



## **A SYSTEMATIC LITERATURE REVIEW ON ARTIFICIAL INTELLIGENCE FOR A SUSTAINABLE FINANCE**

**SARANYA ARUNKUMAR**

Samy Project Hub Hyderabad, Hyderabad, India

### **Abstract**

Sustainable finance is one of the innovative financial instruments that are more well-known to stakeholders worldwide. In sustainable finance, utilizing environmental, social, and good governance factors to make financial sense with an intention to improve the environment and society. Artificial intelligence (AI) is one of the pivotal technologies that support the financial sector. Such support makes the sector find out profitable investment opportunities that adhere to socially and environmentally sound principles in the financial market. This helps to build strong, resilient investment portfolios and to advance economic and environmental sustainability. Though AI reshapes the finance industry, long-term sustainability is also a serious concern in the industry. Research on sustainable finance and AI has attracted a lot of attention in recent days. Studies have been conducted on bibliometric analysis in AI in the sustainable finance area. These studies relied only on the EBSCO database, which may not analyse some recent advancements in the area. The present study finds a gap in that AI in sustainable finance has not been thoroughly examined. Thus, the aim of the study is to address the gap by conducting a systematic literature review on AI in sustainable finance between 2014 and 2024. This study has utilized the Scopus and Web of Science databases to map the evolving nexus between AI and sustainable finance. Academic articles with a focus on "Artificial Intelligence" and "sustainable finance" are selected using predefined search terms. The selection of articles from the database followed strict inclusion and exclusion criteria. Academic publications indexed in these databases are analysed using R and VOS viewer. The results show how AI in sustainable finance has attracted a lot of attention over 10 years. Also, it shows the new emerging research topic areas and the primary publications and the geographic



distribution according to research context. Finally, this study provides a valuable insight to stakeholders who see sustainability as a crucial aspect.

**Keywords:** Artificial Intelligence, Sustainable finance, Systematic literature review

## Introduction

Sustainable finance is an integration of environment, social governance (ESG) and finance (Edmans & Kacperczyk, 2022). ESG is a critical concern for the financial sector when making financial decisions. For example, considering biodiversity, promote a circular economy and reduce pollution through sustainable practices in the organisation. Adoption of practices enhances day-to-day operations of the organisation. The objective of sustainable finance is to protect the environment, conserve resources and promote sustainable development (Zeng & Zhang, 2024). (Kumar et al., 2025) categorised sustainable finance as socially responsible investing, green investing, climate investing, impact investing, energy financing, carbon and sustainable financing. Utilising the preceding stated investment options, allocating funds for environmentally beneficial projects such as energy-efficient innovations, renewable energy projects and eco-conscious infrastructure development with an intention not only to address environmental issues but also to align financial goals with sustainability objectives (Zeng & Zhang, 2024). This enhances an economic and financial performance which influences the environment and society in a positive way (Almaqtari et al., 2024). As a result, it is now a crucial tool to enhance sustainability.

Artificial intelligence (AI) is a cornerstone in advancing sustainable finance (Elhady & Shohieb, 2025), as it has the ability to analyse vast amounts of data, enhance resource efficiency, increase the capacity of renewable energy sources (Zeng & Zhang, 2024) and spot patterns which are more accurate than human comprehension (Bai R. et al., 2024). The utilisation of AI technologies such as machine learning, deep learning, predictive analytics, big data (Davidescu et al., 2025), natural language processing, computer vision (Dou et al., 2025), the internet of things, blockchain (Nandini et al., n.d.), and data analytics (Elhady & Shohieb, 2025) in sustainable finance is offering promising solutions as it diminishes carbon emissions, improves energy efficiency (Zeng & Zhang, 2024), enhances scalability and real-time analytics (Elhady & Shohieb, 2025), and is a key driver of sustainable growth (Ma et al., 2025). The



benefits of AI in sustainable finance are as follows: The application of advanced tools and algorithms in sustainable finance instruments helps to optimise asset allocation, portfolio construction, and risk management. Utilising AI-powered platforms assists in enhancing transparency & accountability, reduces the risks, protects the financial stability of investors, and optimises decision-making (Bai R. et al., 2024). The utilisation of AI tools enhances the effectiveness, accuracy and efficiency (Davidescu et al., 2025) of ESG. As a result, this boosts investors' trust in sustainable finance products, which opens up new opportunities for sustainable investments. (Remya & Amutha, 2024).

Previous studies have highlighted that there have been significant changes in the financial sector due to an advancement in technology (Bai R. et al., 2024a; Dou et al., 2025; Musleh Al-Sartawi et al., 2022a; Remya & Amutha, 2024). AI is a powerful tool that assists in optimising resources effectively (Nandini et al., n.d.-a) and enhances long-term financial sustainability (Dou et al., 2025; Elhady & Shohieb, 2025; Musleh Al-Sartawi et al., 2022a; Remya & Amutha, 2024). These can be achieved with bibliometric analysis (Almaqtari et al., 2024; Davidescu et al., 2025a; Dou et al., 2025; Fotova Čiković et al., 2025a; Kumar et al., 2025; Musleh Al-Sartawi et al., 2022a; Remya & Amutha, 2024). Studies have highlighted that they relied on a single database (Web of Science), which lacks the depth of contextual interpretation in the field. There is a lack of studies highlighting the contextual insights about AI and sustainable finance. The study finds a gap in that AI in sustainable finance has not been thoroughly examined. The purpose of the study is to conduct a systematic literature review on AI in sustainable finance. This study assists in knowing how the field has been developed over time. Thus, a systematic literature review has been conducted with 232 articles on the field in the Scopus and Web of Science databases from 2014 to 2024.

The contribution of the study is to increase the understanding of AI in sustainable finance through a systematic literature review. This provides foundational information to new researchers and investors to understand what is actually happening in the field. Also, the study assists in finding out the articles and potential contributors for the field of research. This study helps to find out the region where the studies have been ignored. Finding out the most important region helps to open avenues for further research.



This article is organised into five sections: The section begins with an overview of AI and sustainable finance. Section 2 presents the previous literature studies relating to AI in sustainable finance. Section 3 deals with methodology. Section 4 deals with results. The final section presents the conclusion, limitations of the study and scope for further research.

## 1. Literature review

Sustainable finance is a rich field of research, as it attracts the interest of researchers, scholars and policymakers (Davidescu et al., 2025a; Edmans & Kacperczyk, 2022; Elhady & Shohieb, 2025; Kumar et al., 2025; Musleh Al-Sartawi et al., 2022a; Remya & Amutha, 2024; Zeng & Zhang, 2024). The integration of sustainable finance and AI is a rapidly growing sector, as it offers solutions to sustainable issues (Musleh Al-Sartawi et al., 2022). A recent study conducted by Bai R. et al. (2024) focused on measuring the usage of AI tools in sustainable finance investment decision-making. According to the outcome, utilising models like predictive analytics, NLP and machine learning offers insights about the financial instruments to the investors. Models assist in predicting long-term sustainable risks, finding out opportunities and enhancing ethical and knowledgeable investment decision-making. A bibliometric study has been adopted by Davidescu et al. (2025) to assess the integration of AI and sustainable finance between 2004 and 2025. This study relied only on the Web of Science and found out the results that the most dominating countries are China and the USA in the field. Also, the dominating sources are Sustainability and the Journal of Cleaner Production, which give emphasis to sustainability and its relevance issues. Also, thematic analysis reveals that the model supports finding out the reliable ESG and making sustainable finance strategies. Most of the applications are found in risk modelling, AI-driven reporting and climate analytics. Similarly, Fotova Čiković et al. (2025) conducted a study with the Web of Science database to find out the science mapping and research hotspots of AI and sustainable finance. The author has found that China, Vietnam and the UK are the dominating countries in the field. The most relevant journals, including Energy Economics and Finance Research, show the strong research that has been conducted in the field. Thematic analysis reveals that emissions and environmental health, institutional and technological infrastructure, green innovation and urban sustainability. Apart from this, a literature study was conducted

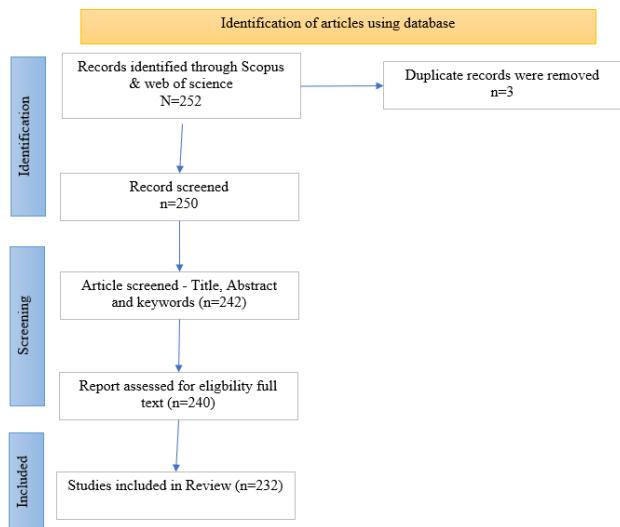


by Nandini et al. (n.d.) to understand the usage of AI in the sustainable finance sector. The author stressed that due to more attention to sustainability, the importance of SDGs increased and forced the organisation to implement sustainable practices in day-to-day operations. Also, advancements in AI transformed the finance sector, and it enhances innovation, offers new products, improves user-friendly services and offers cost-effective transactions. As observed from these studies, bibliometric studies offer limited information about AI and sustainable finance. They give more emphasis to mapping and trends but less emphasis to the applications of AI in sustainable finance. In addition, Davidescu et al. (2025) and Fotova Čiković et al. (2025) conducted the studies with the Web of Science database. The present study makes a unique contribution to integrating the Web of Science and Scopus databases to assess the trends in them. Also, Nandini et al. (n.d.) highlight that there is a lack of systematic studies on AI and sustainable finance. Following the knowledge, the present study finds a gap and understands the contextual insights about AI and sustainable finance.

## 2. Methods

This study has used systematic literature review (SLR). SLR is a well-planned analysis that finds out, selects and critically evaluates the results of previous studies and gains insight about reliable and high-quality outcomes. The present study has followed Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) to select the articles for the process. The primary reason for adopting the PRISMA framework is to ensure reproducibility and transparency in the process. This study has utilised the Scopus and Web of Science databases to select and filter the publications from the selected database, and the description of the process is illustrated in Figure 1.

**Figure 1**  
**PRISMA Framework**



This study has accessed high-quality academic articles from the Scopus and Web of Science databases. The article selection is based on selected keywords: “artificial intelligence” and “sustainable finance”. Research articles were considered, and it should be reported in the English language. The study limits the article search between 2014 and 2024. All the selected articles from both databases have been saved in the .bib extension. These articles have been merged in RStudio and further assessed with the bibliometric library.

### 3. Results

This section sheds light on the formal side of the literature that investigates AI in sustainable finance. This shows the distribution of articles by year of publication, journals and geographical location.

#### 3.1. Descriptive statistics

This study analysed the research articles for the period between 2014 and 2024. Academic material has been collected from 60 sources wherein 71 documents were retrieved from the database. This indicates that there is a robust growth pattern with a yearly rise of 10.41%. The average age of the articles is 1.1 years. The citation of each work is 4.789 times, which indicates a slow influence throughout the academic community. The articles are diverse, with 100 keywords plus 179 author-contributed keywords. According to the database information, there are 328 authors, and the contribution of single authors in publications is 8



articles only. On the whole, 232 articles that offer a thorough analysis about trends and publications made in the field.

**Figure 2**

**Descriptive statistics**

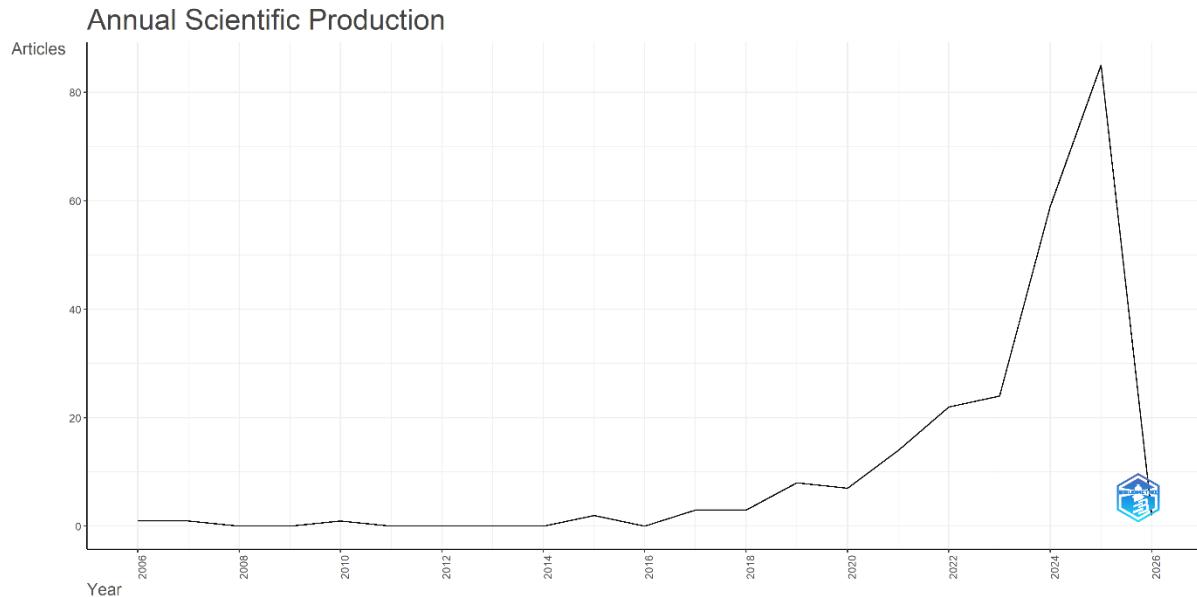
Timespan	2006:2026		Sources	159		Documents	232		Annual Growth Rate	3.53 %	
Authors	790		Authors of single-authored docs	31		International Co-Authorship	32.76 %		Co-Authors per Doc	3.79	
Author's Keywords (DE)	965		References	0		Document Average Age	1.84		Average citations per doc	17.1	

**3.2. Distribution of articles production over time**

Figure 2 illustrates that the academic interest in AI in sustainable finance has grown between 2021 and 2024. The total production of articles during the period was 119, with an average annual growth rate of 78%. This indicates that there is an increasing trend in the field of the study in recent years.

**Figure 3**

**Distribution of articles production over time**

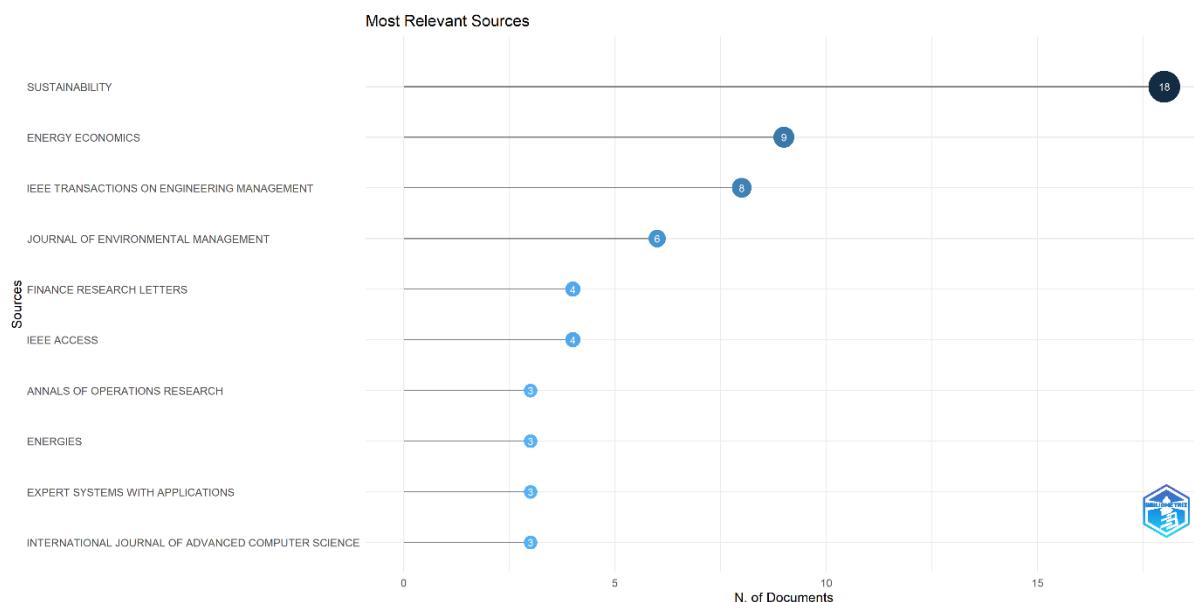


**3.3. Distribution across sources**

The top listed sources in relation to AI in sustainable finance are listed in Figure 4. Sustainability is the top leading source with the highest number of publications (8%) and has an H-index of 9, which represents that at least 7 publications were made in the journal that has received a total of 538 citations. This demonstrates academic significance and the effect of published content in the field. The second is Energy Economics (4%), which published five articles (H-index = 5) with a total of 163 citations. The third contributing source was IEEE Transactions on Engineering Management (3%), which has published only three articles, yet the total citations were 309, indicating the role of the journal in contributing the content in research.

**Figure 4**

**Sources**

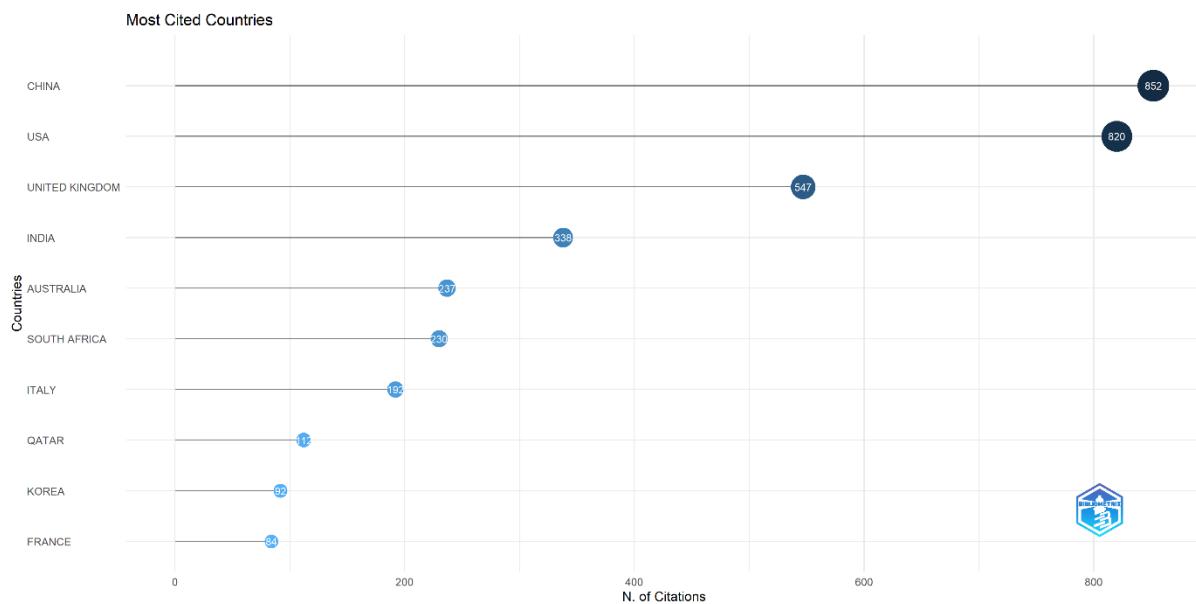


### 3.4. Distribution across geographical countries

Figure 5 shows the top countries that made contributions in the field. This shows that most of the contribution has been made by Asia (98%). In Asia, the majority of studies have been conducted in China (72), India (13), Qatar (4) and Korea (4). China has produced 72 articles, and an outstanding total citation count of 852 makes them a standout performer. Although Australia has produced only 2 articles, the total citation count is 237, and the average citation is 118.50, which indicates a significant impact of articles in the field. The results

indicate that the contribution of developing nations is quite higher than that of the developing nations.

**Figure 5**  
**Distribution across geographic countries**



### 3.5. Keywords

Figure 6 shows the geographic distribution of exact keywords as determined by the Scopus and Web of Science search engines. According to the figure, the most dominant keywords related to AI in sustainable finance are namely 'artificial intelligence', 'finance', 'machine learning', 'sustainability', 'fintech', 'green finance', 'sustainable development', 'deep learning' and 'ESG'. Although machine learning and deep learning dominated the field, 'fintech' is the most predominantly used keyword in the research.

**Figure 6**

## Keywords



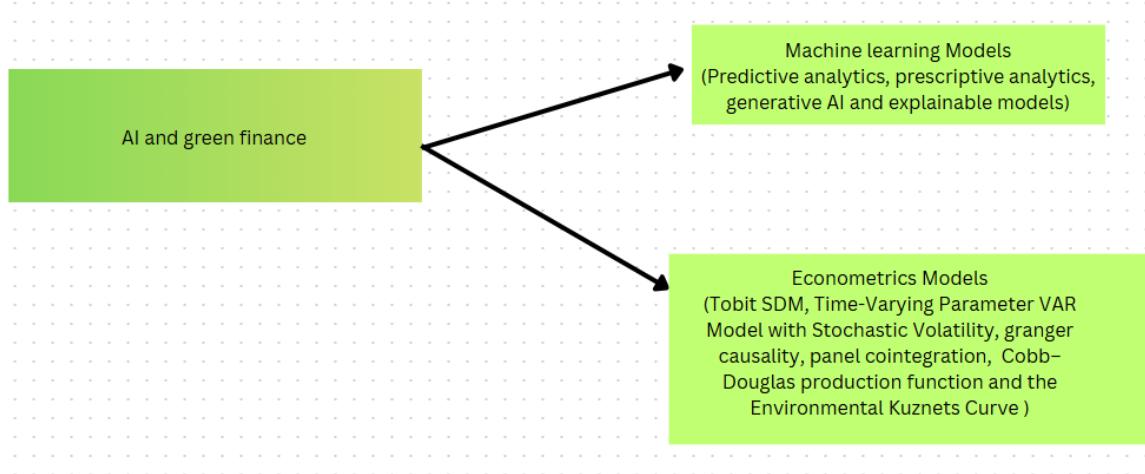
### 3.6. Relationship between AI and sustainable finance

This study measures the relationship between AI and green finance with machine learning and econometric models. Firstly, machine learning models can be used to measure the linkage between the variables. The literature has highlighted that several models, including random forest, gradient boosting tree, stacked ensemble model, voting ensemble model, XGB and LGBM, are used to predict credit ratings, market trends and ESG-related risks in the market. Prescriptive models are used for scenario simulations. Also, a very few deep learning models have been used in green finance. Attention-based CNN is used to find out the important factors that influence the growth of green finance, whereas LSTM assists in predicting real-time stock price predictions. As a result, the models support informed decision-making.

Secondly, econometric models like the Tobit SDM, the time-varying parameter VAR model with stochastic validity, Granger causality, panel cointegration, and the Cobb-Douglas production function. These models focused more on enhancing the relationship with the green finance instruments. The development of AI offers a huge amount of investment that prioritises technological advancement over long-term ESG investments and lower emissions and accelerates economic growth. On the other hand, Taghizadeh-Hesary (2025) concluded that accessing finance did not lower sustainable consumption. Consequently, econometric models have shown a relationship exists between AI and green finance, and it supports enhancing the flow of investment in the market.

Figure 7

## Relationship between AI and Green finance



### 4. Conclusion

The study focuses on conducting a systematic literature review on AI and sustainable finance between 2006 and 2026. The current study on AI and sustainable finance makes a significant contribution in combining information and emphasising key papers, important sources and authors which are examined under R software. Asia is the most scholarly contributing continent for research work in AI and sustainable finance. The engagement of Asian countries like China, India, Qatar and Korea is expanding greatly. Most publications belonged to sustainability, energy economics and IEEE, who offer a roadmap that assists academicians and professionals in understanding what already exists in the market. According to the findings, studies have utilised machine learning models and deep learning models to measure the relationship between AI and sustainable finance. The outcome offers insights to understand the factors that support the growth of sustainable finance and helps the investors to make informed decisions. Also, econometric models assist in knowing the flow of investment, especially in sustainable finance, and a mixed outcome is observed; some may agree that investment reduces carbon emissions, while others don't. Considerably, further work needs to be done to establish an econometric relationship between AI and green finance.

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