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A Bibliometric and Systematic Literature Review on the Concept, Dimensions, and Measurement of Sustainable Financial Literacy

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ABSTRACT

Introduction; Sustainable Financial Literacy (SFL) is a key 21st-century competency that integrates traditional financial literacy with awareness of environmental, social, and governance (ESG) aspects in economic decision-making. As sustainability challenges become increasingly central to global economic systems, understanding SFL has become essential for promoting responsible and ethical financial behavior. **Method**;This study employs a bibliometric and systematic literature review (SLR) approach on 357 relevant scholarly articles to map the evolution of the concept, publication trends, and measurement instruments of SFL. The bibliometric analysis was conducted to identify patterns of author collaboration, contributing countries, and dominant research domains. Meanwhile, the systematic analysis examined the conceptual and empirical dimensions of SFL, encompassing the cognitive (knowledge), affective (attitudes and values), and behavioral (sustainable financial actions) domains. **Results**; The findings indicate that SFL remains a relatively new research field, with major attention directed toward the integration of ESG principles into financial education, green investment, and digital financial inclusion. The measurement of SFL varies across studies, ranging from ordinal to ratio scales, and typically assesses knowledge, attitudes, and behaviors in a quantifiable manner. **Conclusion**; These findings underscore the strategic role of Sustainable Financial Literacy in enhancing sustainable investment decisions, fostering ethical financial behavior, and serving as a critical foundation in supporting the transition toward a green, inclusive, and ethical economy.

Cite This Article: Format for citing the article by other authors, including: author name(s), year, article title, journal name, volume, issue number, page numbers, and DOI (if available).

1. Introduction

Sustainable Financial Literacy has emerged as a key 21st-century competency that integrates traditional financial knowledge with environmental, social, and governance (ESG) awareness in economic decision-making. This literacy not only encourages individuals to manage their finances wisely but also to invest responsibly for the sustainability of the planet and social well-being

A number of studies have shown that improving SFL can strengthen green investment decisions and foster ethical financial behavior. For instance, Mishra & Sahoo, (2025) emphasized the role of sustainable financial literacy and digital inclusion in shaping women's sustainable entrepreneurial intentions, while Margeviča-Grinberga et al., (2023) demonstrated that sustainable financial education in vocational schools can build green economic competencies from an early age. Furthermore, Lulaj & Mekaniwati, (2025) and Tulya et al., (2025) highlighted that understanding sustainable finance influences financial well-being and investment decisions within the context of a circular economy and green supply chains.

On the other hand, Filippini et al., (2024) introduced empirical indicators to measure the level of SFL and its relationship with sustainable investment decisions in Switzerland, while Yücel et al., (2023) showed how public perceptions of literacy and sustainable finance shape trust in green policies. Koomson et al., (2025) extended this concept to the context of clean energy in South Africa, finding that financial literacy significantly affects the adoption of environmentally friendly energy sources. Lastly, Strauss et al., (2023) emphasized that news attention, public trust, and perceptions of greenwashing influence the relationship between literacy and sustainable investment behavior. Overall, SFL serves as an essential foundation in supporting the Sustainable Development Goals (SDGs), particularly Goal 4 (Quality Education), Goal 8 (Decent Work and Economic Growth), and Goal 13 (Climate Action).

Although financial literacy research has developed extensively, studies specifically addressing SFL remain limited. The analysis reveals variations in the conceptualization, dimensions, and measurement of SFL across studies. Conceptually, SFL is understood in different ways from knowledge and awareness of green investment and ESG principles (Filippini et al., 2024; Strauss et al., 2023) to sustainable entrepreneurial behavior and intentions (Mishra & Sahoo, 2025). In terms of dimensions, educational research emphasizes the integration of sustainability content, teacher competence in SFL, active learning approaches, learning environments, and formative assessment (Margeviča-Grinberga et al., 2023). Other studies highlight financial education needs, financial etiquette, and financial attitude, reflecting knowledge, behavior, and value-based aspects in sustainable financial decision-making (Lulaj & Mekaniwati, 2025). Further differences are found in studies linking SFL to corporate sustainability performance, emphasizing its role in helping investors make decisions based on ESG indicators and sustainable finance practices (Tulya et al., 2025), while others still adapt general financial literacy frameworks without considering the sustainability dimensions central to SFL. From these differences, this study seeks to develop a more comprehensive and measurable understanding of SFL, emphasizing the integration of knowledge, attitudes, and sustainable behaviors within the context of financial decision-making that supports the Sustainable Development Goals (SDGs).

In addition, studies on SFL remain limited in adopting a synthetic approach. No prior research has systematically mapped the global development of SFL studies in terms of research trends, dominant keywords, or cross-country and inter-institutional academic collaboration. The absence of a comprehensive bibliometric study has led to a limited understanding of the conceptual and methodological evolution of SFL, creating a research gap that needs to be explored further. Therefore, there is an urgent need to integrate various conceptual and empirical approaches to build a solid theoretical foundation for SFL.

A bibliometric and systematic literature review is necessary to address the ongoing conceptual fragmentation in SFL research. Inconsistencies in definitions and measurements create ambiguity in applying the SFL concept in both academic and policy contexts.

Meanwhile, the exponential growth of sustainable finance research after 2020 indicates a significant rise in academic interest in financial sustainability issues, yet this growth has not been accompanied by clear and comprehensive thematic classifications. Thus, bibliometric and systematic literature reviews are required to address the conceptual and methodological fragmentation still present in SFL studies. The inconsistencies in definitions, dimensions, and measurement instruments have generated ambiguity in the practical and theoretical application of this concept. At the same time, the rapid growth of sustainable finance research after 2020 reflects a heightened academic interest in financial sustainability issues but lacks a coherent and well-defined thematic classification. The urgency of this study is also reinforced by its practical relevance to public policy and education, as global efforts toward a green economy, financial inclusion, and the achievement of the Sustainable Development Goals (SDGs) require a strong conceptual understanding of SFL. Through a bibliometric approach, this study aims to map the SFL research landscape based on publication networks, citation patterns, and key keywords, while the systematic review provides an in-depth synthesis of the concepts, dimensions, and measurement instruments employed across diverse research contexts.

Recent studies show that SFL research now involves multiple disciplines such as finance, communication, education, and behavioral psychology (Garg & Vemaraju, 2025; Ali et al., 2025; Luo & Cheng, 2023; Shange et al., 2024; Merli et al., 2024). The research focus has also expanded to include the role of media, public trust, and perceptions of greenwashing. This development positions SFL as a tool for empowering communities and promoting sustainable entrepreneurship. Overall, SFL has evolved from an individual knowledge construct into an essential instrument in policy and education to support social, economic, and environmental sustainability, thereby accelerating the transition toward a green, inclusive, and equitable economy.

Several research gaps remain in the field of Sustainable Financial Literacy (SFL). First, there is no comprehensive global bibliometric mapping capturing research trends, core themes, and scholarly collaboration (Bel Hadj Miled & Landolsi, 2024; Li & Punjwani, 2025; Lee et al., 2023; Dai et al., 2025). Second, systematic syntheses identifying concepts, dimensions, and measurement tools across contexts are still limited. Third, few studies have linked SFL to sustainability indicators such as ESG factors, the SDGs, or financial well-being. These gaps highlight the need for an integrated framework that unifies diverse approaches and findings. This study aims to provide a comprehensive understanding of SFL through two complementary approaches; first, identifying and mapping publication trends, authors, institutions, and key topics using bibliometric analysis, and second, conducting a systematic review of empirical and theoretical literature to structure the concepts, dimensions, and measurement instruments of SFL. The study aspires to establish a measurable conceptual framework that can guide future research, policy development, and educational strategies supporting the transition toward a green and inclusive economy.

2. Theoretical Framework

Sustainable financial literacy extends the concept of traditional financial literacy by integrating environmental, social, and governance dimensions into financial decision-making. This concept emphasizes individuals' ability to make responsible financial decisions that support economic, social, and environmental sustainability. Iorember et al., (2024) define SFL as an individual's capability to understand, assess, and implement financial decisions based on sustainability principles as an intangible resource within the Resource-Based View (RBV) framework, which strengthens sustainable entrepreneurial intentions, An intangible resource in the form of capability has been proven to generate competitive advantage and enhance performance, as evidenced by several previous studies (Rakhmawati et al., 2020; Rakhmawati et al., 2019; Rakhmawati & Nizar, 2023; Nizar et al., 2024; Nizar et al., 2023; Rakhmawati &

Nizar, 2023; Nizar & Rakhmawati, 2022; Nizar et al., 2024; Husnul Hotima et al., 2024; Sintawati et al., 2023). In line with this, Eyre et al., (2024) highlight SFL as a pedagogical construct that develops ethical and sustainability-oriented financial behavior competencies through education (Nguyen-Viet et al., 2025).

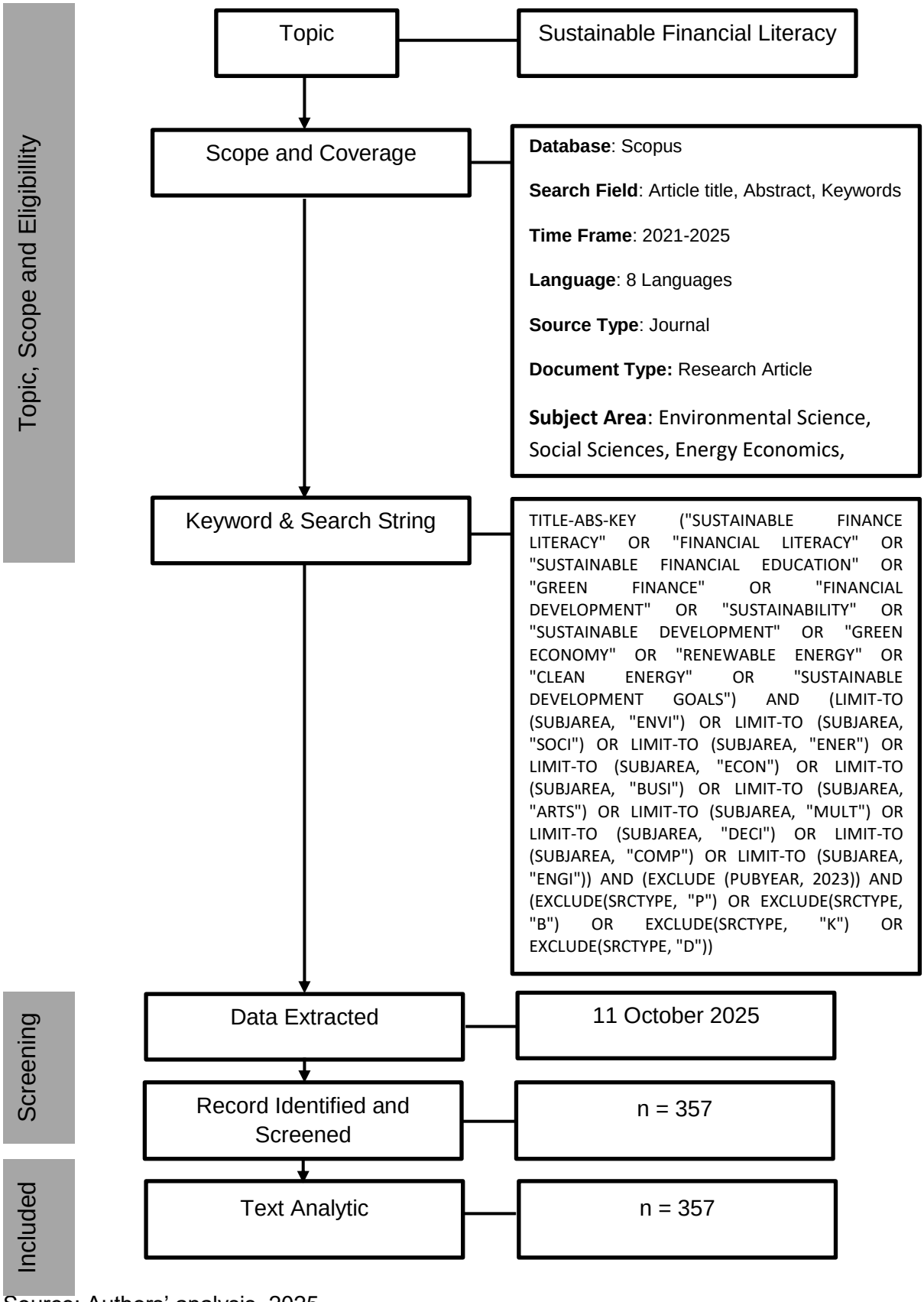
(K. Liang et al., 2023) expand this concept by linking financial literacy to the circular economy and climate finance, positioning SFL as a holistic construct encompassing knowledge, attitudes, and behaviors that promote social and environmental responsibility. In the context of investment, Khan et al., (2025) conceptualize SFL as the investor's ability to interpret ESG information, supply chain sustainability, and gender diversity within boards of directors to make responsible and long-term oriented investment decisions. Meanwhile, (Ritz et al., 2019) define SFL as the knowledge and skills required to identify and evaluate sustainable financial products, representing an advanced stage of traditional financial literacy that embeds sustainability awareness within financial understanding and practice.

3. Methods

This study employs a Systematic Literature Review approach combined with bibliometric analysis to explore the conceptual development and research trends related to SFL. The SLR approach was chosen because it enables researchers to systematically and transparently review, identify, and synthesize findings from previous studies, thereby providing a comprehensive understanding of the evolution of SFL concepts and dimensions. The research data were obtained from the Scopus database, recognized as one of the most reputable and comprehensive international sources of academic literature.

To analyze thematic relationships and research trends, VOSviewer software version 1.6.20 was employed. The bibliometric analysis was conducted through four main stages. First, a co-authorship analysis was performed to map collaboration among authors and institutions. Second, a co-occurrence analysis was carried out to identify dominant keywords forming thematic clusters within SFL research. Third, a citation analysis was used to trace the most influential articles and journals. Finally, a co-citation analysis was applied to identify relationships among references that frequently appear together. The results of these analyses are presented through network visualization, density visualization, and overlay visualization maps to illustrate the dynamics and longitudinal development of SFL literature.

The screening process was conducted through several stages, as illustrated in the following figure:



Source: Authors' analysis, 2025

Figure1. Flowdiagram of search strategy

4. Results and Discussion

4.1 General description from Scopus indexed article

In general, Table 1 highlights the most active institutions conducting research on SFL and sustainability. The dominant institutions include Jiangsu University, China University of Geoscience, and King Saud University, with two from China and one from Saudi Arabia. Furthermore, this table presents an academic distribution map illustrating the key research centers focused on sustainability studies. Meanwhile, Table 2 shows that the main research subject areas related to SFL are environmental science, social sciences, energy, economics, and business. This is particularly interesting because the research aims to provide insights for future researchers in the fields of environment, social studies, business, and economics.

Table 1. Top 10 Authors affiliation

No	Institution Name	Number of Results
1	Jiangsu University	7
2	China University of Geosciences	5
3	King Saud University	5
4	United International University	4
5	Hohai University	4
6	Xinjiang University	4
7	Beijing Institute of Technology	4
8	Chinese Academy of Sciences	4
9	School of Management, Beijing Institute of Technology	4
10	The University of Haripur	4

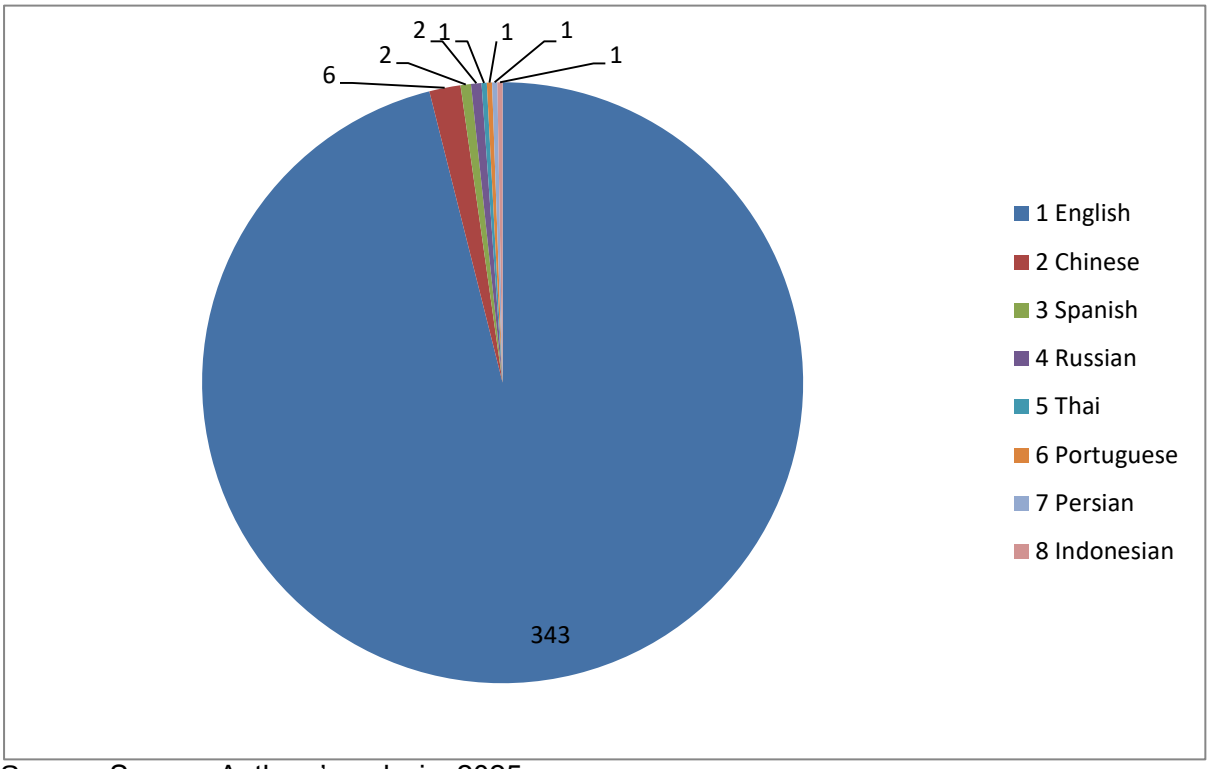
Source: Authors' analysis, 2025

Table 2. Subject Area

No	Subject Area	Count
1	Environmental Science	176
2	Social Sciences	166
3	Energy	100
4	Economics, Econometrics and Finance	82
5	Business, Management and Accounting	72
6	Arts and Humanities	0
7	Multidisciplinary	0
8	Decision Sciences	0
9	Computer Science	46
10	Engineering	33

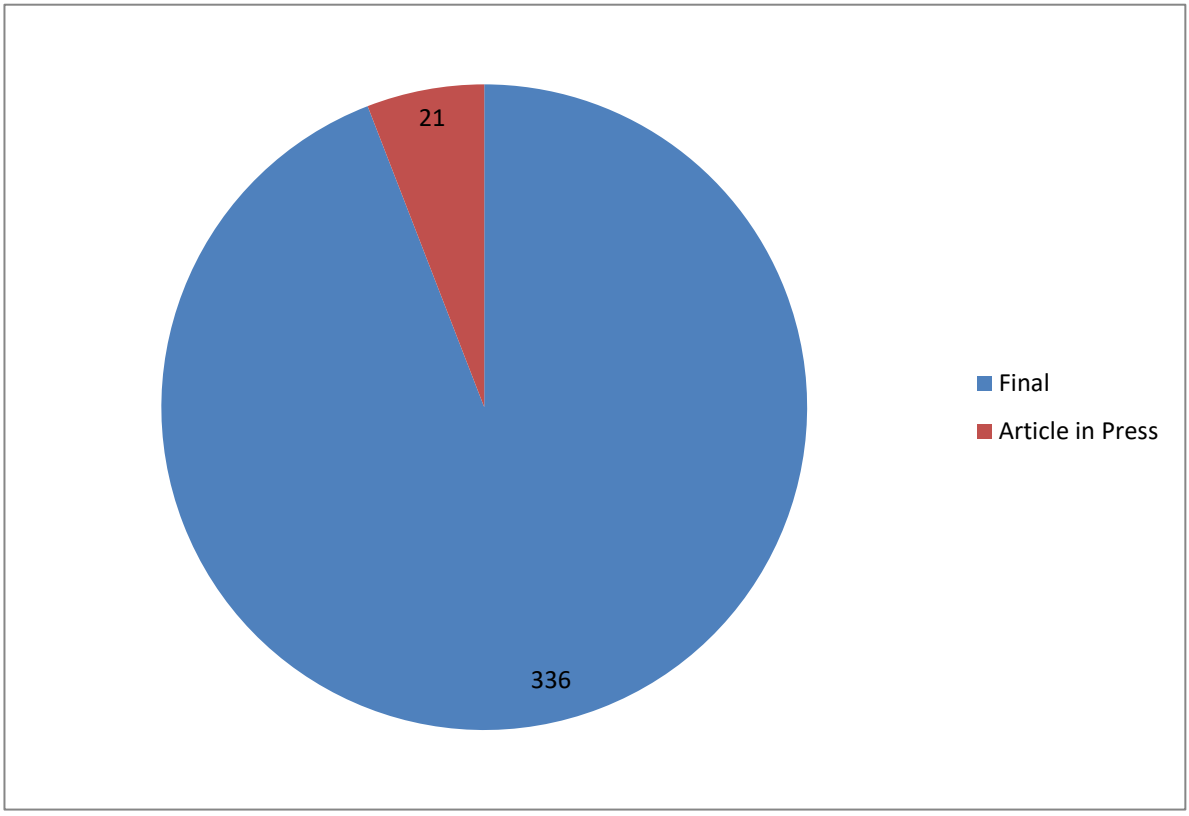
Source: Authors' analysis, 2025

Figure 2 shows that the majority of articles, totaling 343, are written in English, while the rest are in other popular languages like Chinese, Spanish, Russian, and others. This facilitates readers worldwide to access articles in English, the global language. Thereby, furthermore the information from Figure 3 shows that most of the content consists of final articles, while a smaller portion includes articles in press, which are intentionally published in advance for specific reasons or as part of a special issue



Source: Source: Authors' analysis, 2025

Figure 2. Article Language



Source: Source: Authors' analysis, 2025

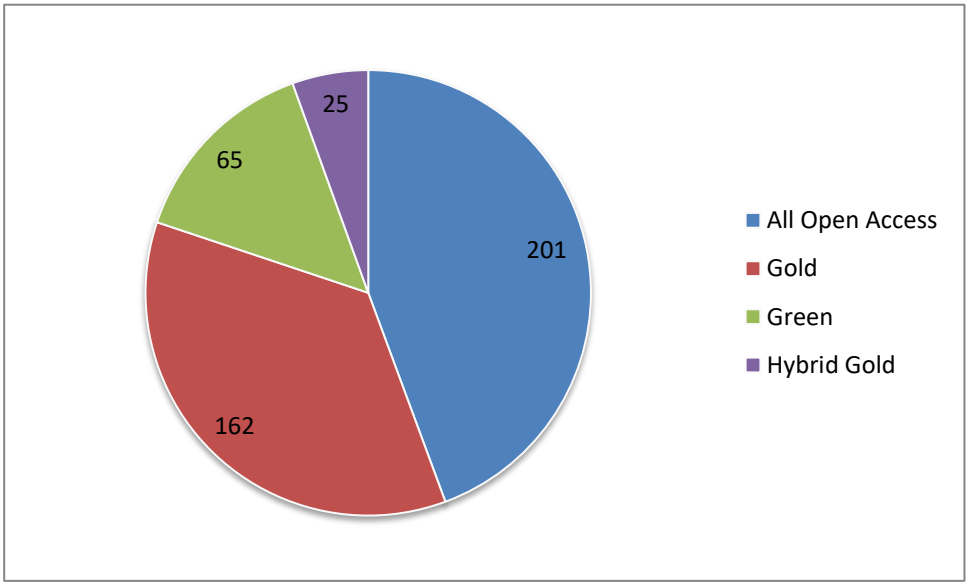
Figure 3. Publication Stage

Table 3. Top 10 Funding Sponsor

No	Top 10 Funding Sponsor	Jumlah
1	National Natural Science Foundation of China	17
2	National Office for Philosophy and Social Sciences	15
3	Ministry of Education of the People's Republic of China	5
4	Fundamental Research Funds for the Central Universities	5
5	European Commission	5
6	UK Research and Innovation	4
7	King Saud University	4
8	United International University	3
9	Natural Science Foundation of Beijing Municipality	3
10	National Social Science Fund of China	3

Source: Source: Authors' analysis, 2025

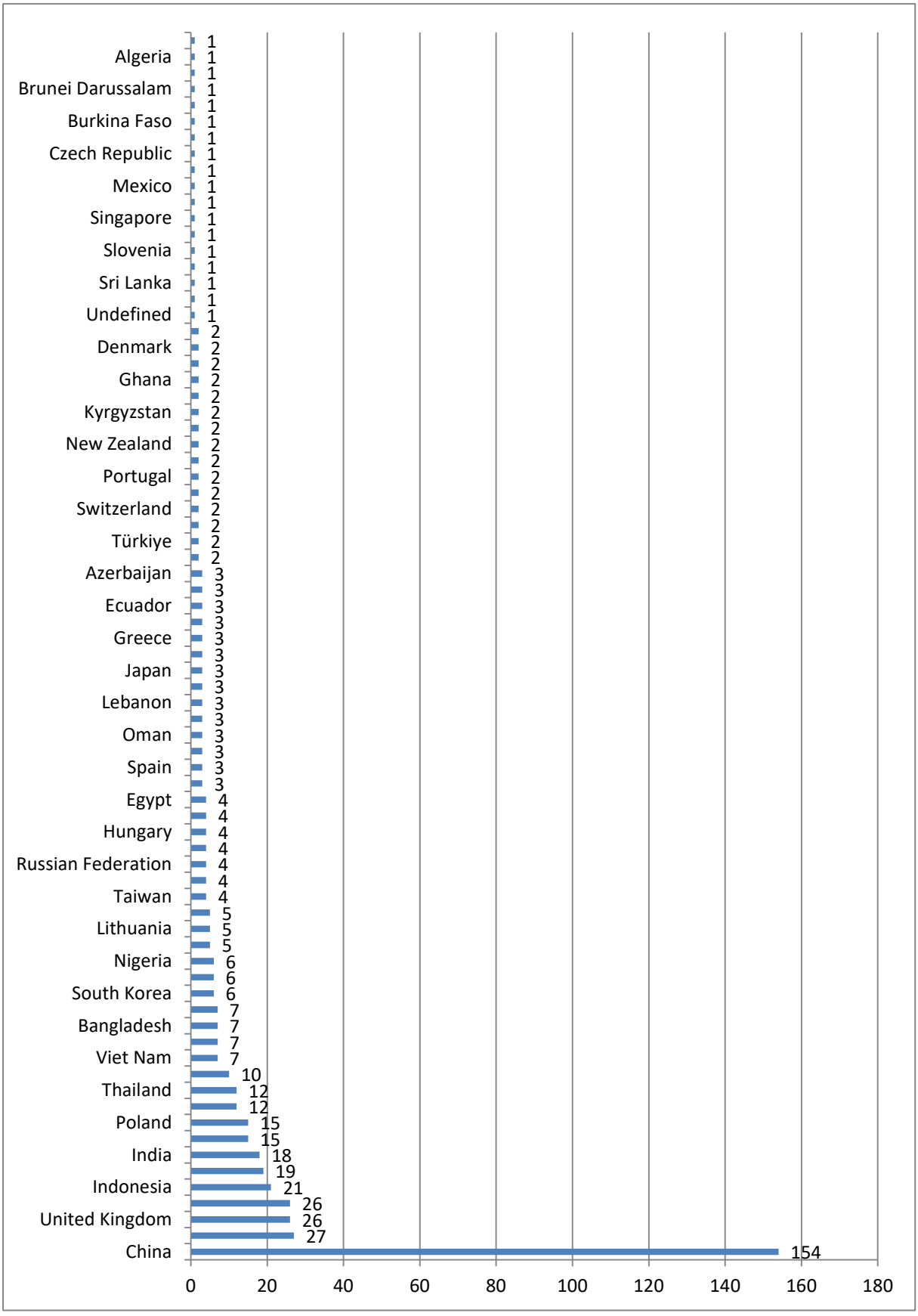
In general, research funding sources on this topic are dominated by national and international institutions that focus on the development of social sciences, economics, and sustainability. The majority of sponsors originate from government agencies and universities in China, followed by support from international research institutions in Europe and the Middle East. This pattern reflects the growing global attention toward SFL research and highlights the strategic role of public funding in fostering academic innovation in this field.



Source: Source: Authors' analysis, 2025

Figure 4. **Article Access Type**

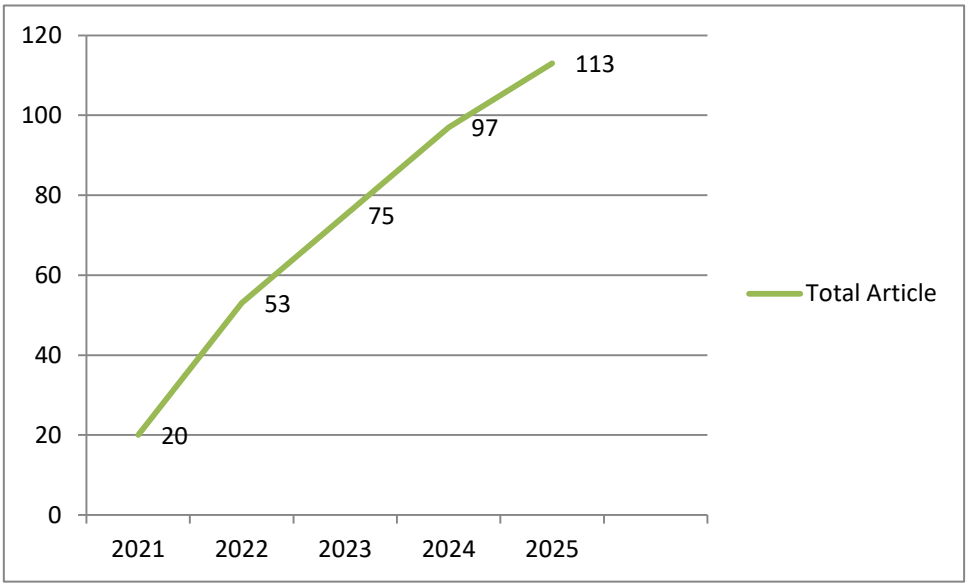
Figure 4 illustrates the proportion of article access types, with a clear dominance of open access, reflecting a strong commitment to scientific openness. The gold and green access categories are also relatively prominent, while hybrid gold represents the smallest proportion. Overall, this pattern indicates a growing trend toward transparency and the wider dissemination of research in the field of sustainable finance.



Source: Source: Authors' analysis, 2025

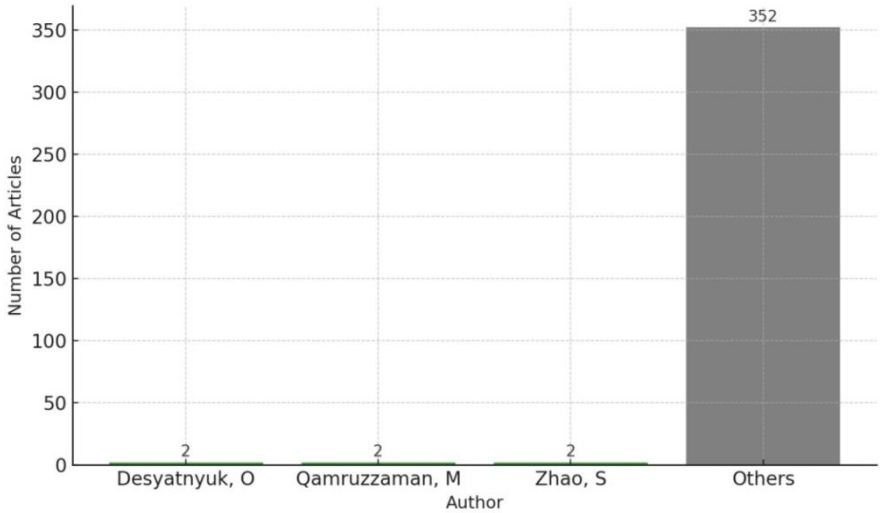
Figure 5. **Number of Articles by Country**

Figure 5 presents the distribution of articles based on the country of publication. It is evident that China dominates significantly compared to other countries, followed by the United Kingdom, Indonesia, and India, which also contribute notably to research on sustainable finance. Meanwhile, most other countries show limited participation, with relatively small numbers of publications. This finding reflects the concentration of research within nations that possess strong research capacity and substantial funding support. Figure 6 illustrates the trend of increasing publication numbers from 2021 to 2025. The data show a consistent annual growth in the number of studies focusing on sustainable finance, indicating a rising level of academic interest and engagement with this topic. This trend suggests that SFL has gained a more strategic position in global research discourse, in line with the growing urgency of the transition toward a green and inclusive economy.



Source: Source: Authors' analysis, 2025

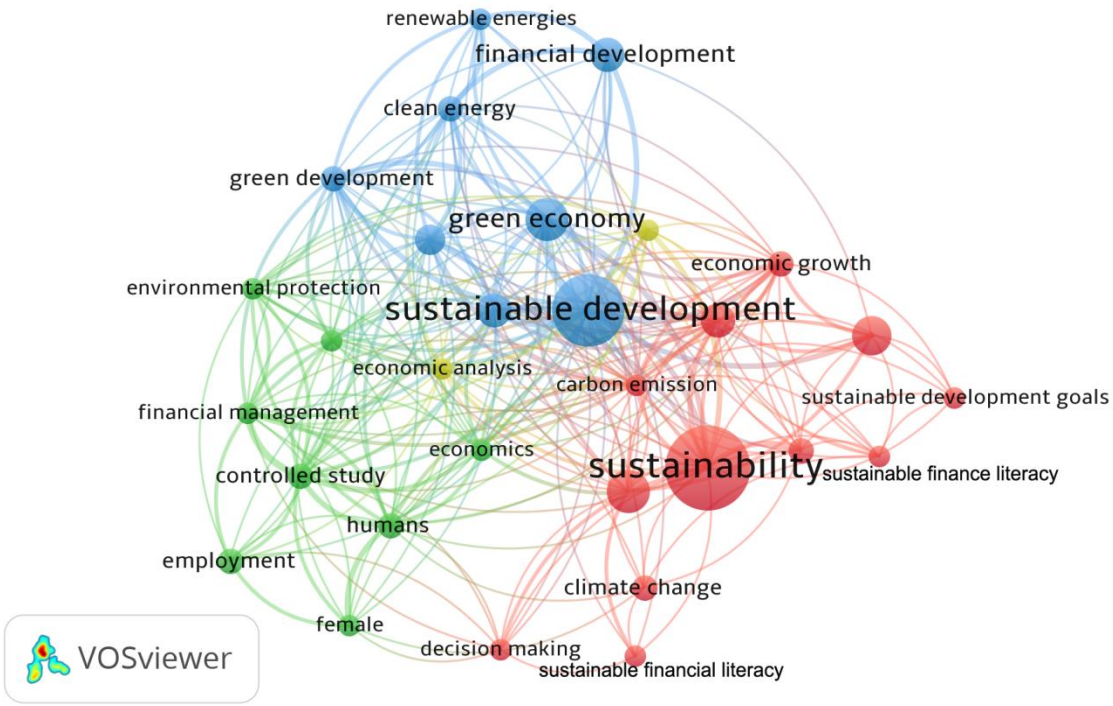
Figure 6. **Number of Articles by Year of Publication**



Source: Source: Authors' analysis, 2025

Figure 7. **Number of Articles per Author in Sustainability Finance**

Figure 7 shows the distribution of the number of articles per author in the field of sustainable finance. The analysis reveals that most publications come from authors who have contributed only once, with only a few researchers having more than one publication. This finding indicates that research in sustainable finance remains widely dispersed among numerous scholars, with no strong dominance by any individual or specific research group.



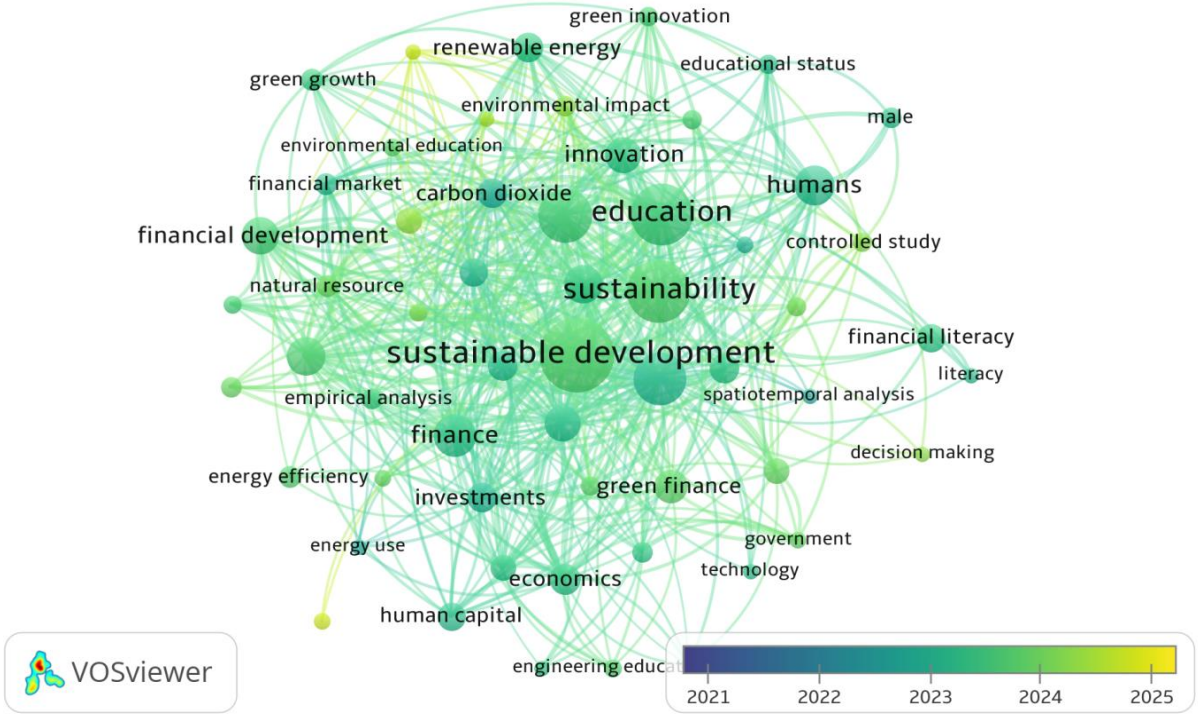
Source: Source: Authors' analysis using Vosviewer, 2025

Figure 8. **Network visualization based on keywords**

Figure 8 presents the keyword co-occurrence visualization map in the field of sustainable finance, divided into five distinct color clusters based on the frequency of occurrence and inter-topic relationships. The blue cluster represents themes centered on financial development, the green economy, and clean energy as some cited in several previous research by (Ali et al., 2025; Desyatnyuk et al., 2025; Ke et al., 2025; Talha, 2023; Tao & Wang, 2024), while the green cluster highlights topics such as environmental protection, financial management, and employment. The red cluster focuses on sustainability, climate change, and SFL, reflecting the strong interconnection between environmental issues and financial literacy in the context of sustainability as some cited in several previous research by (Cui et al., 2023; Gan & Madders, 2024; H. R. Khan et al., 2022; H. Liang & Punzi, 2025; Ni et al., 2025). The yellow and light-green clusters link themes such as economic growth and carbon emissions, serving as a bridge between economic and environmental dimensions. The size of each circle represents the frequency of keyword occurrence as some cited in several previous research by (Aguirre-Benalcazar et al., 2025; András et al., 2022; Yang, 2023)(), whereas the connecting lines illustrate the strength of relationships among concepts across clusters.

Figure 9 further shows that the keyword sustainable financial literacy has a relatively smaller circle size compared to other terms such as sustainability or sustainable

development. This suggests that the topic remains underexplored in the academic literature, indicating that research on sustainability from the perspective of financial literacy is still limited and holds substantial potential for further exploration in future studies.



Source: Source: Authors' analysis using Vosviewer, 2025

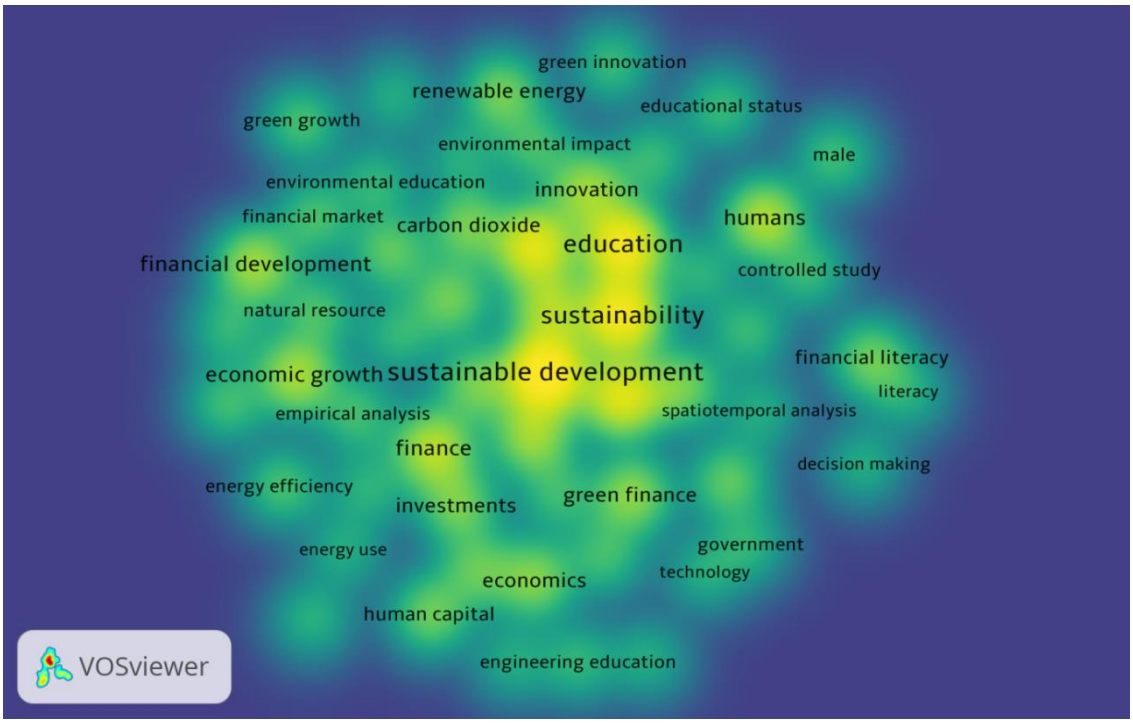
Figure 9. Co-occurrences of Keywords based on Year

Figure 9 illustrates that the most recent issues emerging in 2024 and 2025 within the sustainable concept are primarily focused on financial literacy, natural resource utilization, renewable energy, environmental impacts, and general financial aspects represented by yellow and light-green clusters. The absence of darker blue nodes, which correspond to earlier years such as 2021, indicates that these topics are relatively new and have begun to attract scholarly attention only within the past two to three years. Thus, the latest research trend tends to move toward the integration of financial, educational, and environmental sustainability dimensions as a response to the growing need for green and sustainable economic solutions.

Figure 10 illustrates the density of research issues addressed by scholars, where topics with the highest frequency of discussion are highlighted in bright yellow, while those less frequently explored appear in faded or blurred colors. Among these, topics related to financial literacy and sustainable financial literacy display relatively muted tones, indicating limited attention in the existing literature. Therefore, this study identifies these themes as promising areas for further exploration and recommends conducting future research that develops more robust concepts, dimensions, and measurement frameworks within the domain of sustainable financial literacy.

4.2 Concept of Sustainable financial Literacy

Conceptually, SFL represents an emerging development of traditional financial literacy by integrating economic, social, and environmental sustainability values into financial decision-making processes. SFL goes beyond the individual's ability to manage finances efficiently it also emphasizes how financial decisions impact society and the environment. In this sense, financial literacy is no longer merely an economic instrument but a component of sustainable development strategies that demand social and ecological responsibility from individuals and financial institutions alike.



Source: Source: Authors' analysis using Vosviewer, 2025

Figure 10. Density visualization of Co-occurrence Keywords Related to Sustainable Financial Literacy

At the individual and gender levels, SFL is viewed as women's ability to understand, evaluate, and implement financial decisions that align with sustainability principles. This perspective is grounded in the Resource-Based View (RBV), which positions SFL as an intangible resource that enhances capability and sustainable entrepreneurial intention (Mishra & Sahoo, 2025). Within this framework, women with higher levels of SFL are more adaptive to the green economic transition and more capable of developing socially and environmentally responsible enterprises.

In general, SFL can be defined as the ability to make responsible financial decisions that take into account ESG (Environmental, Social, and Governance) dimensions in both personal and professional contexts (Margeviča-Grinberga et al., 2023). This encompasses understanding financial ethics, sustainable governance, and the balance between short-term profits and long-term impacts on the economic and social ecosystem.

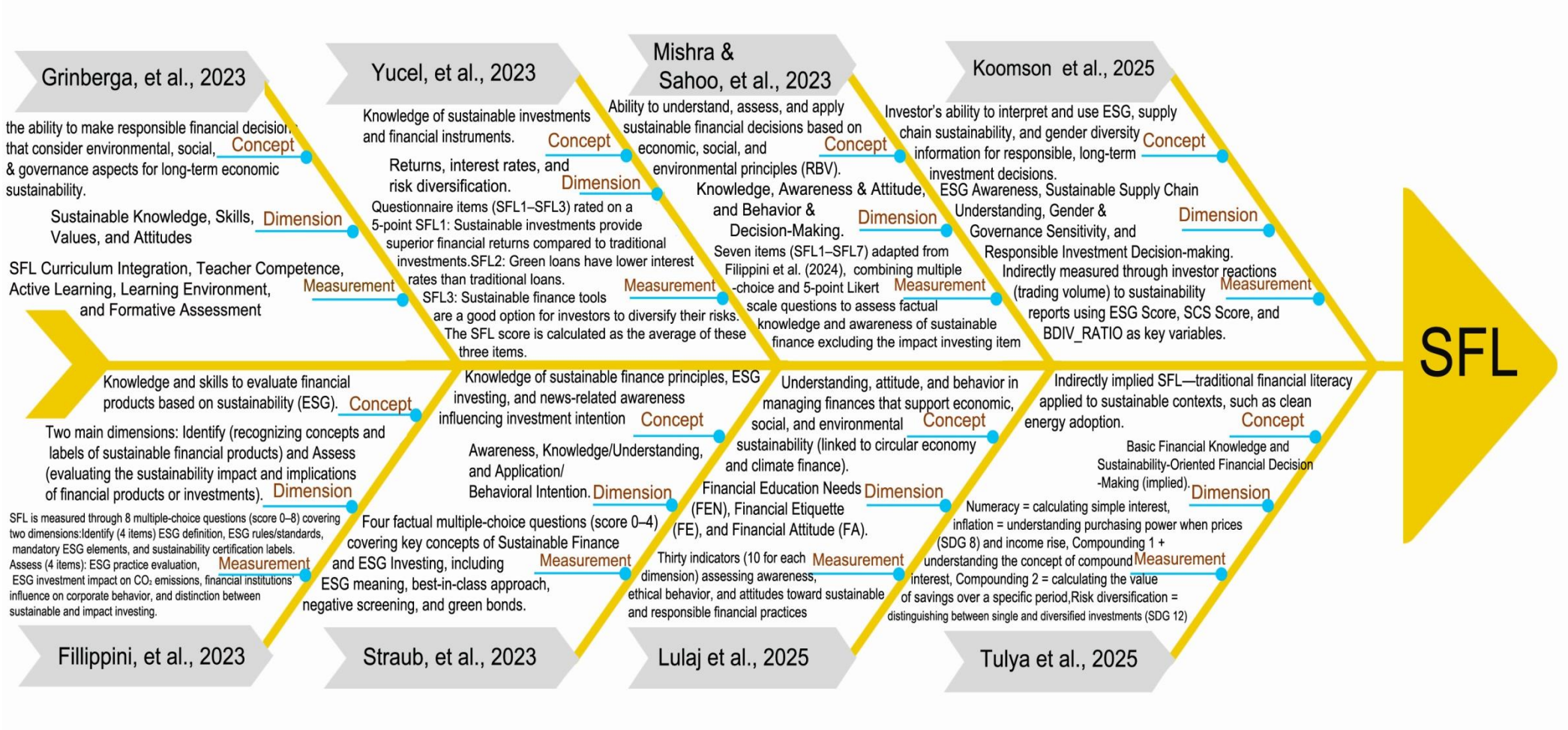
Modern approaches to SFL conceptualize it as a combination of knowledge, attitudes, and financial behaviors that foster the achievement of a circular economy and climate finance, in which individuals are expected to manage their finances responsibly toward the environment and society (Lulaj & Mekaniwati, 2025). In the investment context, SFL includes the ability to understand and interpret ESG information, assess supply chain sustainability

and board diversity, thus enabling highly literate investors to make ethical and long-term-oriented financial decisions (Tulya et al., 2025). Technically, SFL also involves the skills to identify and evaluate the sustainability characteristics of financial products (Filippini et al., 2024), including distinguishing between traditional and sustainable instruments such as green bonds or ESG mutual funds (Yücel et al., 2023). Although not always measured explicitly, conventional financial literacy has been shown to influence sustainable financial behaviors, such as clean energy adoption, suggesting that SFL may also emerge implicitly through the application of financial literacy principles within sustainable development contexts (Koomson et al., 2025).

Pada penerapannya SFL sering dikaitkan dengan anteseden lain seperti pembiayaan hijau yang disediakan di negara-negara maju, yang memaksa perusahaan untuk lebih aware dan meningkatkan pengetahuan mereka terkait keuangan yang berkelanjutan (Talha, 2023; Vukmirović et al., 2024; Desyatnyuk et al., 2025; Xiao, 2025). Finally, the dimensions of SFL extend to factual knowledge and understanding of sustainability issues disseminated through media and public information, shaping individuals' perceptions, attitudes, and intentions toward sustainable investment (Strauss et al., 2023). This implies that attention to news and public trust in financial information play crucial roles in enhancing literacy and engagement in green finance. Accordingly, SFL can be viewed as an integration of three main domains:

1. Cognitive domain (knowledge and understanding) encompassing awareness and comprehension of financial and sustainability issues;
2. Affective domain (attitudes and values) reflecting individuals' sense of social and environmental responsibility; and
3. Behavioral domain (actions and decisions) representing the application of sustainability principles in financial practice

Overall, SFL serves as a crucial foundation for shaping an inclusive, ethical, and resilient sustainable economy, while simultaneously functioning as a means of empowering individuals and communities to contribute toward achieving the Sustainable Development Goals (SDGs) .



Source: Authors' analysis, 2025

Figure 10. Conceptual Fishbone Diagram Summarizing Prior Studies On Sustainable Financial Literacy (SFL), Highlighting The Most Cited And Conceptually Relevant Study

4.3 Dimension And Measurement Of Sustainable Financial Literacy

There are eight studies that are highly relevant to the present research theme, in which SFL is explicitly identified as a variable and featured in the title, while also representing the most frequently cited works in the field. Based on Figure 10, the researcher identifies three primary types of measurement scales employed in previous studies, including the ordinal, nominal, and ratio scales. Furthermore, two main perspectives underpin the measurement of SFL: the societal perspective, which includes general populations and SME actors, and the investor-oriented perspective, which focuses on assessment within large corporations. The following sections provide detailed explanations of each dimension and the corresponding measurement approaches applied across these scales.

Table 4. Ordinal Scale Measurement Likert Type Statements

SFL Dimension	Statement (Measurement Item)	Measurement Model & Source
Integration of Sustainable Development and Sustainable Finance Content into the Curriculum	1. My school curriculum includes topics on sustainable development and sustainable finance. 2. Sustainable finance materials are integrated into competence-based subjects.	Second-Order Construct (Margeviča-Grinberga et al., 2023)
Availability and Competence of Teaching Staff in Sustainable Finance Topics	1. Teachers at my school have a good understanding of the concept of sustainable finance. 2. The school provides training or professional development for teachers related to sustainable finance.	
Implementation of Active and Competence-Based Learning Approaches	1. The learning process in class encourages students to actively participate in discussions about sustainable finance. 2. Teachers use project-based or case study learning methods relevant to sustainable finance.	
Quality of the Learning Environment and Accessibility of Digital/Collaborative Learning Materials	1. The school provides a learning environment that supports collaboration and digital learning. 2. Learning resources on sustainable finance are easily accessible online by students and teachers.	
Formative Assessment Based on Learning Outcomes and the Application of Sustainable Finance Principles	1. Learning assessments at my school include aspects of behavior and attitudes toward sustainability. 2. Students are assessed based on their ability to apply sustainable finance principles in real-life situations.	
Financial Education Needs (FEN) (Awareness & Knowledge — awareness, understanding, and readiness to adopt sustainable financial practices.)	FEN1. Awareness of sustainable financial practices FEN2. Understanding of the circular economy and its relevance to personal finance FEN3. Knowledge of climate finance and its potential impact on personal finances FEN4. Perception of the importance of financial literacy in the context of sustainability FEN5. Confidence in managing personal finances in a sustainable way FEN6. Perception of barriers to adopting sustainable financial practices FEN7. Willingness to make changes to personal financial practices to support sustainability goals FEN8. The effectiveness of current financial education programs in promoting sustainable financial practices FEN9. The potential financial benefits of adopting sustainable financial practices FEN10. The role of government in promoting sustainable financial practices	Second-Order Construct (Lulaj & Mekaniwati, 2025)
Financial Etiquette (FE) (Behavior & Decision-Making ethical norms and responsible financial behavior integrating social and environmental	FE1. How often do you seek out information and resources to support your sustainable financial practices FE2. The effectiveness of sustainable financial incentives and education in promoting behavior change FE3. How confident are you in your ability to balance your	

SFL Dimension	Statement (Measurement Item)	Measurement Model & Source
impacts.)	financial responsibilities with your environmental and social values FE4. The importance of sustainable financial practices in promoting a healthy environment FE5. How important is it to you to invest in companies that prioritize sustainability and the circular economy FE6. Do you believe that financial institutions and policymakers have a responsibility to promote sustainable financial practices among households FE7. To what extent do you prioritize long-term financial and environmental goals over short-term financial gains FE8. The potential environmental benefits associated with adopting sustainable financial practices FE9. Do you believe that financial etiquette and sustainable financial practices can promote positive environmental and social outcomes FE10. To what extent do you consider the environmental and social impact of your financial decisions	
Financial Attitude (FA) (Values & Attitudes — beliefs and ethical commitment toward sustainable and socially responsible finance.)	FA7. The level of financial benefit associated with adopting sustainable financial practices FA8. The level of social benefit associated with adopting sustainable financial practices FA9. The level of environmental benefit associated with adopting sustainable financial practices FA10. The level of personal financial responsibility for promoting sustainable financial practices	
Perception / Attitude (Knowledge & Awareness perception of financial performance of sustainable investments.)	Sustainable investments provide superior financial returns compared to traditional investments.	First-Order Construct (Strauss et al., 2023)
Knowledge / Perception (Knowledge understanding of financial cost structures in green financial instruments.)	Green loans have lower interest rates than traditional loans.	
Attitude / Application (Decision-Making evaluation of sustainable finance tools as risk diversification mechanisms.)	Sustainable finance tools are a good option for investors to diversify their risks.	

Source: Authors' analysis, 2025

In general, Table 4 presents a Likert scale based measurement instrument for SFLencompassing several key dimensions, including the integration of sustainability into education, the need for SFL, financial ethics and behavior, as well as attitudes and perceptions toward green investment. This instrument not only measures knowledge-related aspects but also captures individuals' values, attitudes, and actions within the context of environmentally and socially responsible finance. The measurement model is designed to be flexible and applicable to both the general population and small and medium-sized enterprises (SMEs), as it reflects the ability to understand, evaluate, and apply sustainable financial principles in everyday economic decision-making and business practices. Accordingly, this table provides a comprehensive assessment framework to identify the extent to which awareness and implementation of sustainable finance concepts have been established across different societal groups and small business sectors.

Table 5. Nominal Scale Measurement Multiple Choice Questions

Source	Item (Question and Answer Options)	Aspect Measured
(Mishra & Sahoo, 2025)	1. In the context of sustainable financial investment, what does the acronym ESG mean? a) Environmental and Social Goals b) Environmental and Sustainable Goals **c) Environmental, Social and Governance** d) Environmental, Sustainable, and Governancee) I don't know	Understanding of the basic ESG concept
	2. Must a product advertised as a sustainable financial product meet uniform criteria set by national authorities? **a) Yes** b) No c) I don't know	Knowledge of sustainability regulations and financial standards
	3. Are you aware of any label or certification that proves a financial product is sustainable (by governmental or non-governmental organizations)? **a) Yes** b) No	Awareness of ESG labels and certifications
	4. Suppose a company has a low environmental footprint but poor social practices. Can its stock still be called sustainable? a) Yes **b) No** c) I don't know	Understanding the balance between social and environmental dimensions
	5. In how many of the three ESG components must a company be sustainable to be considered sustainable in the financial market? a) One **b) Two** c) All three d) I don't know	Understanding the integration of ESG principles
	6. Does investing in a green fund directly reduce global CO_2 emissions? a) Yes **b) No** c) I don't know	Understanding the relationship between green investment and real environmental impact
	7. Do financial institutions offering sustainable products always influence the behavior of the companies they invest in (e.g., by attending shareholder meetings)? **a) Yes** b) No c) I don't know	Understanding the active role of financial institutions in corporate sustainability governance
(Filippini et al., 2024)	1. In the context of sustainable financial investments, the acronym "ESG" is often used. What does "ESG" stand for? a) Environmental and Social Goals b) Environmental and Sustainable Goals **c) Environmental, Social, and Governance** d) Environmental, Sustainable, and Governancee) I don't know	Basic understanding of ESG (Environmental, Social, and Governance) concepts and terminology
	2. Does a product advertised in Switzerland as a "sustainable financial product" have to meet uniform criteria set by the state regulatory authorities? **a) Yes** b) No c) I don't know	Knowledge of government regulations and standards related to sustainable financial products
	3. Are you aware of a label (or certificate, or proof) that certifies a sustainable financial product (from governmental or non-governmental organizations)? **a) Yes** b) No	Awareness of certification or labeling for sustainable financial products
	4. Let's say a company has a low environmental footprint but poor social and employee practices. Would it be possible to call the shares of this company a "sustainable" financial product in the financial markets? a) Yes **b) No** c) I don't know	Ability to assess sustainability consistency across environmental and social aspects

Source	Item (Question and Answer Options)	Aspect Measured
	5. In how many of the 3 ESG components (Environment, Social, Corporate Governance) must a company be sustainable to be considered sustainable in the financial markets? a) Only one of the elements b) Two elements **c) All three elements** d) I don't know	Understanding the integration of ESG components in determining corporate sustainability
	6. An investment in a sustainable fund that includes companies with a low CO_2 footprint directly reduces global CO_2 emissions. a) Yes **b) No** c) I don't know	Understanding the link between sustainable investments and actual CO_2 emission reduction
	7. Do financial institutions that offer sustainable products always proactively influence the sustainability behavior of the invested companies (e.g., by participating in the annual shareholders' meeting)? **a) Yes** b) No c) I don't know	Understanding the influence of financial institutions on investee companies' sustainability behavior
	8. Is there a difference for you between "sustainable investing" and "impact investing"? **a) Yes** b) No c) I don't know	Ability to differentiate between sustainable investing and impact investing
(Koomson et al., 2025)	Numeracy :Suppose you need to borrow R100. Which is the lower amount to pay back? **a) R105** b) R100 plus 3% c) Don't know d) Refused	Ability to calculate simple interest and compare nominal values
	Inflation : Suppose over the next 10 years, the prices of the things you buy double. If your income also doubles, will you be able to buy less, the same, or more than you can buy today? a) Less **b) The same** c) More d) Don't know e) Refused	Understanding purchasing power and the real effect of inflation on income
	Compounding 1 : Suppose you put money in the bank for two years and the bank agrees to add 15% per year to your account. Will the bank add more money to your account the second year than it did the first year, or will it add the same amount both years? a) More b) **The same** c) Don't know d) Refused	Understanding compound interest and growth of savings
	Compounding 2: Suppose you had R100 in a savings account and the bank adds 10% per year to the account. After five years, if you did not remove any money, would you have **a) More than R150** b) Exactly R150 c) Less than R150 d) Don't know e) Refused	Ability to apply compound interest to calculate final savings value
	Risk Diversification Suppose you have some money. Is it safer to put your money into one business or investment, or to put your money into multiple businesses or investments? a) One business or investment **b) Multiple businesses or investments** c) Don't know d) Refused	Understanding risk diversification principles in investment
(Strauss et al., 2023)	1. What does ESG stand for? a) Ecological, Standard, Governance **b) Environmental, Social, Governance** c) Environmental, Social, Green	Basic knowledge of ESG terminology and meaning

Source	Item (Question and Answer Options)	Aspect Measured
	d) I don't know 2. What does 'the best in class' investment approach entail? **a) Investing in those companies that are leading in their sector regarding ESG factors** b) Investing in those industries that are leading in ESG factors c) Investing in indices that are leading on ESG factors d) I don't know	Understanding the best-in-class approach in ESG-based investing
	3. The method of constructing your portfolio so that it excludes or avoids 'problem' stocks (e.g., tobacco) is called: a) Impact investing **b) Negative screening** c) Positive screening d) I don't know	Knowledge of exclusionary (negative screening) strategies in sustainable investing
	4. What is a green bond? a) A bond denominated in the national currency (e.g., Euro, U.S. dollars) **b) Raising debt to finance environmentally-friendly investments** c) Only sovereign debt issues for the purpose of funding public transportation d) I don't know	Understanding green bonds as financial instruments for environmental financing

Note: The multiple-choice answers highlighted in green indicate the correct answers.
Source: Authors' analysis, 2025

Table 5 presents the measurement instruments of SFL using a nominal scale in the form of multiple-choice questions designed to assess individuals' factual knowledge and conceptual understanding of various aspects of sustainable finance. The questions encompass fundamental comprehension of Environmental, Social, and Governance (ESG) principles, regulations and certifications of sustainable financial products, the linkage between green investments and real environmental impacts, as well as the role of financial institutions in sustainability governance. In addition, several items evaluate basic numeracy skills, understanding of compound interest, inflation, and risk diversification core components of general financial literacy.

This instrument can be applied to measure SFL among both the general population and micro, small, and medium enterprises (MSMEs), as it evaluates the extent of their foundational knowledge, awareness, and analytical ability to understand sustainability-oriented financial and investment instruments. Hence, the table provides a practical approach to quantitatively assess SFL from both cognitive and behavioral perspectives. Furthermore, the instrument not only evaluates knowledge, attitudes, and behaviors but also adapts to the respondents' context whether individuals or informal business actors/MSMEs. Consequently, the measurement of SFL becomes more comprehensive, reflecting levels of understanding, social responsibility, and readiness to engage with green economic challenges.

Table 6. Measurement Scale: Ratio Type

Variable	Measurement Scale	Source
ESG Score (E, S, G)	Interval / Ratio (depending on the ESG data source)	(Tulya et al., 2025)
SCS Score	Interval / Ratio	
BDIV_RATIO (female board ratio)	Ratio (proportion of female members to total board members)	
BNUM (board number)	Ratio (number of individuals)	
EBITUSD	Ratio (financial value in USD)	
TVA (trading volume activity)	Ratio (number of shares traded)	

Source: Authors' analysis, 2025

From the investor's perspective, the ratio measurement scale table reflects the key variables used to evaluate a company's sustainability performance and investment potential. The ESG Score and SCS Score serve as primary indicators for assessing the extent to which a company integrates environmental, social, and governance (ESG) principles into its operations. The board diversity ratio (BDIV_RATIO) and number of board members (BNUM) represent aspects of good governance and gender representation, both of which have become critical considerations in sustainable investment decisions. Meanwhile, financial variables such as EBITUSD indicate a company's profitability, while TVA illustrates its liquidity level and market interest in the company's stock. The combination of these indicators enables investors to assess the balance between financial performance and sustainability commitment, thereby supporting more responsible and long-term oriented investment decisions.

4.4 Discussion

The analysis of various measurement models indicates that quantitative approaches dominate research on SFL. Most previous studies employed nominal scales through multiple-choice questions to assess respondents' factual and conceptual understanding of sustainable finance concepts . Each correct answer is typically assigned a specific score, with the total score representing the individual's literacy level. This approach allows researchers to obtain objective and measurable results, particularly in evaluating fundamental knowledge such as the definition of ESG, green financial product regulations, and basic financial competencies like compound interest and inflation comprehension. Moreover, this model is highly adaptable and applicable across different populations, including the general public, students, and small business owners.

In addition to nominal scales, SFL measurement frequently utilizes ordinal scales through Likert-type items to assess attitudes, perceptions, and behaviors toward sustainable finance. This approach enables researchers to evaluate the extent to which respondents agree with, understand, or apply sustainability principles in financial decision-making. The measured dimensions often include the integration of sustainability values in education, ethical financial behavior, and the readiness of individuals or institutions to support the green economy. The combination of nominal and ordinal scales renders SFL measurement holistic, as it captures not only cognitive abilities but also affective commitment and behavioral engagement in supporting sustainability. Hence, SFL can be interpreted as a multidimensional competency that evolves from awareness to concrete action (Negi et al., 2025).

Furthermore, from the perspective of investors and corporate analysis, ratio-based measurements are employed to evaluate the sustainability performance of companies targeted for investment. Variables such as ESG Score, female board ratio (BDIV_RATIO), EBITUSD, and trading volume activity (TVA) illustrate the balance between corporate financial performance and social responsibility. This approach highlights the relationship between SFL and the ability of investors to interpret corporate sustainability indicators. By integrating nominal, ordinal, and ratio-based measurements, studies on SFL have succeeded in presenting a comprehensive understanding that spans from individual knowledge levels to corporate sustainability practices. This integrated approach reinforces the significance of SFL as a foundation for responsible and sustainability-oriented financial decision-making (Fu & Tai, 2025). Investors can examine several aspects before making investment decisions, such

as the GRI/CSR reports and the ESG Disclosure Score (Strauss et al., 2023; T. Dai, 2025; Strauss et al., 2023; Pašiušienė et al., 2024)

5. Conclusion

Based on the results of the bibliometric and conceptual analyses, this study demonstrates that the topic of SFL remains relatively new yet is gaining significant global attention particularly within the context of integrating financial, social, and environmental aspects toward sustainable development. The dominance of publications originating from China and leading academic institutions such as Jiangsu University reflects the concentration of research in regions with strong funding capacity and academic infrastructure. The most active research areas related to SFL are Environmental Science and Social Sciences, indicating that the issue of financial literacy has evolved beyond the traditional economic domain toward an interdisciplinary approach. Conceptually, SFL is defined as the ability of individuals to understand and implement financial decisions that are responsible and aligned with ESG principles. Empirically, SFL is measured through ordinal, nominal, and ratio scales, encompassing cognitive, affective, and behavioral dimensions of sustainable financial practices. These findings highlight SFL's critical role as a foundation for the transition toward a green, inclusive, and ethical economy.

The primary limitation of this study lies in the uneven geographical and linguistic distribution of the analyzed publications, as most SFL literature originates from developed countries or East Asian regions and is predominantly published in English. This creates a potential representation bias regarding the contexts of developing countries and non English speaking communities. Furthermore, although several SFL measurement models were identified, a methodological limitation also arises from the inconsistency between the types of measurement scales used. Nominal data collected through multiple-choice or scoring formats may not align statistically with other variables measured on an ordinal or interval scale, potentially affecting the validity of the analysis. This issue can be mitigated by applying data standardization techniques such as z-score transformation or by employing mixed-method approaches that allow for a more consistent integration of different measurement types.

Future research is therefore recommended to translate these findings into practical applications by developing and implementing more comprehensive, context-sensitive, and operational SFL measurement instruments. Such tools should be capable of assessing sustainable financial literacy across different societal groups from individuals to entrepreneurs while capturing the multidimensional nature of financial sustainability. In addition, cross-country comparative studies are needed to evaluate the levels and characteristics of SFL across various economic, social, and cultural contexts. This approach will deepen the global understanding of SFL and strengthen collective efforts toward fostering an inclusive and sustainable economic development.

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