Acta Tecnología - International Scientific Journal about Technologies
Volume: 11 2025 Issue: 1 Pages: 39-49 ISSN 2453-675X

https://doi.org/10.22306/atec.v11i1.277 Received: 06 Mar. 2025; Revised: 15 Mar. 2025; Accepted: 28 Mar. 2025

Shaping sustainable agribusiness through ESG: a bibliometric study

Matus Panko
Department of Banking and Investment, Faculty of Economics, Technical University of Košice, Nemcovej 32, 040 01 Košice, Slovak Republic, EU, matus.panko@tuke.sk
Jozef Glova
Department of Banking and Investment, Faculty of Economics, Technical University of Košice, Nemcovej 32, 040 01 Košice, Slovak Republic, EU, jozef.glova@tuke.sk (corresponding author)

Keywords: ESG, corporate-social responsibility, sustainability, climate-smart business, bibliography.
Abstract: The integration of Environmental, Social, and Governance (ESG) principles has become increasingly important in the agribusiness sector, which faces significant challenges related to sustainability, resource management, and social responsibility. This study explores the motivations and implications of adopting ESG practices within agribusiness, highlighting how these practices can support both environmental stewardship and corporate resilience. This study provides a comprehensive bibliometric analysis of research publications concerning ESG from 2000 to 2023. The analysis aims to evaluate the current state of knowledge, identify prevailing trends, and uncover existing research gaps. Utilising a dataset comprising 3874 research publications retrieved from the Web of Science database, the findings indicate a substantial growth in ESG-related research, underscoring an increased global awareness of critical challenges. Through a review of relevant literature, the research analyses the role of ESG across three key pillars: the environmental impact of agricultural activities, social considerations such as fair labour practices and community engagement, and governance aspects related to transparency and accountability. The findings suggest that companies that prioritize ESG principles are better equipped to meet the growing expectations of stakeholders, including investors, consumers, and regulatory bodies, while also enhancing their competitive position in the market. Additionally, the study emphasizes the importance of climate-smart agriculture and effective governance in addressing the sector's complex challenges. Ultimately, the research underscores the critical role of ESG integration in promoting sustainable development and long-term viability for agribusinesses.

1 Introduction

In recent years, the integration of Environmental, Social, and Governance (ESG) principles into the business practices of various industries has gained significant attention, with the agribusiness sector standing out as one of the most critically impacted. The agribusiness industry plays a vital role in global food security and economic development, but it also exerts significant pressure on natural resources, ecosystems, and local communities. Consequently, the adoption of ESG practices in this sector has become increasingly important for ensuring sustainability and long-term corporate viability. This document provides an overview of the relationship between ESG principles and agribusiness, focusing on the motivations behind this integration and the implications for companies operating in this sector. The environmental, social, and governance pillars of ESG each present unique challenges and opportunities for agribusinesses, and this article explores the relevant literature to understand how companies are responding to these pressures.

Agribusinesses, due to their reliance on natural resources, are at the forefront of sustainability challenges, particularly as global demand for food increases in the face of climate change and resource depletion. Companies that operate within the sector are increasingly required to address their environmental impact, labour practices, and governance structures to meet the growing expectations of investors, consumers, and regulators [1,2]. Moreover, the rise of socially responsible investing (SRI) and the prioritization of ESG criteria by institutional investors have further driven agribusinesses to integrate these principles into their operations to remain competitive and resilient [3]. This article reviews the current state of ESG in the agribusiness sector by analysing the environmental, social, and governance pillars, presenting findings from various studies, and discussing the theoretical implications of ESG integration for this critical industry.

2 Literature review

The environmental pillar of ESG is critically important in agribusiness, as agricultural activities significantly impact ecosystems and natural resources. The agribusiness sector is a major contributor to environmental degradation, including deforestation, water pollution, and biodiversity loss [4]. These impacts are often driven by unsustainable agricultural practices, such as the excessive use of pesticides, fertilizers, and water. According to Zeng and Jiang [3], environmental performance directly affects the outcomes of companies in the agricultural and forestry sectors, underscoring the need for sustainable practices.

Consequently, companies in this sector face increasing pressure to adopt more sustainable agricultural practices that minimize their environmental footprint. One such approach is organic farming, which reduces reliance on

synthetic chemicals and promotes soil health and biodiversity conservation. Companies that adopt these practices not only reduce their ecological impact but also gain a competitive advantage by appealing to environmentally conscious consumers and investors [5]. Alsayegh et al. [6] further emphasize that ESG disclosure can transform a company's sustainability performance, highlighting the importance of transparency in environmental initiatives.

The importance of climate-smart agriculture (CSA) as a framework for addressing environmental challenges in agribusiness is well recognized [7]. CSA aims to enhance agricultural productivity while reducing greenhouse gas emissions and increasing resilience to climate change. However, the adoption of CSA practices remains relatively low due to various barriers, including financial constraints, lack of technical knowledge, and insufficient policy support. Gemtou et al. [8] provide a systematic review identifying the decision-making factors that influence farmers' adoption of CSA, stressing the need for supportive policies and education.

Governments and industry stakeholders must collaborate to create incentives, such as subsidies and training programs, to promote the widespread adoption of CSA practices. This is supported by Wang and Sun [9], who found that the intensity of environmental regulation and ESG performance can influence firms' green innovation. Beyond these policy measures, technological innovation, such as precision agriculture and the integration of renewable energy, is crucial for enhancing the environmental sustainability of agribusiness. Fazrakhmanov et al. [10] discuss the integration of ESG principles in agribusiness management technologies, emphasizing technological advancements as a key factor.

Moreover, Velten et al. [4] discuss the broader implications of sustainable agriculture for global food systems, emphasizing the need for a systemic approach that considers both environmental and social factors. Sustainable agricultural practices, such as crop rotation, agroforestry, and the use of renewable energy sources, can help mitigate the sector's environmental impact while ensuring long-term food security. These practices not only contribute to environmental sustainability but also provide economic benefits by reducing input costs and improving crop yields.

The social pillar of ESG is equally critical in the context of agribusiness, as it encompasses labor practices, community engagement, and the overall social impact of agricultural operations. Fair labor practices and community development initiatives significantly contribute to the social sustainability of agribusinesses [11]. Research indicates that companies that prioritize worker welfare, ensure fair wages, and engage with local communities tend to experience improved productivity and stronger stakeholder relationships. This, in turn, enhances the company's reputation and reduces the risk of labor disputes, which can be costly both financially and in terms of public image. Amaral et al. [12] specifically analyse the impact of the social pillar of ESG on sustainability, emphasizing its importance in corporate performance.

The role of gender diversity on corporate boards is another important social consideration. Although this aspect is not directly covered in the provided sources, Alsayegh et al. [6] and Aguilera et al. [11] touch upon social aspects that include diversity and inclusion as part of ESG performance. Companies with greater diversity on their boards are more likely to excel in ESG metrics, particularly in the social and governance dimensions. Diverse boards are better equipped to address a broader range of social issues, such as gender equality, workplace safety, and community development. This diversity of perspectives leads to more comprehensive ESG strategies and improves decision-making processes, ultimately benefiting the company's long-term sustainability.

Socially responsible investment (SRI) increasingly focuses on companies that demonstrate strong labour practices, as these companies are perceived as lower-risk investments with potential for long-term growth [13]. In the agribusiness sector, where labour conditions can vary significantly depending on geographic location and local labour laws, ensuring fair and equitable treatment of workers is essential for maintaining social sustainability.

The governance pillar of ESG is foundational for ensuring that agribusinesses operate with transparency, accountability, and integrity. Governance structures determine how companies manage risks, comply with regulations, and engage with stakeholders. Strong governance is particularly important in agribusiness, where companies often face complex challenges related to supply chain management, environmental compliance, and social responsibility [14]. Effective governance practices, such as board diversity, ethical leadership, and robust internal controls, enable companies to navigate these challenges and maintain their social license to operate.

The growing importance of ESG reporting in the agribusiness sector has been highlighted in recent studies [15]. Transparent ESG reporting practices not only improve a company's accountability but also attract investors who prioritize sustainability. Au et al. [16] map the landscape of ESG strategies and recommend that future research focus on improving ESG reporting standards. Companies that regularly disclose their ESG performance are better positioned to build trust with stakeholders and demonstrate their commitment to sustainable business practices. ESG reporting is also a key tool for identifying areas for improvement, as it allows companies to benchmark their performance against industry standards and set measurable goals for future progress.

The strategic implications of governance in the agri-food industry are crucial for effectively managing ESG risks [17]. Strong governance structures not only support environmental and social initiatives but also enhance the overall resilience of agribusinesses to external shocks, such as regulatory changes and supply chain disruptions.

The relationship between ESG practices and financial performance is further examined by Tancke et al. [18], focusing on car manufacturers. Their findings demonstrate that strong ESG practices enhance financial performance, suggesting that ESG is not only a compliance requirement but also a strategic asset that can lead to improved profitability. Liu et al. [19] similarly emphasize the positive impact of ESG on financial performance in specific regions, highlighting the broader financial benefits of strong ESG adherence.

Government policies also play a significant role in shaping ESG performance in businesses. Yan et al. [20] provide evidence from natural resource accountability audits in China, showing how government environmental regulation influences corporate ESG performance. This is further supported by Wang and Sun [9], who discuss the substitution effect of environmental regulation intensity and ESG performance on firms' green innovation.

In the context of agribusiness, integrating ESG principles into management technologies is essential. Fazrakhmanov et al. [10] discuss how ESG principles can be applied in agribusiness management technologies, emphasizing the need for technological advancements that support sustainability goals.

Finally, geographical factors impacting agribusiness are considered by Yue et al. [21], who study the effect of geographic distance on domestic trade in the U.S. green industry. Their findings suggest that governance strategies should consider geographic considerations to optimize supply chain management and sustainability outcomes.

3 Methodology and data

Although a literature review and theoretical background are essential for understanding the context and foundational principles of a research topic, they often lack the systematic and quantitative rigor needed for a comprehensive assessment of the state of research within a field [22]. Bibliometric analysis complements these approaches by providing a structured, data-driven evaluation of the research landscape. Unlike literature reviews, which identify gaps through qualitative synthesis, bibliometric analysis highlights underexplored areas and research opportunities by mapping the intellectual structure of a field, such as co-citation networks or keyword trends [23]. Moreover, bibliometric tools enable the visualization of connections between authors, institutions, and journals, offering a holistic view of the collaborative and geographical dynamics that shape the research domain.

The method of textual analysis, introduced by Callon et al. [24], has become a crucial tool for researchers across various disciplines. This approach facilitates the analysis and visualization of the bibliometric structure of numerous topics. It has gained traction not only among researchers but also among librarians, as it aids in the exploration of large datasets of scientific publications, revealing hidden patterns and trends.

One of the prominent tools used in this analysis is the VOSviewer software, which, according to van Eck and Waltman [25], allows users to generate and visualize bibliometric maps of scientific literature. The software simplifies navigation through the intricate realm of academic publications, offering a clear perspective on contemporary trends and patterns in a specific research area. It enables the creation of maps that illustrate the relationships between academic fields, authors, institutions, and other components of the scientific community.

Table 1 Filter settings on the Web of Science platform

	Description	**No. of documents**
Keywords	agriculture, ESG index, ESG ratings, ESG score, Environmental Social and Governance score, ESG, Corporate Social Responsibility, Environmental Social and Governance index, Environmental Social and Governance performance, corporate social responsibility, financial performance, sustainable development, biodiversity, technology and innovations, carbon footprint, climate change, resource management, regenerative agriculture, ecological footprint, carbon neutrality, soil health, circular economy, food safety and quality, and water management	152 301
1st filter	Management, Business, Business Finance, Economics, Operational Research Management Science, Public Administration, Mathematics, Multidisciplinary Sciences, Mathematics Interdisciplinary Applications, Mathematics Applied, and Public Environmental Occupational Health.	14 764
2nd filter	Year 2000 - 2023	14 643
3rd filter	English language	14 384
4th filter	Article	13 058
5th filter	Open access	3 874
Final sample	The total number of the documents	3 874

VOSviewer employs various analytical and visualization techniques, such as co-occurrence word algorithms, bibliographic coupling, and co-authorship algorithms, as explained by van Eck and Waltman [26]. These techniques allow for the creation of highly detailed maps, which can be adjusted to emphasize particular features or relationships within the scientific domain.

It is essential to recognize that the outcomes of bibliometric analysis using VOSviewer do not represent an endpoint but rather a component of a broader analytical process. A comprehensive analysis of patterns and trends shown in the maps enables researchers to draw conclusions about the research environment, identify key thematic clusters, important academic fields, prominent scientific institutions, or leading authorities in a given area of research.

After conducting an extensive review of the relevant literature, twenty-three key terms were identified, with which we filtered out a total of 152 301 publications, to which we subsequently applied a series of several filters (the data filtering process is presented in Table 1). This process resulted in a final data set containing 3 874 publications.

These keywords were selected for bibliometric analysis as they comprehensively cover the key areas of ESG within the context of agriculture and sustainability. They include fundamental ESG concepts (indices, ratings, performance), the relationship between ESG and financial performance, specific environmental challenges (biodiversity, carbon footprint, climate change), and crucial technologies and innovations necessary for enhancing sustainability. The selection also reflects the interdisciplinary nature of ESG, integrating environmental, social, and economic dimensions, which facilitates the identification of trends and research gaps in this domain.

4 Web of Science research results

The analysis of scientific publications from 2000 to 2023 reveals a distinct upward trend in the volume of research within the studied scientific field. The academic interest in ESG has shown a steady increase, transitioning into exponential growth, as illustrated in Figure 1.

In 2000, no articles on this subject were published, but by 2010, this number had increased to 31, reaching a peak of 693 articles in 2022. This growth in publication activity may have been driven by several factors, such as shifts in funding and research support policies, technological advancements, and the progressive development of sustainability criteria.

Although the observed trend presents a promising outlook for the growth and expansion of scientific knowledge, it is essential to recognize that this trend remains subject to potential fluctuations due to a range of external and internal factors. Economic recessions, political shifts, or natural disasters may impact research funding and priorities, potentially leading to a deceleration in publication rates. Conversely, technological advancements, such as the emergence of new data analysis methods or progress in artificial intelligence, could substantially accelerate research activities and improve the efficiency of publishing.

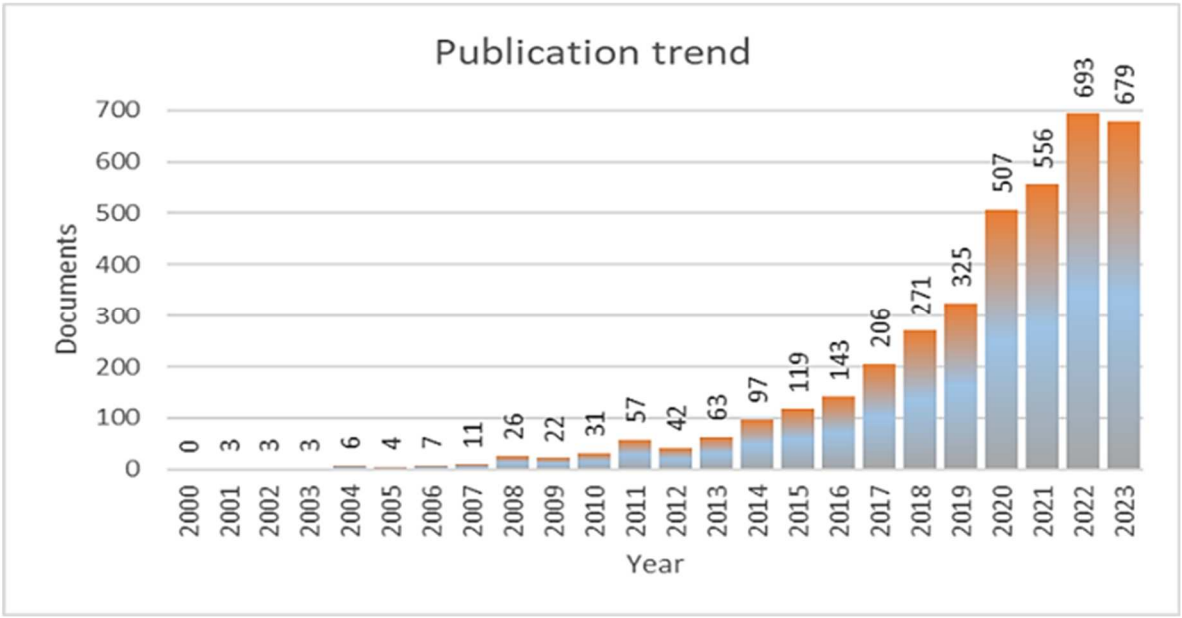

Figure 1 Publication trend

While the current data suggest a positive trajectory, they do not provide a conclusive basis for predicting the sustained increase in publications. Ongoing monitoring of publication trends and adapting to evolving conditions will be critical for maintaining progress and ensuring that research remains relevant within the academic sphere.

Table 2 The number and share of individual countries in publication activity focused on ESG

	Country	No. of documents	% of a publication
1	United Kingdom	881	22.74%
2	USA	579	14.95%
3	Spain	332	8.57%
4	China	327	8.44%
5	Italy	258	6.66%
6	Australia	243	6.27%
7	Germany	222	5.73%
8	France	216	5.58%
9	Netherland	180	4.65%
10	Malaysia	164	4.23%
38	Slovakia	45	1.16%

Based on data from the Web of Science platform, the United Kingdom has the highest share of published scientific articles, representing 22.74% of all works. The United States follows, contributing 14.95% and ranking second. Other countries also exhibit a relatively balanced presence in scientific output, including Spain with 8.57%, China with 8.44%, and Italy, which accounts for 6.66% of the total publications. Australia, Germany, and France also hold notable positions in the global scientific landscape, contributing 6.27%, 5.73%, and 5.58%, respectively. Netherlands and Malaysia complete the list of the top ten countries with contributions of 4.65% and 4.23%.

Slovakia, while not a global leader, contributed approximately 1.16% of all scientific articles, positioning it 38th overall. This ranking reflects Slovakia's active engagement in the international scientific community. However, there is a significant difference in scientific output between leaders such as England and the USA, and other countries, highlighting geographical and possibly financial inequalities in access to scientific resources and publishing (Table 2).

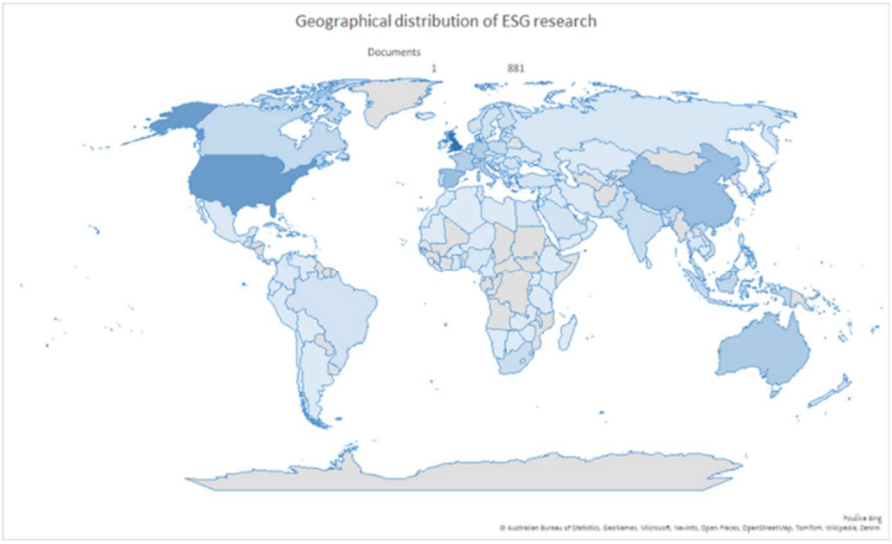

Figure 2 Geographical distribution of ESG research

The analysed dataset encompasses 123 countries (Figure 2), offering a comprehensive view of the global distribution of scientific publications. This broad scope provides valuable insights into how different countries contribute to the advancement of global knowledge. The data are essential for understanding the dynamics of the international scientific community and may serve as a foundation for further research into the influence of geographic and economic factors on scientific productivity.

The category of Business is the most prominent, encompassing 1 078 articles, which constitutes 27.82% of all publications. This indicates that a significant proportion of the research articles fall within the business studies domain, suggesting a strong focus on topics like corporate strategies, market analysis, and organizational behaviour.

Following closely is the Management category, which includes 1 072 articles, representing 27.66% of the total publications. This substantial share highlights the emphasis on management research, including studies on leadership, operations, and organizational dynamics. Together, Business and Management account for more than half of the total publications, showing their pivotal role in the research community's interests.

The third most significant category is Economics, with 841 articles, making up 21.70% of the dataset. This reflects a continued interest in economic theories, policy analysis, and economic impacts on various aspects of society. The substantial representation of this category indicates the critical role of economic perspectives in understanding broader societal trends.

Business Finance is also well-represented, comprising 783 articles or 20.21% of the publications. This category suggests a strong focus on financial aspects within business studies, such as corporate finance, investment analysis, and risk management.

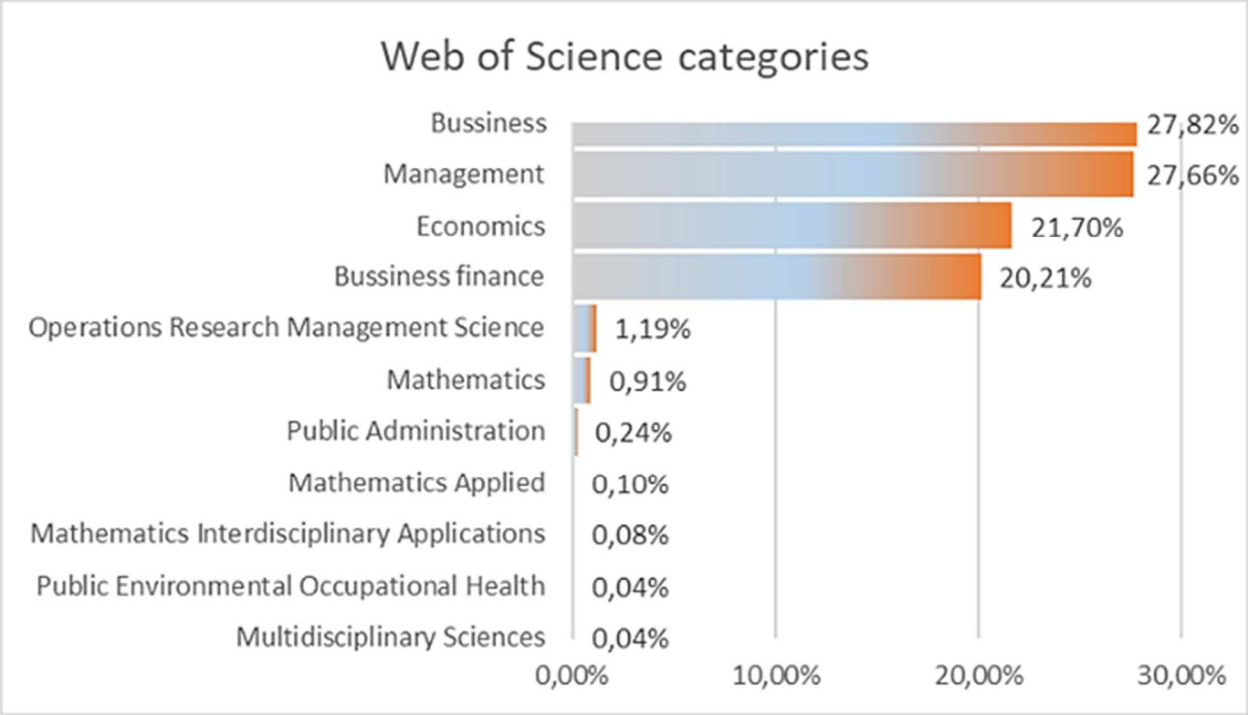

Figure 3 Web of Science research areas (final sample)

In contrast, fields like Operations Research and Management Science contribute 46 articles (1.19%), focusing on analytical models and optimization techniques aimed at improving organizational efficiency. Although this category represents a smaller portion of the dataset, it provides important insights into process improvements and decision-making methods within businesses.

Several other categories have a more limited representation. Mathematics includes 35 articles (0.91%), while Public Administration has 9 articles (0.24%). Even more specialized are Applied Mathematics and Mathematics Interdisciplinary Applications, with 4 articles (0.10%) and 3 articles (0.08%), respectively. Multidisciplinary Sciences and Public Environmental Occupational Health have the smallest shares, with just 2 articles each (0.04%). These categories, though limited in number, often provide highly focused or cross-disciplinary insights that can contribute to broader research areas.

This segmentation of categories from the Web of Science highlights that the majority of the research publications are concentrated in traditional fields like Business, Management, and Economics (Figure 3). These fields dominate the academic output, reflecting their broad appeal and the substantial research activity in these areas. Meanwhile, more niche fields like applied mathematics and public administration, although contributing fewer articles, play a vital role in providing specialized knowledge. This distribution offers a snapshot of the research priorities within the analysed dataset and how different disciplines contribute to the academic discourse.

5 Results of the keyword analysis

As stated earlier, the study comprises a total of 3,874 records. To analyse the relationships between key terms, VOSviewer software was employed, which specializes in visualizing and analysing such data. This analysis revealed 5,208 keywords, with 91 of them surpassing the threshold of 50 occurrences, indicating their presence in a substantial number of documents.

To facilitate better organization and analysis, the keywords were categorized into four primary groups. The first group consists of 28 items, the second has 27, the third includes 20, and the fourth, being the smallest, contains 16 items. This categorization enables a more in-depth understanding of the thematic structure and the relationships among the keywords. Table 3 presents the 30 most frequently occurring keywords, offering valuable insights into the predominant research trends and dynamics within the field.

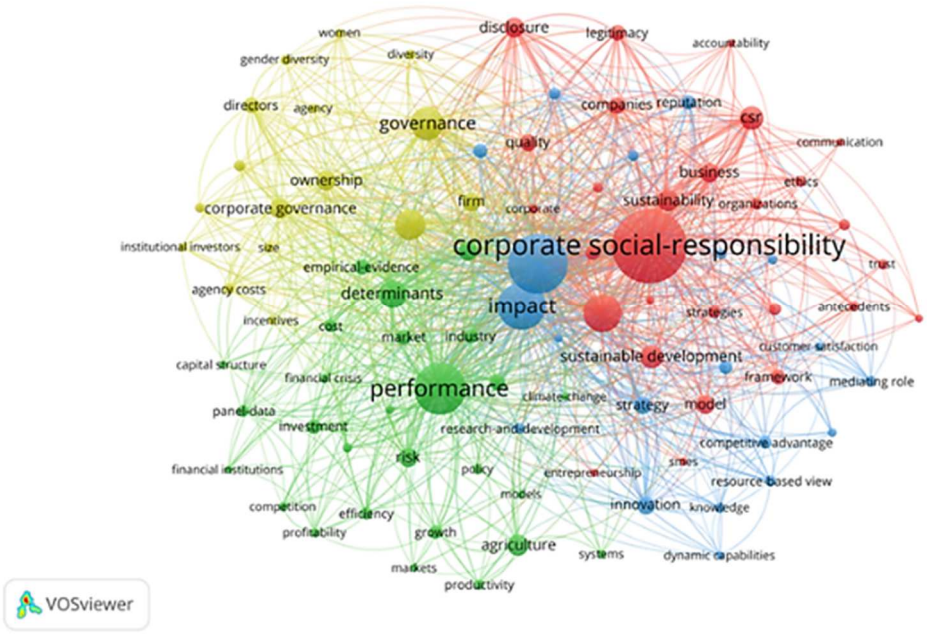

Figure 4 Keyword co-occurrence network for the final sample (2000-2023)

Table 3 Top 30 most frequently occurring keywords

Term	Frequency
corporate social-responsibility	1 868
financial performance	1 133
performance	903
impact	799
management	565
governance	445
firm performance	390
determinants	341
sustainable development	244
sustainability	226
agriculture	224
disclosure	202
ownership	202
corporate governance	200
business	195
risk	191
information	185
model	181
firm	176
innovation	166
strategy	162
quality	159
companies	147
firms	140
empirical-evidence	137
directors	135
legitimacy	133
framework	127
investment	126
market	126

5.1 Important authors

Tables 4 and 5 present the ten most productive authors in the area of environmental, social, and governance (ESG) practices related to agriculture, with Ruth V. Aguilera leading the list, having published three articles that have collectively received 2,061 citations. This distinction highlights her significant influence as a leading expert in the ESG field. The list serves as a valuable resource for those seeking to identify respected experts and key authorities in this area of study.

In total, the field has seen contributions from 9,880 authors. However, the analysis in Figure 4 focuses on those who have published a minimum of five papers and have garnered at least 100 citations. Only 35 authors met these criteria, emphasizing their considerable impact and recognition within the scientific community.

Table 4 Top 10 authors by number of citations

	Name	Documents	Citations
1	Ruth V. Aguilera	3	2 061
2	Jyoti Ganapathi	1	1 939
3	Deborah Rupp	1	1 939
4	Cynthia A. Williams	1	1 939
5	Sadok El Ghoul	2	1 588
6	Omrane Guedhami	2	1 588
7	Chuck Kwok	1	1 587
8	Dev Mishra	1	1 578
9	Collins Ntim	14	1 203
10	Rui Albuquerque	2	1 160

Table 5 Top 10 authors by number of documents

	Name	Documents	Citations
1	Khaled Hussainey	19	664
2	Collins Ntim	14	1 203
3	Andrea Pérez	12	299
4	Dalia Streimikiene	9	132
5	Albert Danso	8	294
6	Joseph Amankwah-Amoah	8	247
7	Ali Uyar	8	93
8	Alfredo De Massis	7	618
9	Ans Kolk	7	434
10	Habiba Al-Shaer	7	399

This information is not only relevant to academia but also serves as a critical guide for policymakers, practitioners, and organizations looking to adopt ESG practices. Authors with a high number of publications and citations are often viewed as leaders in their field, capable of offering valuable insights and direction in discussions on sustainable development.

The analysis of author (Figure 5) distribution based on the number of publications and citations reveals an essential aspect of scientific publishing: the quality and impact of the work are just as important as the volume of publications. This is reflected in the substantial differences among the top-ranking authors, where some works achieve notably higher citation counts, indicating their significant scientific impact and contribution to their disciplines.

This phenomenon highlights that the academic community values research not only for its quantity but, more importantly, for its quality and relevance. The high citation counts of certain works often reflect their innovativeness and importance for further research. This perspective is crucial for understanding the dissemination of scientific knowledge and how it is received and applied within the academic community.

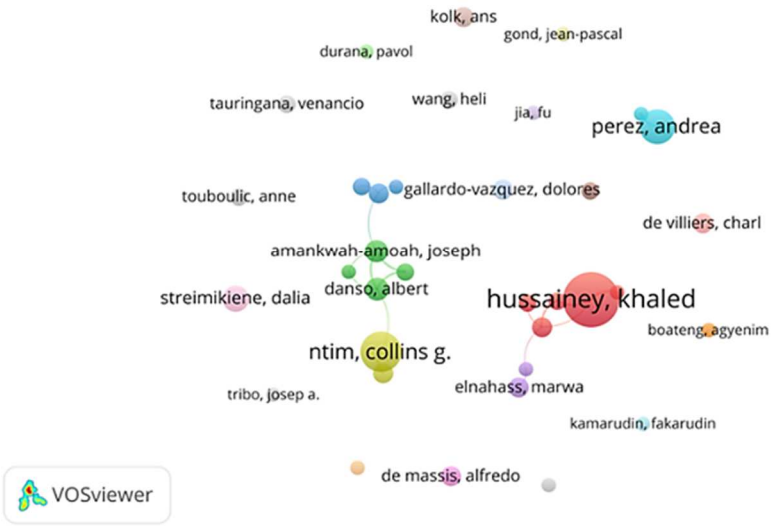

Figure 5 Visual display of individual authors

5.2 The most influential research organizations

Identifying the key institutions in ESG research is vital for understanding where in-novation and scientific progress are concentrated. These organizations often possess state-of-the-art technology and are instrumental in advancing both scientific knowledge and the formulation of global sustainability policies. Their initiatives encourage international cooperation, improving the depth and reach of research. Moreover, they play a crucial role in educating future specialists and driving economic development through the introduction of new technologies and solutions, significantly impacting societal progress.

Table 6 Top 10 organizations by number of documents and citations

	Name	Documents	Citations
1	Harvard University	18	3 922
2	University of Illinois Urbana-Champaign	12	2 462
3	Singapore Management University	21	2 455
4	University of Alberta	7	2 265
5	University of Leeds	51	2 176
6	The University of Sheffield	31	2 097
7	University of Kent	32	2 002
8	Massachusetts Institute of Technology	9	1 945
9	University of Southampton	50	1 849
10	Cardiff University	25	1 790

Table 6 provides a list of the top ten research institutions based on the number of published works, offering insights into the key players in ESG research. These institutions represent potential partners for future collaborations, particularly in exploring ESG's in-fluence on corporate performance. The analysis identified 3 425 universities and research institutions that have contributed studies related to ESG. Among these, Harvard Univer-sity stands out as a leading institution, with 3 922 citations, positioning it as one of the most prominent contributors to ESG research on a global scale. Harvard's work has made a significant impact on advancing scientific understanding in this field.

5.3 The most frequently cited documents

Table 7 presents a carefully selected list of the ten most frequently cited publications focusing on ESG factors. This compilation serves as a valuable reference for researchers and students looking to engage with and contribute to the ongoing scholarly discourse on ESG. The selection is primarily based on citation frequency, which serves as a strong measure of each publication's relevance, impact, and importance within the academic community studying ESG in connection with agriculture. These works are considered foundational, shaping the current understanding and conversations in the field, and providing essential insights and frameworks that are crucial for both emerging and continuing research in ESG studies.

The article receiving the most citations is titled "Putting the S back in corporate social responsibility: A multilevel theory of social change in organizations," authored by Ruth V. Aguilera, Deborah E. Rupp, Cynthia A. Williams and Jyoti Ganapathi, published in 2007 with a total of 1939 citations.

The article [11] provides a comprehensive theoretical model for understanding why businesses increasingly engage in corporate social responsibility (CSR) and their potential to promote positive social change. The authors propose a multilevel approach to analyse CSR, examining pressures from different stakeholders at individual, organizational, national, and transnational levels. They highlight that actors such as employees, management, institutional investors, and NGOs push organizations to adopt CSR initiatives, each driven by various motives including instrumental (self-interest), relational (social ties), and moral (ethical principles).

At the core of the model is the assertion that organizations do not operate in isolation; they are influenced by a complex array of internal and external pressures that shape their approach to CSR. The paper emphasizes that these pressures vary across different national and cultural contexts, affecting the nature and intensity of CSR initiatives. For example, corporations in countries with strong social partnership traditions may face different expectations regarding social responsibility compared to those in more market-driven economies [11].

The article [11] also explores the interaction between these different motives and how they contribute to the adoption of CSR practices. The authors suggest that understanding these dynamics is key to advancing CSR research beyond the debate of whether CSR is beneficial to exploring how and why businesses integrate social goals into their operations. They conclude with directions for future research and practical implications for managers looking to embed CSR into their strategic decision-making, advocating for a deeper consideration of the multifaceted nature of CSR pressures and their impact on organizational behaviour.

Table 7 Top 10 publications by number of citations

Title	Citations
Putting the S back in corporate social responsibility: A multilevel theory of social change in organizations	1939
Does corporate social responsibility affect the cost of capital?	1587
What Do We Learn from the Weather? The New Climate-Economy Literature	1008
Sustainable supply chain management and the transition towards a circular economy: Evidence and some applications	793
The contribution of corporate social responsibility to organizational commitment	770
The Economic Impacts of Climate Change: Evidence from Agricultural Output and Random Fluctuations in Weather	753
Corporate Social Responsibility and Firm Risk: Theory and Empirical Evidence	721
Firm performance: the interactions of corporate social performance with innovation and industry differentiation	663
Corporate governance and environmental performance: is there really a link?	652
Is doing good good for you? how corporate charitable contributions enhance revenue growth	577

6 Conclusions

The integration of Environmental, Social, and Governance principles within the agribusiness sector has emerged as a critical factor in aligning industry practices with sustainable development goals. As agribusinesses grapple with their significant environmental impacts, ranging from resource use to ecosystem disturbances, the adoption of ESG strategies becomes essential. This shift is driven not only by the inherent sustainability challenges of the sector but also by the increasing expectations of stakeholders such as investors, consumers, and regulators. Through embracing practices like climate-smart agriculture and improving governance structures, companies in this sector can enhance their long-term

resilience while contributing positively to global sustainability efforts.

The analysis of the ESG pillars reveals the interconnected nature of environmental stewardship, social responsibility, and governance within agribusiness. Environmentally, the sector's focus has expanded to include practices that reduce its ecological footprint, such as organic farming and precision agriculture. Socially, fair labour practices and community engagement have become crucial in fostering trust and productivity, while governance improvements ensure transparency and accountability, attracting investors who prioritize ethical practices. Together, these elements contribute to a more robust and sustainable business model that aligns with both market demands and global environ-mental goals.

Furthermore, the growing body of literature on ESG in agribusiness underscores the strategic benefits of integrating these principles. As socially responsible investment (SRI) gains momentum, companies that excel in ESG metrics are better positioned to attract capital and secure a competitive edge. The evolving regulatory landscape also encourages agribusinesses to incorporate ESG considerations into their core strategies, emphasizing the importance of adaptability in a rapidly changing global market. In conclusion, the successful integration of ESG principles in agribusiness not only supports environmental and social goals but also serves as a pathway for ensuring long-term corporate viability and resilience in a complex and dynamic industry.

Acknowledgement
We gratefully acknowledge the funding of this paper by the Technical University of Košice scientific grant No. 02/TUKE/2025: The Impact of ESG Strategies on Company Financial Performance: A Bibliometric Analysis.

References

[1] DESCHÊNES, O., GREENSTONE, M.: The economic impacts of climate change: Evidence from agricultural output and random fluctuations in weather, *American Economic Review*, Vol. 97, pp. 354-385, 2007. https://doi.org/10.1257/aer.97.1.354
[2] PÁSTOR, Ľ., STAMBAUGH, R.F., TAYLOR, L.A.: Sustainable investing in equilibrium, *Journal of Financial Economics*, Vol. 142, pp. 550-571, 2021. https://doi.org/10.1016/j.jfineco.2020.12.011
[3] ZENG, L., JIANG, X.: ESG and corporate performance: Evidence from agriculture and forestry listed companies, *Sustainability*, Vol. 15, No. 8, 6723, pp. 1-18, 2023. https://doi.org/10.3390/su15086723
[4] VELTEN, S., LEVENTON, J., JAGER, N., NEWIG, J.: What is sustainable agriculture? A systematic review, *Sustainability*, Vol. 7, No. 6, pp. 7833-7865, 2015. https://doi.org/10.3390/su7067833
[5] ALAREENI, B.A., HAMDAN, A.: ESG impact on performance of US S&P 500-listed firms, *Corporate Governance: The International Journal of Business in Society*, Vol. 20, pp. 1409-1428, 2020. https://doi.org/10.1108/cg-06-2020-0258
[6] ALSAYEGH, M.F., ABDUL RAHMAN, R., HOMAYOUN, S.: Corporate economic, environmental, and social sustainability performance transformation through ESG disclosure, *Sustainability*, Vol. 12, No. 9, 3910, pp. 1-20, 2020. https://doi.org/10.3390/su12093910
[7] ISAKHANYAN, G., GALGO, C., GEMTOU, M., PEDERSEN, S.M.: Business strategies towards climate-smart agriculture in Europe: A literature review, *Business Strategy and the Environment*, Vol. 33, pp. 5073-5085, 2024. https://doi.org/10.1002/bse.3741
[8] GEMTOU, M., KAKKAVOU, K., ANASTASIOU, E., FOUNTAS, S., PEDERSEN, S.M., ISAKHANYAN, G., EREKALO, K.T., PAZOS-VIDAL, S.: Farmers' transition to climate-smart agriculture: A systematic review of the decision-making factors affecting adoption, *Sustainability*, Vol. 16, No. 7, 2828, pp. 1-34, 2024. https://doi.org/10.3390/su16072828
[9] WANG, F., SUN, Z.: Does the environmental regulation intensity and ESG performance have a substitution effect on the impact of enterprise green innovation: Evidence from China, *International Journal of Environmental Research and Public Health*, Vol. 19, No. 14, 8558, pp. 1-24, 2022. https://doi.org/10.3390/ijerph19148558
[10] FAZRAKHMANOV, I., KHODKOVSKAYA, Y., GAISINA, A.: ESG principles in agribusiness management technology, *E3S Web of Conferences*, Vol. 463, 01015, pp. 1-8, 2023. https://doi.org/10.1051/e3sconf/202346301015
[11] AGUILERA, R.V., RUPP, D.E., WILLIAMS, C.A., GANAPATHI, J.: Putting the S back in corporate social responsibility: A multilevel theory of social change in organizations, *Academy of Management Review*, Vol. 32, pp. 836-863, 2007. https://doi.org/10.5465/amr.2007.25275678
[12] DO AMARAL, M.R., WILLERDING, I., LAPOLLI, E.M.: ESG and sustainability: The impact of the pillar social: ESG e sustentabilidade: o impacto do pilar social, *Concilium*, Vol. 23, No. 13, pp. 186-199, 2023.
[13] EL GHOUL, S., GUEDHAMI, O., KWOK, C.C.Y., MISHRA, D.R.: Does corporate social responsibility affect the cost of capital?, *Journal of Banking & Finance*, Vol. 35, No. 9, pp. 2388-2406, 2011. https://doi.org/10.1016/j.jbankfin.2011.02.007
[14] BUALLAY, A.: Sustainability reporting and agriculture industries' performance: Worldwide evidence, *Journal of Agribusiness in Developing and Emerging Economies*, Vol. 12, No. 5, pp. 769-790, 2022. https://doi.org/10.1108/JADEE-10-2020-0247
[15] GERBER, R., SMIT, A., BOTHA, M.: An evaluation of environmental, social, and governance reporting in

the agricultural sector, *Business Strategy and Development*, Vol. 7, No. 1, e316, pp. 1-12, 2024. https://doi.org/10.1002/bsd2.316

[16] AU, A.K.M., YANG, Y.-F., WANG, H., CHEN, R.-H., ZHENG, L.J.: Mapping the landscape of ESG strategies: A bibliometric review and recommendations for future research, *Sustainability*, Vol. 15, No. 24, 16592, pp. 1-26, 2023. https://doi.org/10.3390/su152416592

[17] KUMAR, P., JAKHAR, S.K., BHATTACHARYA, A.: Two-period supply chain coordination strategies with ambidextrous sustainable innovations, *Business Strategy and the Environment*, Vol. 30, No. 7, pp. 2980-2995, 2021. https://doi.org/10.1002/bse.2783

[18] TANCKE, L.M., UŽÍK, M., BLOCK, S., GLOVA, J., BOHA, H.: Managerial perspective on ESG and financial performance of car manufacturers, *Polish Journal of Management Studies*, Vol. 28, No. 1, pp. 330-343, 2023. https://doi.org/10.17512/pjms.2023.28.1.19

[19] LIU, H., WU, K., ZHOU, Q.: Whether and how ESG impacts on corporate financial performance in the Yangtze river delta of China, *Sustainability*, Vol. 14, No. 24, 16584, pp. 1-17, 2022. https://doi.org/10.3390/su142416584

[20] YAN, Y., CHENG, Q., HUANG, M.,LIN, Q., LIN, W.: Government environmental regulation and corporate ESG performance: Evidence from natural resource accountability audits in China, *International Journal of Environmental Research and Public Health*, Vol. 20, No. 1, 447, pp. 1-16, 2023. https://doi.org/10.3390/ijerph20010447

[21] YUE, C., LAI, Y., KHACHATRYAN, H., HOGES, A.: Effect of geographic distance on domestic trade: A case of the US green industry, *Agribusiness*, Vol. 38, pp. 154-174, 2022. https://doi.org/10.1002/agr.21715

[22] PASSAS, I.: Bibliometric analysis: The main steps, *Encyclopedia*, Vol. 4, pp. 1014-1025, 2024. https://doi.org/10.3390/encyclopedia4020065

[23] LINNENLUECKE, M.K., MARRONE, M., SINGH, A.K.: Conducting systematic literature reviews and bibliometric analyses, *Australian Journal of Management*, Vol. 45, pp. 175-194, 2020. https://doi.org/10.1177/0312896219877678

[24] CALLON, M., LAW, J., RIP, A.: *Mapping the Dynamics of Science and Technology*, London, Palgrave Macmillan, 1986. https://doi.org/10.1007/978-1-349-07408-2

[25] VAN ECK, N.J., WALTMAN, L.: Software survey: VOSviewer, a computer program for bibliometric mapping, *Scientometrics*, Vol. 84, pp. 523-538, 2010. https://doi.org/10.1007/s11192-009-0146-3

[26] VAN ECK, N.J., WALTMAN, L.: *VOS: A new method for visualizing similarities between objects*, In: DECKER, R., LENZ, H.J. (ed.) Advances in Data Analysis, Berlin: Springer, pp. 299-306, 2007. https://doi.org/10.1007/978-3-540-70981-7_34

Review process
Single-blind peer review process.