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# Carbon Emission Disclosure in Business & Economics: A Bibliometric Exploration of Trends and Insight

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**Abstract**
Climate change has emerged as a critical global issue, prompting increased corporate responsibility in disclosing carbon emissions. Carbon emission disclosure plays a vital role in corporate transparency and sustainability, influencing investor perceptions, regulatory compliance, and financial performance. This study employs a bibliometric analysis to explore trends and insights in carbon emission disclosure within business and economics research. Utilizing the Scopus database, we analyzed 178 scholarly articles published between 2014 and 2024. The findings indicate a significant growth in carbon-related research, with China leading in publication volume, followed by Australia, the UK, and Indonesia. Additionally, the study identifies key research themes, including carbon performance, climate change, and corporate governance, highlighting their interconnections through network analysis. The PRISMA framework and VOSviewer software were used to map research patterns, collaboration networks, and citation relationships. The results suggest an increasing emphasis on corporate sustainability, regulatory frameworks, and financial implications of carbon disclosure. This study contributes to the understanding of evolving research directions in carbon emission disclosure, providing insights for academics, policymakers, and business leaders on integrating sustainability into corporate strategies.

**Keywords:** Carbon Emission Disclosure, Bibliometric Analysis, Corporate Sustainability, Climate Change

## 1. Introduction

### *1.1 Introduce the Problem*

Climate change has become one of the biggest challenges facing the world today, driving many to raise awareness and take action on carbon emissions (Elsayih et al., 2021). In the business world, disclosure of carbon emissions is increasingly becoming a key concern as part of corporate sustainability practices (Oyewo, 2023). These disclosures not only reflect a company's transparency towards its environmental impacts, but can also influence the perceptions of investors, stakeholders and government regulations. Some studies show that companies that are more transparent in disclosing carbon emissions tend to get long-term benefits, such as improved reputation and better access to funding (Kılıç & Kuzey, 2019).

The relationship between carbon emissions disclosure and corporate financial performance is a topic of interest in economics and business. The study by Reichelstein, (2020) shows that carbon disclosure mandates in the UK can help reduce emissions without negatively impacting financial performance. By requiring companies to report their carbon footprint, these regulations encourage businesses to adopt more sustainable practices, such as improving energy efficiency, minimizing waste, and investing in green technologies. Increased transparency also enhances corporate reputation, attracting environmentally conscious investors and consumers. Moreover, many companies find that effective emission reduction strategies lead to operational efficiencies and cost savings, ultimately benefiting their long-term financial stability. Thus, carbon disclosure policies contribute to climate change mitigation while ensuring economic resilience for businesses.

In Indonesia, research by Rahmawati et al., (2024) revealed that corporate financial performance has an influence on carbon emissions disclosure, but is not significantly driven by environmental performance. This suggests that the main motivation for companies to disclose carbon emissions is still closely related to economic factors and regulatory compliance, rather than environmental awareness. As environmental and sustainability policies continue to evolve, it is important for companies to understand how carbon disclosure can affect their business and how sustainability strategies can be integrated into company operations more effectively.

## 2. Methods

This study uses a bibliometric approach to analyze trends in scientific publications related to disclosure of carbon emissions, carbon performance, and climate change in business and economics. This bibliometric method refers to the framework developed by Setiawan et al., (2023), which includes four main stages: data acquisition, data pre-processing, data analysis, and visualization and interpretation of results. This approach enables the identification of research patterns, collaboration between authors, and the development of topics of focus in academic studies.

The first stage in this study was data acquisition, which was conducted by collecting scientific articles from the Scopus database because it possesses unique attributes in the context of social and humanities; therefore, Scopus provides a better representation of the literature than WoS (Pranckutė, 2021), which is more suitable for bibliometric review (Abhilash et al., 2023; Ahmad et al., 2023; Antwi et al., 2022). The search process was carried out using specific keywords, namely "climate change," "carbon," "carbon emission disclosure," and "carbon performance," with a limitation of publication years between 2014 and 2024, or with the keywords ( TITLE-ABS-KEY ( "climate change" ) OR TITLE-ABS-KEY ( "carbon" ) OR TITLE-ABS-KEY ( "carbon emission disclosure" ) AND TITLE-ABS-KEY ( "carbon performance" ) ) AND PUBYEAR > 2013 AND PUBYEAR < 2025 AND ( LIMIT-TO ( SUBJAREA , "BUSI" ) OR LIMIT-TO ( SUBJAREA , "ECON" ) ) AND ( LIMIT-TO ( DOCTYPE , "ar" ) ) AND ( LIMIT-TO ( SRCTYPE , "j" ) ). In addition, this study only includes journal articles from the field of business and economics and indexed in Scopus. After the data was obtained, the data pre processing stage was carried out by filtering relevant publications based on titles and abstracts, eliminating duplicates, and adjusting the data format so that it could be analyzed further.

Data analysis was conducted using the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) approach to ensure transparency and systematicity in the study screening process (Hansen et al., 2022). Furthermore, VOSviewer software was used for network analysis, including author collaboration mapping, keyword analysis, and citation relationships. In addition, R Studio was utilized for further bibliometric analysis, such as the distribution of publications by time, the most influential journals, and the relationship between research topics. By using a combination of these methods, this study aims to provide a comprehensive overview of research trends in the field of carbon emissions disclosure and carbon performance in the context of business and economics.

## 3. Results and Discussion

Document general characteristics Table 1 shows the research over the period 2014 to 2024, with a total of 178 documents coming from 90 different sources, such as journals, books and other publications. The annual growth

rate of documents reached 26.39%, indicating a significant increase in publications over the period. With an average document age of 3.7 years, the data reflects a high level of relevance to current research. Each document has an average of 40.25 citations, reflecting considerable academic influence. Overall, the data is supported by 11,298 references, providing a strong foundation for further analysis.

In terms of collaboration, the study involved 454 authors, with 12 of them producing single documents. There were only 13 individually authored documents, while there were an average of 3.13 authors per document, indicating a high level of collaboration. A total of 36.52% of the documents involved international collaboration, indicating that this research has a fairly broad global scope. In addition, there were 594 additional keywords (Keywords Plus) and 584 original author's keywords, indicating the diversity of topics studied. All documents analyzed were articles, confirming that the focus of this study was on research-based publications.

Table 1: Document general characteristics

| **Description** | **Results** |
|---|---|
| MAIN INFORMATION ABOUT DATA | |
| Timespan | 2014:2024 |
| Sources (Journals, Books, etc) | 90 |
| Documents | 178 |
| Annual Growth Rate % | 26.39 |
| Document Average Age | 3.7 |
| Average citations per doc | 40.25 |
| References | 11298 |
| DOCUMENT CONTENTS | |
| Keywords Plus (ID) | 594 |
| Author's Keywords (DE) | 584 |
| AUTHORS | |
| Authors | 454 |
| Authors of single-authored docs | 12 |
| AUTHORS COLLABORATION | |
| Single-authored docs | 13 |
| Co-Authors per Doc | 3.13 |
| International co-authorships % | 36.52 |
| DOCUMENT TYPES | |
| article | 178 |

*3.1. Evolution in the number of publications*

Figure 1 shows the development of the number of publications (Production) and average citations per document (Average Citations) from 2014 to 2024. The number of publications increased significantly over time, with a steady rise until 2022, followed by sharp spikes in 2023 and 2024. In 2024, the number of publications peaked at 52 documents, indicating increased attention to research or related fields of study. This trend reflects growing interest, research activity or greater investment in the field.

On the other hand, the average citations per document show a different trend. The highest average citations were recorded in the early years, such as in 2015 with 12.79 citations, but tended to decrease gradually until 2024, where the figure reached 2.58. This decline may indicate that while the number of publications is increasing, the impact or influence of individual documents on the academic community may be diminishing. This could be due to various factors, such as an increasing number of publications that have not had enough time to receive many citations or a broader change in research focus. The combination of these two trends reflects the complex dynamics between research productivity and citation relevance.

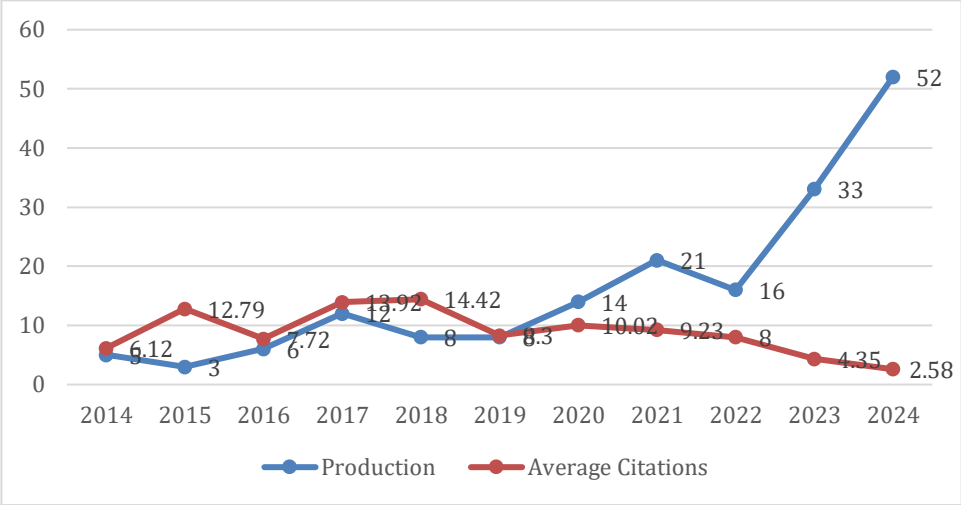


Figure: 1 Evolution in the number of articles production and average citations

*3.2. Distribution across global regions and organizations*

Figure 2 shows the distribution of research contributions or publications by country, with the intensity of the blue color indicating the level of contribution. China dominates significantly, as seen from the striking dark blue color, indicating that the country has a much higher level of research activity or number of publications than other countries in this dataset. This reflects China's great efforts in supporting research and development, including through large investments in higher education institutions and international collaborations. This dominance also indicates China's central role in the global research community over the period covered by the data.

Besides China, countries such as the United States, Australia, the United Kingdom, and Germany also show significant contributions, albeit at a lower intensity, as seen from the lighter blue color. These countries remain global research hubs with consistent activity. However, other regions, such as South America, Africa and most of Southeast Asia, show much smaller contributions or are not even recorded in this dataset. This reveals a global gap in research contributions, where academic activity is more concentrated in regions with more developed research infrastructure. This inequality poses a global challenge to promote equitable access to research resources and increase participation from underrepresented regions.

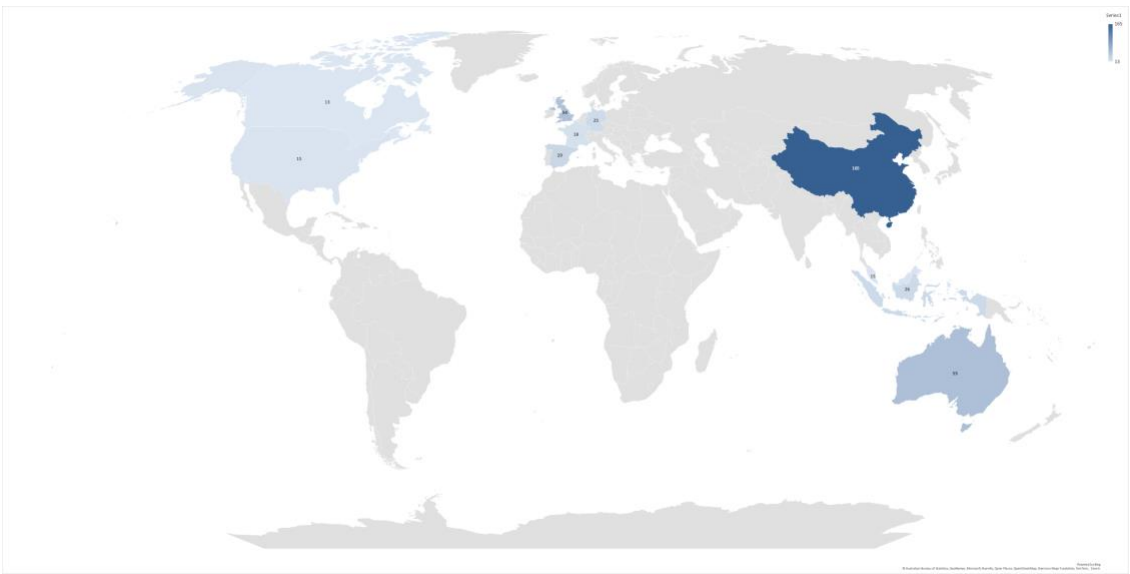

Figure 2: Global distribution of publication density

Table 2: Top 10 organizations contributing to research on carbon

| Region | Frequency |
|---|---|
| CHINA | 165 |
| AUSTRALIA | 55 |
| UK | 54 |
| SPAIN | 29 |
| INDONESIA | 26 |
| GERMANY | 25 |
| FRANCE | 18 |
| MALAYSIA | 15 |
| USA | 15 |
| CANADA | 13 |

The table above shows the top ten countries contributing to carbon-related research based on the frequency of their contributions. China dominates with 165 frequencies, demonstrating its leading role in carbon research at a global level. In second and third place, Australia and the UK recorded contributions of 55 and 54 frequencies respectively, which while significant, is still far below China. Countries such as Spain (29), Indonesia (26) and Germany (25) are in the middle tier of contributions, showing a more limited but still relevant participation in carbon research. On the other hand, countries such as France (18), Malaysia (15), the United States (15) and Canada (13) show lower contribution levels than the countries above them. This disparity in contributions reflects the different research capacities and priorities of each country on carbon issues. China's dominance may reflect a greater commitment to climate change mitigation or internal demands to reduce carbon emissions, while smaller contributions from other countries could be due to factors such as limited resources or a focus on other environmental issues.

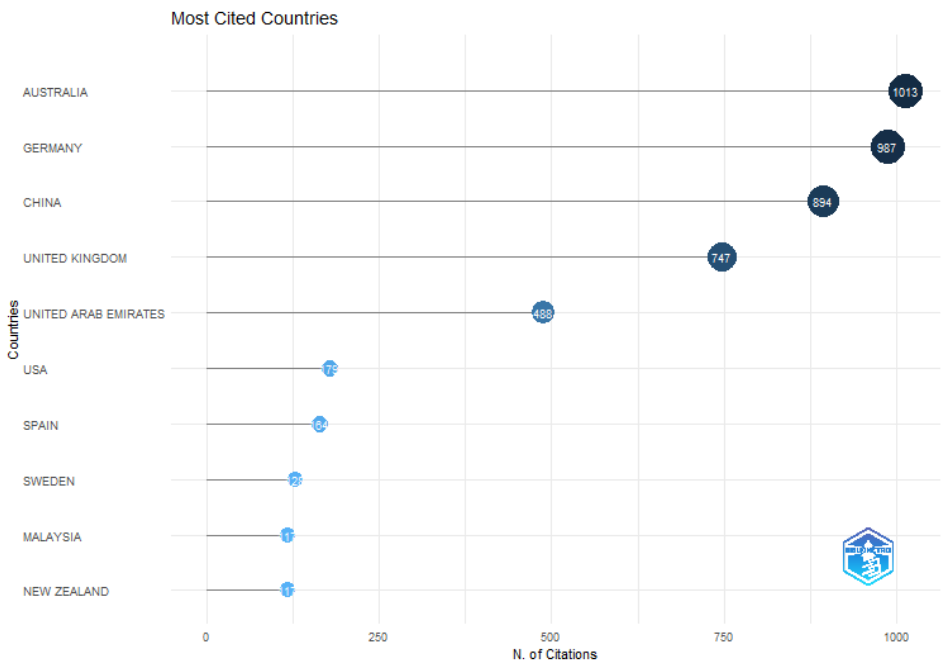


Figure 3: Top Most Cited Countries

Figure 3 shows the most cited countries in the study based on the number of citations. Australia took first place with 1,013 citations, followed by Germany (987) and China (894). These three countries significantly lead in the number of citations, reflecting the great influence of their research in related fields. The UK came in fourth with 747 citations, followed by the United Arab Emirates (489), indicating that research from this country is also widely recognized in the academic community.

Other countries such as the United States, Spain, Sweden, Malaysia, and New Zealand have lower citation counts, with numbers below 500. This indicates a relatively smaller influence compared to the top-ranked countries. However, their presence in this list still indicates an important contribution to the global research literature. This disparity in citation counts may reflect differences in their level of research investment, international collaboration, or the thematic relevance of their research to global issues.

*3.3. Journal analysis*

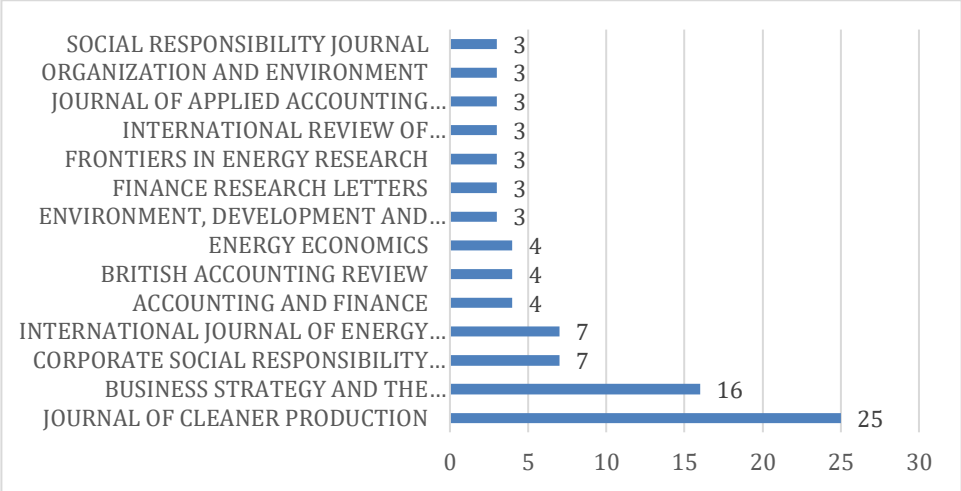


Figure 4: Top 14 journals by production

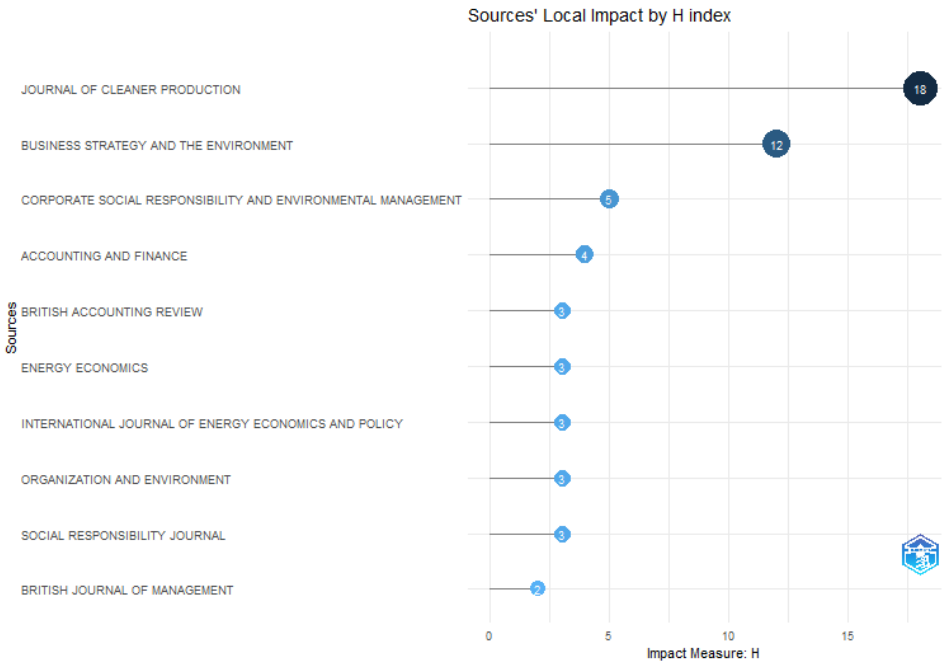


Figure 5: Top 10 Sources' Local Impact

The journal analysis in Figure 4 shows the top 14 journals based on the number of articles published. The Journal of Cleaner Production took first place with 25 articles, followed by Corporate Social Responsibility and Environmental Management with 16 articles. Other journals such as Accounting and Finance and Energy Economics had 7 and 4 articles respectively, while some journals such as Finance Research Letters and International Review of Economics produced 3 articles. This shows that sustainability and social responsibility topics are top of mind in some of the leading journals.

Figure 5 displays the local impact of the top 10 journals based on the H index. Journal of Cleaner Production has the highest H index of 15, indicating significant influence in related research. Other journals such as Business Strategy and the Environment and Corporate Social Responsibility and Environmental Management also show important contributions, albeit with lower H indices. In contrast, some journals such as Social Responsibility Journal and British Journal of Management have relatively smaller local impacts. These findings highlight the major role of leading journals in driving research in sustainability and social responsibility.

*3.4. Network analysis of conceptual structure*

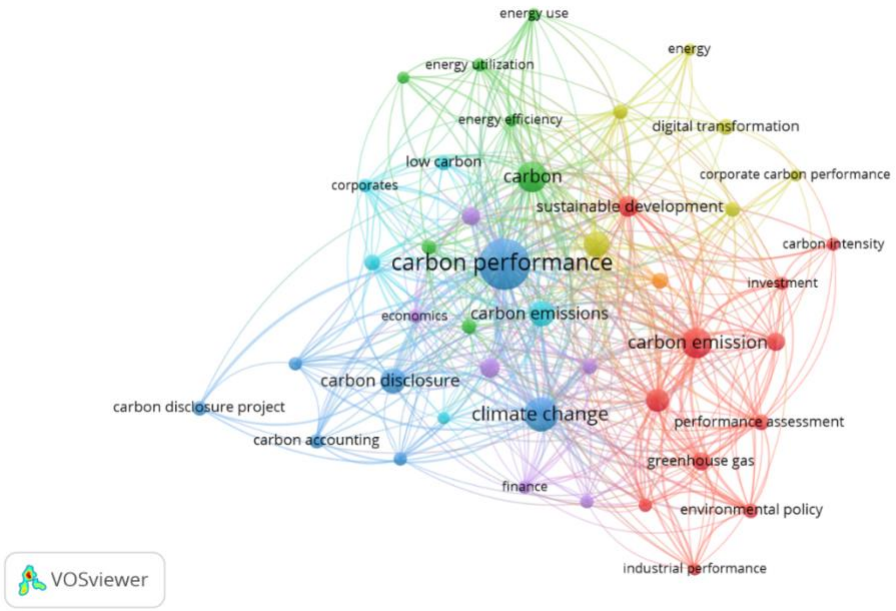


Figure 6: Graphical representation of the co-word network

Figure 7 shows a graphical representation of the conceptual network analysis based on the co-word network. This bibliometric network consists of nodes and edges (Eck & Waltman, 2014). Circular nodes denote keyword occurrences, with larger nodes indicating more extensive research on these keywords (Donthu et al., 2021). The concept of "carbon performance" is at the center of the network with strong connections to other terms such as "carbon emissions," "climate change," and "carbon disclosure," indicating that this topic is a major focus of related research. Close connections between terms such as "sustainable development," "greenhouse gas," and "environmental policy" indicate the integration of carbon performance and sustainability efforts globally. In addition, themes such as "energy efficiency," "digital transformation," and "low carbon" highlight the importance of technological innovation and energy efficiency in addressing carbon emissions. Overall, the network reflects the complexity of the relationships between various factors in carbon performance and sustainability research.

Table 3: Variables used in Carbon Performance research

| Variable | Cluster | Total connection strength | Occurrences | Avg. Pub. Year |
|---|---|---|---|---|
| Carbon performance | 3 | 233 | 87 | 2021.60 |
| Climate change | 3 | 152 | 40 | 2020.78 |
| Carbon emissions | 1 | 144 | 31 | 2020.84 |
| Carbon | 2 | 139 | 31 | 2020.68 |
| Emission control | 4 | 126 | 23 | 2020.91 |
| Enviromental economics | 1 | 97 | 18 | 2021.22 |
| Carbon emissions | 6 | 85 | 22 | 2021.91 |
| Sustainable development | 1 | 85 | 14 | 2020.50 |
| Carbon disclosure | 3 | 69 | 22 | 2021.83 |
| Enviromental management | 5 | 48 | 11 | 2019.73 |

| | | | | |
|---|---|---|---|---|
| Enviromental performance | 5 | 48 | 13 | 2020.92 |
| Greenhouse gas | 1 | 48 | 11 | 2019.64 |
| Performance assessment | 1 | 47 | 9 | 2020.89 |
| Enviromental policy | 1 | 40 | 8 | 2019.88 |
| Carbon footprint | 6 | 39 | 9 | 2021.56 |
| Corporates | 6 | 39 | 6 | 2022.50 |
| Corporates strategy | 1 | 38 | 6 | 2020.83 |
| Sustainability | 1 | 38 | 11 | 2021.91 |
| Carbon dioxide | 4 | 37 | 7 | 2019.29 |
| Economics | 5 | 37 | 6 | 2020.00 |
| Greenhouse gases | 2 | 36 | 7 | 2018.43 |
| Finance | 5 | 34 | 6 | 2020.33 |
| Carbon disclosure | 3 | 33 | 6 | 2020.91 |
| Energy utilization | 2 | 33 | 6 | 2018.17 |
| Corporate governance | 7 | 32 | 9 | 2021.22 |
| Corporate social Responsibility | 4 | 31 | 7 | 2021.00 |
| Energy use | 2 | 29 | 5 | 2018.60 |
| Financial performance | 5 | 26 | 7 | 2019.43 |
| Industrial performance | 1 | 26 | 5 | 2019.60 |
| Energy efficiency | 2 | 25 | 5 | 2018.60 |
| Ghg emissions | 5 | 25 | 6 | 2019.00 |
| Carbon accounting | 3 | 24 | 7 | 2021.71 |
| Investment | 1 | 24 | 6 | 2022.17 |
| Carbon management | 3 | 22 | 6 | 2020.83 |
| Greenhouse gas emissions | 2 | 20 | 7 | 2019.00 |
| Low carbon | 6 | 20 | 7 | 2021.57 |
| Energy policy | 2 | 19 | 5 | 2019.40 |
| Carbon sequestration | 6 | 18 | 5 | 2022.60 |
| Energy | 4 | 18 | 5 | 2021.00 |
| Digital transformation | 4 | 17 | 9 | 2023.67 |
| Carbon intensity | 1 | 15 | 6 | 2022.33 |
| Carbon disclosure project | 3 | 14 | 7 | 2019.00 |
| Corporate carbon performance | 4 | 9 | 5 | 2023.83 |

Table 3 shows the variables used in carbon performance research, including clusters, total connection strength, number of occurrences, and average year of publication. The variable "carbon performance" has the highest connection strength (233) and the most occurrences (87), indicating that this topic is the main focus of research. Other variables such as "climate change" and "carbon emissions" also have high connection strengths, 152 and 144 respectively, with the most recent average publication around 2020. Variables such as "environmental management," "greenhouse gas," and "sustainable development" have lower connections but remain relevant, with average publication years approaching 2019-2020. Meanwhile, more specific variables such as "digital transformation," "carbon intensity," and "corporate governance" show fewer appearances but remain part of recent research, as seen by the average publication year approaching 2022-2023. This data reflects the diverse research focus, with the dominance of key themes related to carbon performance, climate change, and carbon emissions.

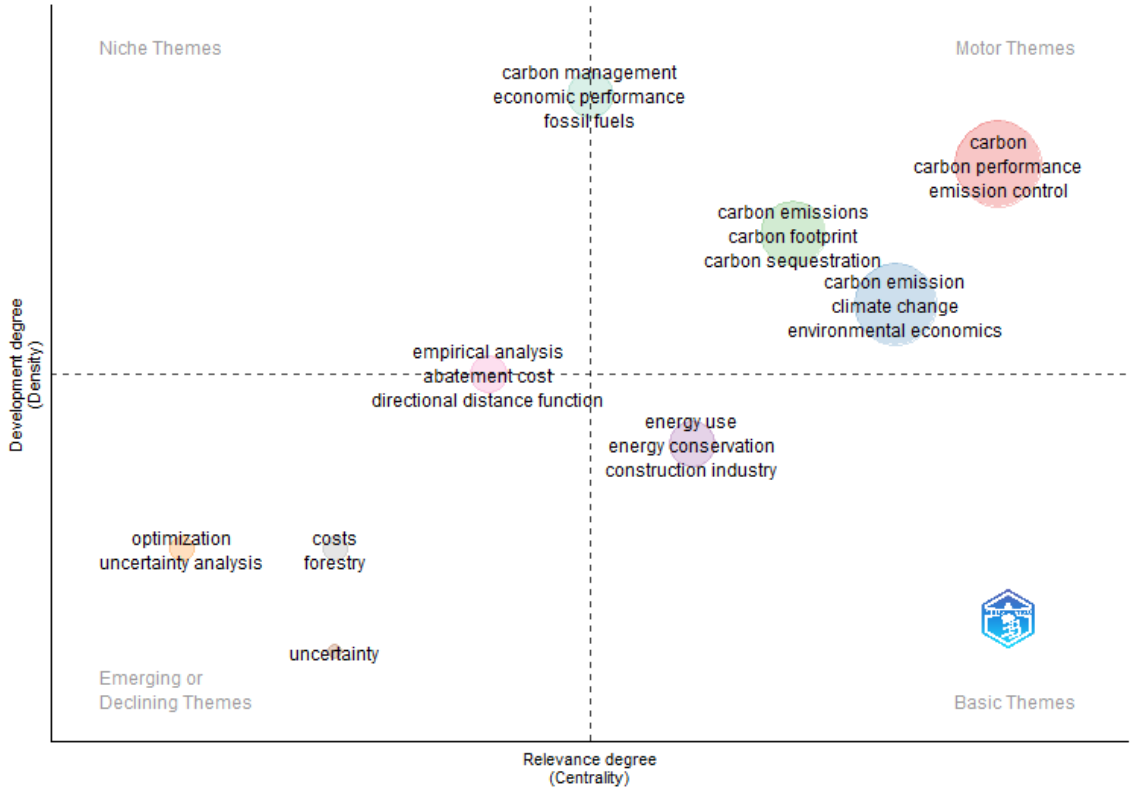


Figure 7: Thematic map by keyword

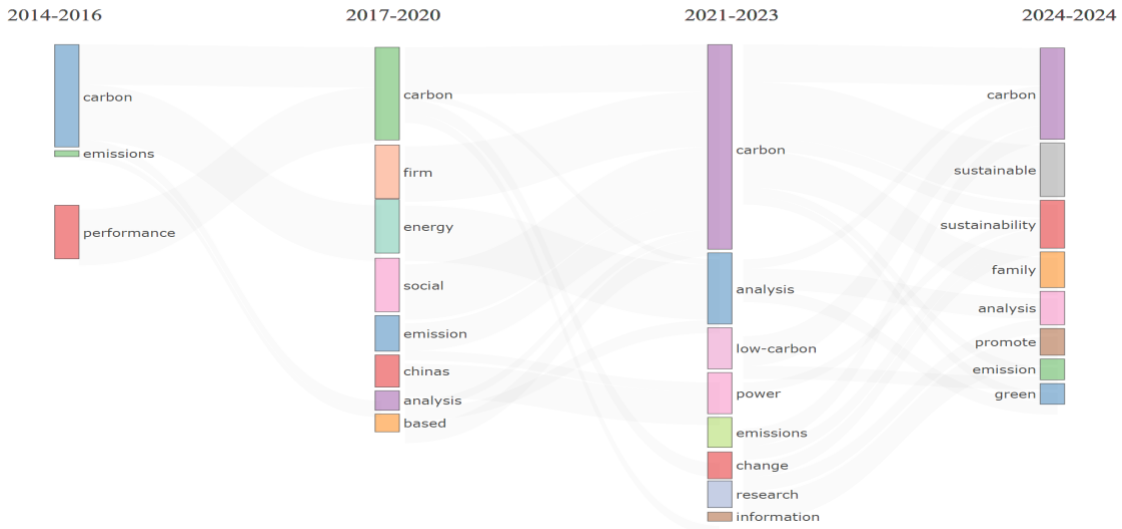


Figure 8: Thematic evolution by titles.

Figure 7 shows a keyword-based thematic map that categorizes research themes based on two main dimensions: degree of development (density) and degree of relevance (centrality). Motor themes such as "carbon", "carbon performance" and "emission control" are located in the upper right quadrant, indicating that these topics have a high level of relevance and development. Themes such as "carbon emissions", "carbon footprint", "climate change", and "environmental economics" are in the lower right quadrant as basic themes, reflecting their importance as research foundations but with a lower level of development. Themes in the upper left quadrant, such as "carbon management" and "economic performance", fall into the category of niche themes, which are highly developed but less central. Meanwhile, themes in the lower left quadrant, such as "optimization" and "uncertainty analysis", are considered emerging or declining themes.

Figure 8 illustrates the thematic evolution by title from 2014 to 2024. In the 2014-2016 period, the main focus was on "carbon", "emissions", and "performance". In the 2017-2020 period, themes began to branch out into new areas such as "firm", "energy", and "social". Furthermore, in the 2021-2023 period, there is more emphasis on themes such as "low-carbon", "power", and "change". For the period 2024-2024, research trends began to focus on the concept of sustainability, with keywords such as "sustainable", "family", "promote", and "green". This shows a shift in research focus from technical and performance aspects towards a more holistic and sustainability-oriented approach.

*3.5. Network analysis of social structure*

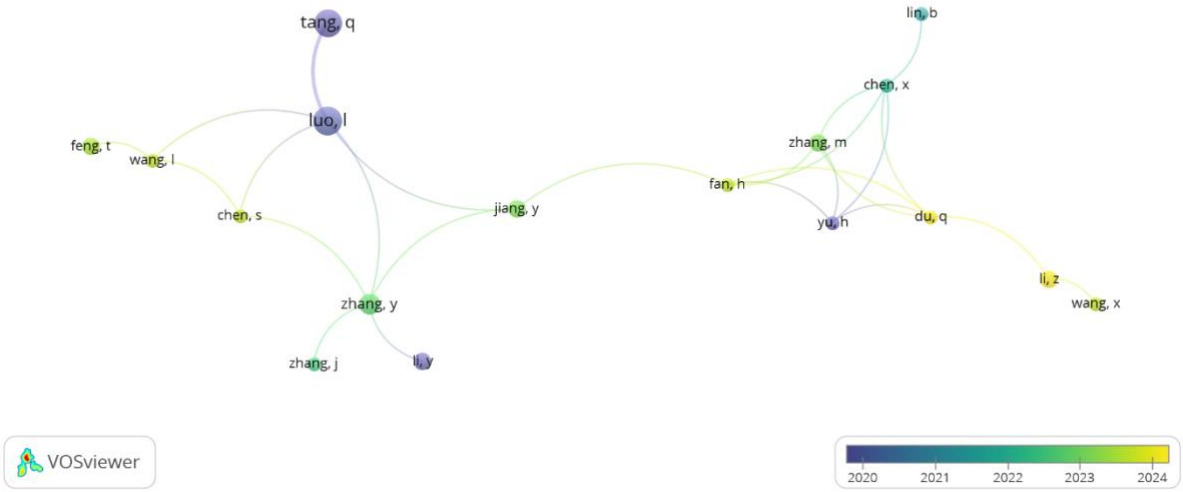


Figure 9: Graphical representation of the author's network

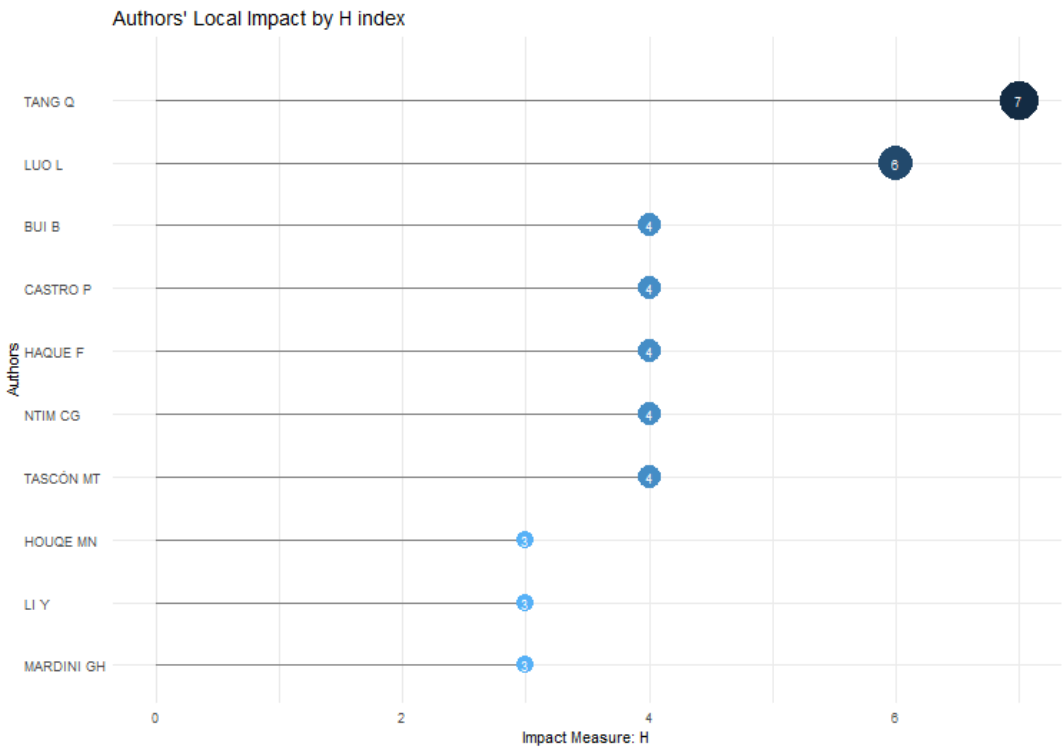


Figure 10: Top Authors' Local Impact

In figure 9, the graph generated using VOSviewer software shows the relationship between authors in the research network. The colors in this graph reflect the year of publication, with a spectrum of colors from purple (2020) to yellow (2024). Relationships between authors are indicated by connecting lines, indicating collaboration or citations in their academic work.

Meanwhile, Figure 10 presents the local impact analysis of authors based on the H index. This diagram displays several authors with different H index values, where Tang Q has the highest value, followed by Lud L and Bui B. The size of the dot indicates the level of impact of each author in this research network. This graph provides an overview of an individual's contribution to research in a given field.

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**Conflict of Interest**: The authors declare no conflict of interest.

**Informed Consent Statement/Ethics Approval**: Not applicable.

**References**

Abhilash, A., Shenoy, S. S., & Shetty, D. K. (2023). Overview of Corporate Governance Research in India: A Bibliometric Analysis. *Cogent Business and Management*, *10*(1). https://doi.org/10.1080/23311975.2023.2182361

Ahmad, G., Subhan, M., Hayat, F., & Al-Faryan, M. A. S. (2023). Unravelling the truth: A bibliometric analysis of earnings management practices. *Cogent Business and Management*, *10*(1). https://doi.org/10.1080/23311975.2023.2194088

Antwi, I. F., Carvalho, C., & Carmo, C. (2022). Corporate Governance research in Ghana through bibliometric method: review of existing literature. *Cogent Business and Management*, *9*(1). https://doi.org/10.1080/23311975.2022.2088457

Donthu, N., Kumar, S., Mukherjee, D., Pandey, N., & Lim, W. M. (2021). How to conduct a bibliometric analysis: An overview and guidelines. *Journal of Business Research*, *133*(April), 285–296. https://doi.org/10.1016/j.jbusres.2021.04.070

Eck, N. J. Van, & Waltman, L. (2014). Measuring Scholarly Impact. In *Measuring Scholarly Impact*. https://doi.org/10.1007/978-3-319-10377-8

Elsayih, J., Datt, R., & Tang, Q. (2021). Corporate governance and carbon emissions performance: empirical evidence from Australia. *Australasian Journal of Environmental Management*, *28*(4), 433–459. https://doi.org/10.1080/14486563.2021.1989066

Hansen, C., Steinmetz, H., & Block, J. (2022). How to conduct a meta-analysis in eight steps: a practical guide. *Management Review Quarterly*, *72*(1). https://doi.org/10.1007/s11301-021-00247-4

Kılıç, M., & Kuzey, C. (2019). The effect of corporate governance on carbon emission disclosures: Evidence from Turkey. *International Journal of Climate Change Strategies and Management*, *11*(1), 35–53. https://doi.org/10.1108/IJCCSM-07-2017-0144

Oyewo, B. (2023). Corporate governance and carbon emissions performance: International evidence on curvilinear relationships. *Journal of Environmental Management*, *334*(February), 117474. https://doi.org/10.1016/j.jenvman.2023.117474

Pranckutė, R. (2021). Scopus and Web of Science stands out for systematic reviews, offering comprehensive coverage across disciplines, including journals, conferences, and patents. *Publications*, *9*(1), 1–59.

Rahmawati, R., Setiawan, D., Aryani, Y. A., & Kiswanto, K. (2024). Role Environmental Performance on Effect Financial Performance to Carbon Emission Disclosure. *International Journal of Energy Economics and Policy*, *14*(1), 196–204. https://doi.org/10.32479/ijeep.15031

Reichelstein, S. (2020). The Impact of Carbon Disclosure Mandates on Emissions and Financial Operating Performance.

Setiawan, D., Rahmawati, I. P., & Santoso, A. (2023). A bibliometric analysis of evolving trends in climate change and accounting research. *Cogent Business and Management*, *10*(3).

https://doi.org/10.1080/23311975.2023.2267233