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Mapping Green Tax Research Trends: A Bibliometric Analysis Study

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ABSTRACT: A green tax is a type of tax that is applied to reduce the amount of pollution and preserve the green environment. This research focuses on the results of mapping research articles on the topic of green taxes from Scopus-indexed international journal literature Q1 (quartile 1) to Q4 (quartile 4) for the period 2015-2024. The purpose of this research is to examine more deeply about green tax research with a bibliometric analysis study focusing on the subject areas of environmental science, energy, economics, econometrics and finance, social sciences, engineering, business management and accounting, computer science. This research uses a descriptive quantitative approach with simple statistical analysis on bibliometric analysis. Bibliometric analysis is used to know future research trends on green taxes. This research also includes visualization analysis results from data processing results with Vosviewer. The results of the study have found 182 articles from Scopus-indexed journals Q1 (quartile 1) to Q4 (quartile 4). The contribution of this research is that it can provide future directions in determining innovative green tax design and distribution effect analysis and provide insights that have value for policymakers in sustainable development.

Keywords: Green Tax, Renewable Energy, Economic Growth, Green Tax Reform

INTRODUCTION

Green taxes originated in the 1920s in the United States due to a proposal to tax environmentally harmful activities (Ashworth *et al.*, 2006; Daniels, 2009). The emergence of the green economy is driven by efforts to reduce pollution, carbon emissions, and damage to ecosystems (Loiseau *et al.*, 2016). This transition can be achieved by taxing environmentally harmful activities or incentivizing green initiatives. There are two ways to implement a green tax transition: an emissions trading policy based on the amount of pollution control and a carbon trading market (Dong *et al.*, 2020). The emergence of carbon dioxide (CO2) emissions and harmful gases is the origin of the green tax (Chien *et al.*, 2021). This pollution control has been enforced since the occurrence of environmental pollution, which has been increasing since the Industrial Revolution (Z. Tan *et al.*, 2022). Many countries impose green taxes in various forms, such as carbon taxes. Aside from carbon taxes, pollution taxes are also a good control measure compared to other measures,

including subsidies, fees, permit trading, etc (Z. Tan *et al.*, 2022). The logical reasons underlying pollution taxes to be a better control are that they can provide direct price signals overall, promote market efficiency, and allow solutions to be tailored to revenue outcomes.

In 1960 there was an environmental crisis with the start of the debate on pollution taxes (Karmaker *et al.*, 2021). In this phenomenon, there was a proposal by the Organisation for Economic Cooperation and Development (OECD) OECD Council (2024) that environmental taxes can be considered as a theoretical basis. In the following decades, many environmental taxes such as carbon, sulfur, and emission taxes existed. The decade of the 1990s saw the introduction of new taxes, such as environmental, ecological, and green taxes (Qi *et al.*, 2023). The concept of green taxes gained attention and became a favorite research agenda of international organizations and economists due to its effectiveness in cost reduction. The existence of green taxes also helps in mitigating global climate change (Doğan *et al.*, 2022). These green taxes are also largely generated from burning fossil fuels, petroleum, coal, and natural gas (Rodríguez *et al.*, 2019). As such, the implementation of green taxes can help reduce CO2 emissions and encourage a shift towards greener and cleaner alternatives (K. Zhang *et al.*, 2016). Green taxes are designed to incentivize individuals and businesses to adopt greener practices and reduce environmental impacts (Osório & Zhang, 2022; Mpofu, 2022). The importance of implementing green taxes can encourage a shift towards cleaner technologies and discourage practices that can damage the environment.

Green tax is a topic of great interest for further research. Previous studies have been conducted by previous researchers focusing on areas such as environmental science, energy, economics, econometrics and finance, social sciences, engineering, business management and accounting, and computer science (Lu & Cheng, 2023; Cheng *et al.*, 2022; Silva *et al.*, 2018; Yeganeh *et al.*, 2021; Ghasemi *et al.*, 2020; Rausch & Yonezawa, 2018; Day & Day, 2022; Kapeller *et al.*, 2023). This study was motivated by the research of Nobanee & Ullah (2023) about bibliometric analysis of research in the field of taxation. This research tries to re-examine with the same method related to green taxes. One hundred eighty-eight green tax research articles were found with the results of 182 articles indexed by Scopus quartile 1 to 4 from 2015-2024. Green tax mapping is so important in terms of carbon dioxide reduction. This was also stated by Moreno-Carbonell *et al.* (2020) highlighted the importance of mapping green tax policies to provide insights into their distribution, effectiveness, and potential impact on environmental and economic outcomes. The authors note that while there is a growing body of literature on green tax policies, there is still a lack of comprehensive and systematic mapping, such as bibliometric visualization. Another study by Nobanee & Ullah (2023) emphasized the need to map green tax regulatory policies across different countries and regions.

This research aims to examine the green tax research more deeply in a bibliometric analysis study. Previous research by Nobanee & Ullah (2023) used a bibliometric analysis study to explore the effectiveness of green taxes in reducing pollution and its impact on economic growth. This research continues the previous research conducted by Nobanee & Ullah (2023), using the subject area coverage of environmental science, energy, economics, econometrics and finance, social sciences, engineering, business management and accounting, and computer science. This study uses the Scopus-indexed journal database quartile 1 (Q1) to quartile 4 (Q4) with a vulnerable period of 2015-2024. The period range was chosen to expand previous research conducted in 2015-2022,

but researchers will add up to 2024. The contribution of this research is that it can provide an overview of future research on green taxes and as a future direction in determining innovative tax designs and analyzing distribution effects. In addition, this research also contributes to offering valuable insights for policymakers in striving for sustainable development.

A literature review aims to report trends, relationships, consistencies and gaps (Hahn & Kühnen, 2013; X. J. Tan *et al.*, 2022). Thus, the work will be easier, more organized, and can be evaluated properly. According to Donthu *et al.* (2021), bibliometric analysis is a method that is well known for its popularity and can be used in exploring and analyzing large amounts of scientific data. This can be probable in revealing certain evolutions and highlighting the field's development under study (Dounthu *et al.*, 2021). According to Moral-muñoz *et al.* (2020), bibliometric analysis can be done in several steps, including searching for study data. Data search with bibliometric analysis is carried out using the Scopus web on paid access by writing the keyword green tax and focusing on the subject areas of environmental science, energy, economics, econometrics and finance, social sciences, engineering, business management and accounting, computer science. Researchers used articles from Q1 (quartile 1) to Q4 (quartile 4) Scopus journals in this bibliometric analysis. The aspects used in this bibliometric analysis are the keywords Green Tax and using statistical tools to process the findings and visualize the results of the bibliometric analysis with Vosviewer software rocks.

This bibliometric analysis was conducted by digging deeper into green tax research with a subject area focus on environmental science, energy, economics, econometrics and finance, social sciences, engineering, business management and accounting, computer science and defining the results in a descriptive quantitative manner. This study focuses on the research objectives, namely that the main findings can provide gaps that will be researched by future researchers with the latest research Gap. This research is useful for future research, where each of the results of the research objectives will be able to provide a view of what steps future researchers will take if they will research on the same topic and can use research gaps that are rarely researched (latest). This latest research gap will be a view and guideline for future research as a novelty for future researchers. So that the scope of future research will be wider. In order for the research conducted by researchers to be more far-reaching, researchers use the Scopus international journal database as secondary data. This article presents 5 stages, namely introduction, literature review, research methods, mapping and simple statistical data processing results to determine the number of percentages studied and visualization with the help of Vosviewer software. The last is the closing (conclusion).

METHOD

The research conducted by researchers used a descriptive quantitative approach to bibliometric analysis. The reason for using a descriptive quantitative approach is that this research analyses data by calculating percentage proportions and describing the data that has been collected. Then proceed to look for research gaps using bibliometric analysis. Bibliometric analysis can assist in intellectual development by using a systematic process and structure and analyzing journals, author names, keywords and countries in a particular field (Khatib *et al.*, 2022). Specific scientific fields and research advances can be used to understand better and develop structures and theories

(Ronda-Pupo, 2017). Another reason researchers use bibliometric analysis is because it can quantitatively measure scientific results, such as the number of journal publications, keywords, author lists and the distribution of research by country. This can be used to evaluate the research performance of individuals, institutions, and funding agencies. Bibliometric analysis can also be used to track research trends, identify keywords, and provide information on research policy for decision-making. Furthermore, this bibliometric analysis uses Vosviewer software.

Some researchers have used bibliometric analysis approaches, such as research conducted by Ibrahim *et al.* (2022) and Suleiman Yahaya *et al.* (2020). Other studies that use bibliometric analysis such as research from Zheng & Kouwenberg (2019) research on corporate governance and Suleiman Yahaya *et al.* (2020) research on business model innovation. The unit of analysis used in this research is scientific articles on green taxes. The data source of this research is scientific publications on green tax research using international scientific journals indexed by Scopus Q1 to Q4. The selection of Scopus-indexed international journal articles from Q1 to Q4 certainly has a reason, namely because of the consideration of the quality of the reputation that has been internationally recognized and has been reviewed by several reliable reviewers to be published. In addition, Scopus-indexed international journals also have a major impact on journal publications or institutions in the world of scientific publication research. The population used in this study is Scopus-indexed international journal articles Q1 to Q4 that examine green taxes with a range of 10 years from 2015 to 2024. One hundred eighty-eight articles were found, but only 182 articles could be downloaded. This is due to system errors in searching the scopus article database.

This research uses secondary data sources from green tax literature. The data collection technique uses a literature study obtained from Scopus literature with a discussion of green taxes. The population in this study were all articles on green taxes from the Scopus web with a range of years 2015-2024. The sample used in this study is the subject of the research area. The stages of searching for literature are by opening the website www.scopus.com with a subscription (paid) with the aim of being able to access all features of the scopus article. The researcher then wrote using the word term Green Tax with the search results taken from the article title. The data obtained by researchers is data on publications in the field of taxation with the scope of green taxes for the last ten years, namely the period 2015-2024. The results of the data search will be explored on the Scopus database by looking at core journals and mapping based on publication year, quartile level, research method, journal name, research data source, ten keywords, top 10 countries with green tax article publishers, and top 10 authors of green tax article publishers. Furthermore, researchers will present quantitatively and visualize the development of green tax research using the Vosviewer software tool. Below is Figure 1 flowchart of the literature search process.

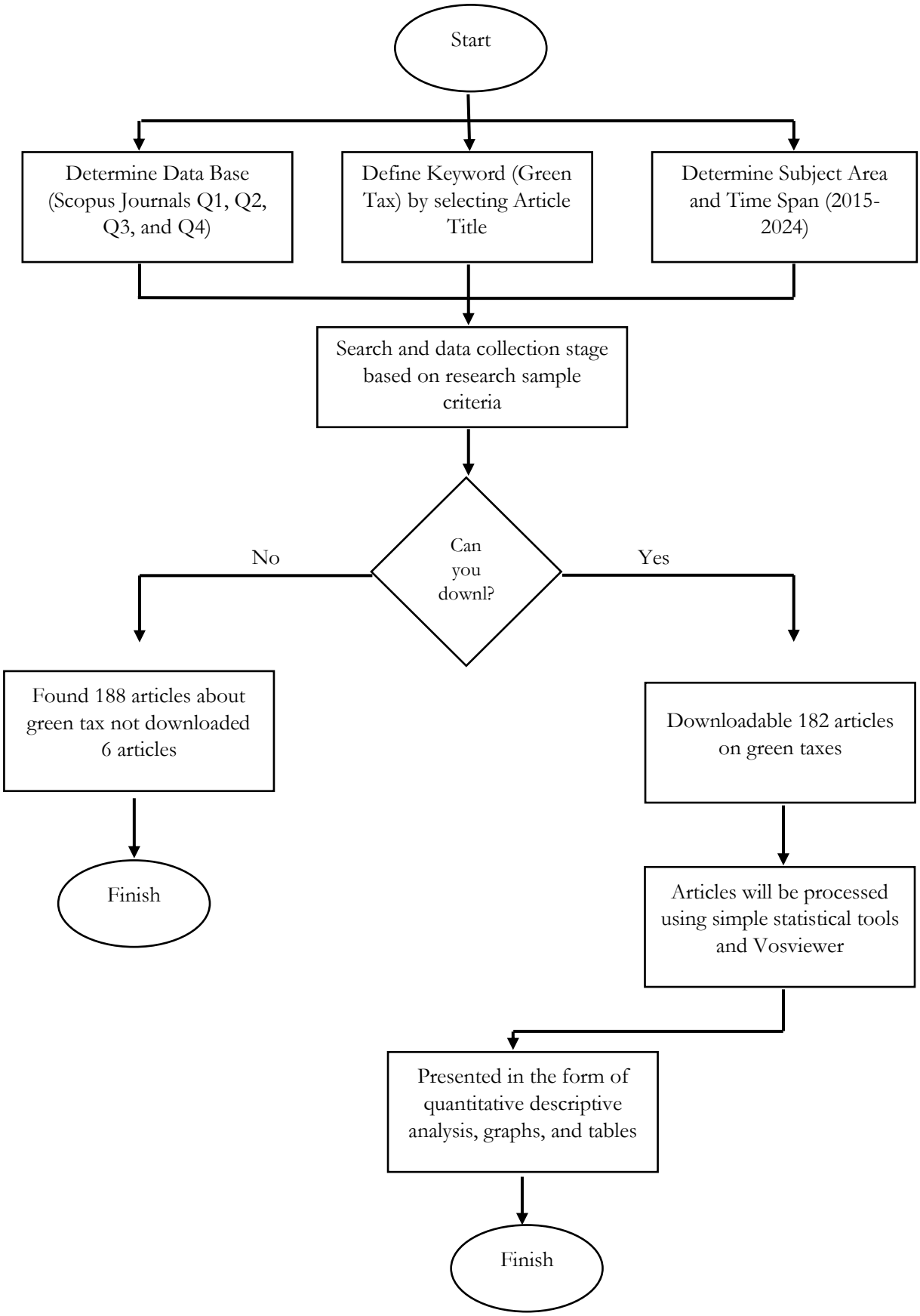

Figure 1 Flowchart of Literature Search Process

Source: Personalised Results (2024)

RESULT AND DISCUSSION

Result Sample Selection Based on Green Tax Quartiles and Year of Publication

Taxation is inseparable from economic change (Lestari, 2021). Therefore, a lot of research on taxation is currently developing. In the academic world, the development of research interest is mainly identified by the volume of published works. Table 1 is a table with a selection of articles based on a sample of research on green taxes from the source of Scopus journals Q1 to Q4. A total of 188 Scopus-indexed articles have been found over the past ten years, from 2015 to 2024. Researchers can only find 182 research articles on green taxes consisting of (quartile) Q1, Q2, Q3, and Q4. Many researchers published a number of research articles on green taxes in Q1, with a total of 127 articles (67.5%). There were also 40 research articles on green taxes published in Q2 (21.2%). For Q3 and Q4, there were six articles (3.1%) and 7 articles (3.7%), respectively. Some articles have not been determined by quartile, namely 2 articles (1%). A total of 6 articles (3.1%) were not found in the search process. This is because an error cannot be downloaded on the Scopus data base system.

Table 1. Scopus journal sample selection based on Q1-Q4

No	Quartile	Number of Articles	Persentage
1	Article Quartile 1 (Q1)	127	67.5%
2	Article Quartile 2 (Q2)	40	21.2%
3	Article Quartile 3 (Q3)	6	3.1%
4	Article Quartile 4 (Q4)	7	3.7%
5	Article Not Yet Assigned a Quartile	2	1%
6	Article Not Found	6	3.1%
	Total	**188**	**100%**

Source: Scopus Journal Data Processed (2024)

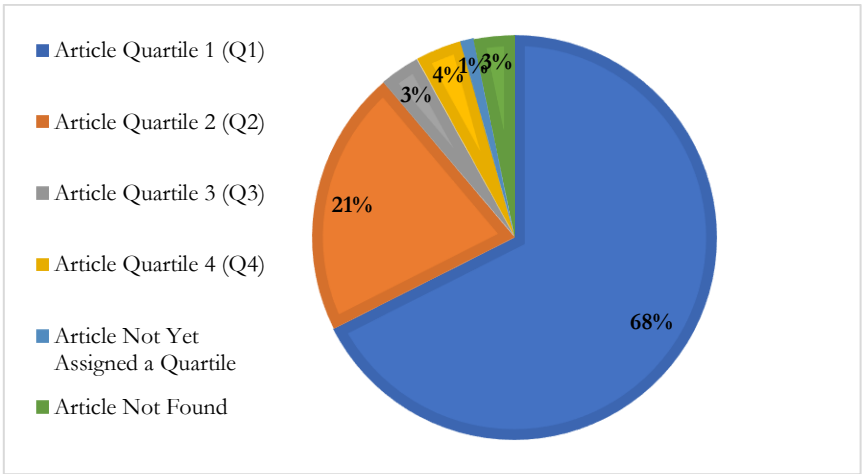

Figure 2 Proportion of Analysis Percentage by Q1 to Q4
Source: Axcel Data Processing (2024)

A total of 182 articles have been mapped over the last ten years, from 2015 to 2024. Researchers chose to map starting in 2015 because they wanted to perfect previous research conducted by Nobanee & Ullah (2023). Nobanee & Ullah (2023) Research conducted by Nobanee & Ullah (2023) mapped from 2015 to 2022. However, researchers will try to refine until 2024 and focus on the subject areas of environmental science, energy, economics, econometrics and finance, social sciences, engineering, business management and accounting, computer science. From the mapping results based on Table 2, 2023 is the year with the highest number of studies discussing green taxes, namely 63 articles (34.6%). The year 2022 is the year with the second highest number of research on green taxes, namely 40 articles (21.9%). The third most research on green taxes, which occurred in 2020 and 2021, is sure to be the same with 19 articles (10.4%). The last research occurred in 2015 and 2016, namely 3 articles (1.6%). Researchers also present a picture of the development of research articles from 2015 to 2024 which is presented in Figure 4. and 3.

Table 2. Mapping results based on the year of publication of green tax research in Scopus journals Q1-Q4 in 2015-2024

No	Year of Publication	Number of Articles	Percentage
1	2015	3	1.6%
2	2016	3	1.6%
3	2017	9	4.9%
4	2018	7	3.8%
5	2019	15	8.2%
6	2020	19	10.4%
7	2021	19	10.4%
8	2022	40	21.9%
9	2023	63	34.6%
10	2024	4	2.1%
Number of Articles		**182**	**100%**

Source: Personal Data Processing Results (2024)

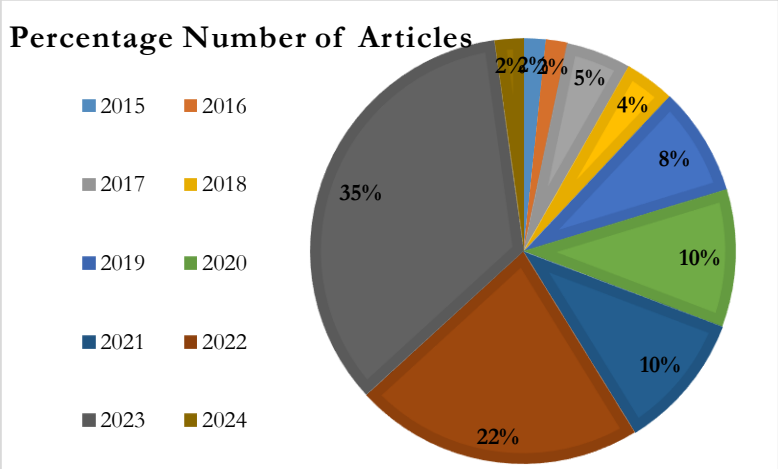

Figure 3 Percentage Proportion on Number of Publication Articles by Year

Source: Excel Data Processing Results (2024)

Figure 3 is the total proportion of the percentage of published articles by year. From this percentage, if seen from the point of view of the original research objectives, future researchers can increase research on green taxes with subject areas such as researchers. Subject areas include environmental science, energy, economics, econometrics and finance, social sciences, engineering, business management and accounting, computer science. Differences from previous research conducted by Nobanee & Ullah (2023) are from the subject area and period of article mapping.

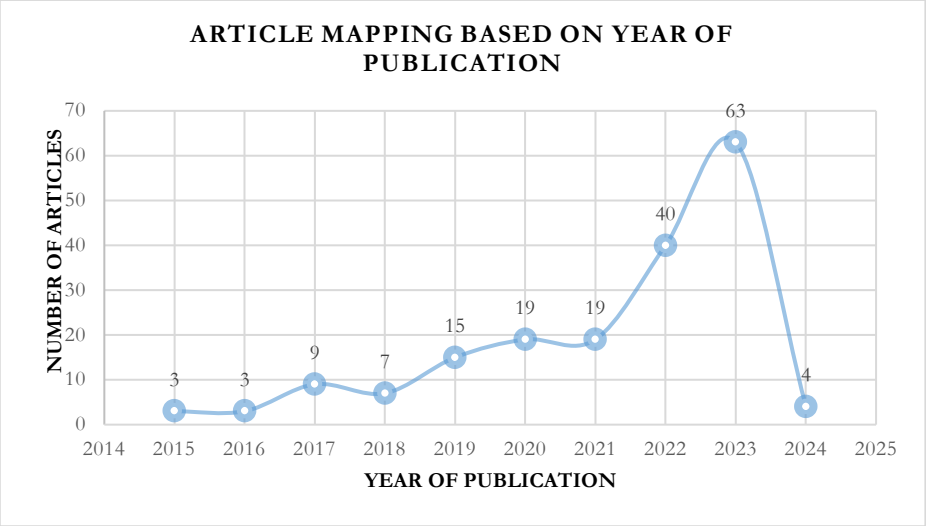

Figure 4 Scopus Journal Distribution Q1-Q4 in 2015-2024

Source: www.scopus.com

Mapping by Scientific Journal Name and Visualization Result

Mapping based on the names of scientific journals has been done with the help of Vosviewer software (Batubara *et al.*, 2022). This mapping includes journal name, number of articles/documents, citations, and total link strength. The top 10 journals that discuss research on green taxes are presented in Table 3. The journal with the first most research is Sustainability Switzerland, with 22 articles. The journal Environmental Science and Pollution Research is the journal with the most research strength, and the journal Environmental Science and Pollution Research is the second journal, with a total of 18 articles/documents. The third journal is occupied by the Journal of Cleaner Production, which has 13 articles with 574 citations. Journal of Environmental Economics and Management has the most minor publications, namely 1 article. For this reason, future authors can choose the Journal of Environmental Economics and Management when publishing research articles that discuss green taxes. Thus, it is likely to be accepted and published. The mapping results based on this journal are also depicted in the visualization results by Vosviewer in Figure 5.

Table 3. Mapping by Journal Name of Scopus Green Tax Articles Q1, Q2, Q3, and Q4

No	Source	Documents	Citations	Total link strength
1	Sustainability Switzerland	22	220	15
2	Environmental Science and Pollution Research	18	169	19
3	Journal Of Cleaner Production	13	574	4
4	International Journal Of Energy Economics and Policy	7	31	8
5	Journal Of Environmental Management	4	361	4
6	Economic Research Ekonomska Istrazivanja	3	40	3
7	International Journal Of Environmental Research And Public Health	3	20	2
8	Energy Reports	3	33	4
9	Applied Economics	2	22	3
10	Journal of Environmental Economics and Management	1	37	4

Source: Vosviewer Data Processing Results (2024)

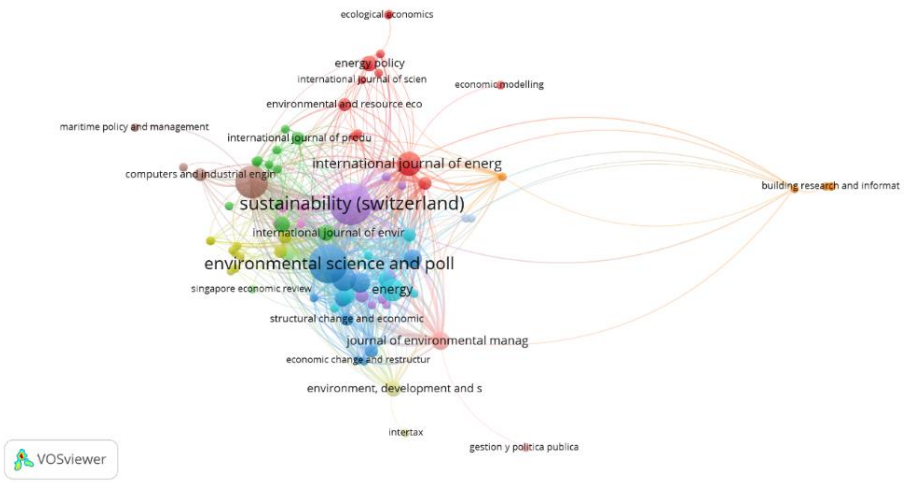

Figure 5 Visualization based on research journal

Source: Vosviewer Data Processing Results (2024)

For more details, the researcher will present the results of statistical data processing with excel. This presentation is in the form of graphs and percentages in the form of pie charts. The following Figure 6 is the result of statistical data processing with Excel.

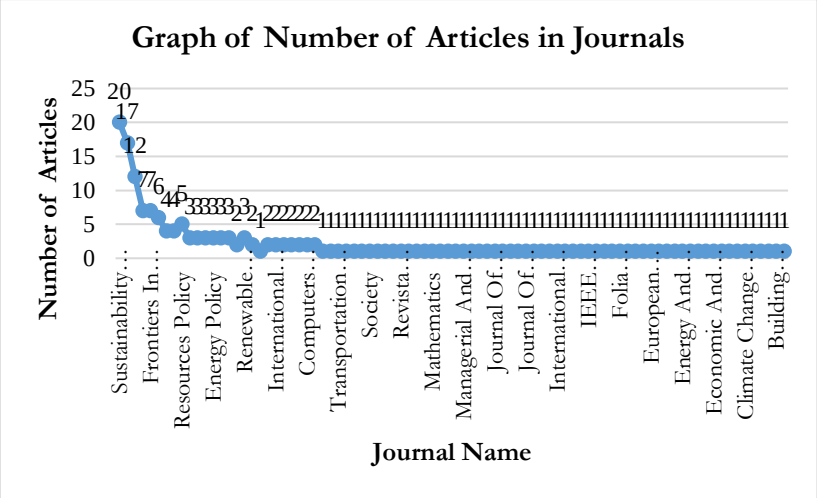

Figure 6 Graph of Number of Journal Publications

Source: Excel Data Processing Results (2024)

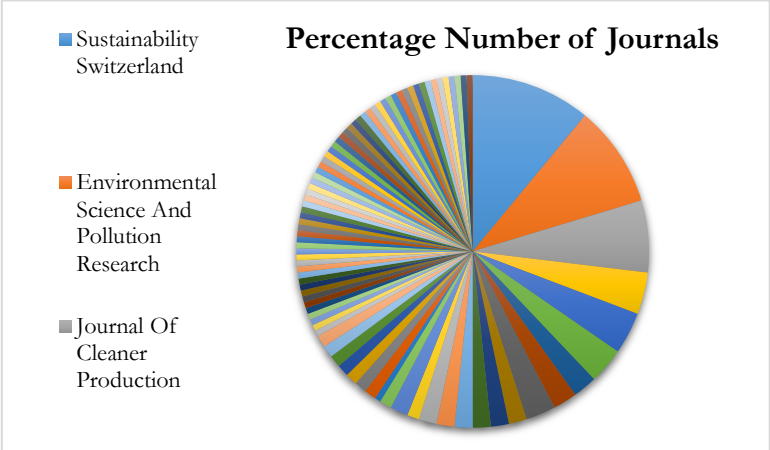

Figure 7 Percentage of Journal Publications on Green Tax Q1,Q2,Q3, and Q4

Source: Excel Data Processing Results (2024)

Mapping by Research Method

Mapping based on research methods is carried out by researchers with the aim of providing gaps for future researchers who will research green taxes (Kang *et al.*, 2020). This mapping is done by analysing one by one the articles that have been found, namely 182 research articles in Table 4. Over the past ten years, quantitative research has been the most widely conducted research, namely 123 (67.5%) articles. This was followed by qualitative research with 33 (18.1%) articles. The rest of the research researchers used mixed research (combining quantitative and qualitative research) in as many as 26 (14.2%) studies. The year 2023 saw the highest number of quantitative studies, with 43 studies. The second most quantitative research was found in 2022, with 22 studies. For the most qualitative research, there were 9 studies in 2022 and 2023. The second highest number of qualitative research is in 2020, namely 6 studies. But here, there is a uniqueness that in 2023, there were 11 mixed studies that occurred in 2023. For this reason, further research can take

qualitative and mixed method research because there is still minimal research using these methods with the topic of green tax research.

Table 4. Mapping by Research Method of Scopus Green Tax Articles Q1, Q2, Q3, and Q4

Year	Research Methods (Number of Articles)			Number of Articles
	Quantitative	Qualitative	Mixed	
2015	3	0	0	3
2016	1	2	0	3
2017	7	1	1	9
2018	5	2	0	7
2019	13	1	1	15
2020	12	6	1	19
2021	15	2	2	19
2022	22	9	9	40
2023	43	9	11	63
2024	2	1	1	4
Total	**123**	**33**	**26**	**182**
(%)	**67.5%**	**18.1%**	**14.2%**	**100%**

Source: Personal Data Processing Results (2024)

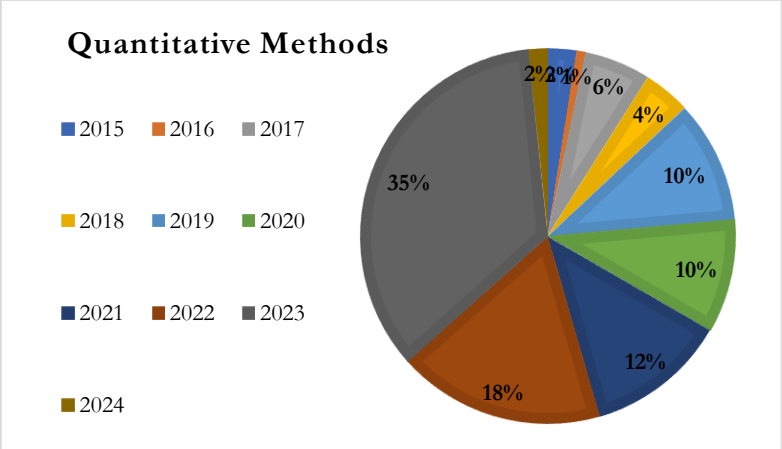

Figure 8 Proportion of the Number of Quantitative Method Studies

Source: Excel Data Processing Results (2024)

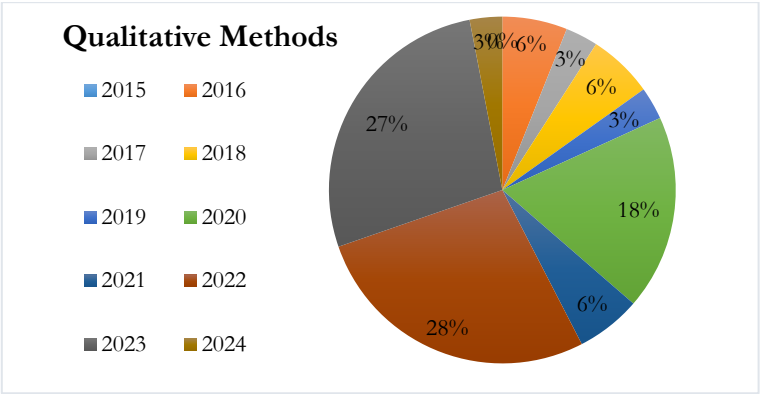

Figure 9 Proportion of Qualitative Research Methods

Source: Excel Data Processing Results

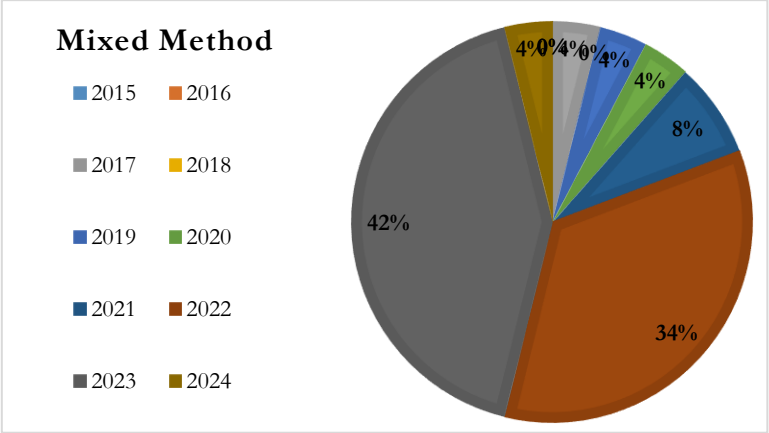

Figure 10 Proportion of Mixed Method Studies

Source: Excel Data Processing Results (2024)

Figure 10 is the proportion of results by Excel data from the number of inventions of quantitative methods, qualitative methods and mixed methods. This proportion is depicted on a pie chart with the results in the form of a percentage.

Mapping Based on Research Data Sources

Mapping based on research data sources has been carried out by researchers presented in table 5. The purpose of mapping this research data source is to find future research gaps that can be a reference for future research using which data sources will be used. Researchers carried out this mapping by analyzing one by one the articles that had been found, namely 182 articles. It was found that most sources of research data were primary data sources, around 136 articles (74.7%). For secondary data sources, 39 articles (21.4%) have been found. The rest of the mixed research data sources are 7 (3.8%) articles. Research using primary data occurred the most in 2023, which amounted to 50. 2022 became the year with the second-highest number of studies using primary data, which amounted to 31. Secondary data used by researchers also occurred the most in 2023, which amounted to 8. For the second secondary data, there were 7, namely in 2022. The average primary data source is done by distributing questionnaires, questionnaires, interviews to

respondents and documentation. As for secondary data, on average, researchers use information obtained from company financial reports and analyze the results of this information.

Table 5. Mapping by Research Data Source of Scopus Green Tax Articles Q1, Q2, Q3, and Q4

Year	Research Data Source (Number of Articles)			Number of Articles
	Primary	Scondary	Mixed	
2015	3	0	0	3
2016	2	1	0	3
2017	4	5	0	9
2018	3	4	0	7
2019	9	6	0	15
2020	14	5	0	19
2021	17	2	0	19
2022	31	7	2	40
2023	50	8	5	63
2024	3	1	0	4
Total	**136**	**39**	**7**	**182**
(%)	**74.7%**	**21.4%**	**3.8%**	**100%**

Source: Personal Data Processing Results (2024)

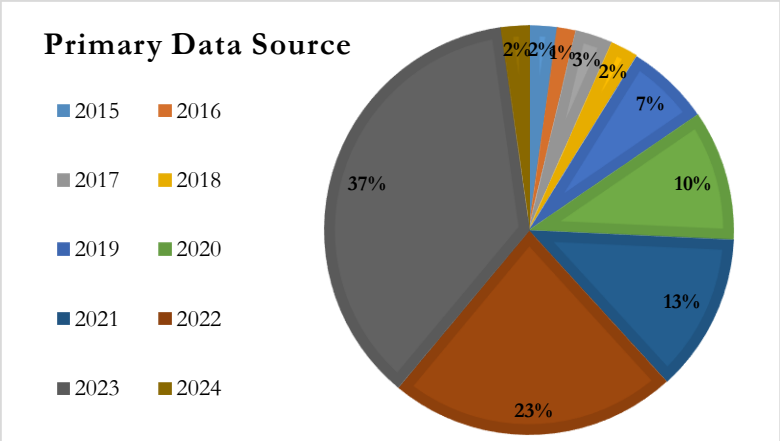

Figure 11 Proportion of Total Percentage Source of Primary Data

Source: Excel Data Processing Results (2024)

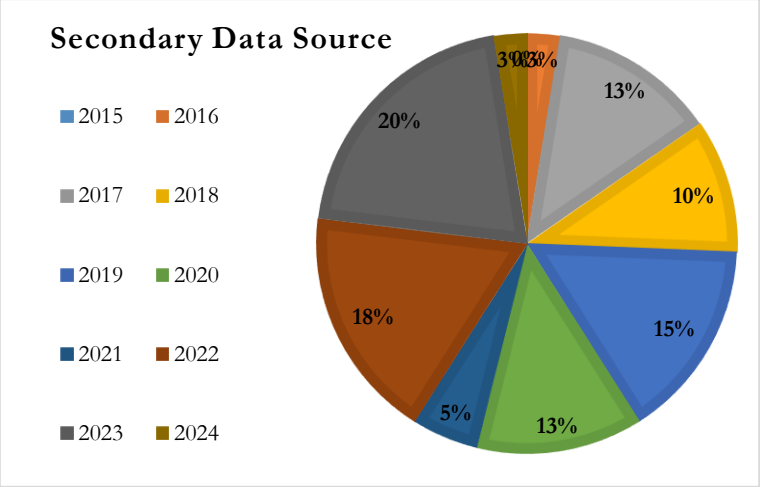

Figure 12 Proportional Percentage of Total Secondary Data Source

Source: Excel Data Processing Results (2024)

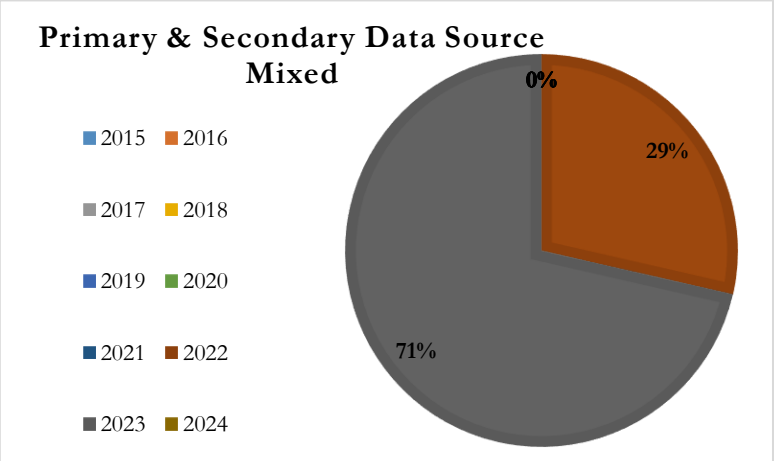

Figure 13 Proportion of Percentage of Mixed Data Sources

Sources: Excel Data Processing Results (2024)

Figures 11, 12, and 13 represent the percentage proportion of the number of research data sources on green taxes. The proportion is presented in 3 pie charts consisting of the Percentage Proportion of the Number of Primary Data Sources, the Percentage Proportion of the Number of Secondary Data Sources, and the Percentage Proportion of the Number of Mixed Data Sources. Based on the data that has been processed above, future researchers can conduct research using secondary and mixed data sources to expand the scientific literature. This is the same as research conducted by (Nobanee & Ullah, 2023).

10 Top Keyword Green Tax Research and Visualization Result

Author keywords are also important in bibliometric analyses. Comerio & Strozzi (2019) suggest that the co-occurrence of keywords is an insightful technique for developing scientific constructs because keywords provide a coherent explanation. Chen *et al.* (2021) also believe that keywords reflect a particular topic in a particular discipline. To be able to understand the literature on green

taxes, the visualisation analysis of the most emerging keywords was carried out by setting minimum criteria. The keywords presented in Figure 3 have been the subject of discussion for the last ten years. From the results of data processing using Vosviewer, the keyword carbon tax became the keyword with a total link strength of 67 times. The second most frequently used keyword in green tax research is environmental tax with a total link strength of 48 times. It is not surprising that these two keywords top the research on green taxes. This is because carbon tax and environmental are part of green tax which is often reviewed in previous studies. Thus, the number of keyword occurrences indicates the strength of the relationship between keywords in the same article and keyword analysis represents the general content of the article (Nobanee & Ullah, 2023).

Table 6. Top keyword of green tax research

No	Keywords	Occurrences	Total link strength
1	Carbon Tax	18	67
2	Environmental tax	13	48
3	Green Innovation	12	47
4	Environmental taxes	11	46
5	Green Finance	7	32
6	Renewable energy	6	32
7	Green tax	8	30
8	Carbon taxes	6	26
9	Green tax reform	7	25
10	Economic growth	6	24

Source: Vosviewer Data Processing Results (2024)

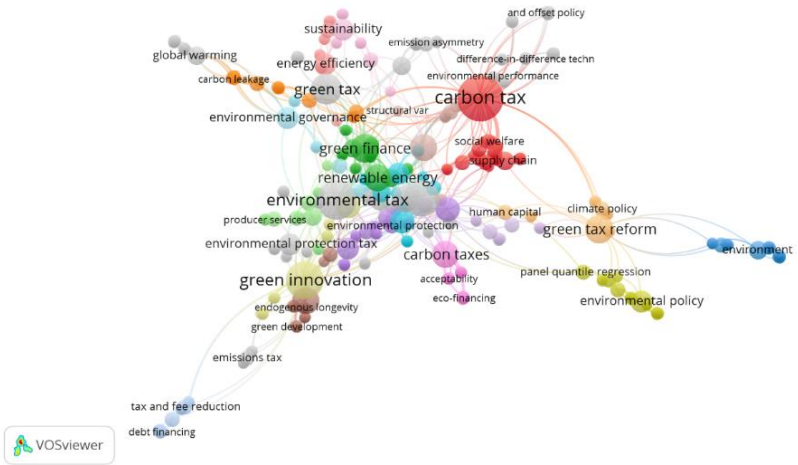

Figure 14 Keyword Visualization

Source: Vosviewer Data Processing Results (2024)

The results of the mapping carried out by researchers based on keywords can provide an overview of future research. These keywords can be used as research variables. Carbon Tax is the keyword with the highest Occurrence results. Future researchers can develop research on carbon tax where carbon tax is still related to green tax. Research on carbon tax has been done by many previous

studies, such as research conducted by (Ramadhani & Koo, 2022; J. Zhang *et al.*, 2024). Apart from the carbon tax variable, research from this keyword can also use other variables or keywords such as Renewable Energy, Economic Growth and others.

Top 10 Authors With Green Tax Research and Scopus Visualization Results in Q1-Q4

Authorship analysis plays an important role in trend identification and cluster analysis of green tax research. By analyzing collaboration patterns among researchers and institutions, author-based analysis can provide insights into the development of the green tax research field. The emergence of new research topics and perspectives, as well as the evolution of research networks and communities. Ngo than quang, Phan thi thu hien, Gyamfi bright akwasi, and Hoo wong chee are the authors with the most publications presented in table 7. The average author only published 2 documents in common, with a total strength of 9. Next, the researcher provides an image presentation of the visualization of the top authors.

Table 7. Top 10 authors with green tax research

No	Author Name	Document	Total link strength
1	Ngo,than quang	2	9
2	Phan, thi thu hien	2	9
3	Gyamfi, bright akwasi	2	8
4	Hoo, wong chee	2	6
5	Ng, alex hou hong	1	6
6	Ng, chee pung	1	6
7	Ofori, elvis Kwame	1	6
8	Sam, toong hai	2	6
9	Sarpong, kwabena agyarko	1	6
10	Tee, poh kiong	2	6

Source: Vosviewer Data Processing Results (2024)

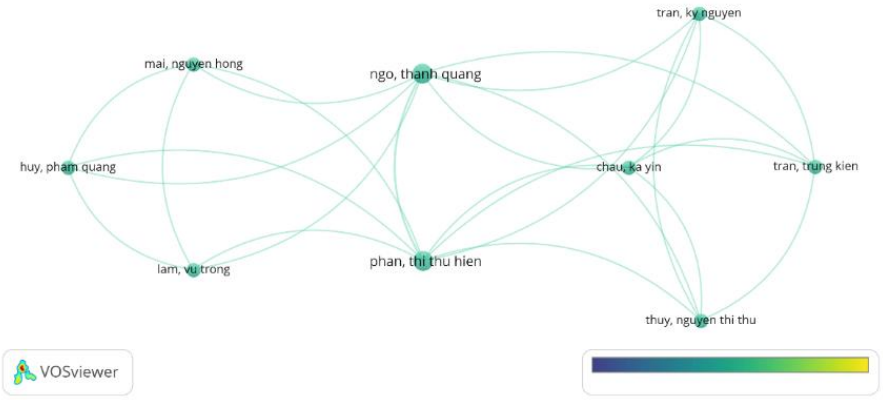

Figure. 15 Visualization by Autor Name

Source: Vosviewer Data Processing Results (2024)

Top 10 Countries With Green Tax Research And Visualization Results

In the study of bibliometric reviews, citation analysis remains one of the most widely used techniques (Khan *et al.*, 2022). Citation analysis is considered a quantitative tool used to evaluate a discipline, topic, author, or journal based on the total citations generated. Citation analysis also includes patterns, frequency examination, and graphs of article citations. (Nobanee & Ullah, 2023). This is also true of the mapping of green tax research by country presented in Table 8. Researchers found that China is the leading country with the highest number of research articles on green taxes, namely 115 articles with 2,357 citations. Zhang *et al.* (2016) examined carbon taxes from 1989 to 2014 and found that the United States was the top country in research on green taxes. This shift is due to China's rapid industrialization and encourages researchers to explore green taxes in China. Therefore, along with the development of China, it is important to be able to implement and explore. Pakistan occupies the second place with 13 research articles and 579 citations. It turns out that the comparison is higher than in the United States. Mapping based on this country is also depicted in the visualization results in Figure 16.

Table 8. Countries of Scopus Green Tax Articles Q1, Q2, Q3, and Q4.

No	Country Name	Document	Citation	Total link strength
1	China	115	2.357	64
2	Pakistan	13	579	28
3	United kingdom	10	193	24
4	Turkey	10	625	20
5	Saudi arabia	4	167	13
6	United arab emirates	3	137	11
7	Australia	11	65	10
8	Taiwan	5	44	10
9	India	12	273	9
10	United states	14	177	8

Source: Vosviewer Data Processing Results (2024)

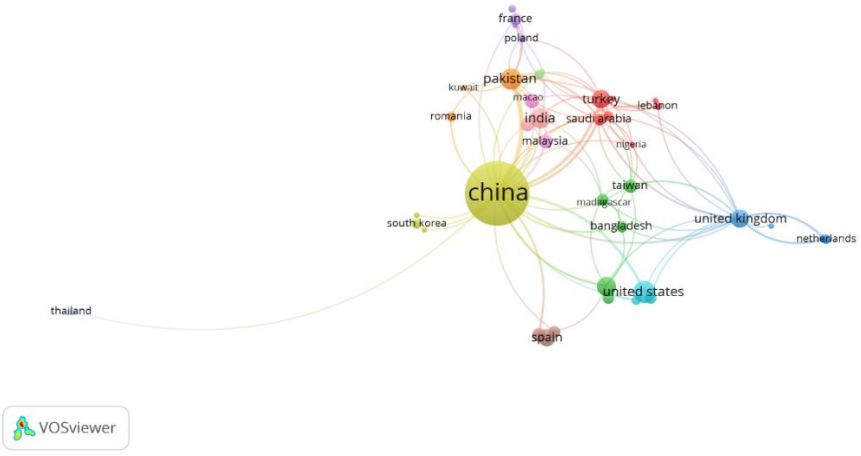

Figure 16 Visualization by Country
Source: Vosviewer Data Processing Results (2024)

CONCLUSION

Green taxes are considered an emerging topic in the environmental field and can assist in promoting environmentally friendly behavior. This study aims to examine more deeply about green tax research by using a descriptive quantitative bibliometric analysis study. A total of 182 articles on green taxes were found from the Scopus-indexed journal literature Q1, Q2, Q3 and Q4 with a subject area focus on environmental science, energy, economics, econometrics and finance, social sciences, engineering, business management and accounting, and computer science. This mapping was conducted during 2015-2024 and improves on previous research. The mapping is based on publication year, quartile level, research method, journal name, research data source, ten keywords, top 10 countries with green tax article publishers, and top 10 authors of green tax article publishers. The mapping results are also presented as a visualization of data processing with Vosviewer to find out future research gaps. The main finding in this study is that each of the results and discussions presented by the researcher provides a gap for future research, such as what methods can be used in the future, what research variables to use and what research data sources can be used. This research contributes to future research on green taxes as a future direction in determining innovative tax designs and analyzing distribution effects.

Green tax is a type of tax that every country should be able to implement because it can provide benefits to the community itself. Benefits in terms of increased state revenue and public health. Thus, researchers provide suggestions for future governments to include carbon taxes, pollution taxes, congestion charges, renewable energy subsidies, energy-efficient building incentives, environmentally friendly goods and services procurement policies, and environmental impact assessments. In addition, the government should also implement a goods and services policy for business entities to purchase environmentally friendly products and services. This can stimulate demand for environmentally friendly products and services for other business entities. This research article has limited problems, such as research using a single Scopus database in searching for research literature on green taxes. Future research can conduct research using databases from international journals such as Elsevier and Thomson Reuters in searching for literature. The results of bibliometric analysis can be compared with research that current researchers have written. Thus the coverage obtained will be broader and will add to the treasure of knowledge in the field of taxation research, especially green taxes.

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