara et al. (2021) presented a systematic literature review on the domain, albeit with data limited to February 2020. However, these reviews either concentrated on a single domain or failed to provide a comprehensive overview highlighting current trends and literature gaps. This gap underscores the importance of the present study.

This study introduces two novel contributions to the existing body of knowledge. Firstly, it enhances the literature by conducting a bibliometric study of available empirical data from a global perspective. Notably, this is the first bibliometric review in this domain to be supplemented with content analysis. Secondly, it contributes to the field by identifying the scope of research on achieving the UN Sustainable Development Goals (SDGs) and providing recommendations for future studies. The primary objective of this study is to examine the current research landscape, identify prominent authors, the most productive journals, and significant papers, and uncover hidden patterns in the literature. Finally, the paper concludes with an in-depth thematic analysis of the topic's evolution and highlights emerging key research areas.

Building upon these concepts, the present study aims to address the following questions:

RQ1 What is the wide-ranging view of sustainable development through financial inclusion literature, and how has it developed over time?

RQ 2 What are the primary themes and opportunities in this context?

RQ 3 Is there a connection between the SDGs and the concept of financial inclusion? How?

The structure of this study is as follows: Section 2 provides a concise summary of the literature on financial inclusion and the Sustainable Development Goals (SDGs). The methodology employed in this study is detailed in Section 3. Section 4 presents the performance analysis and scientific mapping findings used to address Research Questions 1 and 2. Section 5 incorporates content analysis to focus on Research Question 3. Sections 6, 7, and 8 discuss the managerial implications, results, suggested directions for future research, and challenges identified in the study.

The primary objective of this work is to establish a domain-specific linkage between global research on sustainable development and financial inclusion.

2. Literature review on Financial Inclusion and SDGs

Financial inclusion and sustainable development are closely interconnected goals that yield significant benefits for society and the environment (Ozili, 2022). Financial inclusion is essential for fostering economic growth and eradicating poverty (Nizam et al., 2020). Numerous empirical studies have examined the relationship between financial inclusion and economic progress, utilizing diverse datasets across various countries (Dahiya & Kumar, 2020; Sigalla & Carney, 2012; Wang et al., 2022).

Financial inclusion is a multifaceted process that cannot be achieved in a single step; rather, it is a continuous journey that requires the successful attainment of other objectives, such as the widespread availability and effective utilisation of financial and banking services (Dahiya & Kumar, 2020). The 2030 Agenda seeks to promote the formalisation and growth of micro, small, and medium-sized enterprises (MSMEs) by enhancing access to financial services while fostering inclusive and sustainable economic growth (Yang & Zhang, 2020). Several strategic documents have recognised financial inclusion as a critical tool for addressing poverty in emerging economies (Chitimira & Warikandwa, 2023). Financial inclusion aims to enhance the capacity of economically disadvantaged households to withstand financial shocks, invest in their children's health and education (Tidjani, 2020), and accumulate small amounts of wealth to seize favourable investment opportunities within regional economies (Kuada, 2019). Economic and social growth in the most vulnerable segments of an economy is only achievable if these groups eventually attain financial independence. Research indicates that financial services play a significant role in achieving several of the 17 Sustainable Development Goals (SDGs). These goals include eradicating extreme poverty (SDG 1) (Saha & Qin, 2022), reducing hunger while advancing food security (SDG 2) (Jia et al., 2021), achieving optimal overall well-being and health (SDG 3) (Chitimira & Warikandwa, 2023; Fernandez, 2019), and promoting quality education (SDG 4) (Saini et al., 2022). Financial services also contribute to fostering gender equality (SDG 5) (Roy & Xiaoling, 2022), ensuring equitable access to infrastructure, sanitation, and water (SDG 6) (Sarkar & Bharat, 2021), and advancing renewable energy (SDG 7) (Liu et al., 2021). Additionally, they support employment and economic advancement (SDG 8) (Zehri et al., 2024), innovation, and sustainable industrialisation (SDG 9) (Küfeoğlu, 2022). Furthermore, aligning financial services with SDGs 10 and 16 highlights the importance of fostering peaceful, equitable societies and achieving broader economic and social objectives (Klapper et al., 2016).

Women, often considered the most vulnerable among impoverished populations, continue to face biases globally across various spheres, including family, community, employment, commerce, and politics (Roy & Xiaoling, 2022). Women also perform three times more unpaid labour than men (Tyson & Klugman, 2022). Economic empowerment provides women with autonomy to make decisions for their families and facilitates increased spending on healthcare and education, ultimately contributing to greater economic development. The study by Aziz et al. (2022) highlights a significant correlation between gender and the utilisation of financial services. The research found that in countries where barriers limit women's participation in paid employment, women were less likely than men to possess a bank account. Conversely, nations that promote gender equality in the workforce and have efficient regulatory systems to support these efforts report a higher proportion of financially empowered women. Financial inclusion enables women to attain financial stability (Moghadam & Karami, 2023), enhancing their ability to save money, withstand unexpected economic shocks, and effectively manage their finances, even amidst changing environmental circumstances (Mulili, 2020). The COVID-19 pandemic has transformed how people access financial services, highlighting the need for digital financial inclusion, particularly in emerging nations, to ensure equitable access and foster sustainable economic progress. Efforts to advance financial inclusion must align with and support the Sustainable Development Goals (SDGs) (Tay et al., 2022). A critical question remains: How should regulators and governments implement the UN SDGs effectively before 2030?

The most effective strategy for nations is to focus on formulating plans for a digital revolution, with particular emphasis on the role of FinTech in promoting financial inclusion (Zetzsche et al., 2019). Information and communications technology (ICT) interventions, by improving access to government, education, healthcare, and financial services, can play a vital role in reducing poverty, especially among disadvantaged populations (Mehta & Kalra, 2006). Furthermore, leveraging digital financial inclusion tools like fintech (Gumilar et al., 2024), government-backed financing mechanisms such as microfinance (Hackney, 2022), and partnerships with multilateral development banks and other stakeholders (Chibba, 2009) can significantly contribute to achieving sustainable development. Danladi et al. (2023) introduced a multi-stakeholder framework designed to optimise the use of fintech to enhance financial inclusion and attain the Sustainable Development Goals (SDGs). Their analysis prioritises national ownership, fosters an enabling environment for private sector investments, promotes innovation and digital literacy, and focuses on cost-effective, privately funded financial solutions. These strategies can expedite governments' adoption of fintech solutions, advancing financial inclusion and contributing to sustainable development.

Although independent studies on financial inclusion and the Sustainable Development Goals (SDGs) exist in the literature, few have explored the tangible connection between the two. Financial inclusion can potentially align the 2030 Agenda with economic growth while safeguarding natural resources in an era of rapid development (Mhlanga, 2021). This initiative aims to highlight the underprivileged segments of society and foster meaningful change. In this context, examining the potential impact of financial inclusion on achieving sustainable development objectives is essential. This paper employs a domain-focused hybrid review approach (Kraus et al., 2022) to analyse the intersection of financial inclusion and sustainable development. It evaluates the historical impact of this domain, identifies emerging research areas, and offers managerial implications to achieve sustainable development further.

3. Methodology

3.1 *Bibliometric and Content Analysis*

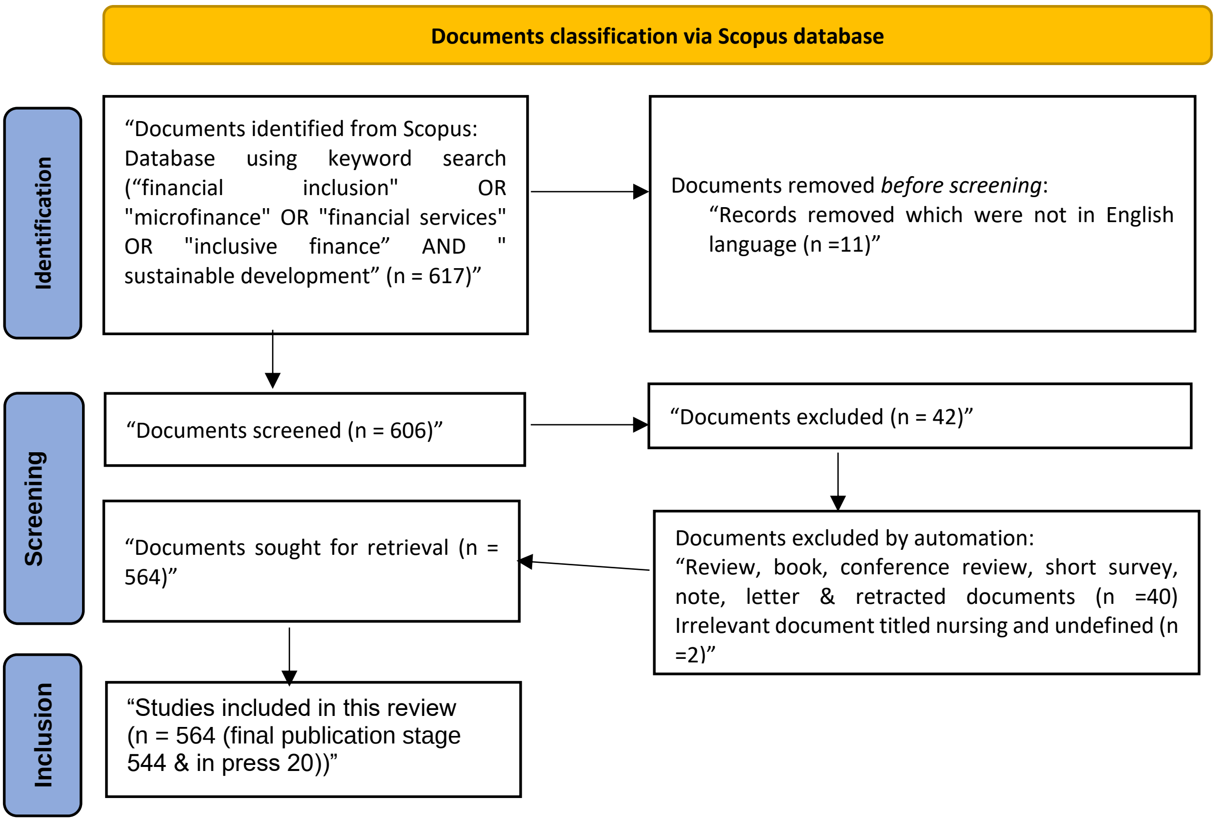
Scholarly articles, often referred to as literature reviews, are a cornerstone of scientific investigations (Kraus et al., 2022). Recently, bibliometric analysis has emerged as a widely used and rigorous approach for studying and evaluating literature in business and management disciplines (Öztürk et al., 2024). Bibliometric analysis employs quantitative methodologies to examine and assess large volumes of research papers (Donthu et al., 2021). Its growing popularity among academics can be attributed to several factors, including the rise of digital tools and bibliometric software such as VOS Viewer, CiteSpace, and Biblioshiny, along with access to comprehensive academic databases like Web of Science and Scopus (Moral-Muñoz et al., 2020; Öztürk et al., 2024). These advancements make bibliometric analysis highly suitable for the present study.

In addition, content analysis enables researchers to delve deeper into a selective number of publications (ranging from tens to low hundreds) using quantitative and qualitative methods (Kraus et al., 2022). When combined with bibliometric analysis, content analysis goes beyond citation counts and publication metrics to uncover underlying themes, trends, and patterns within the academic literature. This approach tracks a topic's evolution over time and highlights the interdisciplinary nature of the research field. Such in-depth understanding supports informed decision-making in policy development and strategic research planning.

3.2 *Identification of Keywords and Inclusion-Exclusion Criteria*

The search process began with a preliminary search on Google Scholar to identify key terms that frequently appeared in the literature on “financial inclusion” and “sustainable development.” These terms were refined through diligent discussion among the authors to identify precise keywords for concrete results in this research domain. Subsequently, the authors conducted a search in the Scopus database for bibliographic data using a Boolean string (Kraus et al., 2022): TITLE-ABS-KEY: “financial inclusion” OR “microfinance” OR “financial services” OR “inclusive finance” AND “sustainable development,” conducted on 9 December 2022. Scopus was chosen as it is the most extensive scientific database for scholarly works and provides readily available bibliographic data and records (Pranckutė, 2021; Öztürk et al., 2024). Publications from all years were considered from 1999 to 9 December 2022. A total of 617 documents were initially retrieved and subsequently narrowed down to 564 using the criteria outlined below (Figure 1).

Figure 1: Prisma flow diagram for inclusion criteria



Source: PRISMA 2020 flow diagram (Alsharif et al., 2023; Henriques & Pereira, 2024; Page et al., 2021).

The Scopus search was restricted to documents written in English, resulting in the identification of 606 English-language documents. From these, 406 articles, 126 conference papers, and 35 book chapters were selected to guide the research. Conference papers and book chapters were included alongside articles, as some studies recommend their inclusion due to the valuable insights they offer (Wang & Su, 2020). Conference papers often present cutting-edge research, reflecting the latest trends and developments in a given field. Similarly, book chapters provide in-depth discussions on specific topics and synthesise new ideas. Analysing articles in conjunction with conference papers and book chapters allows for identifying emerging topics, contextual insights, and a deeper understanding of the progression of the research area. Certain types of documents were excluded from the search, including reviews, books, conference reviews, short surveys, notes, letters, retracted documents, and those written in languages such as French, Russian, Spanish, Chinese, Italian, and Portuguese. Additionally, documents deemed irrelevant or undefined were removed during further refinement. Ultimately, 564 documents (544 final publications and 20 in press) were included for bibliometric analysis.

4. Results

This study employed two bibliometric methods for data analysis: performance analysis and science mapping. The authors conducted a performance analysis to address the first and second research questions, identifying research publication and citation trends, the most prolific authors and countries, and highly cited sources and papers. The authors utilised science mapping methodologies to answer the third research question, followed by content analysis. The development of the research topic was illustrated using thematic maps. The links between co-words were analysed and visualised with the widely used free bibliometric analysis tool, VOS Viewer. Additionally, thematic maps generated using Biblioshiny were employed to examine the evolution of the research domain.

4.1 Performance Analysis

This section presents the results from the perspective of performance analysis. It includes descriptive statistics of the data, notable trends in publication and citation patterns, prominent authors, leading countries, highly influential sources, and the most cited publications.

4.1.1 Descriptive Data Collection Statistics

Table 1 presents the bibliographic statistics for the study area, "Sustainable Development Goals through Financial Inclusion." The dataset comprises 564 documents published between 1999 and 2022, with an average age of 4.67 years and an annual growth rate of 15.53%. These documents were disseminated across 339 scientific sources, indicating that the research field is highly popular among scholars and holds significant potential for future growth. Furthermore, the average citation per document is 9.397, reflecting a growing academic interest in this subject matter.

Table 1: Principal information about the compilation of bibliographic data

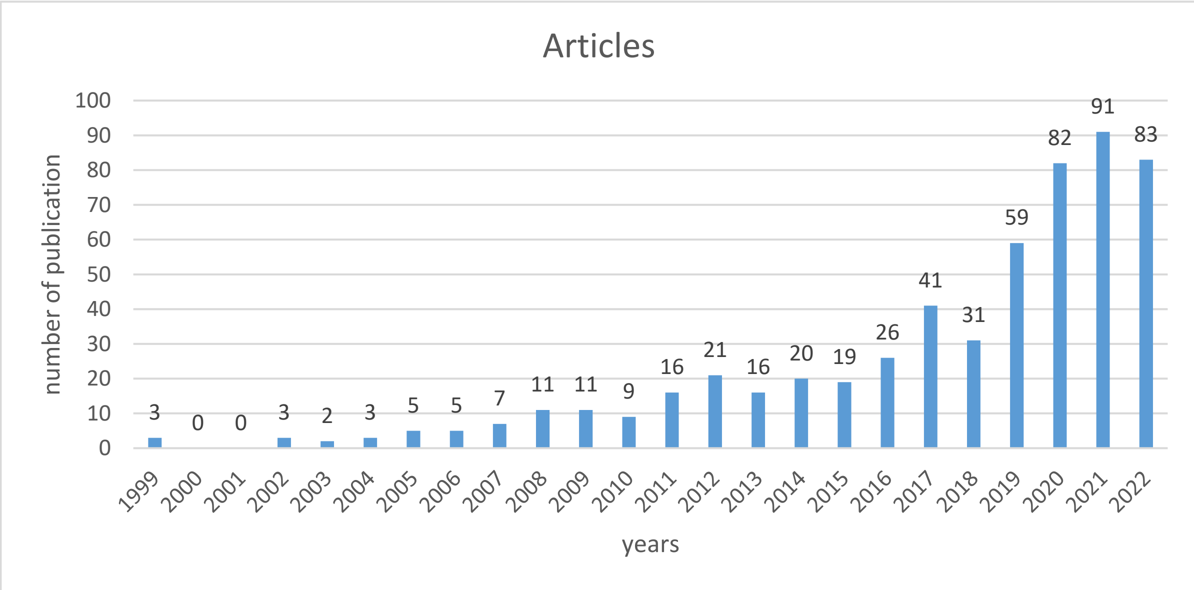
Primary details on the data	Results
Duration	1999-2022
Sources	339
Documents	564
Annual Growth Rate %	15.53
Average Age of Documents (years)	4.67
Average citations per doc	9.397

Source: Table extracted using R studio Biblioshiny interface.

4.1.2 Current Publication and Citation Trends

Figure 2 illustrates the annual scientific output in the research field, with an average yearly growth rate of approximately 15.53%. The figure highlights a significant increase in publications over the past decade (2011–2022), accounting for more than half of all papers published in this domain. This trend indicates that research on achieving sustainable development goals through financial inclusion is an emerging area within business and management studies, attracting increasing academic attention. Moreover, based on current publication trends, this field is expected to grow in the coming years.

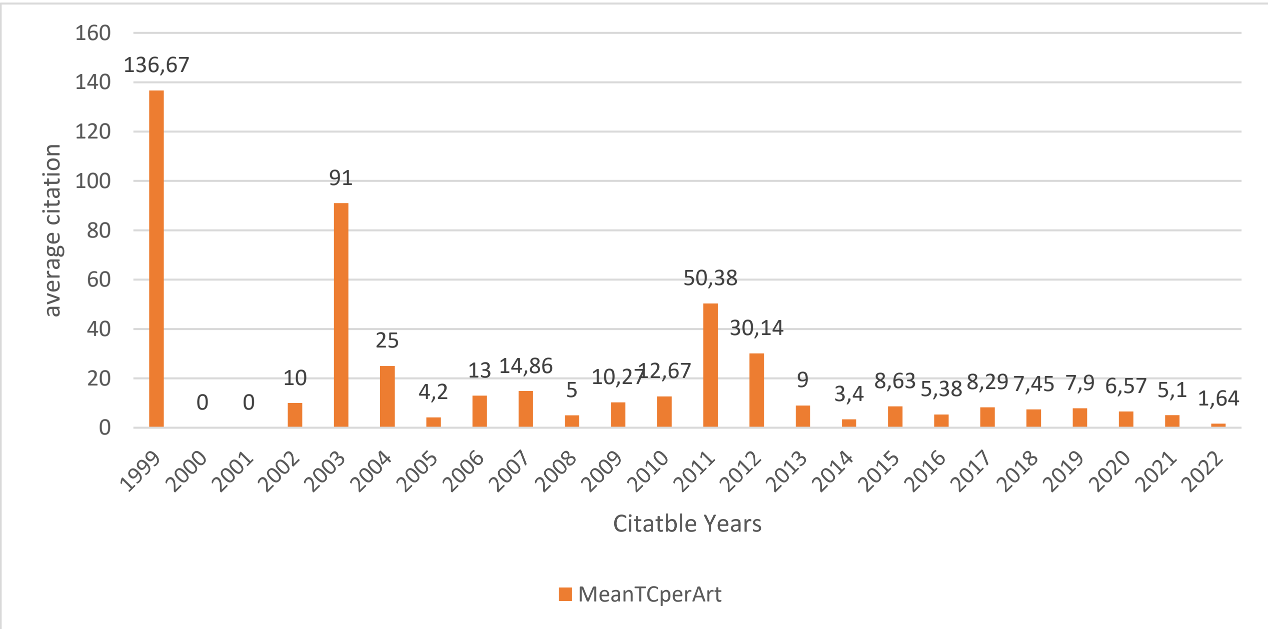
Figure 2: Annual Scientific Production (1999–2022)



Source: Data extracted using R studio Biblioshiny interface presented using MS Excel.

Figure 3 illustrates the total number of citations for the entire academic field. The graph reveals that a significant number of citations were received during the early years of the research (1999–2003), with 136.67 citations recorded in 1999 and 91 citations in 2003. This high citation count for the initial years may be attributed to these papers being among the first to address this concept, making them more frequently referenced by readers. In contrast, papers published between 2013 and 2022 have received fewer citations. This could be due to authors prioritising earlier publications to understand the origins and foundational work in the study field.

Figure 3: Average citations per year



Source: Data extracted using R studio Biblioshiny interface presented using MS Excel.

4.1.3. Most productive authors

Table 2 presents a comprehensive list of the most prolific authors and their respective publication records in the field of financial inclusion aimed at achieving sustainable development goals. Ranked first is Babajide AA, who has published five papers. Despite leading in the number of publications, Babajide has received only 13 citations. In second place is Mia MA, with four published papers. All other listed authors have contributed at least three papers each.

Interestingly, Arner DW and Buckley RP, despite having published three papers each, have garnered the highest number of citations (53), highlighting the significant impact of their work. Additionally, Hassan MK, with an H-index of 41, stands out as a prominent author in the research field, reflecting both productivity and the influence of his contributions.

Table 2. Most productive authors in the field of Sustainable development through financial inclusion

Authors	Articles	citations	h index
BABAJIDE AA	5	13	8
MIA MA	4	43	8
ADETILOYE KA	3	6	5
ARNER DW	3	53	10
BUCKLEY RP	3	53	8
CHIRAMBO D	3	14	5
HASSAN MK	3	18	41
HURUTA AD	3	12	5
JORGE-VAZQUEZ J	3	12	7
KANDPAL V	3	1	2

Note: The figures in the table were generated using the R Biblioshiny interface, with H-index values derived from Scopus metrics.

4.1.4. Countries with the Highest Productivity and Influence

In Table 3, the authors analyse the top 10 countries that have published research in this area between 1999 and 2022 and present the results.

Table 3. Top countries with the greatest number of publications and their corresponding total citation count

Country	TC	TP	AC
UNITED KINGDOM	969	103	9.40
GERMANY	603	56	10.76
CANADA	530	26	20.38
USA	515	162	3.17
CHINA	427	310	1.37
INDIA	145	123	1.17
SPAIN	121	53	2.28
SOUTH AFRICA	118	40	2.95
SWEDEN	115	18	6.38
IRAN	112	18	6.22

Note: TC = total citation; TP = total publication; AC= Average citation. Figures extracted using the R Biblioshiny interface.

Table 3 highlights that China is the most productive nation, with 310 publications, indicating that Chinese academics are highly engaged in research on sustainable development and financial inclusion. The United States and Malaysia follow in terms of publication output. In terms of citations, the United Kingdom leads with 969 citations across 103 papers. Canada emerges as the most influential country, boasting an impressive average citation count of 20.38 per paper.

4.1.5. Most productive sources

Examining the most productive sources is a vital aspect of bibliometric analysis. Table 4 identifies the leading sources publishing research on financial inclusion and sustainable development, ranked by their citation impact. The International Journal of Agricultural Sustainability stands out with the highest number of citations, despite producing only two publications, highlighting its emphasis on quality over quantity. In contrast, the most productive source, Sustainability, leads in publication output with 62 papers, garnering a total of 530 citations in the field of sustainable development through financial inclusion. This source also boasts an h-index of 12, a g-index of 19, and an m-index of 1.333, making it the most influential source in this research domain. Another notable contributor is Sustainable Development, which has published 12 papers, received 244 citations, and achieved an h-index and g-index of 12 each, underscoring its influence in the field.

Table 4. Top 10 journals ranked by source influence (total citation index)

Sources	TC	TP	h-index	g-index	m-index
INTERNATIONAL JOURNAL OF AGRICULTURAL SUSTAINABILITY	645	2	2	2	0.167
SUSTAINABILITY	530	62	12	19	1.333
WORLD DEVELOPMENT	489	6	5	6	0.208
GLOBAL ENVIRONMENTAL CHANGE	401	1	1	1	0.091
SUSTAINABLE DEVELOPMENT	244	12	10	12	0.476
STRATEGIC MANAGEMENT JOURNAL	181	1	1	1	0.05
ENERGY POLICY	118	3	3	3	0.273
DEVELOPMENT AND CHANGE	97	4	3	4	0.231
JOURNAL OF FORESTRY	96	1	1	1	0.063
WATER RESEARCH	82	1	1	1	0.083

Notes: TC = total citation; TP = total publication, table extracted using R studio Biblioshiny interface.

4.1.6. Highly Cited Papers

The most-cited papers play a critical role in evaluating the scholarly impact of authors and sources. Table 5 lists the top 10 publications ranked by citation count. The analysis reveals that the work by Pretty et al. (2011), titled "Sustainable Intensification in African Agriculture", received a total of 629 citations. This study conducted a quantitative analysis of 40 projects across Africa, focusing on sustainable intensification—an approach aimed at increasing agricultural production without harming the environment. The paper highlights critical global issues, including world hunger (SDG 2), the education of women farmers (SDG 5), and the role of microfinance and agricultural technologies in creating employment opportunities and supporting industries (SDG 8 and SDG 9). The second most-cited publication and one of the earlier influential works is titled "Micro-credit Initiatives for Equitable and Sustainable Development: Who Pays?" by Rahman (1999), with 407 citations. Published in 1999, Rahman's anthropological assessment of the Grameen Bank's microfinance initiative highlights the challenges faced by both the institution and its beneficiaries. Bank personnel were required to optimise loan allocation among recipients and maintain high recovery rates to ensure the institution's economic sustainability. However, women borrowers often experienced pressure from bank employees and fellow borrowers to make rapid repayments, leading to significant tension and frustration. This dynamic introduced a new form of dominance over women, touching upon issues related to SDGs 3, 5, and 16. The third most-cited document, titled "Can Farmers' Adaptation to Climate Change Be Explained by Socio-economic Household-level Variables?" by Below et al. (2012), explored the relationship between socioeconomic factors and farmers' adaptive behaviour through quantitative analysis. The study's findings emphasise the importance of an effective education system promoting gender equality, government investment in rural infrastructure, the development of social capital, agricultural extension services, and access to microcredit as key strategies for enhancing farmers' capacity to adapt to climate change. This work aligns with SDGs 4, 5, 8, and 9.

Table 5: - Top 10 highest-cited publications

Sr no	Title	Authors and years	SO	TC	TCpY
1	"Sustainable intensification in African agriculture"	Pretty et al. (2011)	International Journal of Agricultural Sustainability	629	52.42
2	"Micro-credit initiatives for equitable and sustainable development: Who pays?"	Rahman, (1999)	World Development	407	16.96
3	"Can farmers' adaptation to climate change be explained by socio-economic household-level variables?"	Below et al., (2012)	Global Environmental Change	401	36.45
4	"Liability of foreignness in global competition? Financial service affiliates in the city of London"	Nachum (2003)	Strategic Management Journal	181	9.05
5	"The influence of financial incentive programs in promoting sustainable forestry on the nation's family forests"	Kilgore Michael A et al., (2007)	Journal of Forestry	96	6
6	"Application of system dynamics for developing financially self-sustaining management policies for water and wastewater systems"	Rehan et al. (2011)	Water Research	82	6.83
7	"Utilizing the clean development mechanism for the deployment of renewable energies in China"	Schroeder (2009)	Applied Energy	75	5.36
8	"Financing off-grid sustainable energy access for the poor"	Glemarec (2012)	Energy Policy	70	6.36
9	"Motives to engage in sustainable investment: A comparison between institutional and private investors"	Jansson & Biel (2011)	Sustainable Development	70	5.83
10	"Green credit financing versus trade credit financing in a supply chain with carbon emission limits"	An et al. (2021)	European Journal of Operational Research	69	34.5

Note: SO- Source title, TC - Total citation, TCpY – Times citable per year (the figures in the table are extracted using the R Biblioshiny interface and the sources are extracted from the Scopus database).

In summary, highly cited papers have effectively addressed various critical issues outlined in the SDG 2030 agenda, leveraging various means and products of financial inclusion to promote sustainable development. To some extent, these efforts have contributed to achieving sustainable development goals. Notable works by Nachum (2003), Kilgore Michael A. et al. (2007), and Rehan et al. (2011), among others, have also tackled key SDG-related topics, including women's empowerment, access to financial services and products, and the promotion of renewable energy solutions.

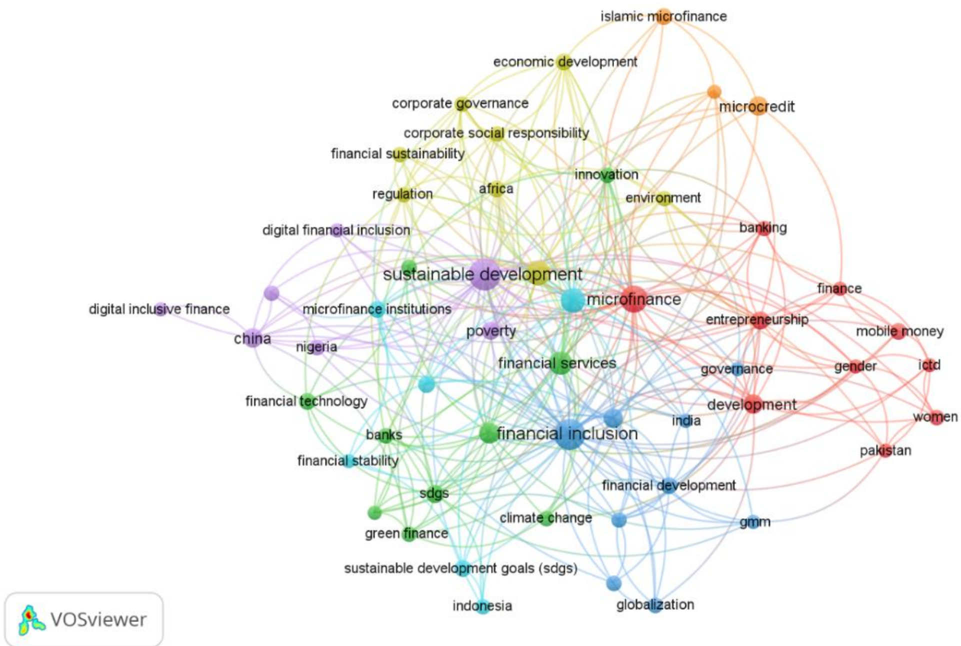
4.2 Science mapping

Science mapping involves analysing the interconnections among various elements of research, as highlighted by Donthu et al. (2021) and Cobo et al. (2011). This approach focuses on evaluating the structural relationships and intellectual interactions within a study area, providing insights into its overall framework and knowledge dynamics.

4.2.1. Co-occurrence network of keywords

In academic research, co-occurrence analysis of keywords provides valuable insights into a broad range of concepts and their interrelationships (Merigó et al., 2020). In Figure 4, the size of the circles represents the frequency of keyword appearances within the dataset—the more frequently a keyword is used, the larger its circle. The figure shows that the term "sustainable development" (in purple) forms the largest circle, along with "financial inclusion" (in blue) and "microfinance" (in red). These keywords are interconnected, illustrating the strong linkages between studies exploring the successful attainment of sustainable development through financial inclusion. The term "microfinance" further connects to keywords such as "gender," "women," "entrepreneurship," and "development," indicating that research on these topics is closely related. Additional prominent keywords in the clusters include "green finance," "SDGs," "poverty," "digital financial inclusion," "economic development," and "corporate social responsibility," among others, highlighting the diverse and interconnected nature of the field.

Figure 4 Network visualisation of author's keywords



Note: Network visualisation depends on the occurrence of the author's keywords extracted from VosViewer.

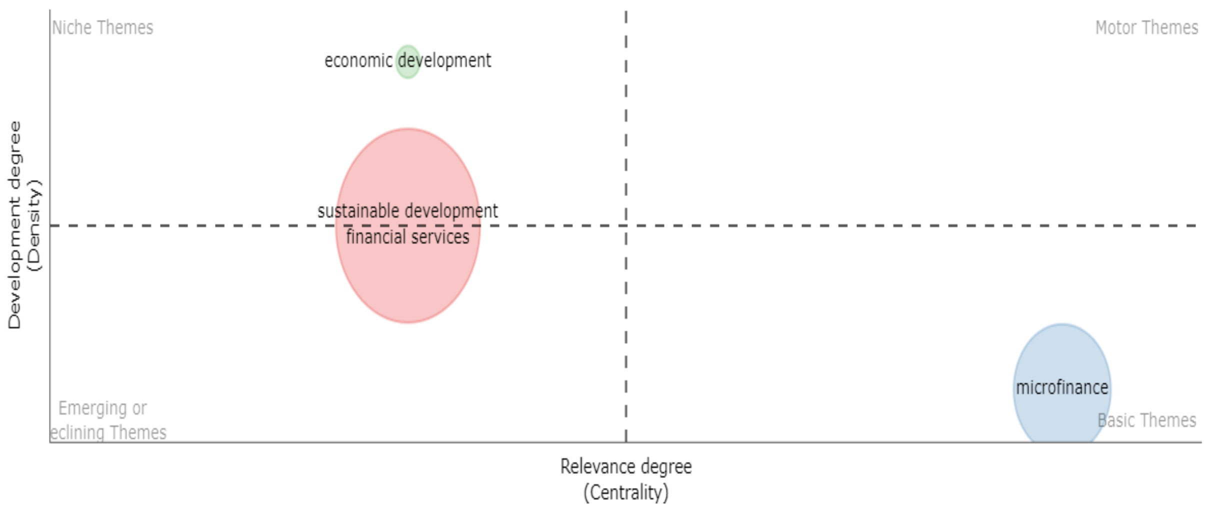
A thematic evolution analysis is conducted in the following section to better understand the interconnections and draw conclusions about the themes identified through the authors' keywords.

4.2.2 Thematic evolution

Co-word analysis was employed to create a thematic map across three distinct periods, forming the basis for a deeper investigation into the field's thematic evolution. The thematic map divides topics into four quadrants based on their centrality and density values plotted along two axes. This longitudinal approach to co-word analysis identifies the most prominent themes explored within the study field over the designated period. The centrality of a theme on the map reflects its significance, indicating its connections to other themes. At the same time, the density measures the internal coherence and growth of connections within a cluster. The size of a cluster corresponds to the frequency of keyword occurrences, while its position on the map is determined by its density and centrality (Cobo et al., 2011). The Biblioshiny package in RStudio created a thematic map of keywords related to "Sustainable Development through Financial Inclusion". The analysis utilised authors' keywords as the primary field, with parameters set to a minimum cluster frequency of 10 per thousand documents and a word count threshold of 250. Two cutting points were identified based on annual scientific productivity trends (see Figure 2): 2008 and 2015. Accordingly, the study was divided into three periods: Period One (1999–2008), Period Two (2009–2015), and Period Three (2016–2022).

The thematic map for Period 1 is presented in Figure 5. The keyword "microfinance" appears in the lower-right quadrant of the map, characterised by high centrality and low density. This placement suggests that it represents an important foundational theme that had not yet been extensively explored within the research field. This may be attributed to the relatively nascent state of microfinance research during this period, with limited interdisciplinary studies conducted. Additionally, the keywords "sustainable development" and "financial services" are located in the lower-left quadrant, indicating themes with low centrality and low density. These themes are considered underdeveloped or emerging during this period and were of limited significance to researchers at the time, as reflected by the relatively low attention they received. Finally, the keyword "economic development" is identified as a specific niche topic. It is placed in the upper-left quadrant, signifying low centrality but high density, suggesting that while this topic was well-researched within its niche, it held minimal significance in the broader context of the field during this period.

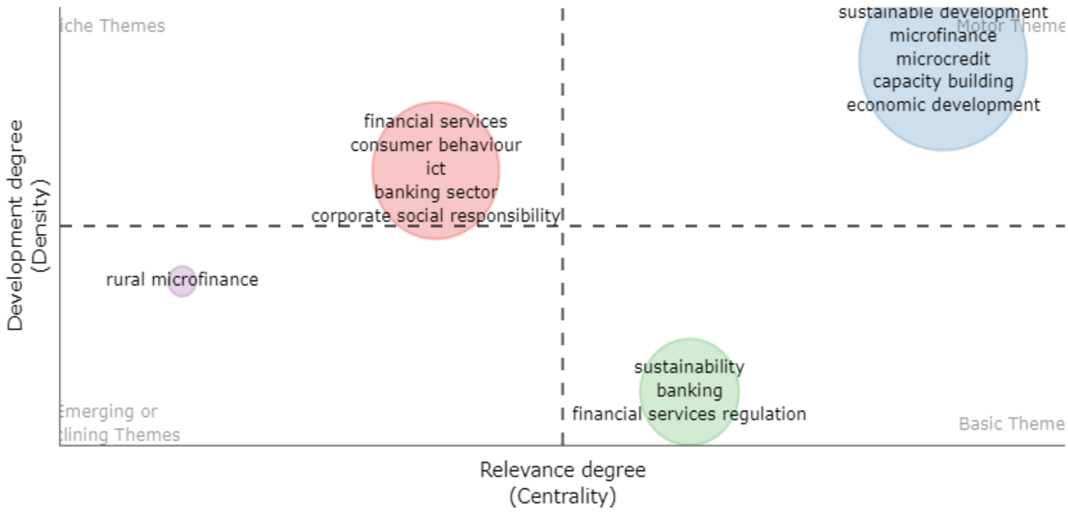
Figure 5 Period 1 (1999- 2008) Thematic map



Note: this map was generated using Biblioshiny.

Figure 6 illustrates the thematic map for Period Two. The upper-right quadrant of the map features motor themes, characterised by high centrality and density, representing major and well-researched concepts. A prominent cluster of keywords in this quadrant includes "sustainable development," "microfinance," "microcredit," "capacity building," and "economic development." Many of these concepts have evolved from the core and emerging themes identified in Period One. In the lower-right quadrant, a new basic theme is observed, featuring the keywords "sustainability," "banking," and "financial services." These themes indicate foundational areas of research that were not extensively explored during this period, suggesting the need for further investigation. The lower-left quadrant represents themes with low centrality and density, which are considered underdeveloped or emerging. The keyword "rural microfinance" falls within this category, highlighting its limited attention and minor significance during this timeframe. Lastly, the upper-left quadrant contains well-researched niche themes but have low centrality, indicating limited relevance to the broader field. This quadrant includes keywords such as "financial services," "consumer behaviour," "ICT," "banking sector," and "corporate social responsibility." These themes exhibit high numerical density but a low degree of centrality within the research domain.

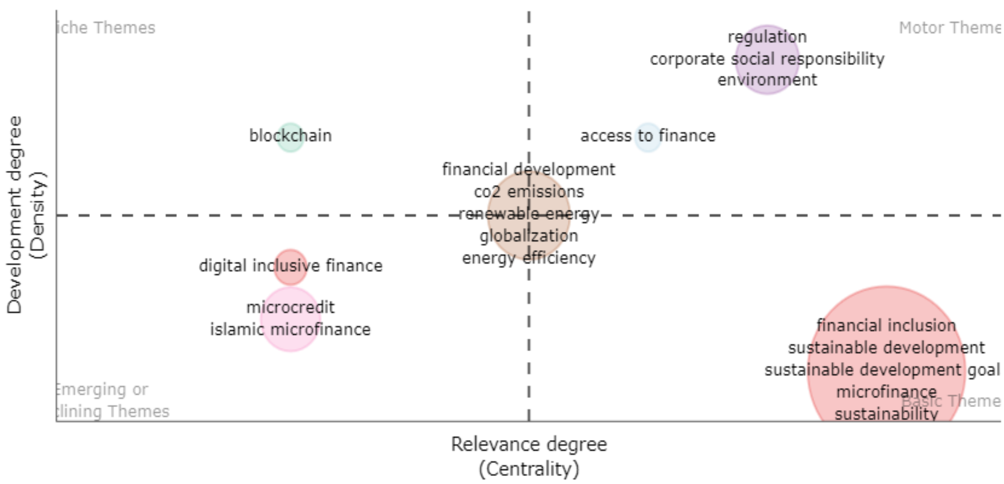
Figure 6 Period 2 (2009-2015) Thematic map



Note: this map was generated using Biblioshiny.

Figure 7 illustrates the thematic map for Period 3. In the upper-left quadrant, a small cluster centres around the keyword "blockchain," representing a specialised theme for this period. This reflects the growing focus on blockchain technology and its applications within the current research field. The lower-left quadrant contains two clusters representing emerging or declining themes. One cluster focuses on "digital inclusive finance," while the other highlights "Islamic microfinance" and "microcredit," which occupy a marginal position in this research area. Islamic microfinance emphasises ethical practices, such as allowing repayment flexibility for debtors facing financial difficulty and, in some cases, promoting charitable donations by financially capable beneficiaries. At the centre of the map lies a cluster of keywords, including "financial development," "CO2 emissions," "renewable energy," "globalisation," and "energy efficiency." This cluster is characterised by moderate to high levels of centrality and density, indicating a growing research focus on environmental challenges driven by globalisation and financial development. In the upper-right quadrant, motor themes with high centrality and density represent significant and well-researched concepts. Two notable clusters in this section are "access to finance" and "regulatory," "corporate social responsibility (CSR)," and "environment." These themes connect financial access with CSR, environmental concerns, and regulatory issues, showcasing their importance in the research field. Finally, the lower-right quadrant highlights the dominant theme for Period 3, encompassing keywords such as "financial inclusion," "sustainable development," "sustainable development goals (SDGs)," "microfinance," and "sustainability." While these themes are central to the research field, they indicate a gap in exploring how financial inclusion and microfinance contribute to achieving the SDGs. This underscores the need for researchers to place greater emphasis on these areas in future studies.

Figure 7 Period 3 (2016-2022) Thematic map



Note: this map was generated using Biblioshiny.

The analysis of the three time periods reveals a clear evolution in the research on financial inclusion and sustainable development, with the two initially distinct topics gradually merging into a unified field. Traditional methods of accessing credit have transitioned to more modern approaches, such as blockchain technology and digital financial inclusion. Furthermore, research interest has expanded to encompass sustainable development goals (SDGs), sustainability, microfinance, environmental issues, regulations, and corporate social responsibility (CSR). Despite these advancements, sustainable development and financial inclusion remain central areas of interest, underscoring their continued importance in academic and policy discourse.

5. Content analysis

This section presents the results of our content analysis, focusing on the connection between research on financial inclusion and the Sustainable Development Goals (SDGs). As the first step of our analysis, we manually examined the frequency of specific terms frequently appearing in the sample literature based on keywords identified during our literature review. From this initial analysis, three major themes emerged, linking the dimensions we aim to explore in this study: 1) Financial Technology and Sustainable Development in the Literature; 2) Social Capital, Microfinance, and Women Empowerment; 3) Green Finance and Economic Development and their role in addressing the SDGs. These themes form the foundation of our investigation into how financial inclusion research aligns with and contributes to achieving the SDGs.

5.1 Financial Technology and Sustainable Development

The modern economy relies heavily on finance, and a strong nation cannot thrive without a robust financial system. However, traditional financial services are inadequate for supporting the complexities of an evolving and increasingly dynamic economic environment (Liu et al., 2021). According to Arner et al. (2020) and Demir et al. (2022), FinTech serves as a critical enabler of financial inclusion, which plays a pivotal role in achieving balanced and effective sustainable development. FinTech has the transformative potential to revolutionise the financial industry, entire economies, and societies. Gbongli et al. (2019) investigated the long-term viability and acceptance of mobile-based financial services that promote comprehensive financial inclusion in emerging economies. Similarly, Yang and Zhang (2020) demonstrated that, in the context of China's high-quality economic development, continuous exposure to digital financial inclusion and restructuring of the financial sector's ecological framework provide steady financial support for the sustainable growth of small and micro-enterprises. This, in turn, facilitates the expansion of both the macroeconomy and micro-level businesses.

Artificial intelligence (AI) is a key topic in discussions on technology-driven interventions and their impact on sustainable development. AI plays a critical role in achieving the Sustainable Development Goals (SDGs), particularly in poverty reduction (SDG 1), infrastructure improvement (SDG 9), and facilitating economic growth and development in developing nations (SDG 8) (Mhlanga, 2021). AI contributes to poverty alleviation by enhancing the quality of research data through tools like poverty maps and by transforming the financial sector via financial inclusion initiatives. However, the uncontrolled application of experimental AI by Big Tech poses significant risks to achieving the UN SDGs (Truby, 2020). Poorly designed and recklessly deployed AI-based decision-making tools can adversely impact users as they navigate critical financial decisions, jeopardising the overarching goal of financial inclusion. While technological advancements in AI hold immense promise, the financial sector is at a pivotal moment, with discussions intensifying about its potential to drive a transformative shift in the industry.

5.2 Social Capital, Microfinance and Women Empowerment

The concept of “social capital” emphasises the importance of social networks and norms in fostering sustainable development (Pretty, 2003). Social capital is believed to be vital in facilitating economic growth and development (Maclean, 2010). Similarly, there is increasing recognition that microcredit initiatives can contribute to equitable and sustainable development (Rahman, 1999). Microfinance institutions are often regarded as social enterprises, as they aim to serve individuals who are typically excluded from mainstream financial and banking systems (Lopatta et al., 2017). Microcredit initiatives integrate a business-oriented approach with a willingness to learn from other's experiences while focusing on the primary goal of alleviating poverty, particularly among women (Sigala & Carney, 2012). Both microfinance and social capital are critical elements of traditional development initiatives, rooted in understanding the importance of social determinants for achieving inclusive development (Maclean, 2010). Empowering women is essential for achieving sustainable development on a global scale. One effective strategy for enhancing women's empowerment is providing access to microfinance services (Huis et al., 2017a). However, in recent years, microfinance institutions (MFIs) have increasingly faced financial challenges, which have begun to take precedence over their mission to assist the poor, particularly women. This phenomenon, known as "mission drift," occurs when MFIs prioritise financial gain over their fundamental goal of serving the needy (Lopatta et al., 2017; Mia & Lee, 2017). Several significant challenges must be addressed for the microfinance sector to grow and expand sustainably. Parikh (2006) identified three critical responsibilities for rural microfinance service providers: (1) effectively communicating with clients in remote areas, (2) managing and processing institutional data, and (3) collecting and distributing funds to distant locations. To ensure long-term growth and sustainability, these responsibilities must be addressed with the aid of technological advancements and robust information systems (Parikh, 2006).

5.3 Green Finance and Economic Development

The tension between pursuing economic growth and conserving natural resources (Xu et al., 2020) has intensified in recent years due to the push for sustainable development initiatives (Liu et al., 2021). In this context, green credit finance (GCF) has emerged as a financial product offered by banking institutions to encourage green investments and advance sustainable development goals (An et al., 2021). The energy crisis and the impacts of climate change have prompted a re-evaluation of anthropogenic economic activities, driving the expansion of green finance (Xu et al., 2020). The link between financial inclusion and green finance is increasingly recognised, particularly in the context of a green economy. For a nation to remain competitive while striving for sustainable development, financial inclusion is essential, and the green economy is becoming a central policy element (Wang et al., 2022). Moreover, FinTech is critical in advancing green finance by leveraging technology to promote sustainable practices (Liu et al., 2021). It is widely acknowledged that natural resources must be protected from human-induced degradation. Historically and in contemporary contexts, communities have demonstrated the capacity to collaborate for effective long-term resource management (Pretty, 2003). To foster sustainable economic growth, policymakers and the financial sector in each country must intensify efforts to enhance financial inclusion (Nizam et al., 2020). Policies should prioritise providing practical access to financial services through microfinance institutions (MFIs), ensuring that marginalised populations are supported in achieving long-term sustainable development (Mia & Lee, 2017).

6. Managerial and practical implications

The content analysis of thematic evolution highlights several emerging research areas, including “financial technology and sustainable development goals (SDGs),” “social capital,” “microfinance and women empowerment,” and “green finance.” Each of these areas holds significant managerial and practical implications. For financial technology (FinTech) and its connection to SDGs, managers and researchers are encouraged to adopt innovative FinTech solutions that directly support specific SDGs. This includes leveraging data-driven tools to analyse customer behaviour and utilising mobile platforms to extend banking services to remote and underserved areas. Enhancing digital payment systems for low-income or marginalised populations, fostering “buy now, pay later” mechanisms, and integrating blockchain technology for transparency are critical steps to advancing financial inclusion. Moreover, fostering collaborations with technology firms, non-profits, and government entities can drive the co-creation of digital financial products tailored to the needs of underserved populations. These partnerships can significantly enhance financial inclusion and contribute to achieving broader sustainable development goals.

In the context of social capital, managers are encouraged to establish robust networks and partnerships with stakeholders such as NGOs, government agencies, and socially excluded groups to enhance resource-sharing capabilities. Integrating social capital indicators—such as trust, community engagement, and collaboration—into strategic planning and performance metrics can provide long-term benefits and foster sustainable relationships. When it comes to microfinance and women’s empowerment, it is essential to develop gender-inclusive policies that offer female entrepreneurs access to capital, training, and mentorship programs, enabling them to utilise financial resources more effectively. Tailoring financial products to address the specific needs of women—such as smaller loans for children’s education, reduced interest rates, or flexible repayment options—can significantly enhance their economic participation and empower them to achieve greater financial independence.

Finally, green finance underscores the importance of integrating sustainability into financial strategies, such as developing green bonds or sustainability-linked loans prioritising environmentally sustainable initiatives. Managers and researchers should advocate for adherence to environmental, social, and governance (ESG) standards both within their organisations and among stakeholders. Actively implementing green financing policies to support eco-friendly projects aligned with sustainability objectives is crucial. The combined impact of these initiatives can inspire organisations to align their strategies with the Sustainable Development Goals (SDGs), thereby fostering resilience, inclusiveness, and long-term success.

7. Conclusion

The analysis revealed a growth rate of 15.53% in research focused on sustainable development through financial inclusion. The most prominent authors in this domain are Hassan MK and Arner DW. Additionally, Canada emerged as one of the most influential countries in this research field, while Sustainability was identified as the most relevant source. The most frequently cited papers were authored by Rahman (1999), Below et al. (2012), and Pretty et al. (2011). These studies addressed a range of Sustainable Development Goals (SDGs), including SDG1 (No Poverty), SDG2 (Zero Hunger), SDG3 (Good Health and Well-being), SDG5 (Gender Equality), SDG8 (Decent Work and Economic Growth), SDG11 (Sustainable Cities and Communities), SDG12 (Responsible Consumption and Production), and SDG17 (Partnerships for the Goals). Furthermore, they proposed actionable solutions to help achieve these goals. The literature highlights that creating more job opportunities (SDG 8) for marginalised and underprivileged sectors of society is crucial to breaking the vicious cycle of poverty (SDG 1). Achieving this, however, requires significant monetary intervention. Technology plays a pivotal role in realising Sustainable Development Goals (SDGs). The findings suggest an increasing trend toward financial technology (FinTech) as a means to facilitate financial assistance more efficiently in today’s fast-paced world.

The application of artificial intelligence (AI) has the potential to enable countries to achieve several SDGs, including fostering better industries and infrastructure (SDG 9), improving access to quality education (SDG 4), enhancing overall well-being (SDG 3), and providing improved financial services. These advancements, in turn, can significantly contribute to reducing poverty in emerging economies. Various technologies can be effectively harnessed to achieve the social and economic objectives outlined in the 2030 Agenda for Sustainable Development, demonstrating their alignment with global goals.

The co-occurrence analysis revealed hidden patterns in the research, which were further supported by thematic analysis. During the period 1999–2008, the primary keywords were "sustainable development," "economic development," and "microfinance." In Period 2 (2009–2015), the research focus shifted to "sustainable development," "sustainability," and "financial services." By Period 3 (2016–2022), the dominant keywords evolved to include "financial inclusion," "microcredit," and "regulations." Throughout the years, sustainable development has remained the central theme of this research domain. While it is challenging to predict which topics will gain greater attention in the future, the thematic analysis of keywords suggests that the current trends are likely to persist. Experts are expected to continue contributing to studies addressing critical areas such as poverty reduction (SDG 1), women's empowerment (SDG 5), employment generation (SDG 8), entrepreneurship and enterprise development (SDG 9), and overall well-being (SDG 3).

The Sustainable Development Goals (SDGs) have expanded far beyond being solely an environmental concern, taking root in various disciplines such as economics, computer science, decision science, data science, psychology, and business management. Consequently, it is fair to state that achieving these goals depends significantly on the cooperation of diverse stakeholders (SDG 17). The findings of this study provide a foundation for future research development and foster collaboration among nations and researchers. They also serve as a guide and source of inspiration for scholars across various fields. This research represents a step toward recognising financial inclusion as a critical enabler in achieving the United Nations' 2030 Agenda for Sustainable Development Goals.

8. Limitations and future research

Although this study makes valuable contributions, certain limitations remain. One strength lies in its reliance on bibliometric data sourced from the Scopus database, but its weakness arises from the inherent limitations of this database. For instance, this study did not include several relevant articles and publications indexed in other databases, such as the Web of Science. Future research should consider incorporating data from additional databases, such as ScienceDirect and EBSCO, to ensure broader coverage and comprehensiveness. This study contributes to the existing qualitative reviews on sustainable development through financial inclusion. However, researchers are encouraged to focus on empirical studies that can better inform policy formulation and highlight practical implications at the grassroots level. Given the complexity of the SDGs—due to their numerous targets, trade-offs, and interdisciplinary considerations—future research should prioritise developing more efficient and reliable methodologies to track and confirm the evolution of SDGs within this field. Additionally, there is a pressing need to conceptualise and develop a generalisable theoretical framework that positions financial inclusion as a crucial component in analysing the SDGs while accounting for their inherent complexity. The findings of this study are expected to inspire and guide researchers in management, economics, and related fields toward achieving sustainable development goals, serving as a foundation for advancing the Agenda 2030 objectives.

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Credit author statement

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