CARBON DISCLOSURE PRACTICES: A BIBLIOMETRIC ANALYSIS

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ABSTRACT

An increasing interest in Carbon Disclosure study has been generated in recent years as a result of the phenomenon of climate change and its effects on the worldwide market. This study's goal is to conduct a bibliometric examination of prior research. We looked at research papers that used the keywords "Carbon Disclosure" and "Carbon Accounting Disclosure" and were available on the Dimensions Database. The current study makes use of VOSviewer software. Le Luo was discovered to be the author with the most influence, receiving 1802 citations. The most active contributor is Western Sydney University, Australia, with 30 articles and 1852 citations. The most active contributor is Western Sydney University, Australia, with 30 articles and 1852 citations. With 3958 citations, the USA is the most influential nation, followed by Australia (3328 citations). Business Strategy is ranked second with 33 publications, while SSRN Electronic Journal is first with 104 publications and 585 citations. Finally, it was discovered that between 2018 to 2022, the number of researchers studying carbon disclosure dramatically rose.

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Introduction

The whole world is facing a problem of Global Warming, changing climate and ecological preservation. The United Nations developed the Intergovernmental Panel on Climate Change (IPCC) in response to rising gas emissions, and the Kyoto Protocol, which had been signed by at least 55 nations, was published at an international conference as a means of stabilising the concentration of greenhouse gases. Emission Trading (ET), the Clean Development Mechanism (CDM), and Joint Implementation(JI) are the three instruments used to carry out the Kyoto Protocol . Renewal of the 1997 Kyoto Protocol was agreed upon at the 21st Conference of Parties (COP) with the Paris Agreement, which demonstrates the countries' commitment to keep the earth's temperature increase below 2°C. In response to curb this problem and control carbon emissions, Kyoto Protocol under United Nations Framework Convention on Climate Change was adopted and from here carbon trading and carbon emission allowances came into picture. Absolute gas emission production in Indonesia equals 1.2% of global emissions, placing Indonesia in the 21st position globally. (Saraswati, 2020)

Figure No 1: Annual Co2 Emissions from Fossil Fuels and Industry in world
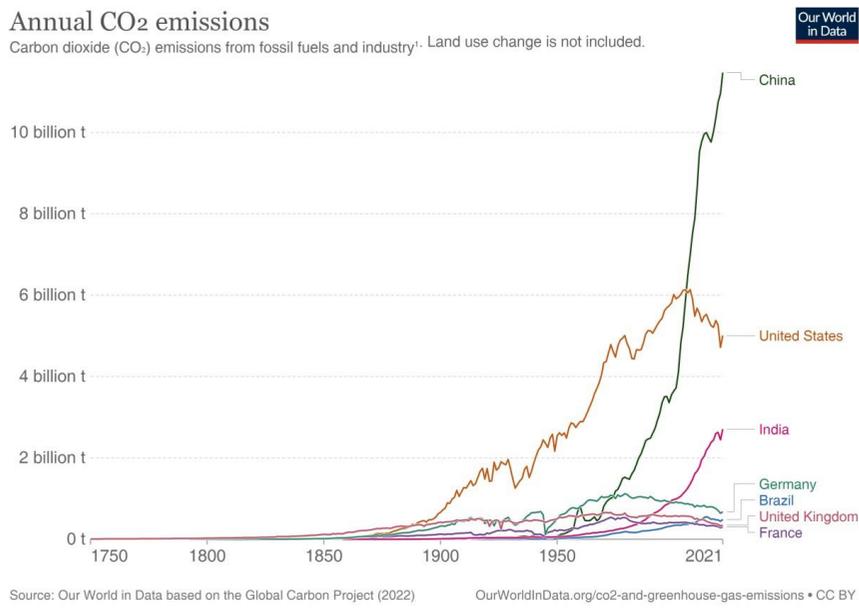
Source: https://ourworldindata.org

Because it is now a valuable commodity, carbon credit must be financially accounted for at various stages (i.e. when received for free, when purchased, when used, when sold & when surrendered). Firms require instructions on how to account for carbon at each phase because the setting is voluntary and there is no standard accounting practice. Organizations must understand how carbon accounting and disclosure function, which firm-specific factors define the disclosure method, and how disclosure is generated and improved over time in order to highlight climate risks and opportunities. (Borghei, 2021) Additionally, it will improve the preparation of financial statements and their comparability for use in decision-making by accountants, auditors, financial report preparers, investors, and other stakeholders. The significance of revealing carbon emissions is anticipated to encourage businesses to be more open about environmental data so that stakeholders may gauge how seriously they take climate change. (Ernst & Young, 2011)

Due to the lack of clear advice on financial accounting for carbon, companies affected by emission trading systems or companies that produce carbon offsets are not required to disclose carbon information in a consistent manner. Therefore, the disclosure setting is optional. Guidelines are lacking, which results in inconsistent carbon financial accounting and opaque carbon disclosure procedures. This makes it difficult for investors and stakeholders to compare financial accounts and make educated decisions.

Various researches have been conducted in order to study the scope and effects of carbon disclosure practices. (Bazhair et al., 2022) assessed the literature that is currently accessible on corporate carbon reporting by evaluating the themes that have been covered in the field, current research trends, and theoretical viewpoints. (Choi et al., 2013) intended to disclose the extent of the voluntary disclosures of the disclosure of the disclosure of the major major Australian majors, from between 2006 to 2008 majors. (Borghei, 2021) tries to address the current expansion and fragmentation of the carbon disclosure literature by identifying significant study areas and upcoming research trends. (Saraswati, 2020) done systematic literature review of 17 articles to support Sustainable Development Goals for reducing carbon emission We set out to conduct a bibliometric study of prior studies in order to determine the trends in the literature that is currently accessible on carbon disclosure procedures. The purpose of the study was to learn how scientists are investigating the subject of carbon disclosure. To understand the current state of the existing literature, we made an effort to identify the most productive author, organisation, nation, and journal in the relevant topic. The present study has been divided in three parts i.e. Introduction of

the topic, the research Methodology for defining the research layout and lastly the Analysis and Findings

Research Gap

As we previously indicated, the topic of corporate carbon disclosure has grown in importance, and researchers are expressing a keen interest in it. Many studies have been done to examine the reasons for and limitations of voluntary disclosures, as well as the voluntary carbon declarations made by businesses or the systematic review of literature has been done of limited research studies. We aim to carry out a bibliometric analysis to provide an overview of the literature that is currently available in this area.

Objectives of Study

Following are the objectives of the study:

1. To identify the most significant author on the basis of citations.

2. To identify the organisation with highest number of publications.

3. To identify the most productive nation on the basis of citations.

4. To identify the most productive journal on the basis of number of publications.

Research Methodology

Research Questions

Following research questions have been formed to help in bibliometric analysis:

RQ1: According to the total amount of citations, which researcher is the most significant?

RQ2. Which organisation has produced the most publications overall?

RQ3: Based on the total number of citations, which nation is the most productive?

RQ4: According to the volume of publications in each journal, which journals are the most productive?

RQ5: How have studies on carbon disclosure changed over time, as evidenced by the number of publications from one year to the next?

Data collection

Data from the dimension database was gathered. VOSviewer is a piece of software that allows academics to conduct bibliometric analysis in addition to offering many other features including data mining and graphical presentation.

We searched for the information using the terms "Carbon Disclosure" and "Carbon Accounting Disclosure." After removal of duplicate papers, 786 articles were included which were taken into account for this bibliometric analysis.

Analysis and Findings:

Research Question 1: According to the total amount of citations, which researcher is the most significant?

Table No 1: Most Cited Authors

S.NO.	AUTHOR	CITATION	TOTAL PUBLICATION
1.	Le Luo	1802	24
2.	Qingliang Tang	1780	27
3.	Michael W. Toffell	700	03
4.	Elizabeth Stanny	477	04
5.	Frank Schiemann	362	05
6.	Dennis M. Pattern	222	04
7.	Kuo Lopin	218	03
8.	Abeer Hassan	201	09

The top researchers are listed in Table 1 together with the number of citations they have received. The most cited researcher is Le Luo, who has 1802 citations. 2015 saw the publication of a paper by Le Luo and two other writers, Lin Liang and Qingliang Tang, titled "Gender Diversity, Board Independence, Environmental Committee, and Greenhouse Gas Disclosures." The maximum number of citations for this publication was 638. Le Luo is a senior lecturer and academic researcher at Macquaire University's Department of Accounting and Corporate Governance. Transparency, CSR, carbon accounting, corporate governance, and greenhouse gases

are some of his research interests. The H-index for her is 17. Qingliang Tang holds to the second spot. He presently holds the position of Accounting Professor at Western Sydney University. International accounting, carbon accounting, and management have been his areas interest in research. He has 5025 citations overall, and his H-Index is 31. The two of his of works that have received the most citations in this area are "Corporate Incentives to Disclose Carbon Information: Evidence from CDP Global 500 Report" and "Gender Diversity, Board Independence, Environmental Committee & Greenhouse Gas Disclosure." The third most influential author is Michael W. Toffell followed by Elizabeth Stanny at fourth position.

Figure No 2: Bibliometric analysis of Authors on the basis of citations
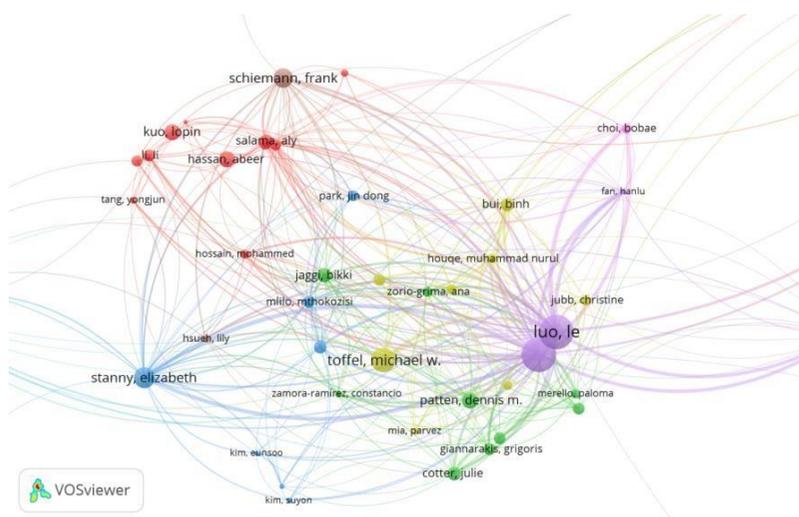
**Research Question 2. Which organisation has produced the most publications overall?**

Table No 2: Most Productive Organisation

S.NO.	ORGANISATION	DOCUMENTS	CITATIONS	COUNTRY
1	Western Sydney University	30	1852	Australia
2.	Macquaire University	15	192	Australia
3.	University of New Castle Australia	09	384	Australia
4.	Universtat Hamburg	08	386	Germany

5.	University of South Australia	07	405	Australia
6.	Standford University	07	86	California
7.	University of Otago	06	215	New Zealand
8.	Swinburne University of Technology	06	155	Australia

Table 2 lists the institutions with the highest productivity. The most prolific institution is Western Sydney University of Australia, which has 30 publications and 1852 citations. Table 2 ranks Macquaire University second with 15 publications and 192 citations. With 9 publications and 384 citations, University of New Castle Australia takes third place. The majority of the studies—5—are conducted in Australia, followed by 2 in New Zealand, 1 in Germany, 1 in California, and 1 in the United Kingdom (Table 2). Therefore, it may be said that Australian institutions have made the biggest contributions to carbon disclosure practises. It is important to note that the two most prominent authors in Table 1, Le Luo and Qinglang Tang, are professors at Macquaire University and Western Sydney University, respectively.

Figure No 3: Bibliometric analysis of Organisations on the basis of Publications
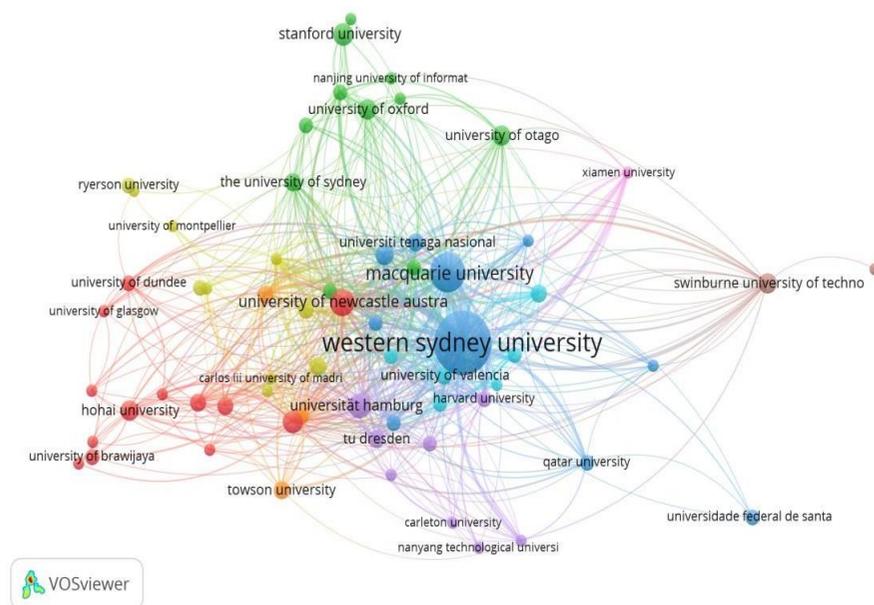
S.NO.	COUNTRY	CITATIONS
1.	United States	3958
2.	Australia	3914
3.	United Kingdom	1901
4.	China	1113
5.	Netherlands	746
6.	Germany	702
7.	Canada	690
8.	New Zealand	486

Research Questions 3: Based on the total amount of citations, which nation is the most productive?

Table 3: Most Cited Countries

With 3958 citations, the United States has the highest level of influence. Australia is second with 3914 citations. With 190 citations, the United Kingdom is third. In this field, other nations like China, the Netherlands, Germany, Canada, and New Zealand have also made significant contributions. It is clear that the USA, Australia, and the UK have made the biggest contributions to the carbon disclosure sector.
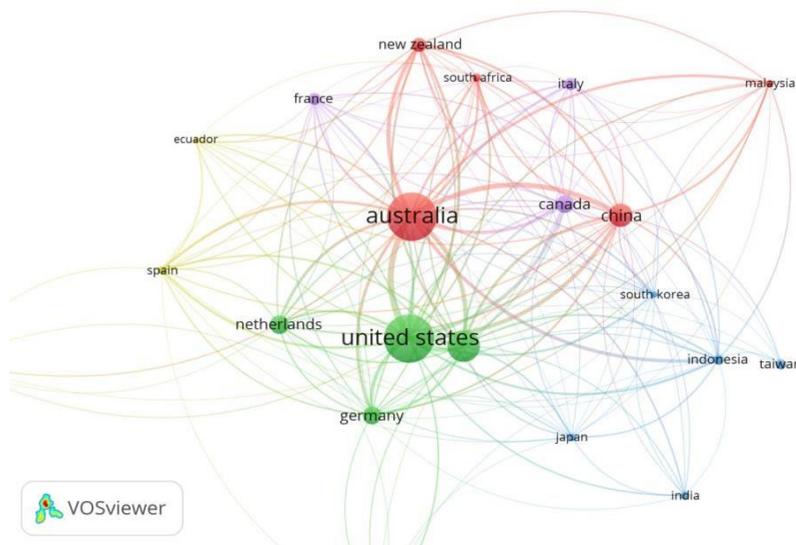

Figure No 3: Bibliometric Analysis of Most Cited Countries

Research Question 4: According to the volume of publications in each journal, which journals are the most productive?

S.NO.	JOURNAL	PUBLICATION	CITATION
1.	SSRN Electronic Journal	104	585
2.	Business Strategy & the Environment	33	1542
3.	Sustainability	32	210
4.	Social & Environmental Accountability Journal	12	122
5.	Environmental Science & Pollution Research	12	95
6.	Sustainability Accounting Management and Policy Journal	11	197
7	International Journal of Environmental Research and Public Health	11	72
8.	Corporate Social Responsibility and Environmental Management	10	820

Leading the pack with 104 publications and 585 citations, SSRN Electronic Journal secures the first spot. This journal's H-index is 129 and its impact factor is 1. "With 33 publications, Business Strategy and the Environment was ranked in second place. This journal's current impact factor is 10.811. The Journal is listed in the UGC CARE, SCOPUS, and Web of Science indexes (SSCI). The third-placed Sustainability Journal had 32 publications. The Journal is listed in the UGC CARE, Scopus, Web of Science, and DOAJ indexes. Journal has a 3.889 Impact Factor. Other noteworthy journals include the International Journal of Environmental Research & Public Health, the Social & Environmental Accountability Journal, Environmental Science & Pollution Research, Sustainability Journal and Accounting, Management & Policy Journal, Corporate Social Responsibility and Environment Management, Accounting Research Journal and lastly Meditari Accounting Research.

Figure No 4: Bibliometric analysis of Journals on the basis of Publications

Research Question 5: How have studies on carbon disclosure changed over time, as evidenced by the number of publications from one year to the next?

Table No 5: Number of Publications in last 10 years

Year	Number of Publications
2022	154
2021	135
2020	87
2019	62
2018	40
2017	49
2016	34
2015	37
2014	37
2013	36
2012	22

Figure shows that there have been more publications on carbon disclosures over time. Only 40 academic publications were published in 2018; in 2019, 62 articles were published. This number

increased to 87 academic articles in 2020. From 2018 to 2022, there is a noticeable increase of 214.3% in the number of publications in the topic of carbon disclosure. The conclusion is that academics are expressing interest in carbon disclosure procedures. As climate change has emerged as a pressing issue that requires rapid attention, carbon disclosure and accounting have gained attention.

Figure No 6: Graph depicting the number of Publications per year
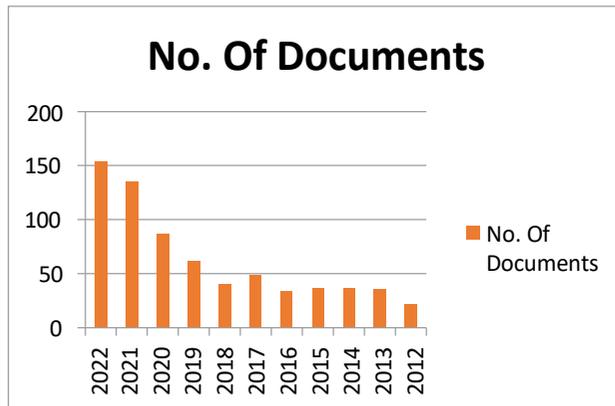
Conclusion

The idea of disclosure in the context of global environmental governance has changed since it was first introduced. Carbon Disclosure has caused an organisational field where organisations undertake tasks that are partially complementary and partially overlapping to emerge. Businesses must track and report information about their environmental performance and effects so that investors can judge its significance for "Company's Future". This is known as "Carbon Disclosure".

Investors now support climate related disclosures because they recognise that in order to make informed investments decisions, they need reliable information about climate risks, and that climate can pose significant financial risks to businesses.

Academicians and researchers are examining the approaches taken by businesses for their voluntary carbon disclosures, the transparency of these disclosures, the elements that affect their veracity and the problems associates with these disclosures. Accounting academicians have performed research to go deeply into this area and attempt to uncover the benefits and drawbacks of carbon disclosure policies and well as how they would impact the accounting industry.

We sought to conduct a bibliometric study on prior research studies because these studies are accelerating and becoming more numerous every year. The analysis of this study will provide a summary of the literature produced by different scholars in this subject.

Six research questions were formed to find the most significant researcher, most productive nation, most frequently used keywords, most productive organisation and the trend of publications over years. Dimensions database and VOSviewer software were used to analyse these questions. It was found that Le Luo is the most prominent author. He is a senior lecturer and academic researcher at Macquaire University in Australia in the Department of Accounting and Corporate Governance. Qingliang was placed second. He is presently an accounting professor at Western Sydney University, Australia. Western Sydney University in Australia emerged as the most productive organisation with 30 papers published. With 15 publication Macquaire University in Australia came in second. On the basis of citations, the United states had the highest influence with 3958 citations followed by Australia 3914 citations. SSRN Journal leads the table with highest number of published articles (104 articles) followed by Business Strategy and Environment in second place with 33 publications. An increasing growth rate of 214.3% can be seen in the number of publications from year 2018 to 2022. This suggests that more academics and scholars are becoming interested in this subject. Accounting researchers are attempting to expose the current disclosure methods and the problems associated with them. This study will be useful to future researchers because it identifies the most productive authors, nations, organisations, and journals. This will enable them to concentrate entirely on producing high-quality work. Researchers who want to review papers can find high-quality papers by doing a direct search for the most prolific journals and authors from our analysis.

This research study has a disadvantage that we only used data from one database, the Dimensions Database. Data can also be retrieved from other databases, such as Scopus and Web of Science. These two are regarded as the two biggest databases in the world. Research that incorporates information from these databases can produce more precise results.

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