THE 'ENGINE' AND 'FUEL' OF CARBON FINANCING: CARBON MARKETS AND OFFSETTING MECHANISMS IN THE POST-PARIS ERA – A BIBLIOMETRIC ANALYSIS.

Martin Kamau Muchiri – Szilvia Erdei-Gally – Maria Fekete-Farkas

Abstract

The study aimed to provide a one-stop overview of research regarding carbon financing through carbon markets and offsetting mechanisms based on a comprehensive bibliometric analysis. The main research question that this study sought to answer was "how has scientific research on carbon financing evolved in the Paris Agreement era in terms of thematic focus, emerging trends, and international collaboration patterns? To answer this question, the dataset was derived from the Web of Science and analyzed using the biblioshiny package available in R, Vos viewer software, and Microsoft Excel. The study summarizes results on the main details of the corpus used, trend patterns, thematic topics, co-citation performance, and co-occurrences. The study reveals valuable insights, including a conspicuous research gap within the African region. China is identified as the most dominant country regarding research related to carbon financing and carbon credit trading. There is evidence of regional and inter-regional research collaborations between continents and countries, especially within Asia, Europe, and North America. The study recommends strengthening research collaborations with African countries as well as exploring emerging themes such as carbon sequestration, blue carbon initiatives, and the application of game theory in driving carbon financing innovations. Regarding research limitations, the scope of the analysis is limited to one database i.e., the Web of Science, and results might be geographically biased as there is a high absence of research contributions from Africa.
Keywords: *Carbon financing; carbon markets; offsetting mechanisms; VOS Viewer; R*
JEL: *Q53, Q54*

Introduction

Following notable previous global initiatives including the UNFCCC of 1992, the Kyoto Protocol of 1997, and the 2015 Paris Agreement, innovative concepts such as carbon financing have since emerged (Su et al., (2023). While there is no agreed-upon definition of carbon financing, previous authors have presented various versions. Guo et al., (2021) define carbon financing in a general sense as the use of market-based financial instruments such as carbon taxes, ETS, green, blue, transition, catastrophe, or sustainability-linked bonds, climate hedging instruments and derivatives, blended financial instruments, climate-linked equities, insurances, and nature-based financial instruments among others to address the issues of climate change. Labatt & White, (2011) present a narrow version and define carbon finance as cashflows derived from the trading of carbon permits. According to Dunbar et al., (2024), the concept of carbon financing involves financial mechanisms that promote policies and activities that seek to reduce greenhouse gas emissions (GHG) from the atmosphere or enhance carbon sequestration. Song & Wu, (2023) note that among these mechanisms, carbon credit trading and market-based solutions have emerged as critical initiatives and strategies in pursuing sustainable development goals as part of the global climate policy. Carbon financing fosters green innovations and technologies that are key to achieving the net zero goals (Swinkels, 2024). The scope of carbon financing extends to multiple disciplines including finance, policy, economics, and environmental science (Su, Yu and Zhou, 2023).

Carbon markets and offsetting mechanisms provide the framework upon which financial resources are channeled to projects that support carbon sequestration or reduce GHG emissions (Geng et al., 2023). These include carbon markets that operate either in voluntary (e.g. Verra, Gold Standard, etc.) markets or compliance markets such as the EU ETS. Carbon credits & offsetting mechanisms generate the carbon credits that are then traded in the carbon markets (Blanton *et al.*, 2024). Such includes the Reducing Emissions from Deforestation and Forest Degradation (REDD) mechanisms, the Certified Emission Reduction (CERs) and Verified Carbon Units (VCUs). Ideally, the carbon credits traded in the carbon markets are supplied by offsetting mechanisms while the carbon markets connect the buyers of these credits usually mostly companies or governments from developed economies that need to meet their voluntary or compliance sustainability obligations (Li and Zhang, 2024). Offsetting mechanisms and carbon markets work hand in hand in driving global initiatives to combat climate change.

As economies across the globe strive to meet their sustainability goals, significant interest is drawn to both voluntary and compliant carbon market activities (Zhou and Li, 2019). Carbon financing has become a crucial component in promoting green transition through financing green projects such as renewable energy (Zhang & Wang, 2024). This has attracted growing academic interest in exploring the various dynamics of the carbon credit market, evaluating the effectiveness of strategies, and analyzing market gaps among others (Wu, Liu and Tang, 2024). Su et al., (2023), notes that despite this growing interest, comprehensive analysis of thematic evolution, emerging trends, intellectual structure, and collaborative efforts between authors and countries remains limited.

This study therefore seeks to unravel this gap by applying bibliometric tools, especially the biblioshiny package available in R and the VOS viewer software to analyze the current trends, thematic evolution, and collaboration initiatives for scientific research relevant to carbon credit. The aim is to examine the intellectual landscape and highlight research trends that potentially provide actionable insights to practitioners, academics, and policymakers. The study is therefore anchored on the following specific objectives:

1. Identifying the trend patterns of scientific research on carbon financing in the Paris era
2. Uncovering the most relevant research themes, co-occurrences, and emerging topics after the Paris Agreement.
3. To visualize and analyze research collaborations among countries, and performance analysis through co-citation to expound on global knowledge-sharing patterns.

Materials and Methods

At the heart of this study was to unravel in what ways has scientific research on carbon financing progressed since the Paris Agreement, particularly regarding thematic priorities, emerging research trends, and patterns of international collaboration? In addressing this research question, the study design employed in this study is bibliometric analysis which is a data-centered quantitative approach designed to explore the intellectual structure and emerging thematic or topical trends for a given area of research (Donthu, Kumar, Mukherjee, *et al.*, 2021). Bibliometric analysis has gained much popularity over recent years due to various reasons including the accessibility and availability of bibliometric software such as Leximancer, VOS viewer, Gephi, and scientific databases such as Web of Science, Scopus, etc. (Khan *et al.*, 2021). These tools offer great utility, especially in handling

large volumes of scientific data enabling researchers to uncover emerging research trends, collaboration patterns, journal performance, and intellectual structure of literature domains (Verma and Gustafsson, 2020; Donthu, Kumar, Pattnaik, *et al.*, 2021). This study used R and VOS viewer software to conduct the analysis. These two tools were selected due to their ability to handle robust data and produce quality visualizations. Also, both can read plain text files making it easy to analyze as there is no need to convert the files to other formats like bitext, etc.

The data was derived from the Web of Science database which is recognized as a reliable and comprehensive source for academic literature. Relevant keywords were carefully selected and combined to construct the search query as follows;

TS= (((("Carbon credits") OR ("carbon trading") OR ("Carbon Markets") OR ("Carbon Offset Mechanisms") OR ("Carbon Pricing") OR ("Emissions Trading Systems (ETS)") OR ("Carbon Sequestration Financing") OR ("Voluntary Carbon Markets (VCM)") OR ("Compliance Carbon Markets")))

The aim was to attract research related to carbon financing and different facets of carbon market trading and mechanisms. After running the search based on the keyword combination above, a total of 6833 scientific publications relevant to the selected keyword above were attracted. According to Donthu, Kumar, Mukherjee, et al., (2021) bibliometric analysis is preferred when the scope of review is broad otherwise alternative manual review approaches such as meta-analysis and systematic review are selected. In this case, the data (6833 documents) was too large for manual review. The study focused on research publications published from 2016 to 2025. The selection of this timeline was motivated by the fact that 2016 was the year the Paris Agreement was enacted. Arguably, it would be expected that countries would accelerate their carbon reduction initiatives and potentially explore all available mechanisms to achieve their nationally determined contributions (NDC) moving forward (Su, Yu and Zhou, 2023).

Regarding document type, open-access original research articles, reviews, data papers, book chapters, and early access written in the English language were included in the study. Retracted articles and those not relevant to the study after a manual review were excluded from the analysis. As part of the inclusion criteria, the study included articles that were anchored on the following six SDGs); 06 (clean water and sanitation), 07 (affordable and clean energy),09 (Industrial innovation and infrastructure), 11(sustainable cities and sanitation), 12 (responsible consumption and production), and 13(climate action). The selection of these SDGs was informed by their direct alignment with the objectives and carbon credit markets and mechanisms.

The search for the dataset analyzed in this study was conducted as of January 2025 and exported in *plaintext* format. This format was preferred because it was easily readable by both R and VOS viewers which are the main tools used in analyzing the data. The data was exported in bits of 500 records which covered full records and cited references as it was impossible to export more than 500 reports at a time when capturing full records and references. The multiple files were then compiled into one plain text file that was used for analysis. The research process is illustrated in the Prisma model as shown in figure 1 below:
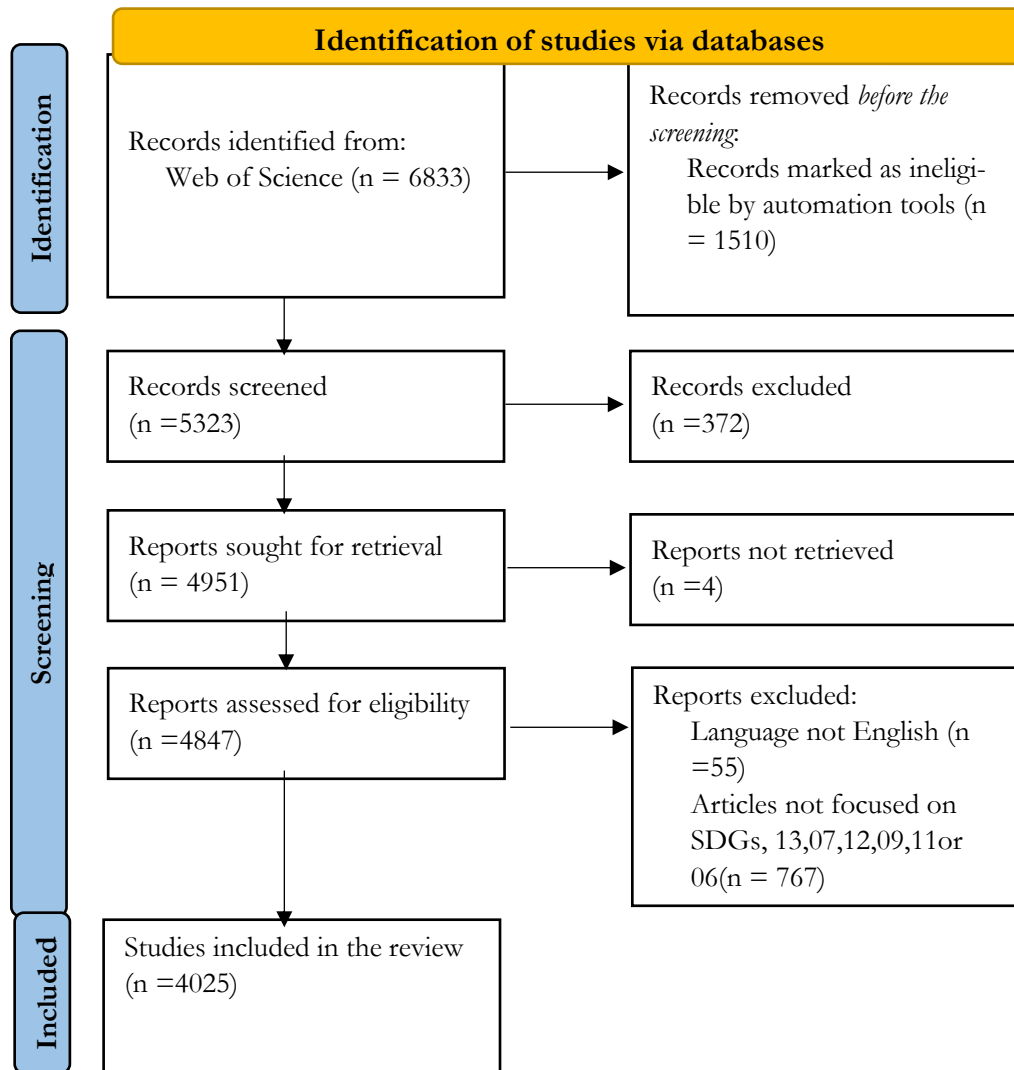
Figure 1; Prisma flowchart (Page et al., 2021)
Source: Authors own analysis based on Prisma template

Findings and Analysis

This section presents the analysis results. Particularly, the section details the main characteristics of the corpus used in this study, results for trend analysis, world cloud, co-citation, Zipf's Law, and co-occurrence network. Results are presented in tables and figures.

Table 1: Main Information of the Corpus

Description	Results
MAIN INFORMATION ABOUT DATA	
Timespan	2016:2025
Sources (Journals, Books, etc.)	880
Documents	4025
Annual Growth Rate %	-21.32
Document Average Age	3.53

Average citations per doc	19.06
References	151950
DOCUMENT CONTENTS	
Keywords Plus (ID)	4446
Author's Keywords (DE)	9802
AUTHORS	
Authors	10761
Authors of single-authored docs	313
AUTHORS COLLABORATION	
Single-authored docs	364
Co-Authors per Doc	3.93
International co-authorships %	28.55
DOCUMENT TYPES	
article	3665
article; book chapter	34
article; data paper	1
article; early access	100
article; proceedings paper	32
review	183
review; book chapter	1
review; early access	9

Source: Author's work based on R studio.

The analysis of the main information regarding the dataset used for the study reveals some important insights. *Table 1* reveals that the average age of the documents is 3.53 years indicating that most of the studies considered are recent potentially addressing contemporary trends and issues. The 4025 research publications were published across 880 sources. The average citation of 19.06 indicates that this area of study has significant relevance and influence in policy and academic discourse. Notably, the publications drew insights from a wide body of literature with a total of 151,950 references and a total of 10,761 authors. The area of research also has a high level of global collaboration as indicated by 28.55% international co-authorship and a co-authorship of 3.93 average per document. Empirical research is dominant (3665) though well supplemented by systematic reviews (183).

Trend Analysis

Table 2 shows a steady growth in the number of articles published over the years from 2016 to 2023. The increase is notably enormous between 2022 to 2023 with an increase of 163 articles which is relatively higher by far from the other years. This rising trend indicates the rising attention on research related to climate change strategies, the carbon market, and pricing mechanisms. Table 2 provides more details on the annual scientific production from the year 2016 all through to 2024.

Table 2: Publication Production over Years

Year	Articles
2016	173
2017	195
2018	236
2019	287
2020	339
2021	391
2022	632
2023	795
2024	957

Source: Author's work based on R studio.

Figure 2 below shows a sharp increase after 2020 which can be attributed to net zero commitments, carbon market developments, and EU ETS reforms among others. The exponential growth between 2022 to 2024 could potentially be attributed to increased funding for climate-related research or multidisciplinary intersections especially in policy, finance, and technology. The sharp growth after 2021 aligns with the current developments, especially with new carbon market mechanisms, growth in ESG investing, and growing commitments in corporate climate investments.
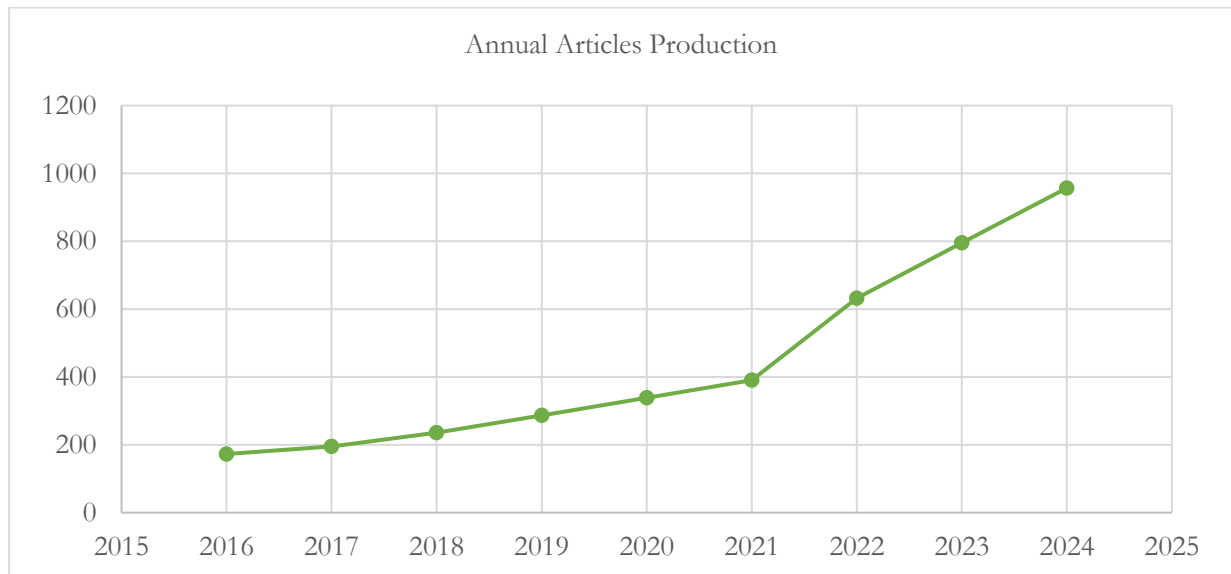
Figure 2: annual scientific production
Source: Authors own analysis based on excel

Thematic analysis

Thematic analysis reveals that carbon financing is the most dominant theme with 409 appearances, followed by carbon trading (301) and followed by climate change (257). These results indicate that carbon pricing and market mechanisms in the broader environmental context are the central concepts for the publications analyzed. Notably, China is the only country that has appeared among the keywords possibly suggesting that it could be the country with the highest level of research

activity on carbon financing and carbon market-related research. Also, climate policy, combined with the carbon tax and carbon pricing appeared 135 times indicating a high prevalence of policy-centered research on carbon financing. It is worthwhile to note that, the technical aspects including economic instruments i.e., trading, pricing, and market mechanisms are more prominent than technological solutions. More emphasis is also given to implementation i.e.; major themes revolve around policy and market-based solutions. Table 3 shows the results of the thematic analysis based on the author's keywords.

Table 3: Author's Keywords Frequency

Author's Keywords	Frequency
Carbon Pricing	409
Carbon Trading	301
Climate Change	257
Carbon Tax	158
China	143
Climate Policy	135
Carbon Markets	126
Carbon Credits	125
Carbon Market	125
Carbon Emissions	92

Source: Author's work based on R studio.

Figure 3: word cloud
Source: Author's work based on R

Figure 3 presents a visual for the main themes identified based on the authors keywords frequency through a word cloud. Similarly, the word cloud depicts the dominant market-based mechanisms i.e. carbon pricing/trading, the growing emphasis on mitigation, collaboration and policy as well as the emerging geographical hotspot for related research.
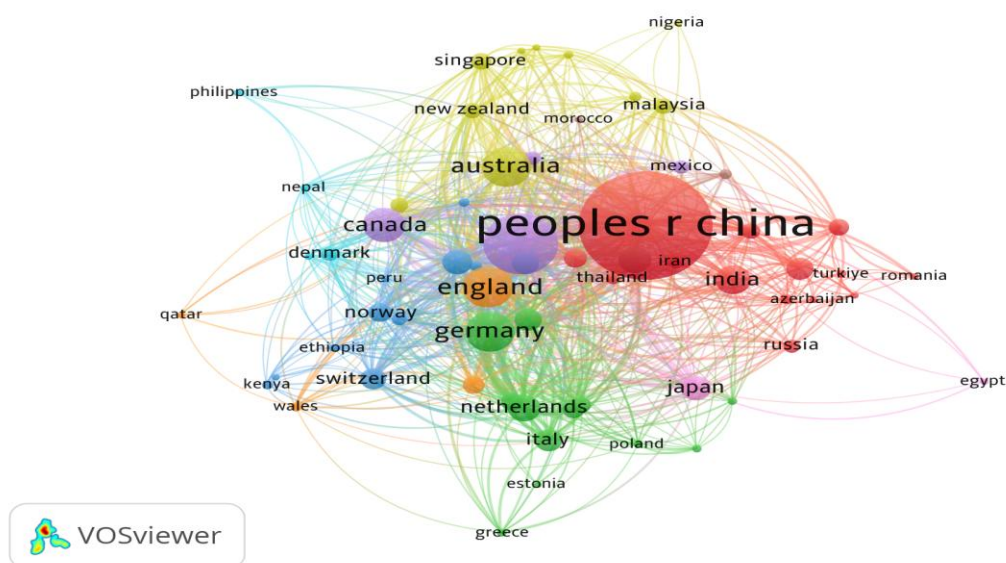
Co-authorship

Co-authorship is visualized in a network made of nodes, colored clusters and connecting lines as shown in figure 4. The size of the nodes in the co-authorship network is a representation of the volume of co-authored publications (Tian et al., 2024). The People's Republic of China has the highest number of co-authored publications followed by England, Germany, India, and Australia. Notably, China has the most prominent node indicating that it is the largest contributor of research collaborations on carbon financing and carbon credit market-related research. Countries are grouped into different clusters based on their frequency of collaboration. Each cluster has a different color. The red color represents the countries within the Asian region with the highest collaborations including China, Japan, Russia, and India. The green cluster represents European countries including Germany, Italy, and the Netherlands. The yellow cluster includes countries within the Asia-Pacific region such as Malaysia, New Zealand, and Australia while the blue cluster represents countries within North America and Northern Europe such as Norway, Canada, and England.

The thickness of the connecting lines between the nodes indicates how strong the co-authorship ties are between countries (Chinchilla-Rodríguez et al., 2024). Figure 4 shows strong collaborative ties between China, Russia and India while Germany is strongly connected with other European countries. The co-authorship network highlights China as the central hub of research activities for carbon financing and carbon market-related research. Notably, regional collaborations such as between Asia Pacific and Europe are well pronounced. Although European Countries tend to have smaller nodes compared to China, it is important to note that its network interconnections seem denser potentially indicating strong collaborations within the European region.

The full accounting method considers the total publications for the given countries without minding the number of authors involved therefore providing an equal treatment for the co-authorship contributions (Lim and Kumar, 2024). Notably, African countries like Kenya, Ethiopia, and Nigeria have very small nodes indicating less involvement in the research area highlighting a potential research gap within the African continent. A similar study examining the global trends from 1992 also identified China as the hub of carbon finance research and also noted the absence of similar studies from African countries (Su, Yu and Zhou, 2023). These findings could be attributed to the various economic, political and institutional factors.

Arguably, many African countries tend to allocate little budget to research and development to niches such as carbon finance or climate change related due to their low national budgets as there are other competing development priorities such as infrastructure, healthcare and poverty alleviation among others (Best and Zhang, 2020). Universities and other related research institutions therefore lack the financial capacity to support such specialized research (Nulambeh and Eryiğit, 2022). Also, although government across the globe including in the African continents have indicated initiatives to integrate green financing initiatives into their national climate and development policies, unstable governance arising from political instability potentially disrupt international collaborations and long-term agendas such as climate change related initiatives(Rennkamp, 2019). Lastly, there are few institutions in Africa which specialize in climate related studies and as a result African researchers tend to migrate to institutions abroad where they contribute under the affiliations of other countries.

Figure 4: co-authorship results
Source: Authors analysis based on VOS viewer

Zipf's Law (Word Frequency)

Zipf's Law is based on the formulae $f(r) \propto 1/r$ and its key idea is that word frequency is inversely related to its rank (Ryland Williams et al., 2015). It is mainly used in keyword identification, indexing, and text analysis to uncover the most significant words for topic analysis within a research area. The results of Zipf's analysis are summarized in Table 4 below and visualized in Figure 5.

Table 4: Zipf's Law (Word Frequency)

Authors Keywords	Occurrences
Carbon pricing	409
Carbon trading	301
Climate change	257
Carbon tax	158
China	143
Climate policy	135
Carbon markets	126
Carbon credits	125
Carbon market	125
Carbon emissions	92

Source: Authors analysis based on R studio

The results in Figure 5 indicate that carbon pricing ranked first with 409 occurrences, carbon trading second with 301 occurrences and climate change ranked 3 with 257 occurrences. The frequencies tend to decrease inversely as expected under Zipf's law. However, the decline is not proportionally perfect as expected. The decline ratio for this dataset is calculated as (409/301) = 1.36 which is less than the ideal value of 2 according to the law. Carbon pricing, carbon trading, and climate change are the dominant terms in the dataset. Given this pattern, it is more helpful to investigate the co-occurrence of these major terms to further explore their thematic relationship.
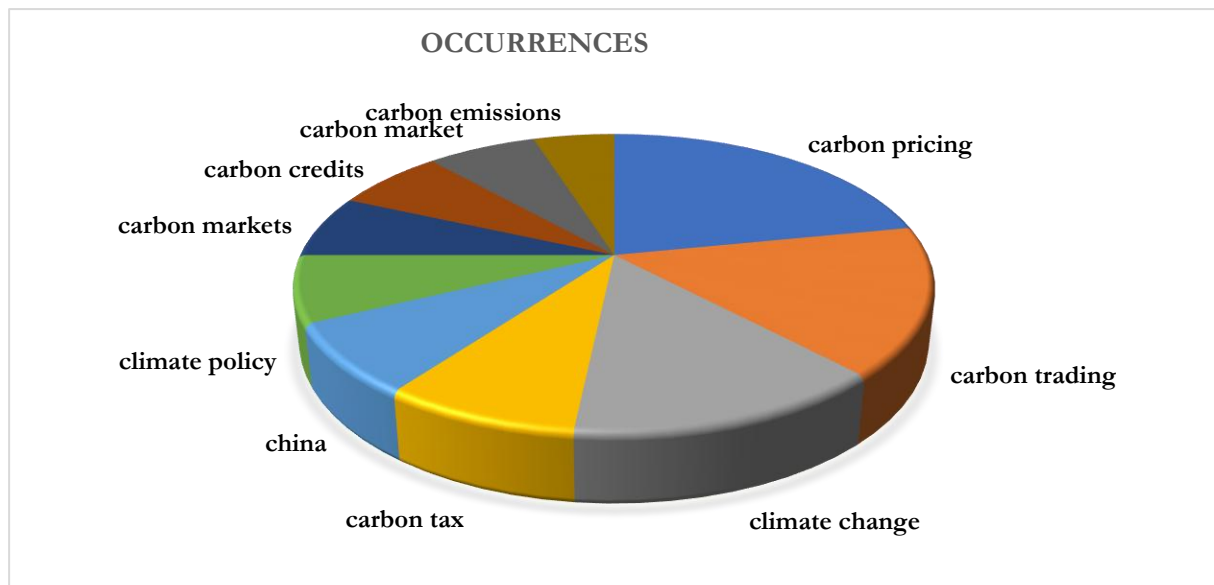
Figure 5: Keyword Occurrences based on Zipf's Law
Source: Author's analysis based on Excell

Co-occurrence Analysis

As indicated in Figure 6 below, the co-occurrence analysis confirms carbon pricing, climate change, and carbon trading as the dominant topics. Keywords like climate policy bridge the various clusters revealing its relevance across the three themes. Regarding the thematic groups, the purple cluster is the largest node and has carbon pricing and climate policy as the dominant terms. The green cluster primarily focuses on climate change, carbon markets and mitigation strategies. The blue cluster mainly focuses on emission reduction technologies and mechanisms. The yellow cluster highlights systematic and regional issues with keywords such as carbon tax, emission reduction with China being highlighted as the major regional player. The red cluster is much focused on sustainability, broader environmental themes showcasing the integration of carbon discourse and ecological concerns.

Figure 6: Co-occurrence analysis
Source: Authors analysis based on VOS Viewer

Conclusions, Recommendations and Limitations

The study provided a comprehensive bibliometric analysis and identified major thematic areas such as carbon pricing, carbon trading, climate policy, and climate change-related topics. These thematic results reveal the critical role of regulatory tools and market-based mechanisms in the carbon financing discourse. The trend analysis reveals a growing trend for publications in this domain most of which have been published in recent years as revealed by the document's average age of 3.53 years. China has been identified to have played the largest role in the related research activities and strong research collaborations were evident across North America, Asia, and Europe. Research engagements from Africa are conspicuously missing with only a few appearances from Kenya, South Africa, and Nigeria revealing the potential under-development of the carbon trading market in Africa. The Zipf's law reveals the presence of power-law distribution indicating the focused nature of the examined literature and emphasizing underrepresented themes and regions such as Africa. To address this challenge, initiatives to strengthen institutions for successful implementation of carbon pricing policies are highly recommended. From an economics point of view, policies that aim at diversifying economies from fossil fuel centric economies to renewable energies are also recommended. Study limitations include limited scope as only the Web of Science database was used.

References

Baros, Z. - Bujdosó, Z. - Kovács, T. - Patkós, Cs. - Radics, Zs. (2012): The social aspects and public acceptance of biomass giving the example of a Hungarian region International Journal Of Renewable Energy Development 1 : 2 Paper: 40 https://doi.org/10.14710/ijred.1.2.39-43

Best, R. and Zhang, Q.Y. (2020) 'What explains carbon-pricing variation between countries?', Energy Policy, 143. Available at: https://doi.org/10.1016/j.enpol.2020.111541

Blanton, A. et al. (2024) 'The status of forest carbon markets in Latin America', Journal of Environmental Management, 352, p. 119921. Available at: https://doi.org/10.1016/j.jenvman.2023.119921

Chinchilla-Rodríguez, Z. et al. (2024) 'Examining the quality of the corresponding authorship field in Web of Science and Scopus'. Available at: https://doi.org/10.1162/qss_a_00288

Donthu, N., Kumar, S., Pattnaik, D., et al. (2021) 'A bibliometric retrospection of marketing from the lens of psychology: Insights from Psychology & Marketing'. Available at: https://doi.org/10.1002/mar.21472

Donthu, N., Kumar, S., Mukherjee, D., et al. (2021) 'How to conduct a bibliometric analysis: An overview and guidelines', Journal of Business Research, 133, pp. 285–296. Available at: https://doi.org/10.1016/j.jbusres.2021.04.070

Dunbar, K., Owusu-Amoako, J. and Treku, D.N. (2024) 'Unveiling the Nexus: Carbon finance and climate technology advancements', International Review of Financial Analysis, 96, p. 103658. Available at: https://doi.org/10.1016/j.irfa.2024.103658

Geng, L., Hu, J. and Shen, W. (2023) 'The impact of carbon finance on energy consumption structure: evidence from China', Environmental Science and Pollution Research, 30(11), pp. 30107–30121. Available at: https://doi.org/10.1007/s11356-022-24303-y

Guo, Q., Su, Z. and Chiao, C. (2021) 'Carbon emissions trading policy, carbon finance, and carbon emissions reduction: evidence from a quasi-natural experiment in China', Economic Change and Restructuring, 55(3), pp. 1445–1480. Available at: https://doi.org/10.1007/s10644-021-09353-5

Khan, M.A. et al. (2021) 'Value of special issues in the journal of business research: A bibliometric analysis', Journal of Business Research, 125, pp. 295–313. Available at: https://doi.org/10.1016/j.jbusres.2020.12.015

Labatt, S. and White, R.R. (2011) Carbon Finance: The Financial Implications of Climate Change. John Wiley & Sons.

Li, L. and Zhang, D. (2024) 'Forest carbon offset protocols in compliance carbon markets', FOREST POLICY AND ECONOMICS, 165, p. 103253. Available at: https://doi.org/10.1016/j.forpol.2024.103253

Lim, W. and Kumar, S. (2024) '(PDF) Guidelines for interpreting the results of bibliometric analysis: A sensemaking approach', ResearchGate [Preprint]. Available at: https://doi.org/10.1002/joe.22229

Nulambeh, N.A. and Eryiğit, K.Y. (2022) 'Exploring the energy-environment growth nexus in francophone Africa in presence of institutions', Environment, Development and Sustainability, 24(8), pp. 10069–10087. Available at: https://doi.org/10.1007/s10668-021-01856-5

Page, M.J. et al. (2021) 'The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. Available at: https://doi.org/10.1136/bmj.n71

Rennkamp, B. (2019) 'Power, coalitions and institutional change in South African climate policy', Climate Policy, 19(6), pp. 756–770. Available at: https://doi.org/10.1080/14693062.2019.1591936

Ryland Williams, J. et al. (2015) 'Zipf's law holds for phrases, not words', Scientific Reports, 5(1), p. 12209. Available at: https://doi.org/10.1038/srep12209

Song, J. and Wu, D. (2023) 'Modelling Forest carbon sink trading with carbon credit using stochastic differential game', Environmental Science and Pollution Research, 30(26), pp. 68934–68950. Available at: https://doi.org/10.1007/s11356-023-26974-7

Su, L., Yu, W. and Zhou, Z. (2023) 'Global Trends of Carbon Finance: A Bibliometric Analysis', Sustainability, 15(8), p. 6784. Available at: https://doi.org/10.3390/su15086784

Swinkels, L. (2024) 'Trading carbon credit tokens on the blockchain', International Review of Economics & Finance, 91, pp. 720–733. Available at: https://doi.org/10.1016/j.iref.2024.01.012

Tian, W. et al. (2024) 'Understanding co-corresponding authorship: A bibliometric analysis and detailed overview', Journal of the Association for Information Science and Technology, 75(1), pp. 3–23. Available at: https://doi.org/10.1002/asi.24836

Verma, S. and Gustafsson, A. (2020) 'Investigating the emerging COVID-19 research trends in the field of business and management: A bibliometric analysis approach', Journal of Business Research, 118, pp. 253–261. Available at: https://doi.org/10.1016/j.jbusres.2020.06.057

Wu, Y., Liu, X. and Tang, C. (2024) 'Carbon Market and corporate financing behaviour-From the perspective of constraints and demand', Economic Analysis and Policy, 81, pp. 873–889. Available at: https://doi.org/10.1016/j.eap.2024.01.006

Zhang, Y.-J. and Wang, W. (2024) 'How Does China's Carbon Emissions Trading Policy Affect the Financing of High-Carbon Enterprises?', Energy Journal, 45(4). Available at: https://doi.org/10.1177/01956574241281564

Zhou, K. and Li, Y. (2019) 'Carbon finance and carbon market in China: Progress and challenges', Journal of Cleaner Production, 214, pp. 536–549. Available at: https://doi.org/10.1016/j.jclepro.2018.12.298A műre a Creative Commons 4.0 standard licenc alábbi típusa vonatkozik: CC-BY-NC-ND-4.0.

Authors

Martin Kamau Muchiri
0000-0001-7429-2366
PhD Candidate,
Doctoral School of Economics and Regional Sciences, Hungarian University of Agriculture and Life Sciences
Muchiri.Martin.Kamau@uni-mate.hu or mmuchiri@kyu.ac.ke

Szilvia Erdei-Gally
0000-0003-3118-9427
Assistant Professor
Institute of Technology, Hungarian University of Agriculture and Life Sciences
erdeine.kesmarki-gally.szilvia@uni-mate.hu

Maria Fekete-Farkas
0000-0002-6058-009X
Professor
Institute of Agricultural and Food Economics, Hungarian University of Agriculture and Life Sciences
Farkasne.Fekete.Maria@uni-mate.hu