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Corporate Social Responsibility Trends in the Airline Industry: A Bibliometric Analysis

Kaisa Sorsa ¹ and Carolina Bona-Sánchez ^{2,*}

¹ Faculty of Engineering and Business-Master School, University of Applied Sciences, 20520 Turku, Finland; kaisa.sorsa@turkuamk.fi

² Department of Financial Economics and Accounting, University of Las Palmas de Gran Canaria, 35017 Las Palmas de Gran Canaria, Spain

* Correspondence: carolina.bona@ulpgc.es

Abstract: The aim of this study is to perform a bibliometric analysis of corporate social responsibility (CSR) research in the airline industry, underscoring current developments and future trends. Utilizing open-source R software (version 4.2.3), including the Bibliometrix R library (version 4.1.4) and VOSviewer (version 1.6.20), this study notes a significant rise in CSR research. It highlights influential studies, leading scholars, and key journals in the field. The co-word analysis shows CSR's impact on efficiency, value, employee perceptions, and customer loyalty. Post-COVID trends indicate an expanded focus on health, safety, and environmental, social, and governance (ESG) factors. The research suggests a shift towards integrated CSR strategies in the airline industry, emphasizing sustainability, stakeholder inclusion, and transparent reporting. This shift marks a movement towards more comprehensive and effective CSR approaches in stakeholder communication.

Keywords: corporate social responsibility; airline industry; bibliometric analysis; co-word analysis



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1. Introduction

In 2023, the airline industry recovered from COVID-19, with operating profits nearing pre-pandemic levels at USD 22.4 billion [1]. The sector's market value is projected to reach USD 814.5 billion, representing a 7% increase compared to 2022 [2]. Despite facing challenges such as inflation and fluctuating oil prices, the industry has seen a significant reduction in losses, dropping from USD 140 billion in 2020 to USD 6.9 billion in 2022 [3–5]. Looking forward, the sector anticipates a 25.5% annual growth rate through 2027, driven by increased air travel, low-cost carriers, and technological advancements [6,7].

Parallel to this economic recovery, the significance of CSR in the airline industry has magnified. CSR, as defined by the World Business Council for Sustainable Development, encompasses businesses' ongoing efforts to contribute to economic development while enhancing the quality of life for employees, their families, and the broader community [8]. This concept extends beyond profit-seeking, incorporating the impact of business activities on society and the environment [9]. It embodies a self-regulatory model that holds companies accountable not only to shareholders but also to wider stakeholders and the public [10]. Through CSR practices, firms in the airline industry can actively ensure their impact is positive across economic, social, and environmental sectors [11].

CSR's scope within the airline industry is broad, addressing challenges such as environmental impact, particularly carbon emissions from aircraft contributing to climate change [12], noise pollution affecting communities near airports [13], and waste management, especially the disposal of non-recyclable materials like single-use plastics [14]. Ensuring supply chain sustainability, balancing safety and security with passenger convenience, maintaining economic sustainability, upholding fair labor practices, and providing accessible services, including for those with disabilities, are among the other critical aspects [15–18].

CSR in the airline sector has gained prominence due to its significant environmental and social impacts. Airlines, as global entities, face responsibilities that extend beyond profit-making, encompassing societal and environmental roles [19]. This responsibility includes initiatives for reducing greenhouse gas emissions, engaging with communities, ensuring employee welfare, and practicing ethical business conduct. The industry, contributing to about 2–3% of global CO₂ emissions, is under pressure to adopt sustainable practices, influenced by regulatory frameworks like the Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA) [20].

Modern stakeholders demand transparency and sincere commitment to CSR. The industry's "green footprint" increasingly influences passenger choices and investor decisions, with a growing preference for airlines that integrate sustainability into their operations [21,22]. However, the path to authentic CSR is fraught with challenges like the high cost of sustainable technologies and the risk of "greenwashing" [23]. Navigating these challenges requires a collaborative approach that combines technological advances with stakeholder dialogue and a strong commitment to sustainability [24].

In this context, a bibliometric analysis can provide invaluable insights into how the airline industry is responding to CSR imperatives, which strategies are effective, and how these approaches are shaping its impact on society and the environment. In the academic field, bibliometric analyses have served to map out the development, influence, and thematic areas of CSR research across different sectors [25–31]. At the same time, the airline industry has been examined through bibliometric studies, primarily focusing on its efficiency, revenue management, airport capacity management, and airport service quality [32–36]. However, a detailed bibliometric analysis that specifically explores CSR within the airline industry is still lacking. Our initial review of the literature shows that while bibliometric studies have investigated CSR in wider contexts such as sustainability, environmental management, and corporate governance, the specific combination of CSR practices and challenges within the airline industry has not been explored through bibliometric analysis. This finding points out a significant research gap, especially given the airline industry's large environmental and social impact and the increasing demands from the public and regulatory bodies for sustainable and responsible corporate behaviors. In this sense, our bibliometric analysis provides a detailed, data-driven overview of the research landscape, equipping researchers with the tools to forecast emerging trends and identify unexplored topics in the research field. This analysis not only allows us to capture the current state of the field but also shows pathways for future investigation, offering a valuable roadmap for scholars aiming to advance the discourse on CSR and sustainability in the airline industry. Particularly, the study is driven by specific research questions that aim to explore the evolution, current state, and evolving trends of CSR in the airline industry.

RQ1: How has the volume of literature on CSR in the airline industry changed over time?

RQ2: Which works on CSR in the airline industry have had the most significant global impact?

RQ3: Who are the key authors in the field of CSR in the airline industry?

RQ4: Which works are recognized as highly influential in studies investigating CSR in the airline industry?

RQ5: What is the geographic distribution of publications on CSR in the airline industry?

RQ6: What main themes and subthemes emerge from keyword and topic clustering in CSR airline research?

RQ7: Are there emerging trends or novel topics in recent publications that indicate shifts in focus or new directions in CSR research applicable to the airline industry?

This study is structured as follows: Section 2 outlines our methodological approach, detailing the selection of keywords, search strategy, and the process for refining our dataset to ensure its relevance and comprehensiveness. In Section 3, we present the results of our bibliometric analysis, showing the evolution of CSR research within the airline industry, highlighting significant thematic focuses, and identifying influential publications and authors in the field. Section 4 delves into a discussion of these findings, interpreting the

trends, identifying gaps in the literature, and suggesting avenues for future research. Finally, Section 5 concludes the study by summarizing our main findings and highlighting the contributions of our research to the academic understanding of CSR in the airline industry.

2. Methods

Bibliometric analysis has become a crucial tool for researchers, enabling them to reveal trends and connections within the scientific literature. Bibliometrics involves statistically analyzing written publications [37]. Essentially, it helps provide insights into how knowledge spreads across different fields, measures the impact of scholarly works, and offers a comprehensive view of research activities over time [38].

Our bibliometric approach uniquely enables a comprehensive and systematic examination of the existing CSR literature in the airline industry. Utilizing advanced analytical tools, we map the evolution of research topics, identifying shifts and emerging trends that signal the changing focus and priorities within the research community. By investigating the co-occurrence of keywords and the formation of thematic clusters over different periods, we can identify areas that are acquiring increasing attention, suggesting fruitful avenues for future research. By identifying highly cited works and authors, we can determine which topics have not only dominated past discourse but are also likely to influence future research agendas. Additionally, the geographical and interdisciplinary analysis facilitated by our bibliometric method offers insights into potential future research trends by revealing where and how CSR research intersects with other disciplines and regional priorities. This global perspective is instrumental in anticipating how wider societal, economic, and environmental factors will shape the directions of CSR research in the airline industry, providing a complete understanding of the field's current position and its future trajectory. In the contemporary era and with the rapid proliferation of academic literature, bibliometrics has become indispensable. It assists various stakeholders, from researchers to policymakers, in effectively navigating the vast realm of academic information, ensuring they stay informed and make informed decisions based on current developments [39].

The use of Web of Science (WoS) for bibliometric analysis is highly valuable due to its extensive coverage and strict selection criteria, which guarantee the inclusion of peer-reviewed and scientifically reputable literature. Employing WoS for bibliometric research provides academics with a reliable and comprehensive dataset, enhancing the credibility and scope of their research findings and contributing to a deeper understanding of scholarly fields [40].

Before initiating the data collection, we conducted an initial scan of the literature to identify common and emerging terms within the research domain. This step provided a foundational understanding of the terminology and themes prevalent in the field. The search strategy adopted was as follows (see Figure 1): The terms ["Corporate Social Responsibility" OR CSR AND Airline*] were used as the primary keywords. Using an asterisk as a wildcard after "Airline" enables the inclusion of all lexical variants stemming from the root word, thereby broadening the search scope to cover a wider array of relevant literature. The search was conducted in the "Topic" section, which includes the titles, abstracts, and keywords of the articles. This initial search yielded 146 documents.

Following the initial search, we undertook a detailed, multi-step process to refine this dataset. Web of Science is known for its rigorous process of selection and normalization of data, which helps to minimize the presence of duplicates. However, as with any extensive and complex database, we were vigilant and verified the collected data to ensure the accuracy and completeness of our bibliometric analysis by employing manual review strategies aimed at the identification of duplicates and assessment of the direct relevance of each selected document. Thus, each of the 146 documents was subject to a preliminary screening based on title, abstract, and keywords review. This crucial step enabled us to verify the direct connection of each document to CSR practices in the airline industry. To minimize bias and ensure accuracy, this manual review was conducted by two independent researchers to ensure no duplicates were overlooked and only studies directly related to our

research question were considered. This thorough process resulted in 145 studies pertinent to our research objectives. The dataset was then limited to documents published in English (144 studies).

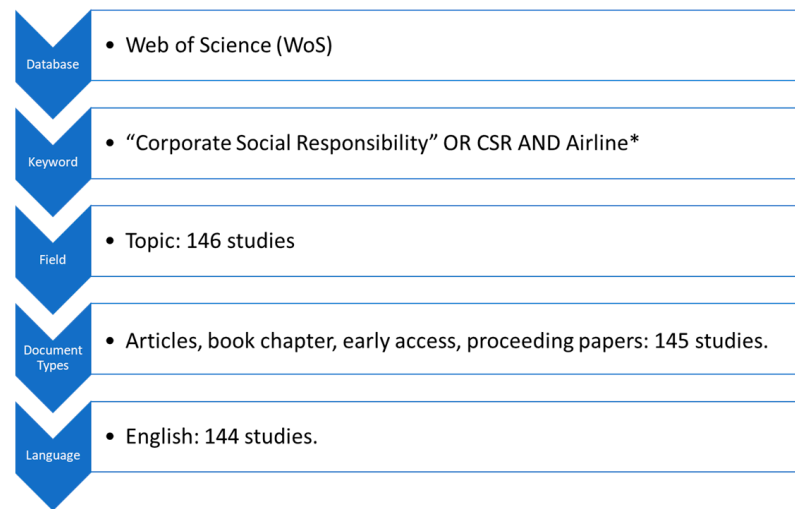


Figure 1. Research process.

Bibliometrix, in tandem with VOSviewer, presents an interesting combination for exploring bibliometric data. Researchers employ these tools to identify key metrics and craft revealing scientific cartography [41]. Bibliometrix excels in data interrogation, while VOSviewer’s capability for visualization reveals the often hidden patterns of scholarly influence, collaboration, and thematic clustering within specialized fields. The approach to RQ1 and RQ2 includes two principal metrics. The initial focus is on the “Annual Scientific Production” graph, which offers a window into the research community’s shifting interests. Next, the “Most Globally Cited Documents” are shown to highlight the key papers that have shaped the discourse within this field.

When it comes to addressing RQ3, the exploration of the “Most Relevant Authors” serves to highlight the leading figures whose work has the greatest impact within the area of study. Consequently, this table presents the scholars who have made significant contributions to the field, providing valuable information for researchers when identifying seminal works and recognizing leading experts.

For RQ4, reference is made to the “Most Local Cited Documents” table, which provides information about articles that have been cited most frequently in studies analyzing CSR in the airline industry, signifying their substantial impact within the research field under consideration.

To explore RQ5, the “Countries’ Scientific Production” metric is employed to display the geographical diversity and the extent of interest in researching CSR within the airline industry. This metric illustrates the regions where the most active and potentially impactful research originates.

When exploring RQ6 and RQ7, the map of co-words is analyzed, which provides a picture of the research landscape, and allows for the identification of emerging trends or novel topics in the intersection of CSR and the airline industry.

3. Results

3.1. Main Information about Data

Addressing our first research question regarding the evolution of the volume of CSR literature within the airline industry, our data cover a 15-year period from 2008 to 2023, sourced from a diverse array of 77 different journals, books, and other relevant publications. The dataset indicates a robust annual growth rate of 20.79%. The average document age is approximately 4.29 years, suggesting a relatively recent research area. Each document

has received an average of 28.05 citations, indicating the research’s substantial impact and its widespread recognition among scholars. All together, these documents cite a substantial number of references (totaling 8275). In terms of content, there are 530 author keywords, highlighting the wide range of topics and terminology prevalent within the research field. A considerable number of authors—350 in all—have contributed to this body of literature. An examination of the collaborative nature of the publications leads us to conclude that there are six single-authored documents, whereas the average number of co-authors per document is three, indicating a tendency towards collaborative research efforts. International co-authorships account for one-third of all collaborations (33.33%), reflecting a significant degree of global cooperation in this research area. A detailed examination of the document types reveals that most are articles (127), followed by a smaller number of other document types, such as articles with early access (7), articles that are also book chapters (2), and articles that are also proceedings papers (6). There are also two reviews.

3.2. Publication Trend over Time

Closely related to our first research question, the period from 2008 to 2012 saw nascent academic interest in CSR in the airline industry, evidenced by a modest total of eight publications (Figure 2). From 2008 to 2009, the field appeared to be emerging, with only one article in 2008 followed by a year with no published studies. Between 2010 and 2012, research began to gain traction with 10 studies (7 articles and 3 proceeding papers). In the years from 2013 to 2015, there was a moderate rise, with a total of 14 studies (13 articles and one proceeding paper). The period from 2016 to 2019 saw a more robust increase, with 47 studies (including 42 articles, 2 book chapters, 2 proceeding papers, and one review), highlighting a diversification in publication types. From 2020 to 2022, there was a marked increase in output, with 55 studies (54 articles and one review), with the highest annual output observed in 2022. In 2023, evidence of sustained interest and ongoing research is clear, with 17 studies (10 articles and 7 articles in early access).

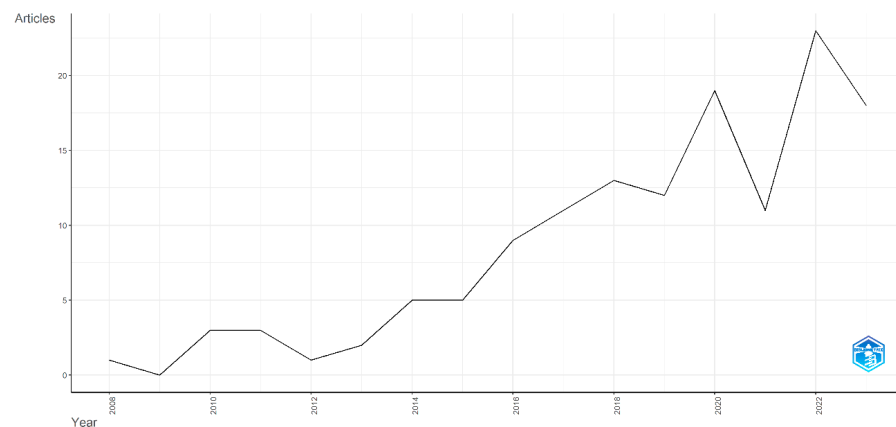


Figure 2. Annual scientific production.

3.3. Most Globally Cited Documents

In response to our second research question regarding which CSR studies in the airline industry have had the most significant global impact, as evidenced by citation counts, Table 1 highlights the key work of Kang et al. which displays the highest total citation count of 382 [42]. Exhibiting a normalized citation count (TC) of 2.00 and an average of 27.29 citations per year, this publication emerges as a cornerstone for subsequent research in the field. Their study delves into a diverse array of sectors, including hotels, casinos, restaurants, and the airline industry, scrutinizing each sector individually. In the context of airlines, the authors reveal that positive CSR initiatives exert an adverse impact on profitability, while negative CSR actions cast a shadow on firm value. The findings underscore the significance stakeholders attach to negative CSR practices, thereby

advocating for airlines to prioritize reducing such practices, especially in the realm of employee relations. Furthermore, the research suggests that the benefits of investing in positive CSR initiatives may not align with short-term financial gains, as they may lead to a decrease in return on assets.

Table 1. Most globally cited documents.

	Total Citations	TC per Year	Normalized TC
[42]	382	27.29	2.00
[43]	163	23.29	3.43
[44]	131	11.91	1.94
[12]	124	8.86	0.65
[45]	120	24.00	3.69
[46]	89	9.89	1.49
[47]	89	22.25	3.50
[23]	81	9.00	1.36
[48]	74	14.80	2.28
[49]	70	4.38	1.00

A noticeable trend emerges over time, with recent publications, namely Han et al. and Chuah et al., standing out for their robust annual citation rates of 24.00 and 22.25, respectively [45,47]. What is even more striking is their elevated normalized citation counts (Normalized TC) of 3.69 and 3.50, highlighting their growing significance and potential to shape the trajectory of future research. Han et al. present a theoretical framework that effectively explains customer choices when it comes to supporting and paying a premium for eco-friendly airlines committed to environmental CSR practices [45]. Their work seamlessly integrates cognitive and affective aspects, addressing gaps in current socio-psychological theories on pro-environmental behavior.

Meanwhile, Chuah et al. highlight the crucial connection between the success of airline CSR initiatives, such as carbon offsetting, and how well they align with consumer values and trust [47]. The research emphasizes the significance of consumers' environmental concerns and the incorporation of CSR into their self-identity, which drives sustainable engagement actions. Airlines need to improve the transparency and credibility of their CSR efforts. They should aim their communications at environmentally conscious consumers, as this not only encourages customers to go beyond mere transactions but also supports the broader goals of sustainable travel and cleaner production. Cowper-Smith and De Grosbois, with 124 citations and a normalized citation count of 0.65, offer key insights into sustainable tourism practices, significantly impacting both policy and industry [12].

It is worth noting that Theodoulidis et al., while having a lower total citation count compared to Kang et al., carries substantial influence, especially considering the time since its publication, achieving a normalized citation count of 3.43 [42,43]. Just like Kang et al., Theodoulidis et al. conducted their research with companies from the airline, casino, hotel, and restaurant sectors [42,43]. Their investigation delved into the complex relationship between CSR, firm strategy, and corporate financial performance, offering valuable theoretical insights and practical guidance for professionals in the tourism industry.

The range of journal topics is outstanding. In addition to journals primarily centered around transportation, the data reveal active research involvement in interdisciplinary fields such as cleaner production, hospitality, finance, and consumer services. This diversity underscores the far-reaching influence of CSR within the airline industry.

3.4. Most Relevant Authors

Regarding the third research question exploring the key authors in the field of CSR in the airline industry, Table 2 shows that Joonho Moon stands out as the dataset's most prolific author, contributing to a total of eight articles. Heesup Han and Seoki Lee follow close behind, each with seven articles. Evaluating fractionalized contributions—which account for shared authorship—Joonho Moon still leads, with contributions to three articles.

This dominance suggests that Joonho Moon likely held a primary authorship position, played a significant role in these works, or authored with fewer collaborators. Although both Heesup Han and Seoki Lee have published the same number of total articles, Seoki Lee displays a higher fractionalized article count (2.416 compared to Heesup Han's 1.783), possibly indicating fewer co-authors or a more central role in joint efforts. Insim Kim and Xiaoni Li have both contributed to five articles, although Insim Kim shows a marginally elevated fractionalized contribution, suggesting that Insim Kim may have engaged with fewer co-authors or assumed a more key role in co-authored papers compared to Xiaoni Li. Among the authors credited with four articles, fractionalized counts reveal slight variations, with Sanaz Vatankhah marginally ahead. It is also worth mentioning that both Bechir Ben Lahouel and Younes Ben Zaied—each credited with three articles—share an identical fractionalized count of 0.75, due to parallel collaboration patterns.

Table 2. Most relevant authors.

Authors	Articles	Articles Fractionalized
Joonho Moon	8	3
Heesup Han	7	1.78
Seoki Lee	7	2.42
Won Seok Lee	6	2.17
Insim Kim	5	2
Xiaoni Li	5	1.67
Yaghoub Abdi	4	1.33
Xavier Cámara-Turull	4	1.33
Sanaz Vatankhah	4	1.58
Bechir Ben Lahouel	3	0.75

Articles fractionalized is calculated as 1 divided by the total number of authors.

3.5. Most Local Cited Documents

In line with our fourth research question, which focuses on works recognized as highly influential in studies investigating CSR in the airline industry, Table 3 offers insights into the articles that have received the most citations in the considered research field. In essence, it sheds light on the publications that have risen to prominence and wielded influence within this field of study. With a comprehensive view that encompasses both local and global perspectives, Table 3 provides us with a clear understanding of the global impact and significance of each study, as well as its standing within the research community devoted to exploring CSR in the airline industry.

Table 3. Most local cited documents.

Document	Local Citations	Global Citations	LC/GC Ratio (%)	Normalized Local Citations	Normalized Global Citations
[12]	48	124	38.71	1.67	0.65
[44]	30	131	22.90	1.94	1.94
[49]	25	70	35.71	1.00	1.00
[50]	24	61	39.34	1.00	1.00
[51]	23	46	50.00	1.39	0.77
[52]	21	67	31.34	0.73	0.35
[23]	21	81	25.93	1.27	1.36
[53]	21	42	50.00	4.02	1.67
[54]	18	64	28.13	4.71	1.35
[42]	17	382	4.45	0.59	2.00

Local Citations: The number of citations the document received from within the dataset. Global Citations: The total number of citations the document received across all datasets. LC/GC Ratio (%): The ratio of Local Citations to Global Citations, expressed as a percentage. Normalized Local Citations: Local Citations normalized based on the average citation count in the field. Normalized Global Citations: Global Citations normalized based on the average citation count in the field.

Within the table, the 2011 study authored by Cowper-Smith and De Grosbois, published in the “Journal of Sustainable Tourism”, stands out for its substantial impact [12]. Globally, it has 124 citations, underscoring its extensive influential role in CSR discussions within the airline industry. On a local scale, it gathers 48 citations, demonstrating its worthy recognition within the research community focused on investigating CSR in the airline industry. This balance between local and global recognition underscores the study’s importance.

Among the noteworthy studies in the table, Lee et al.’s research published in *Tourism Management* and Tsai et al.’s study in the *Journal of Air Transport Management* are found [44,49]. Lee’s paper, enjoying 131 global citations alongside a considerable number of local ones, demonstrates its influential role in advancing the comprehension of the intersection between tourism and CSR [44]. On the other hand, Tsai’s study, though with fewer citations, maintains a prominent position within the field, particularly in the ground of air transport management [49].

Every study included in the table, involving the ones we have discussed, adds to the comprehension of CSR in the airline industry from various perspectives. While Cowper-Smith and De Grosbois’s study stands out, the rest of the research also holds a key role in shaping a well-rounded understanding of the subject [12]. Collectively, these studies explain the diverse ways in which CSR practices can influence the airline industry, providing valuable insights to manage future research and industry practices.

3.6. Countries’ Scientific Production

Regarding our fifth research question on the geographical distribution of research on Corporate Social Responsibility (CSR) in the airline sector, Figure 3 presents a detailed visual representation with different shades of blue to indicate varying levels of scientific production by country. China emerges as the leading contributor, represented by a darker shade, with 70 publications, suggesting significant academic involvement in the domain. South Korea is depicted in a closely matching hue, with 65 contributions, which reflects a similarly high level of research activity in the field.

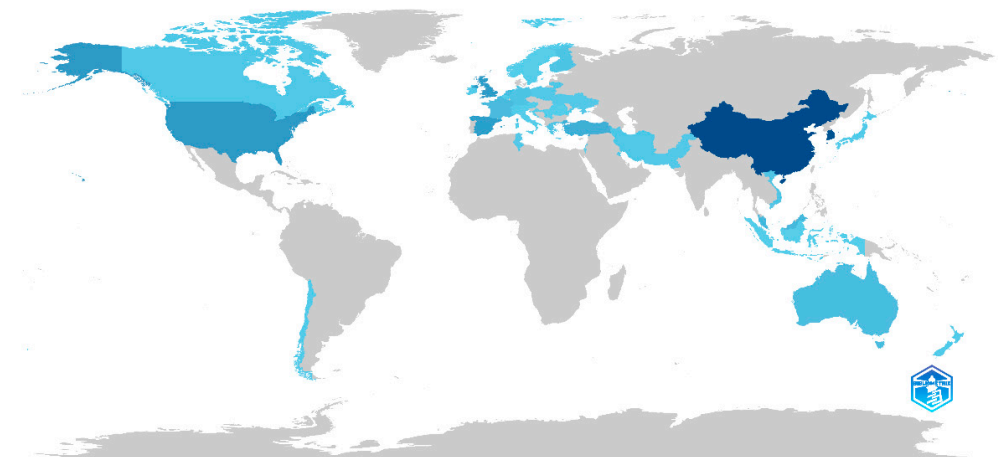


Figure 3. Countries’ scientific production.

The USA and the UK show a moderate level of scientific production with 27 and 26 publications, respectively, which could imply a steady but less intense focus on this topic compared to China and South Korea. Spain also shows notable activity with 24 publications, reflecting a regional research interest in CSR within the European context.

Turkey, Malaysia, France, Australia, and the Netherlands have fewer publications (ranging from 16 to 8), suggesting that this line of research is less prominent compared to the countries with higher frequencies.

3.7. Keyword and Topic Clustering

In exploring our sixth research question on the primary themes and subthemes derived from the keyword and topic clustering in CSR airline research, it is crucial to acknowledge a common practice in bibliometric analysis. This involves aggregating certain keywords while excluding others, aimed at refining the dataset for more focused and meaningful results.

This methodological step is critical in distilling broad concepts into manageable categories that truly reflect the core topics of research [41]. For instance, grouping variations of “performance”-related terms under a single umbrella keyword allows for a comprehensive analysis of the performance theme without the noise of semantic discrepancies [55]. Similarly, eliminating keywords that are overly specific or empirically oriented, such as “Altman Z-score” or “case study,” serves to maintain the thematic consistency of the analysis, ensuring that the focus remains on conceptual rather than on methodological dimensions [56].

Figure 4 displays the co-word map following the aggregation and exclusion of keywords. As expected, and given that the search query in the Web of Science included “CSR” and “airline*”, the largest nodes correspond directly to these keywords. The resulting dataset is thus specifically tailored to occurrences where these terms are the principal focus of the research.

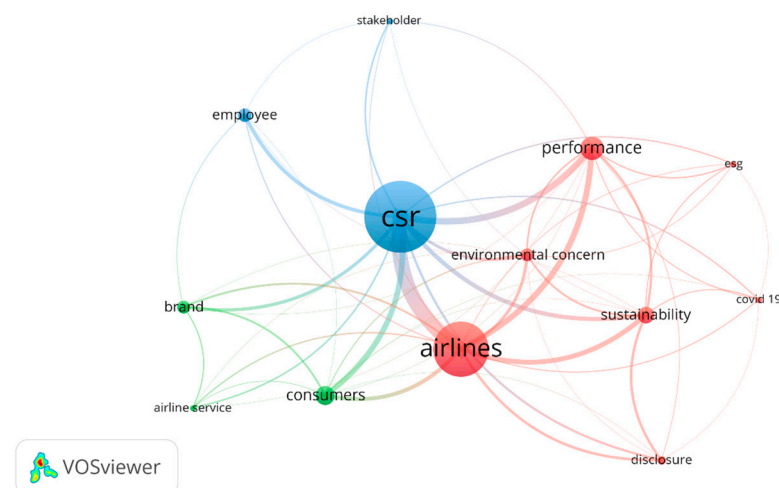


Figure 4. Co-word map.

The blue cluster highlights the significant relationship between CSR efforts and the financial and operational performance of airlines. Notably, half of the twelve most cited papers in the dataset address this topic, with three being the most globally cited [42–44]. Studies by Kang et al. and Theodoulidis et al. were summarized in Section 3.3 [42,43]. Lee et al. categorizes CSR into operation-related and non-operation-related activities and finds that operation-related CSR positively impacts airline performance consistent with financial markets recognizing these CSR activities as value added practices [44]. The authors also note that oil prices can affect this relationship, with high prices benefiting operation-related CSR impact but not non-operation-related CSR.

Other significant contributions within this cluster include those by Wang et al. and Lee and Park [46,52]. Wang et al. investigate CSR performance in major airlines and find that larger airlines generally show better CSR performance and that private airlines have made marked improvements [46]. They also find that publicly listed airlines outperform non-listed ones in CSR. The study by Lee and Park investigates the effect of CSR on the financial performance of airlines and finds a positive correlation with market value but not with accounting measures. The research suggests that airlines with robust CSR practices may see an improvement in their market perception and financial valuation, which offers airline executives a strategic incentive to embrace CSR activities.

Collectively, studies show the impact of CSR initiatives on the operational and financial performance of airlines. Investments in fuel efficiency and sustainable practices are shown to not only reduce environmental harm but also encourage operational efficiency and productivity, leading to excellence in operations. The link between CSR efforts and financial performance is complex, presenting both immediate financial challenges and enduring benefits. Thus, although certain CSR activities may lead to initial expenses, they tend to offer long-term improvements in market value and attractiveness to investors, highlighting the critical role of strategic CSR planning.

Other topics included within the blue cluster relate to “Employee” and “Stakeholder”, acknowledging the challenge of fulfilling the varied expectations of stakeholders and suggesting that airlines need to develop CSR strategies that are both flexible and adaptable to changing social, environmental, and economic circumstances. This approach to stakeholder engagement emphasizes the need for a strategic and inclusive view on CSR within the airline industry. Although “Stakeholder” covers the interests of various groups including investors, employees, customers, and local communities, one group of research is specifically concerned with employee-related issues. Kim and Kim examine the impact of CSR on frontline employees’ engagement, well-being, and task performance [57]. They identify the positive effects of perceived support for CSR from both management and customers on employee work engagement, organizational commitment, and job performance. They also reveal that the importance which employees attach to CSR can significantly change the relationship between management support and organizational engagement. Moreover, Ilkhanizadeh and Karatepe explore how flight attendants perceive CSR initiatives and show that work engagement serves as a crucial link between CSR practices—including economic, legal, ethical, and philanthropic activities—and flight attendant career satisfaction and advocacy behaviors [54].

The red cluster shows that research in the airline industry is increasingly focusing on sustainability and on the environmental dimension of CSR. While both CSR and sustainability are concerned with responsible business practices, CSR is more about the company’s responsibility to be socially responsible, whereas sustainability is about ensuring the longevity of resources and the environment for future prosperity. Among the works addressing these topics is the study by Hagmann et al., which reveals that an airline’s eco-friendly image can influence passenger decisions during ticket purchase, with passengers prepared to pay more for airlines perceived as environmentally responsible, although this premium is less than what they would pay for additional comforts such as extra legroom [23]. Cowper-Smith and De Grosbois examine CSR practices in the airline industry and highlight a focus on environmental initiatives (particularly emission reduction) [12]. While many airlines report having achieved key CSR goals like improving community involvement and diversity, detailed information on the specific initiatives undertaken is often lacking. Author research highlights the need for more in-depth investigation into airline CSR efforts, particularly beyond environmental measures.

The emergence of COVID-19 brought new focal points to CSR research. Prados et al. examine the Facebook communication strategies of two major airlines during the COVID-19 pandemic, focusing on brand engagement and post virality [58]. They find that airlines with posts containing informative content and CSR references had better customer engagement and more positive reactions than their counterparts.

Another topic linked to the red cluster is the importance of ESG considerations, which is gaining traction, and which reflects a broader trend in how airlines are weaving these factors into their operational strategies and corporate reporting. Kuo et al. investigate how adopting CSR practices (specifically ESG indicators) affects airlines’ financial performance [53]. They show an initial decrease in return on assets after implementing ESG practices, but an eventual improvement, suggesting that strategic ESG focus is beneficial for sustainability. Finally, the term “disclosure” refers to how airlines communicate their CSR efforts and results to stakeholders, suggesting a trend towards greater transparency and accountable reporting methods. In this sense, several airlines, including KLM, Delta,

and Lufthansa, have successfully integrated global CSR standards into their operations, adopting Global Reporting Initiative (GRI) standards for reporting. These comprehensive CSR reports cover a wide range of initiatives from environmental sustainability efforts, such as reducing CO₂ emissions and noise pollution, to social responsibility practices, including enhancing passenger convenience and ensuring employee welfare. Such CSR initiatives, aimed at effectively communicating the firms' CSR efforts, can significantly influence customer loyalty and brand perception by demonstrating a company's commitment to ethical practices, environmental stewardship, and social responsibility.

Central to the green cluster is the focus on consumer perceptions, attitudes, and behaviors, emphasizing the importance of how consumers respond to an airline's CSR commitment. Thus, studies in these cluster explore the relation between CSR initiatives in the airline industry and their impact on consumer loyalty and brand perception, signifying a research focus on how CSR commitment shapes an airline's reputation. In this context, Chen et al. analyze customer awareness and opinions on airline social responsibility and its impact on customer loyalty, finding that customers value social responsibility but are not fully satisfied with the airlines' execution of these initiatives [50]. Han et al. explore the effects of CSR within the airline industry on corporate reputation and find that airlines emphasizing economic responsibility often witness enhanced customer attitudes and satisfaction [45]. These authors also reveal that environmental responsibility also favorably impacts customer perceptions. However, an airline's overall reputation is substantially affected by customer viewpoints, which are informed by their satisfaction and attitudes toward the airline's CSR efforts. Finally, this cluster explores the impact of CSR on the quality and competitiveness of airline services. Chiu et al. investigate the relationship between service quality and purchase intentions in the airline industry and show that superior service quality is key to increasing purchase intentions by enhancing the airline's reputation and positive word-of-mouth among travelers [59].

Considering the clusters collectively, the overlaps and interconnections lead us to conclude that the research fields are not isolated. For example, how consumers perceive airline brands might be influenced by the company's CSR performance, which is tied to both the blue cluster and the green cluster. Similarly, an airline's sustainability efforts, which fall within the red cluster, are likely to have implications for brand perception and stakeholder relations, creating interplay with the other two clusters.

Overall, our analysis sheds light on the varied perspectives of stakeholders on CSR within the airline industry, including those of employees, customers, local communities, suppliers, and investors. It demonstrates the impact of CSR initiatives on key stakeholder groups, notably in enhancing customer loyalty and employee satisfaction, and stresses the important influence these groups have on CSR strategy formulation. Thus, the importance of stakeholder engagement is highlighted by showing how airlines are progressively engaging in dialogue and collaboration with stakeholders to enhance CSR performance. The findings point out the advantages of aligning CSR activities with the values and expectations of customers, especially regarding environmental efforts, emphasizing the positive outcomes of such alignment. Results also underline the significant impact that clear and genuine CSR communication has on building consumer trust and loyalty, highlighting the importance of stakeholder perceptions and actions in evaluating CSR effectiveness. All the above note a shift towards involving stakeholders in the development and execution of CSR strategies, moving towards more holistic approaches that include ESG considerations, especially in the post-COVID era.

This analysis reveals that airlines' CSR strategies are closely aligned with several United Nations Sustainable Development Goals (SDGs). Their initiatives to cut carbon emissions and boost fuel efficiency are a direct benefit to SDG 13 (Climate Action), while their dedication to fair labor practices and employee welfare is in line with SDG 8 (Decent Work and Sustainable Economic Growth). Efforts in waste management and minimizing single-use plastics advance SDG 12 (Responsible Consumption and Production), and the drive towards technological innovation for better operational efficiency and sustainability

ties in with SDG 9 (Industry, Innovation, and Infrastructure). Additionally, findings point to a broader trend in the industry towards greater transparency and deeper engagement with stakeholders. In this context, the commitment to CSR reporting standards like the GRI becomes increasingly important, potentially encouraging stakeholder trust by highlighting the airlines' dedication to CSR principles. By integrating these international standards into their operations, airlines not only move closer to fulfilling global sustainability goals but also gain a competitive advantage in the marketplace by attracting environmentally and socially aware consumers. This strategy stresses the vital role and impact of the airline industry in advancing global CSR action.

4. Discussion

In this section we address our seventh research question by focusing on investigating emerging trends and new directions in CSR research relevant to the airline industry.

4.1. Emerging Trends

In this section, we shed light on the dynamic challenges and innovative practices shaping CSR in the airline industry. The airline industry's exploration of corporate social responsibility (CSR) has faced a diverse range of challenges, especially heightened by the widespread impact of the global COVID-19 pandemic [60–64]. A primary challenge lies in the rapid integration of health and safety measures within CSR frameworks, necessitating airlines to not only reimagine passenger experience but also to ensure these measures are financially sustainable in the long term. The adoption of comprehensive health protocols has placed additional operational and financial burdens on airlines, challenging their resilience in turbulent times.

Environmental sustainability represents another critical challenge. As airlines attempt to reduce their carbon footprint, the transition to eco-friendly aviation fuels and the adoption of energy-efficient aircraft designs demands substantial investment and innovation. This transition is further complicated by fluctuating fuel prices and the need for global regulatory alignment on environmental standards. While "environmental concern" is a well-established area within CSR [12,65,66], the link with "sustainability" might reflect a more complete approach, considering economic and social sustainability in addition to environmental aspects [67,68]. This could involve topics like sustainable tourism, economic resilience, and social equity.

The inclusion of "ESG" suggests that airlines are increasingly being evaluated not just on their environmental initiatives but on a broader range of social and governance issues [69–71]. This includes discussions around diversity and inclusion, ethical governance practices, and how these areas are integrated into corporate strategy and reporting. The broadening scope of ESG factors introduces complexities in achieving a balance between economic, social, and governance responsibilities. Airlines are now tasked with navigating the complexities of ethical governance, workplace diversity, and inclusive practices, all while maintaining transparency and accountability to stakeholders. This expansion of CSR's scope necessitates a reevaluation of corporate strategies, posing a challenge in aligning business operations with the broader ESG criteria.

The connection between CSR and "performance" signals a trend towards more rigorous and quantitative assessments of the impacts of CSR initiatives [72–74]. There is growing scholarly interest in how to measure CSR outcomes effectively, not just in terms of company performance but also in terms of social and environmental impact. In the context of "stakeholder", there is a trend towards adopting more collaborative approaches to CSR, where stakeholders play a more active role in shaping CSR policies and practices [75–78]. The link between "consumers" and "brand" implies an increasing interest in how CSR initiatives influence consumer behavior, brand perception, and loyalty [79–82]. There is an emerging focus on personalizing CSR efforts to align with consumer values and expectations. Regarding "disclosure", the trend may be towards more comprehensive and standardized reporting, in response to investor demands or regulatory changes [48,83,84].

These trends reflect a dynamic and evolving field where the general expectations from corporations—especially within high-impact industries like airlines—are growing. Researchers are likely responding to these changes by examining new dimensions of CSR, measuring impacts more precisely, and considering the changing global context post-COVID-19.

4.2. Future Research Directions

This section proposes critical areas for further investigation, particularly through the lens of recovery and sustainability in the post-COVID era.

Health and Safety Protocols: The pandemic's consequences will continue to see health and safety as a foundation of CSR initiatives. Airlines will likely innovate further in this area, developing protocols that not only meet current standards but are also adaptable to future health challenges. Research into the efficacy of these measures and their impact on consumer confidence will be vital for continuous improvement and industry-wide adoption.

Sustainable Practices: The urgency of environmental sustainability will drive airlines towards more aggressive carbon reduction targets, the adoption of sustainable aviation fuels, and investments in next-generation aircraft technologies. Future trends may include a shift towards a circular economy model, where waste reduction and recycling become integral to airline operations, and the exploration of carbon offset programs that contribute to global reforestation and conservation efforts. There is a clear imperative for future studies to examine the adoption and impact of eco-friendly technologies, biofuels, and carbon offset programs. Such research should aim to quantify their environmental benefits, assess consumer response, and analyze the implications for the airline's economic performance, mapping a path towards genuine sustainability in the industry. Additionally, the integration of ESG factors into airline strategies signals a critical area for future inquiry. It is crucial to investigate how ESG initiatives influence financial outcomes, brand reputation, and stakeholder relations, and to tackle the challenges of accurate ESG reporting. This research direction is essential for understanding the full range of benefits associated with sustainable practices in the airline industry.

Stakeholder Engagement: The evolving landscape of CSR emphasizes the importance of engaging a broad range of stakeholders in meaningful dialogue. Future trends will likely see airlines leveraging digital platforms to facilitate stakeholder engagement, utilizing social media, and other online tools to gather feedback, share progress on CSR initiatives, and co-create solutions with passengers, employees, and community partners. Furthermore, exploring the intersection of CSR with employee engagement and organizational culture will also be welcome, including a comprehensive examination of how CSR initiatives impact employee perceptions, job satisfaction, and the broader organizational values. Future studies could provide valuable insights into CSR's efficacy in attracting and retaining talent, promoting ethical culture, and enhancing the airline's competitive edge. Additionally, the connection between consumer behavior and brand loyalty and CSR efforts in the airline industry presents a critical avenue for future research. This line of inquiry should focus on understanding how CSR shapes consumer decisions, the role of effective communication in building brand loyalty, and the strategies for authentic engagement with today's environmentally and socially conscious consumers.

Technological Innovations: Technology will be a key enabler of CSR objectives, with advancements in digitalization, artificial intelligence, and the Internet of Things (IoT) offering new ways to enhance operational efficiency, reduce environmental impact, and improve customer experience. Future innovations may include smart aircraft that optimize fuel use, AI-driven predictive maintenance to minimize downtime and emissions, and virtual reality (VR) training for staff to ensure the highest standards of safety and service. Future investigations should delve into how technological advancements can encourage environmental performance, enhance the passenger experience, and rationalize operations. Additionally, the impact of digitalization on CSR reporting and stakeholder engagement

warrants thorough exploration, highlighting the critical role of innovation in driving sustainable and responsible practices in aviation.

Regulatory Impact and Global Standards: The evolving regulatory landscape, characterized by initiatives like the Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA), provides fertile ground for research into how regulations influence CSR practices within the airline industry. As governments and international bodies impose stricter environmental standards, airlines are compelled to reassess and realign their CSR strategies to not only comply with these regulations but also to contribute meaningfully to global sustainability goals. This dynamic interplay between regulatory changes and CSR practices offers insights into the broader implications for the industry's role in addressing climate change and sustainable development.

Understanding how airlines navigate and respond to regulatory pressures is crucial. This includes examining the strategies they adopt to meet or exceed compliance requirements, the innovations encouraged by these challenges, and the potential shifts in corporate priorities towards more sustainable practices. Compliance with environmental regulations, while often seen as a burden, can also serve as an incentive for positive change, driving airlines to adopt more eco-friendly technologies, improve fuel efficiency, and invest in alternative fuels and carbon offset programs.

5. Conclusions

The bibliometric analysis has offered a detailed overview of the evolution of CSR practices within the airline industry, revealing trends and identifying gaps. It suggests avenues for future research and practical implementations while examining effective strategies and their impacts on society and the environment.

Particularly, the analysis, which covers the period 2008–2023, illustrates a significant increase in academic interest in the intersection of CSR and the airline industry, reaching its peak in 2022. In terms of globally cited documents, Kang et al. stands out as the most cited, while Han et al. and Chuah et al. are gaining influence with their high citation rates [42,45,47]. Theodoulidis et al. 4 also demonstrates significant impact despite a lower citation count [43]. The *Journal of Sustainable Tourism*, especially Cowper-Smith and De Grosbois's contribution, emerges as a noteworthy publication in this field [12].

Among leading authors, Joonho Moon takes the lead with eight articles, followed by Heesup Han and Seoki Lee with seven each. Moon's substantial fractionalized contribution suggests a central role in research, while Seoki Lee also emerges as a key contributor based on fractional count, indicating active participation in co-authored works. Regarding locally cited documents, Cowper-Smith and De Grosbois's study is particularly influential, with 124 global and 48 local citations [12]. Other notable works include Lee's study and Tsai's research, all contributing to the understanding of CSR's role in the tourism and air transport sectors [44,49]. Additionally, the data reveal varying degrees of emphasis on CSR in the airline industry across different countries, with Asian countries, especially China and South Korea, leading in terms of publications, highlighting the global diversity of research in this field.

The co-word map reveals three distinct clusters. The blue cluster reveals a strong connection between CSR and airline performance, with some studies highlighting that operational CSR enhances airline efficiency and market value, being the relationship between CSR initiatives and financial performance more complex. Additionally, employee engagement and perception of CSR also positively impact job performance and satisfaction. These insights suggest that robust CSR practices can be strategically beneficial for airlines.

The red cluster indicates a growing emphasis on sustainability and environmental aspects of CSR in the airline industry. The COVID-19 pandemic has shifted the focus toward effective CSR communication for better customer engagement. Additionally, integrating ESG factors into business practices is linked to long-term financial gains, reflecting a trend toward transparent CSR reporting.

The green cluster highlights the impact of airline CSR activities on consumer perceptions, loyalty, and brand equity. Research shows that customers value CSR but feel that airlines could improve in the execution thereof. The effect of CSR on corporate reputation is evident, with economic and environmental responsibilities influencing customer satisfaction and attitudes. Additionally, service quality is linked to increased purchase intentions thereby enhancing corporate reputation.

Considering the above, our study provides a detailed overview of CSR practices in the airline industry, with a strong focus on ESG issues. It reveals a significant increase in CSR research post-COVID-19, emphasizing the industry's shift towards health, safety, and environmental sustainability. The study highlights the airline sector's efforts in reducing carbon emissions, implementing sustainable aviation fuels, and enhancing energy efficiency, reflecting a commitment to environmental stewardship. Socially, it outlines initiatives aimed at employee welfare, community engagement, and customer satisfaction, emphasizing inclusivity and workplace safety. In terms of governance, our findings reveal a move towards ethical conduct, transparency, and integrated reporting, indicating an industry trend towards accountability and stakeholder trust. Overall, the analysis underscores the airline industry's comprehensive integration of CSR strategies across ESG dimensions, aligning with global trends and stakeholder expectations.

Our findings highlight that technological innovations are crucial for achieving CSR objectives in the airline sector, enabling reductions in environmental impact and improvements in operational efficiency. Key advancements include fuel-efficient planes, alternative energy sources, sophisticated traffic systems, and digitalization efforts, all contributing to lower carbon emissions, increased energy savings, and waste reduction. Innovations like lightweight materials in aircraft design and alternative propulsion methods support the goal of carbon-neutral growth. Technologies such as the Internet of Things (IoT) and artificial intelligence (AI) further enhance efficiency through predictive maintenance. In the wake of COVID-19, the focus on health, safety, and ESG considerations has elevated the role of technology, with developments like contactless solutions and advanced air filtration systems proving vital for ensuring passenger safety and reinforcing CSR commitments to public health and trust.

It is essential to acknowledge that the bibliometric analysis conducted in the current study is based on datasets derived from the Web of Science (WoS). While WoS is well-known for its comprehensive coverage and reliability in various scientific domains, the exclusive reliance on this database may introduce a selection bias, limiting the generalizability of our findings across the entire range of literature pertaining to corporate social responsibility (CSR) in the airline industry. This limitation stems from the potential exclusion of relevant studies published in sources not indexed by WoS, including journals, conference proceedings, and books that might offer additional insights into the field.

Future research directions highlight the need for a multidisciplinary approach to understanding CSR in the airline industry, emphasizing the importance of innovation, stakeholder engagement, and strategic integration of CSR into core business practices. As the industry continues to recover from the COVID-19 pandemic and faces increasing pressure to address sustainability challenges, these research areas offer valuable insights into the evolving role of CSR in shaping the future of aviation.

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