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Bibliometric Analysis of Research on Tax Compliance from 1989-2023

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ABSTRACT

Tax compliance is a crucial aspect for both developing and developed countries. It has led to an increasing number of publications in the field, making it imperative for researchers to delve into this matter. The analysis uncovers publication trends, identifies key authors, productive countries and institutions, and highlights influential journals in this area. This research utilizes bibliometric analysis to examine the interconnections among documents related to tax compliance. Initially, 993 documents from various categories were gathered from the Thompson Reuters Web of Science Core Collection database. Bibliometric analysis was then conducted using a combination of VOSviewer, Bibliometrix, and Biblioshiny from R. The study's outcomes shed light on publication patterns, network analysis of co-authorship, co-citation, keyword co-occurrence, and bibliographic coupling. This study deepens our understanding of tax compliance research, provides valuable insights into the current research landscape, and is a valuable reference for future investigations in this field.

Keywords: *Web of Science; Bibliometric Analysis; Tax Compliance; VOSviewer; RStudio.*

1.0 Introduction

Public finance and governance are critically dependent on tax compliance. Modern economic systems are built on tax compliance, or the adherence of people and corporations to tax laws and regulations. Effective tax collection generates government money that supports the delivery of fundamental public goods and services, from infrastructure improvement to social welfare initiatives. As globalisation and technology evolve, providing reliable tax compliance methods has become a top priority for governments worldwide. Scholarly research has become a vital source of insights into the dynamics of tax compliance behaviour as governments struggle with the complexity of tax systems and the difficulties presented by tax evasion and avoidance.

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Recent years have seen a rise in the use of bibliometric analysis, a potent technique for mapping the intellectual landscape of a field, to systematically identify patterns of publication, collaboration, and influence across academic disciplines. Using bibliometric analysis in tax compliance research provides a lens through which we may track knowledge development, recognise essential contributions, and find new themes and research trends. The bibliometric analysis offers a unique perspective on evaluating the evolution of tax compliance research and its more significant impact on policy and practice by closely examining the metadata of scholarly publications, such as publication frequency, authorship networks, and citation trends. Scientific evaluation research can be conducted using the bibliometric analysis data (Moral-Muñoz *et al.*, 2020). This study sets out on a bibliometric tour through the field of tax compliance. We aim to map the routes of significant authors and organisations, untangle the intellectual threads that have woven the fabric of this heterogeneous subject, and reveal the outlines of tax compliance research across time. We seek to provide insights that not only shed light on the current status of the discipline but also illuminate its future directions by diving into the quantitative components of tax compliance scholarship.

The study's primary goal is to assist researchers and academics in comprehending the body of existing knowledge in the field of study and its current global connections. This research would also help coordinate international research networks and authors and link academic institutions. This paper attempts to achieve its goal with a relational technique for bibliometric investigations. The relational approach uses a variety of tests, namely co-citation analysis, bibliographic coupling, co-authorship analysis, and co-word analysis, to identify linkages between the study area articles. Bibliometric and science mapping are the best techniques for illustrating the scientific status in a study field, locally or worldwide (Doulani, 2020). The study employed this method to synthesise 993 research papers written between 1989 and the beginning of 2023. The tax compliance knowledgebase was mapped by Bibliometrix using RStudio, and bibliographic links to this research were examined using the visualisation of similarity (VOS) viewer program. Bibliometric analysis was used to uncover links and structural models for the research disciplines and to build a complete database of tax compliance and related fields. This vast pool of publications was then evaluated. Compared to other traditional review methods that use critical or narrative synthesis or meta-analysis, this review strategy synthesised a large data set. The subsequent research goals frame the remaining components of the study:

1. To gain an overview of the current body of research on tax compliance.
2. To examine authorship, citations, and region contributions.
3. To identify notable authors based on their citation counts and writing partnerships.
4. To assess the growth and development of the field of tax compliance.

2.0 Literature review

The idea of paying taxes on time is not new; it has changed as taxation systems have advanced and the political, social, and economic climate has changed. Tax compliance refers to how well taxpayers adhere to their duties under a nation's or jurisdiction's tax rules and regulations. Enforcement, facilitation, trust, justice, equity, transparency, and reciprocity are just a few variables that can affect tax compliance. Different nations and regions have distinct techniques and obstacles to enhance tax compliance and boost domestic resource mobilization.

According to the Holy Bible, Mathew 22:17-21, Jesus said to them: "Render therefore to Caesar the things that are Caesar's, and to God the things that are God's." This statement reveals that revenue authorities have carried out taxation from ancient times. When the federal income tax was first introduced in the US in 1913 to pay for World War I, it was discovered that the primary reason for tax collection in the past was to fund wars (Fontinelle, 2023). In addition to addressing other economic and social issues, taxation has also been used to redistribute wealth and reduce poverty (Devos, 2014). Today, the most money collected through the world's current tax systems is utilized to meet society's needs, including providing products and services to its people.

Tax compliance is "taxpayers' decision to comply with tax laws and regulations by paying tax timely and accurately" (Youde & Lim, 2019). There are two types of tax compliance: voluntary compliance and enforced compliance. According to the source, (Kirchler *et al.*, 2008) are the proponents of the slippery slope framework, which merges voluntary and enforced compliance; Allingham & Sandmo (1972) are the authors of the first study on individual tax compliance based on economic theory. (Devos, 2014) critically reviews and evaluates the state of knowledge of taxpayer compliance from 1980 to 2012. The source cites (Allingham & Sandmo, 1972) as the developer of the utility theory that assumed taxpayers to be utility maximizers in decisions of tax reporting and compliance.

Economic and behavioural strategies are the primary tax compliance methods to persuade individuals to abide by the taxation system. The economic approach- typically limited to penalties- may be required to enforce compliance by taxpayers who would otherwise refuse to fulfil their civic duties (James & Alley, 2009). According to the slippery slope theory (Kirchler *et al.*, 2008), tax compliance increases as a result of economic factors influencing tax behaviour, such as audit probability and fines (Andreoni *et al.*, 1998; Collins & Plumlee, 1991)). Contrarily, psychological factors, including social norms and views of justice, encourage obedience and faith in the government (Cowell, 1992; Orviska & Hudson, 2003).

Therefore, the relevance of tax compliance and adoption to accomplish economic gains and social transformation can be better understood with greater theoretical understandings, conceptual frameworks, and empirical inputs.

3.0 Methodology

3.1 Bibliometric analysis

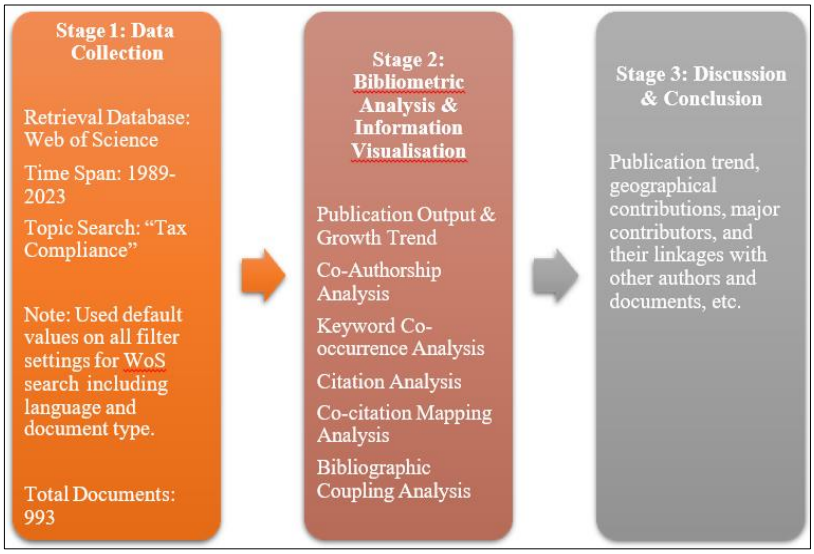
Bibliometric analysis is a quantitative tool to determine the literature's volume and growth trend for a specific growing field. It presents a retrospective analysis of the works that have been published and evaluates the contributions made by scholars in the area of focus. Technology comparing past and current research on a topic, bibliometric analysis enables the investigation of potential future research development areas (Albort-Morant *et al.*, 2017; Gaviria-Marin *et al.*, 2018). Performance analysis and science mapping are two powerful methods the study used. The performance analysis assessed the publications' effectiveness in publishing output by nations, authors, affiliated organizations, and growth patterns over time. The second relational technique of bibliometric is scientific mapping analysis, which finds connections between publications and looks at the development of the study field. This co-citation analysis and co-authorship, co-word, and thematic evolution analyses were carried out. With the aid of citations, co-citation analysis reveals the most popular publications and authors in a field of study. Researchers perform evolution analyses to comprehend the evolution of the study area over time and its patterns in the future (Ding & Yang, 2022).

3.2 Data source

The data source for the study was the core collection of the Web of Science (WoS) on August 2, 2023. WoS is one of the world's most famous scientific citation index databases. The researcher searched "tax compliance" in the topic search field. The publications first appeared in 1989, which was also the inception period of this research field. The stages of article retrieval and further analysis are displayed in Figure 1.

In Stage 1, 993 documents were received after the topic search using "tax compliance". Among the total publications, the three main document types were article (n 907, 91.14%), article; proceedings paper (n 27, 2.72%) and report; early access (n 21, 2.11%), and others like editorial reviews and book chapter were less than 6. The records exported for all 993 documents contained complete information (authors, addresses, publication year, source journal, title, subject categories and references), including abstract and cited references. Thus, this comprehensive data derived from Stage 1 was effectively used to carry out the bibliometric analysis and information visualization in Stage 2.

Figure 1: Stages of Bibliometric Analysis on Tax Compliance Research



Source: Compiled by author

In Stage 2, the internationally widely used free bibliometric analysis software VOSviewer (Visualization of Similarities) was applied to analyse and visualize the relationships among the authors, countries, journals, co-citations and terms. Because it is tough to identify clusters in mapping and derive themes from them, VOSviewer has a compelling user graphic interface that quickly examines these maps (Cobo *et al.*, 2011). Another free software, "package" Bibliometrix, developed by Massimo Aria and Corrado Cuccurullo, was also employed in this study. Bibliometrix for RStudio has an inbuilt utility, Biblioshiny, with a graphical interface for non-coders, resulting in comprehensive analysis with improvised plot representation. It combines bibliometric techniques such as co-word and co-citation network analysis, generating collaboration networks and Sankey plots to analyze a research field's evolution.

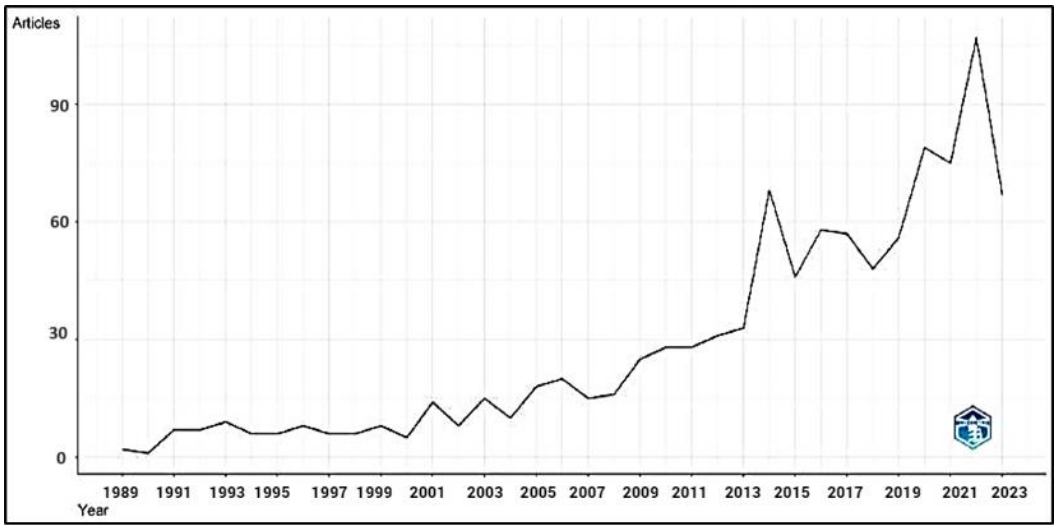
In Stage 3, both software were used to develop field plots and compare the results for some particular type of analysis available in both.

4.0 Findings

4.1 Publication output and growth trend

The annual publications in Figure 2 revealed the development in the research field. Since the concept's inception in 1989, we have seen exponential growth in the publications on the topic per year, with most in 2022, with 107 documents.

Figure 2: Annual Scientific Production per Year with 107 Productions alone in the Year 2022



Source: Biblioshiny using RStudio

Also, to understand the trend, it was essential to see the most contributing sources, countries, affiliations and keywords for the 993 documents considered for this analysis. A table discussing the top 10 countries, sources, authors, affiliations and keywords was analyzed separately (Table 2). Most documents were recorded from the USA (565) and UK (212). The reason for the greatest number of documents from the USA could be the political concerns due to the increasing "tax gap" in the 1980s, which led to structured research into tax non-compliance and evasion (Devos, 2014). Out of 372 sources, the Journal of Economic Psychology published 72 documents, the Journal of Economic Behavior & Organization published 52 documents, the Journal of Public Economics published 41 documents, and the National Tax Journal published 30. Out of 1777 authors for 993 documents considered for the study, the top contributing authors included Kirchler E (54 documents) and Alm J (35 documents), according to the selected fields' total number of documents. In contrast, the most locally cited authors are Alm J (938 citations) and Kirchler E (886 citations). Most documents were affiliated with the University of Vienna in Austria, the White Rose University Consortium (a strategic partnership between the Universities of Leeds, Sheffield, and York) and Georgia State University. Among the author's keywords, the most frequently used keywords and phrases were tax compliance, tax evasion, tax morale, taxation, compliance, social norms and trust.

Table 1: Listing the Top 10 Contributing Countries, Sources, Authors, Affiliating Institutions and Keywords

Country	F	Sources	F	Authors	F	Affiliation	F	Keyword	F
USA	565	Journal of Economic Psychology	72	Kirchler E	54	University of Vienna	40	Tax Compliance	343
UK	212	Journal of Economic Behavior & Organization	52	Alm J	35	White Rose University Consortium	31	Tax Evasion	176
Germany	166	Journal Of Public Economics	41	Torgler B	24	Georgia State University	30	Tax Morale	70
Italy	125	National Tax Journal	30	Williams Cc	19	University of Sheffield	26	Taxation	43
Austria	109	International Tax and Public Finance	27	Kogler C	14	University of Vienna	25	Compliance	35
Australia	95	Journal of Business Ethics	26	Mckee M	14	University of London	21	Social norms	33
China	94	Journal of Behavioral and Experimental Economics	20	Muehlbacher S	14	N8 Research Partnership	21	Trust	30
Netherlands	71	Finanzarchiv	19	Mittone L	13	Ifo Institute	19	Tax administration	25
Romania	70	Accounting Review	17	Hofmann E	12	N8 Research Partnership	19	Field experiment	23
Spain	66	Sustainability	11	Gangl K	11	University of Michigan	19	Experiment	22

Source: Computed from bibliographic data.

The focus on tax compliance is a visible research interest of both developed and developing economies, and well-known publication setups understand its future implications and readily participate in expanding this research field.

4.2 Mapping analysis of publications and authorship

4.2.1 Co-authorship analysis

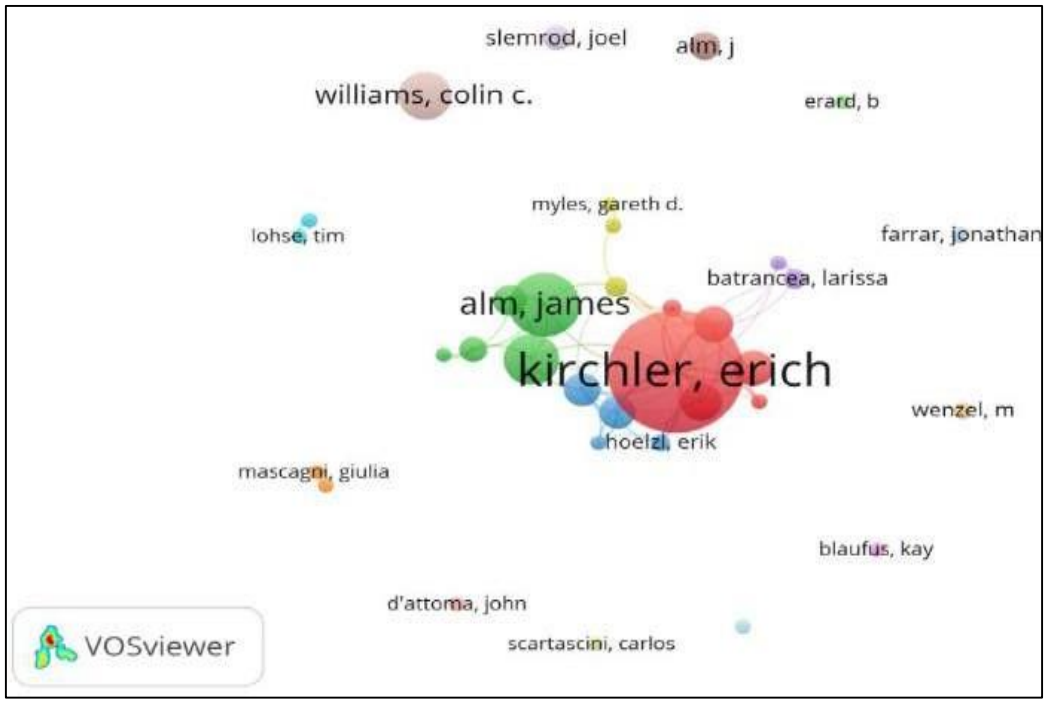
When the unit of analysis is the author: The unit of analysis was a minimum of two authors using the fractional method of counting, which fractionally divided the credit among authors. For example, an article has four authors; they equally share 0.25 credit for the article, while in total counting, one credit is added for each of the four authors. Out of 1809 authors for 993 articles taken from the Web of Science Core Collection from 1989 to 2019, the minimum number of documents of an author was five thresholds, qualifying 34 authors to meet the threshold.

Statistically, 1.88% of the authors (n=1809) were credited with five publications on tax compliance. When creating author data based on the co-authorship map, the threshold value was set at five to quickly find the prominent authors (n=34) who had published the relevant topics. Thus, only 34 items were analyzed.

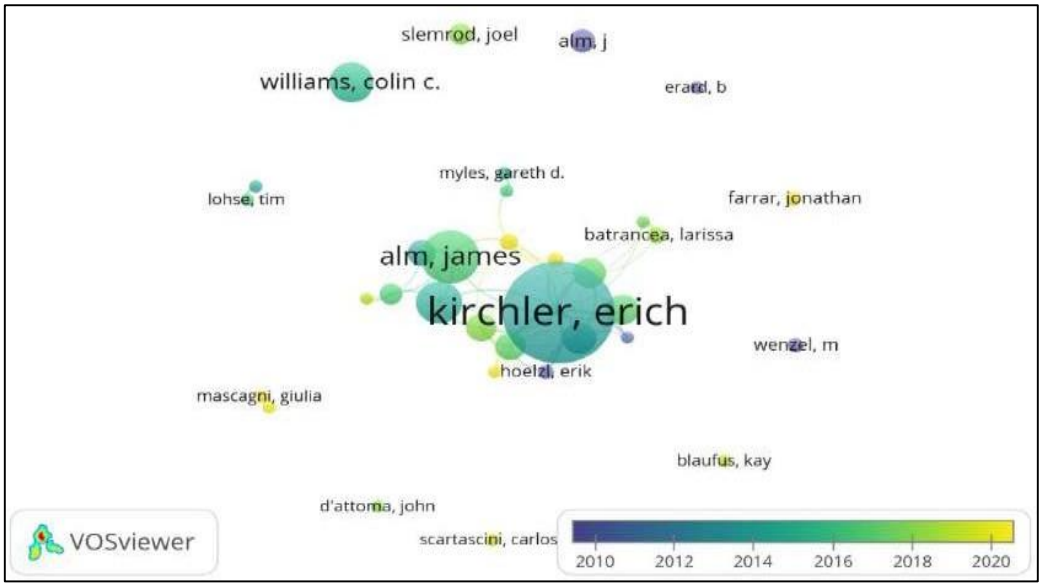
In Figure 3, the colour balls represent 17 linked clusters, with 52 links representing a collaboration with a total link strength of 93.00 for all clusters. These clusters reveal leading academic relations and researchers based on the average publication year in the network. For instance, the strong-link researchers "Kirchler, Erich", "Muehlbacher, Stephan", and "Kogler, Christoph" were grouped in a cluster in Figure 3a. The prominent researchers in the network were "Kastlunger, Barbara", "Kirchler, Erich", "Kogler, Christoph", "Mittone, Luigi", "Muehlbacher, Stephan", "Torgler, Benno" and "Alm, James". In Figure 3b, the circles' size represents the author link-weights, and the gradient colour from blue to yellow demonstrates the average publication year from 2010 to 2020. It is visible from Figure 3b that some documents published in 2014 have strong author link-weights like "Kirchler, Erich," "Kogler, Christoph" and "Muehlbacher, Stephan".

Figure 3: Author Cooperation Network

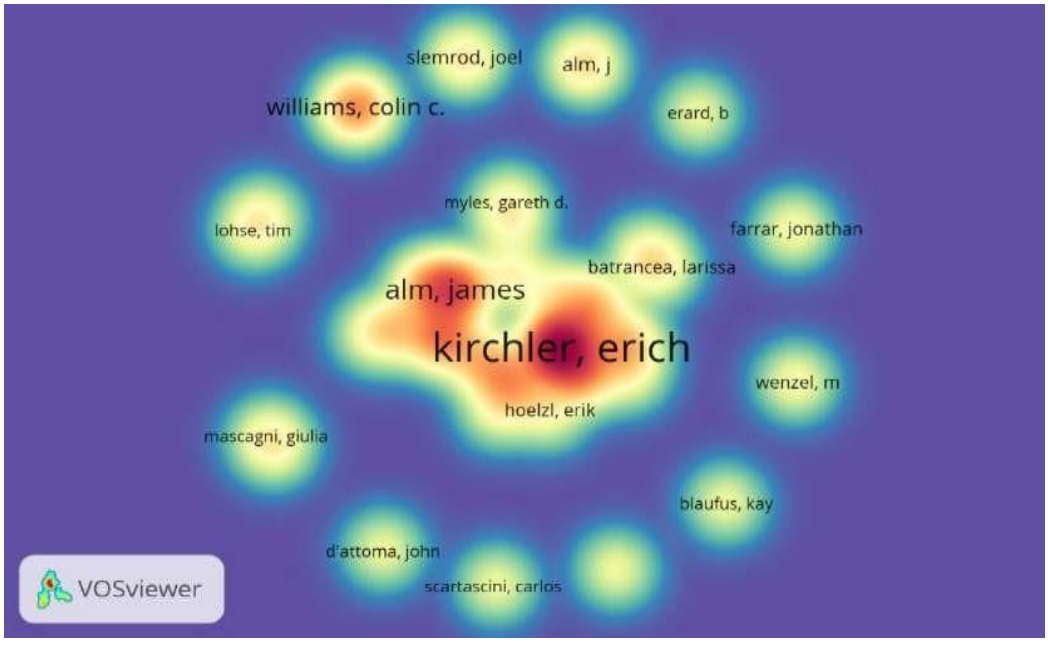
(a)



(b)



(c)



Notes: *(a) Network visualization based on document weights; (b) Overlay visualization based on document weights and average publishing year; (c) Density Visualization of clusters 17, links 52 and total link strength of 93.00.*

Source: Drawn from bibliographic data.

In Figure 3c, the density of yellow circles represents the most strongly linked clusters for the same authors represented in network analysis. Thus, the visualizations represent strongly linked authors in most recent years, like "Kirchler, Erich," "Kogler, Christoph", and "Muehlbacher, Stephan". These visualizations also indicate that suggested research fields are rigorously growing.

When the unit of analysis is country. Out of the 80 countries, for 993 articles taken from the Web of Science Core Collection from 1989 to 2023, the minimum number of a country's documents was five thresholds, qualifying 39 countries to meet the threshold. Statistically, 48.75% of the countries (n=80) were credited to meet the threshold. Other countries published less than five documents; thus, 39 countries were analyzed for country collaboration network analysis.

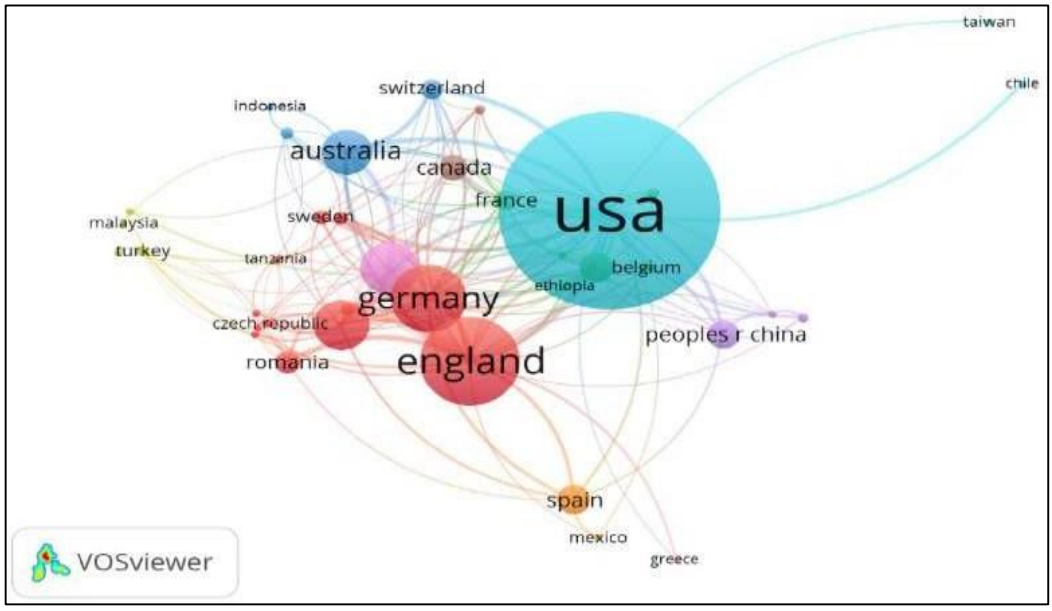
In Figure 4, the colour balls represent ten linked clusters, with 185 links representing a collaboration with a total strength of 305.50 for all clusters. These clusters help reveal the author's country collaboration based on document weights and average publishing year with a minimum score. For instance, the strong-link countries are "The USA," "Italy," "The Netherlands", and "Germany", as represented in Figure 4a. Interestingly, with solid link weights, "England" and "Germany, as well as the USA", "Taiwan", and "Chile," there is no direct author collaboration with each other. The other contributing countries were "Sweden," "Republic of China," "Australia" and others. In Figure 4b, the circles' size represents the document's contribution from the countries in the form of document weights, and the gradient colour from blue to yellow demonstrates the average publication year from 2012 to 2020. It is visible from Figure 4b that documents published in previous years have strong country links, like "Germany" and "England." In Figure 4c, the density of yellow circles represents the most strongly linked clusters for countries represented in network analysis. Thus, the visualizations represent strongly linked country collaboration in past years, like "Germany" and "England." With the increase in inter-country contributions, the linkages and partnerships have increased. Figure 4b indicates that the research fields and researchers are breaking the boundary barriers and spreading to other developing countries like Spain, China, and Mexico and developed countries like Germany, the USA, Canada, and France. This augmentation helps extend the potential for research contributions and author collaborations in the fields considered.

In addition to the above, we would like to discuss the bibliometrics results using R (Biblioshiny) of author-country collaboration (Table 1) that highlights single-country partnership (SCP) and multi-country partnership (MCP). Of the 281 documents (also top country contributor, Table 2) originating from the USA, 66 are multi-country partnership documents. Austria had 18 Single Country Participated documents and 34 multi-country

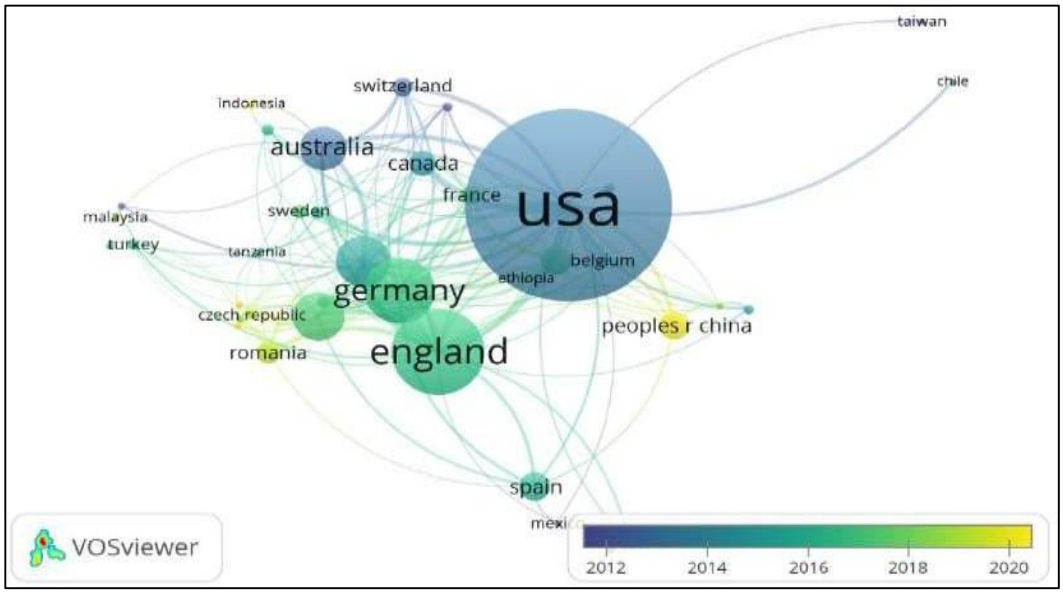
partnership documents. The considered research fields allow country collaborations and author partnerships across regions.

Figure 4: Country Cooperation Network

(a)



(b)



(c)

Notes: *(a) Network visualization based on document weights; (b) Overlay visualization based on document weights and average publishing year with a minimum score of 2012 and a maximum of 2020; (c) Density Visualization of clusters 10, links 185 and total link strength of 305.50.*
Source: Drawn from bibliographic data.

Table 2: Total Collaborated Documents and Author Country Partnerships

Country	Articles	Freq	SCP	MCP	MCP Ratio
USA	281	0.283	215	66	0.235
United Kingdom	98	0.099	54	44	0.449
Germany	68	0.068	49	19	0.279
Austria	52	0.052	18	34	0.654
Italy	52	0.052	36	16	0.308
China	42	0.042	34	8	0.19
Australia	39	0.039	27	12	0.308
Spain	34	0.034	27	7	0.206
Canada	28	0.028	20	8	0.286
Netherlands	23	0.023	15	8	0.348

Source: Computed from bibliographic data.

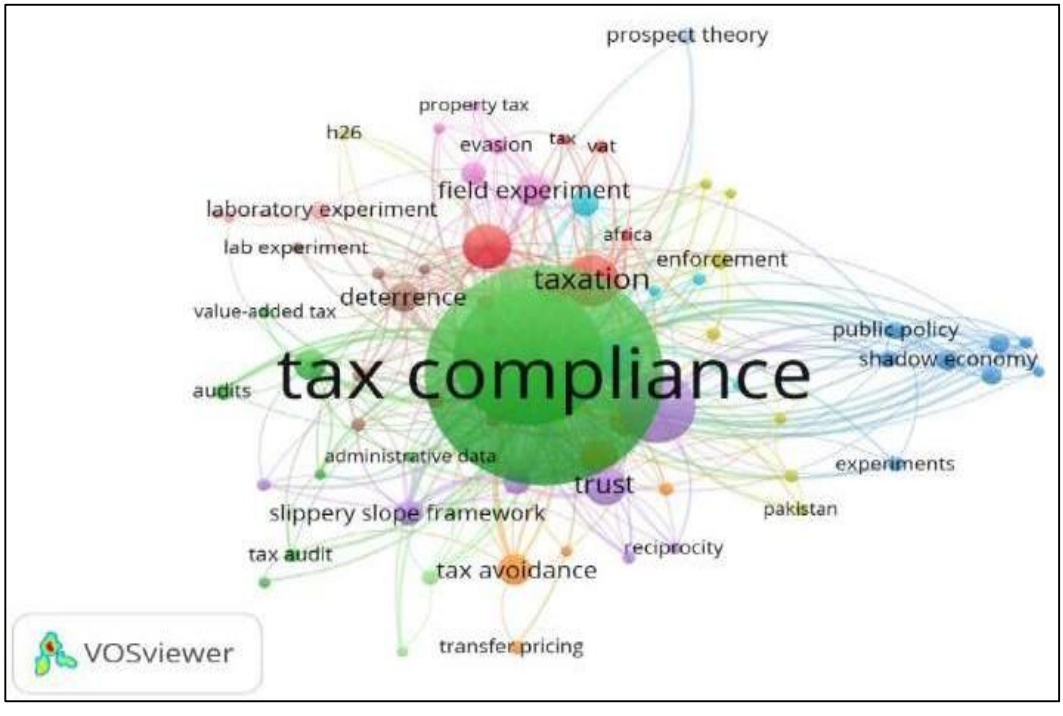
4.3 Analysis of co-occurrence of keywords

Keyword co-occurrence analysis. Out of 1840 authors' keywords for 993 documents, the threshold for a minimum number of keyword occurrences was set to five. Statistically, 19.29% out of total (n = 1840) keywords occurred twice in the documents, 10.33% occurred thrice, 6.52% keywords occurred four times in the documents, 4.02% occurred five times and so on, with a minimum number of occurrences of keywords as five, out of 647 keywords 74 meet the threshold. In total, 74 items with a link strength of 1058 were analyzed.

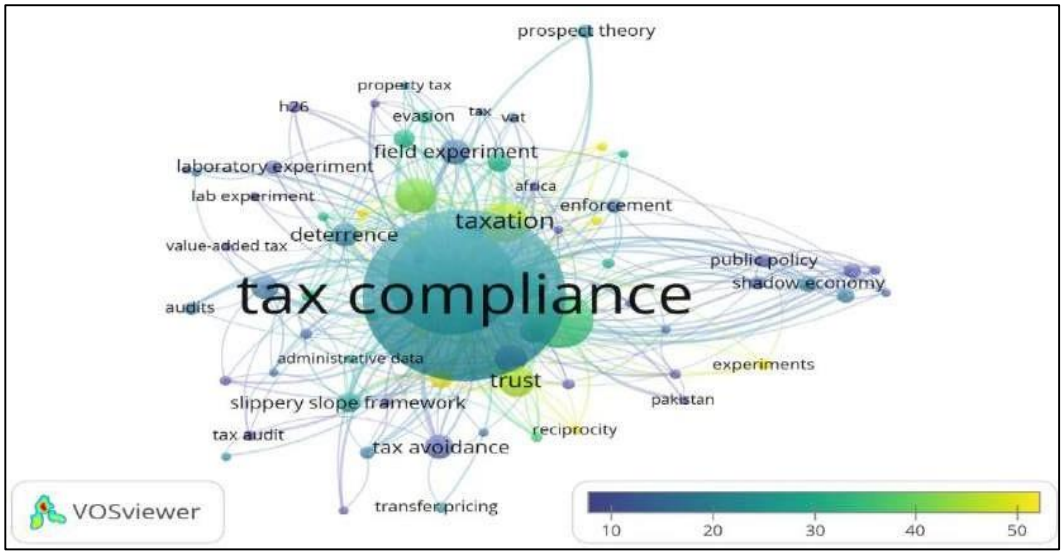
In Figure 5, the size of the circles represents the occurrences of keywords. The larger the circle, the more a keyword is selected in the documents. In Figure 5a, the keywords "Tax compliance" (green-coloured circle), "taxation" (red-coloured) and "Public policy" (blue-coloured) had the most muscular strength out of all items, linked exclusively with "tax compliance" as their related topics, helping analyse the co-occurrence of keywords.

Figure 5: Keyword Co-occurrence Analysis

(a)



(b)



Notes: *(a) Network visualization based on link weights; (b) Overlay visualization based on link weights and average citation score of 74 items, 13 clusters and total link strength of 1058.*
Source: Drawn from bibliographic data.

Figure 5b represents the documents' average citation score and co-keyword link-weights with minimum average citation score (dark-blue colour) and maximum average score (in yellow). Interestingly, keywords like "tax compliance" with maximum occurrences and substantial link weights belonged to documents with low average cited scores. In contrast, keywords like "behavioural economics" with minimum occurrences belonged to documents with high average citation scores. Thus, the citation of linked documents may not necessarily affect the co-occurrence of keywords. Keyword co-occurrence analysis reveals how often a word has been identified as a keyword in the 993 documents.

In Table 3, a link means a co-occurrence connection between two keywords. According to the VOSviewer manual, each link has a strength, represented by a positive numerical value. The higher this value, the stronger the link. The total link strength indicates the number of publications in which two keywords occur together. In the header in Table 3, it can be seen that the new research mainly concentrated on "Tax Compliance", "Evasion, "Tax Evasion", "Taxation", "Morale", "Behaviour", "Enforcement", "Trust", "Tax Morale", "Social Norms" and others. In addition to this, Biblioshiny results for the most relevant keywords, as shown in Figure 6, highlighted "Tax Compliance," followed by "Tax Evasion" and "Tax Morale" with the greatest number of occurrences. The results

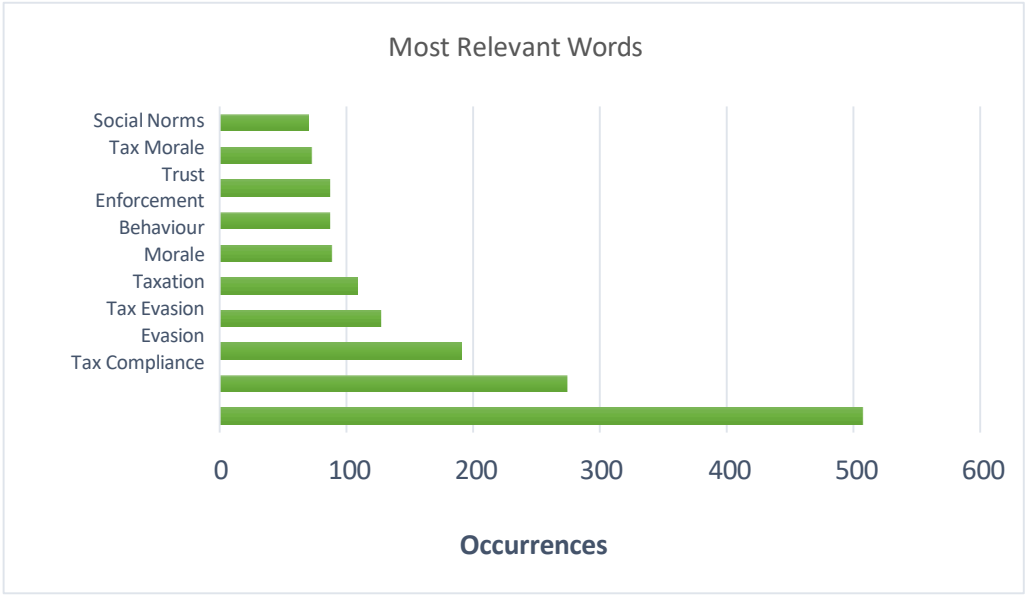
are evidently in the lines of VOSviewer and graphically represent the occurrences of the most relevant keywords.

Table 3: The Link and Total Link Strength of the Top 10 Occurrence Keywords

Keyword	Occurrences	Total Link Strength
Tax Compliance	508	2477
Evasion	274	1590
Tax Evasion	191	1011
Taxation	128	723
Morale	109	683
Behaviour	89	549
Enforcement	87	479
Trust	87	589
Tax Morale	73	448
Social Norms	70	451

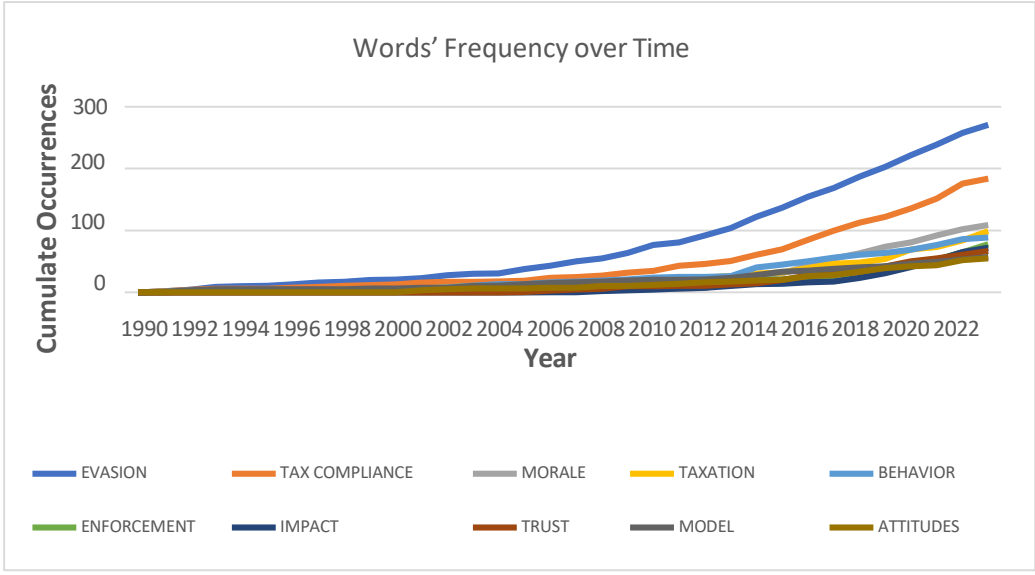
Source: Computed from bibliographic data.

Figure 6: Graphical Representation of the Most Cited Keywords



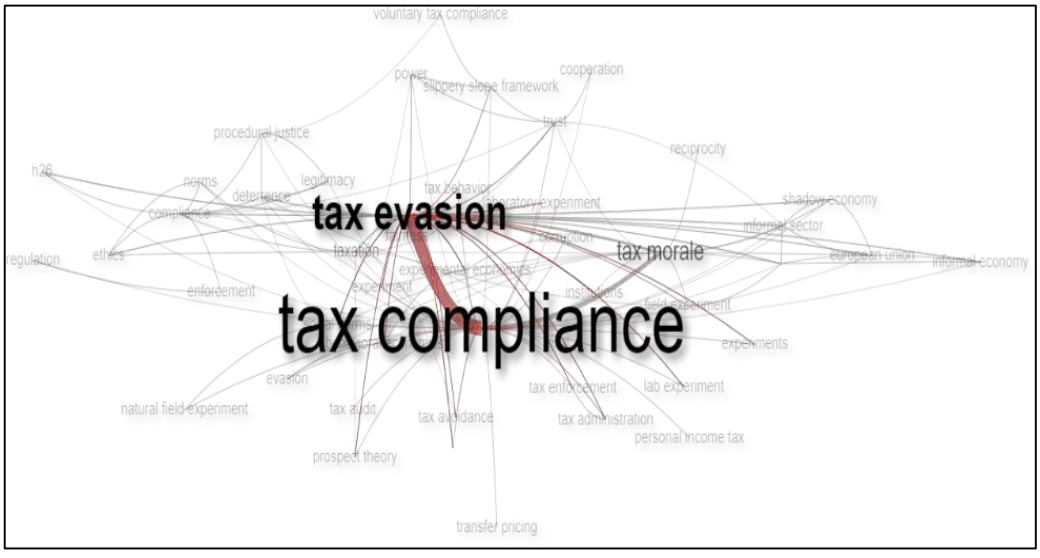
Source: Drawn from bibliographic data.

Figure 7: Annual Growth of Most Relevant Keywords based on their Occurrences



Source: Drawn from bibliographic data.

Figure 8: Network Analysis of Keyword Co-occurrence



Source: Biblioshiny using RStudio

Also, Figure 7 helped us understand the annual growth of the most relevant keywords based on their occurrences. “Tax compliance”, with a sharp increase in the curve, has emerged as the most common keyword since 1995. Similarly, we observe a rise in “morale” and “behaviour”. “Morale” has been used since 1998 and has seen a stable rise in its occurrences, progressively emerging as an important research field.

In Figure 8, “tax compliance” forms clusters with “tax evasion,” “tax morale”, “tax audit”, “tax avoidance”, and so forth. In contrast, “tax morale” forms the linkage with the “informal sector” and includes “informal economy” and “reciprocity” in its cluster, indifferent to the co-occurrence results of VOSviewer, as shown in Figure 5. This exception could be because both software use different mapping and clustering methods. While VOSviewer uses a unified approach, Bibliometrix for R uses K-means clustering to identify clusters that express common concepts.

4.4 Analysis of citations and references

Citation analysis. A citation link links two items, where one article cites the other. Citation links are treated as undirected by VOSviewer. Hence, no distinction is made between a citation from item A to item B and a citation in the opposite direction. To analyze the citations of 993 documents, the minimum number of citations threshold set to three citations resulted in 710 documents that met the criteria. Statistically, 71.50% of the total (n=993) documents had three citations. Out of 710 documents, 637 were connected, while 73 were not. Thus, 637 items have been analyzed.

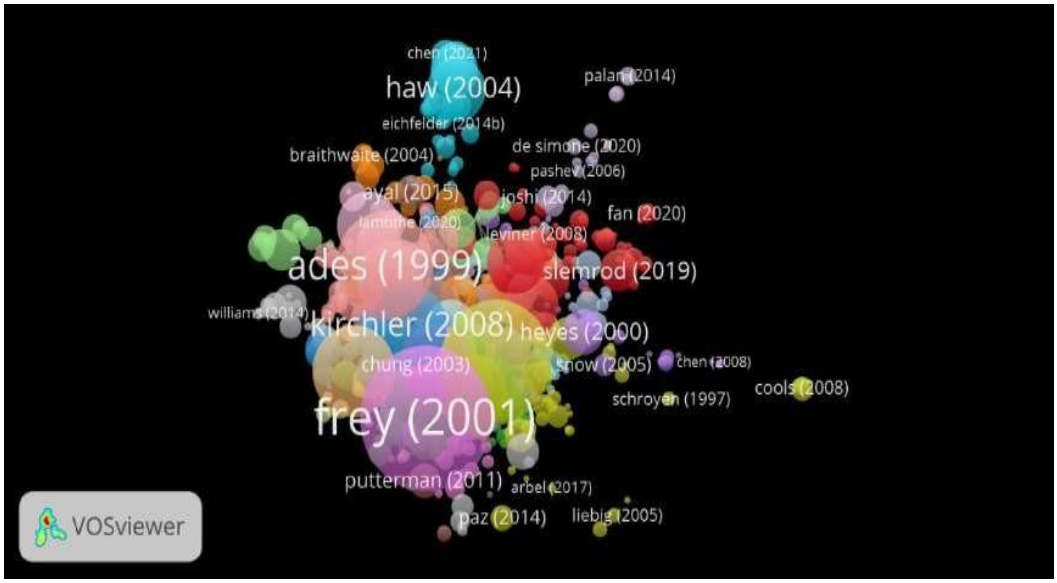
In Figure 9, the citation analysis helps us understand the link between the two items. The closer they are placed, the stronger the relationship they share. In Figure 9a, the different coloured circles represent various documents, and their size is proportional to the citations of the respective papers. For instance, “Frey & Jegen (2001)”, with 1408 citations, described in light pink colour and “Andreoni *et al.* (1998)”, represented by the yellow circle, with 981 citations, have the most significant number of citations and are co-linked to other documents with the same- coloured lines. The overlay visualization in Figure 9b, based on citation weights and average citation score, represents lower average citation scores (in blue) to higher average scores (in yellow). The yellow representations for “Frey & Jegen (2001)” “Andreoni *et al.* (1998)”,” “Kirchler *et al.* (2008),” “Ades & Di Tella (1999)” and “Haw *et al.* (2004)” have the most significant number of average citations as compared to “Alasfour (2019),” and “Casara *et al.* (2023)” which have a smaller number of average citations, evidently because of their publication year.

Figure 9c highlighted the most cited and strongly co-related documents out of 637 selected items with the most links (981) of “Andreoni *et al.*, (1998)” and “Kirchler *et al.* (2008)” with a total of 127 links. It is worth discussing that the citations for both are 374

and 451, respectively, which is a minor difference but has no proportionality with the link score.

Figure 9: Citation Visualization Analysis

(a)



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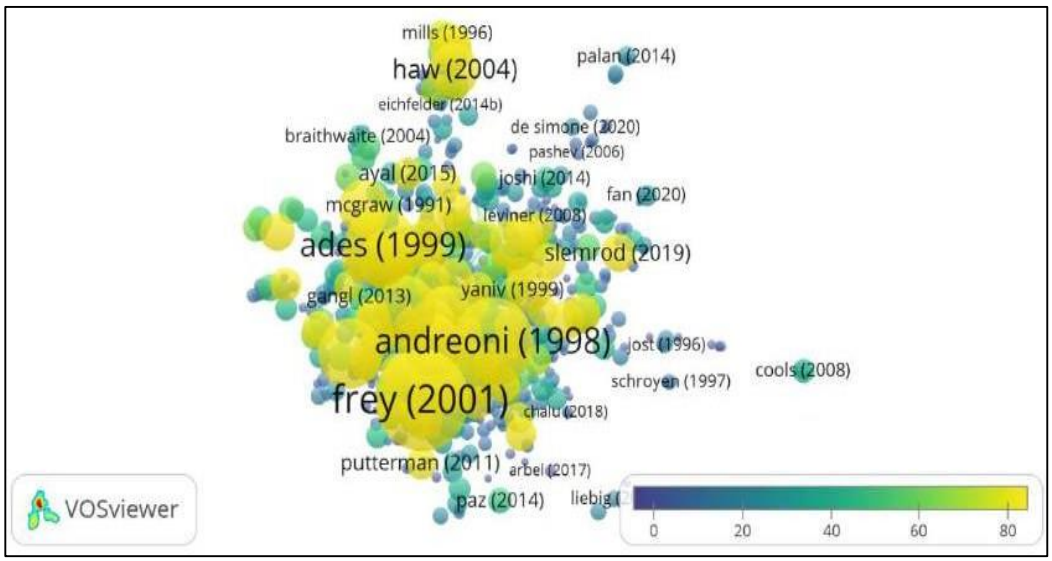
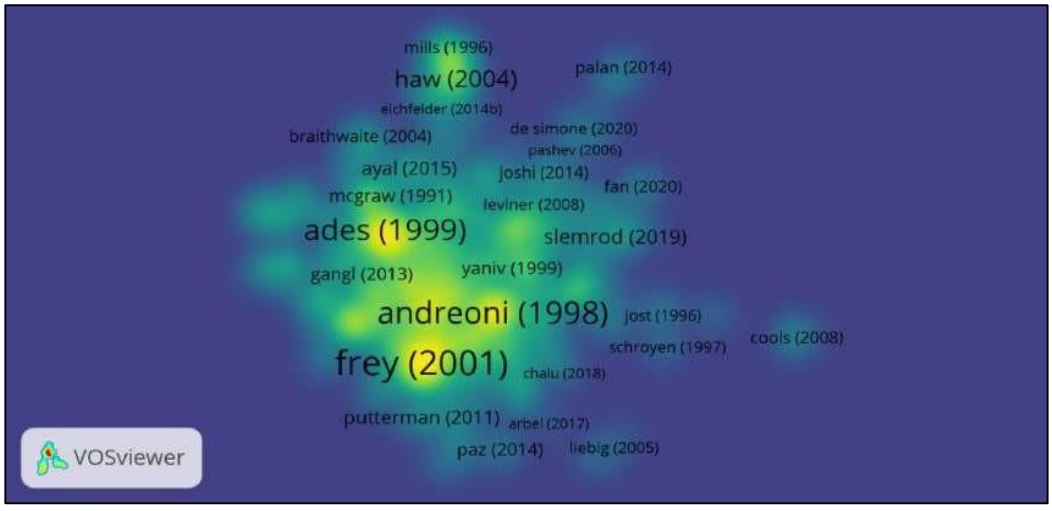


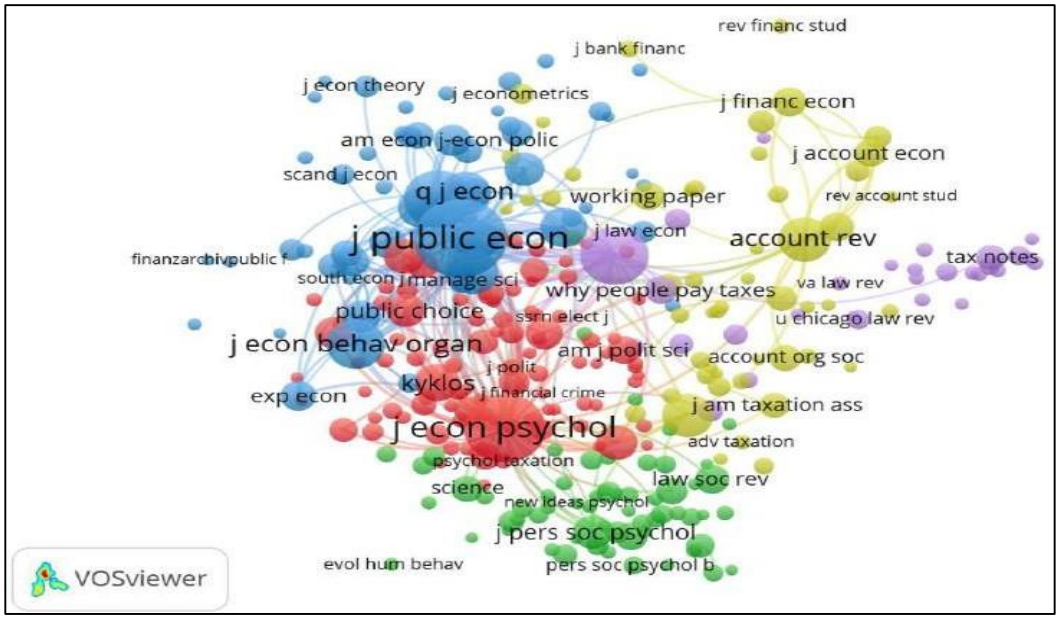
(c)



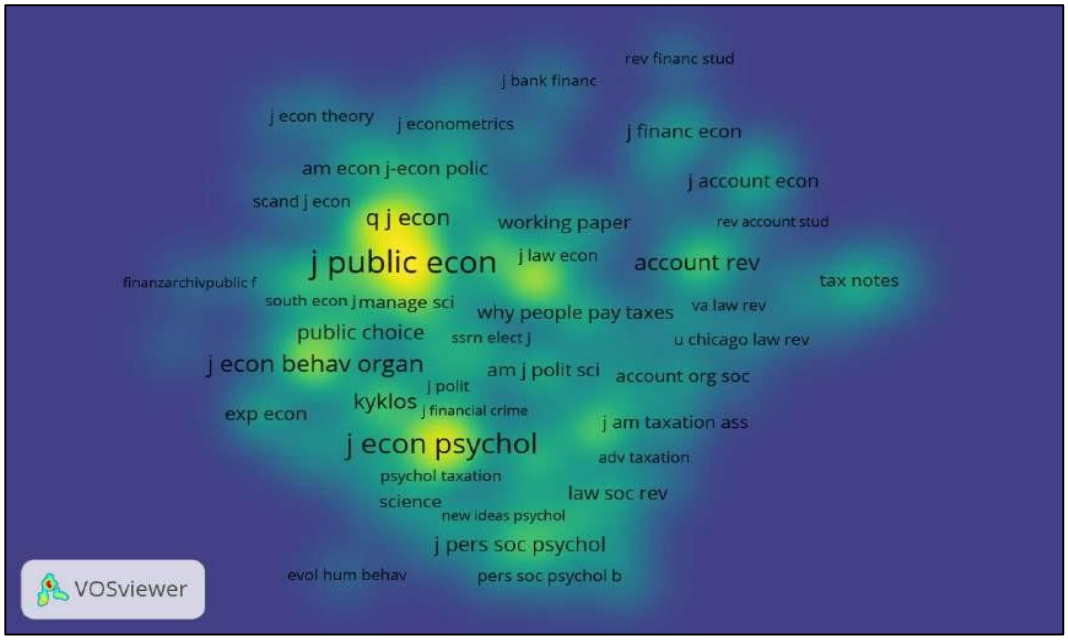
Notes: *(a) Network visualization based on citation weight; (b) Overlay visualization based on citation weights and average citation score; (c) Density visualisation of 637 items forming 27 clusters and with a total link strength of 4047.*
Source: Drawn from bibliographic data.

Figure 10: Co-citation Analysis for the Sources

(a)



(b)



Notes: *(a) Network visualization based on citation weight; (b) Density visualization based on citation weights for 14343 sources forming 5 clusters with 29764 links and a total link strength of 602705.*
Source: Drawn from bibliographic data.

Co-citation mapping analysis. A co-citation link links two items cited by the same document. Figure 10 shows co-citation analysis, keeping the source as the unit of analysis. The coloured circles and lines represent the sources and their co-linkages with other sources. At the same time, the size of the circle depicts the citation weight. The minimum number of citations of a source is set at 20; of the 14343 sources, 298 meet the threshold. Network visualization in Figure 10a, "Journal of Public Economy" in blue, has most citations to its credit and forms a blue cluster with co-cited sources like "Journal of Economic Theory" and "Journal of Economic Behaviour." In red, "Journal of Economic Psychology" forms linkages with "Public Finance" and "Journal of Socio-Economy". In comparison, other sources in green, yellow and purple have comparatively fewer citations and weak interlinkages. Thus, density visualization, Figure 10b, clearly highlights the most cited sources, that is, "Journal of Public Economy", "Journal of Economic Psychology", "National Tax Journal", and "Journal of Economic Behaviour".

Bibliographic coupling analysis. A bibliographic coupling link links two items that cite the same document.

Unit of analysis: documents. Figure 11 summarizes the bibliographic coupling for the authors that cite the same document based on citation weight. The coloured circles are documents co-linked with the same-coloured links, and the circle's size represents the paper's citation score. The larger the circle, the more citation score it has to its credit. The minimum number of citations of a document is set at 5; of the 993 papers, 615 meet the threshold. Of the 615 items, five items are not connected, and 610 items are analysed. In Figure 11a, "Frey & Jegen (2001)" in red colour is coupled to "Kirchler *et al.* (2008)," "Alm *et al.* (1995)", and "Schols & Lubell (1998)," while "Andreoni *et al.* (1998)" in yellow colour is linked to "Mills *et al.* (2010)," "Sanchez & Sobel (1993)" linked unidirectional and "Haw *et al.* (2004)" in green couples with "Williams (2007)" and so on. In Figure 11b, overlay visualization is based on the average citation score from colour panel blue to yellow, where blue represents average citation and yellow represents a high average citation score. Thus, in Figure 11c, "Frey & Jegen (2001)", "Kirchler *et al.* (2008)", "Andreoni *et al.* (1998)", "Haw *et al.* (2004)", and "Gintis *et al.* (2003)" are the most cited documents.

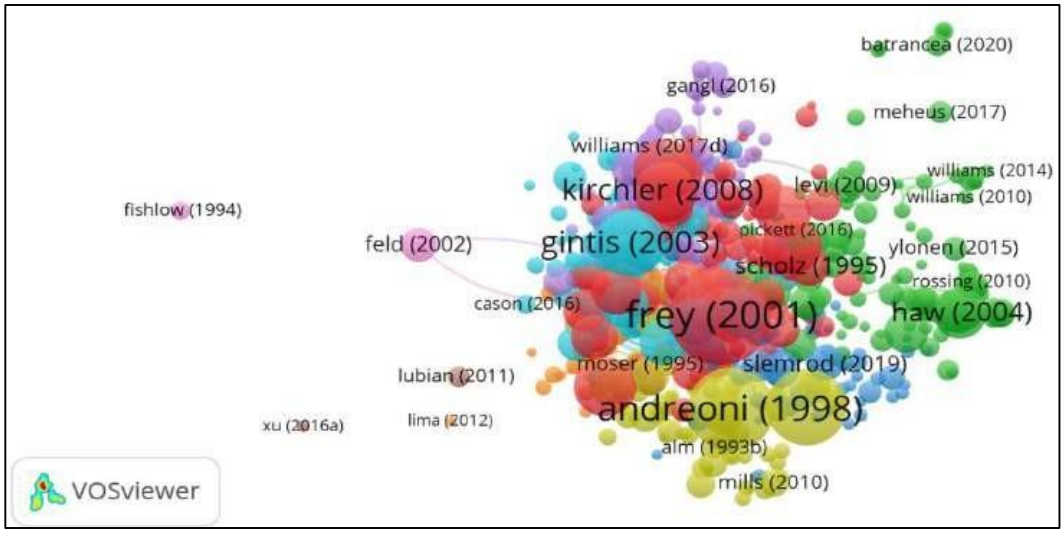
Unit of analysis: countries. The bibliographic coupling for keeping countries as the unit of analysis leads to exciting results. The minimum number of documents in a country is 5; out of 80 countries, 39 met the threshold. Network visualization comprehended coloured circles represented countries while the links were relationships; "USA," "Mexico," "Israel," and "Chile" in Figure 12a were coupled together and had most documents to their credit. Figure 12b shows the average citation score from least to most citations on the colour bar of blue to yellow; documents from "The USA," "Australia," "Denmark", and "Germany" had the most citation scores. The density visualisation in Figure 12c restates that "USA," "England," "Italy", and "Germany", with most documents, had more linkages with other papers and formed strong clusters.

Evolution analysis of themes and future development in tax compliance. The thematic evolution analysis helps explore the evolutionary relationships, evolution paths and evolutionary trends of the thematic content and structures that occur over time. Thematic evolution plays a vital role in displaying the thematic development of the research fields. The Sankey diagram in Figure 13 highlights visual data analysis using a flow chart. It shows how different themes are connected and developed through the decades (Aria *et al.*, 2020). We split twenty years into five periods: 1989–1999, 2000–2015, 2016–2020, 2021-2023. Each node represents the theme, and the size means the keywords included in the article. The flow between the nodes represents the evolutionary direction of the research theme. The graph indicates that tax compliance and tax evasion were hot topics for a certain period, while these have remained long-lasting over the last decades. The issues considered for this bibliometric analysis were of the perpetual area of

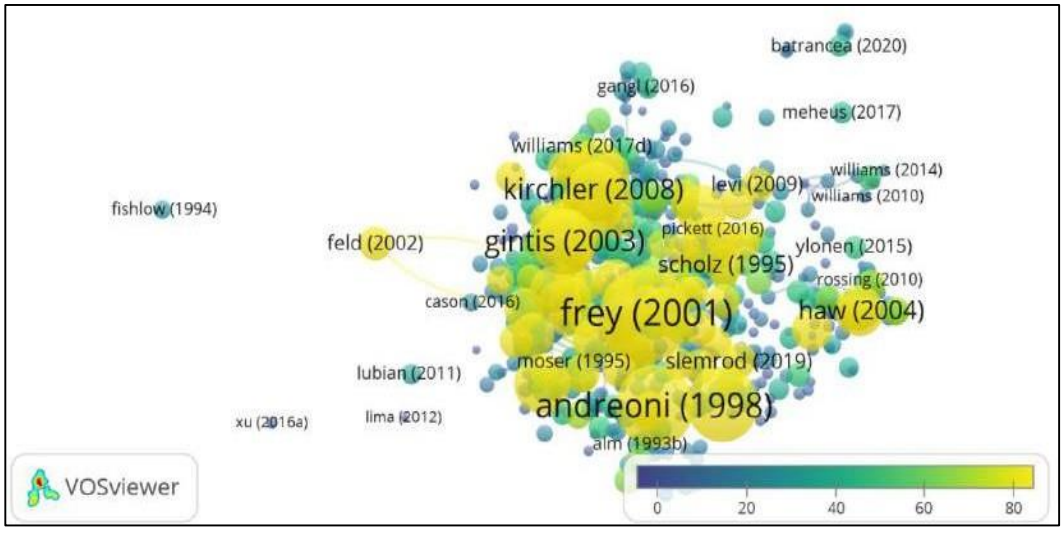
interest, while the hot topics were more dynamic, merging with other fields. The emergence of themes to identify constructs explains the evolution of the focal area from establishing backgrounds and introducing ideas about the concepts, leading to the emergence of tax compliance and tax evasion as research themes. With time, these fields have evolved toward sustainability as a research field.

Figure 11: Bibliographic Coupling Considers Documents as a Unit of Analysis

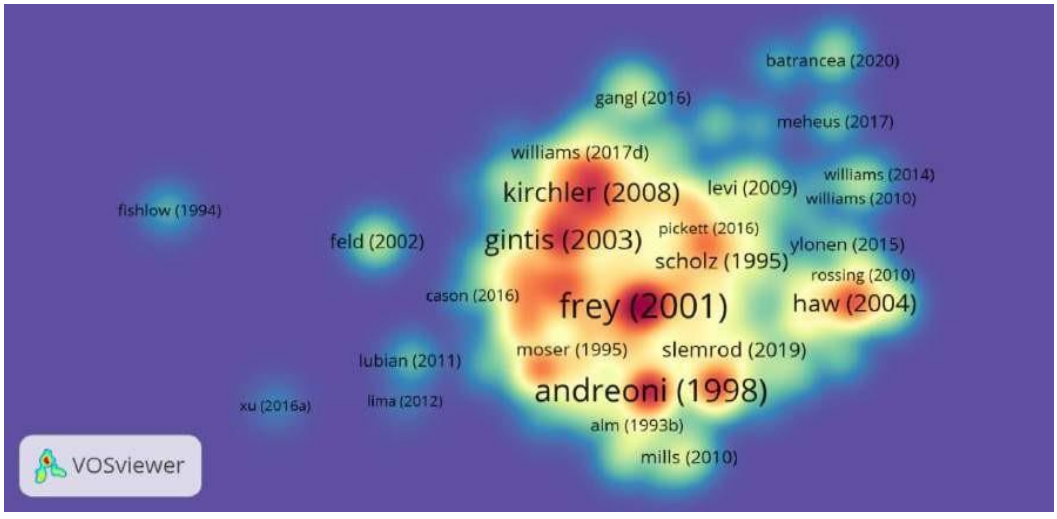
(a)



(b)



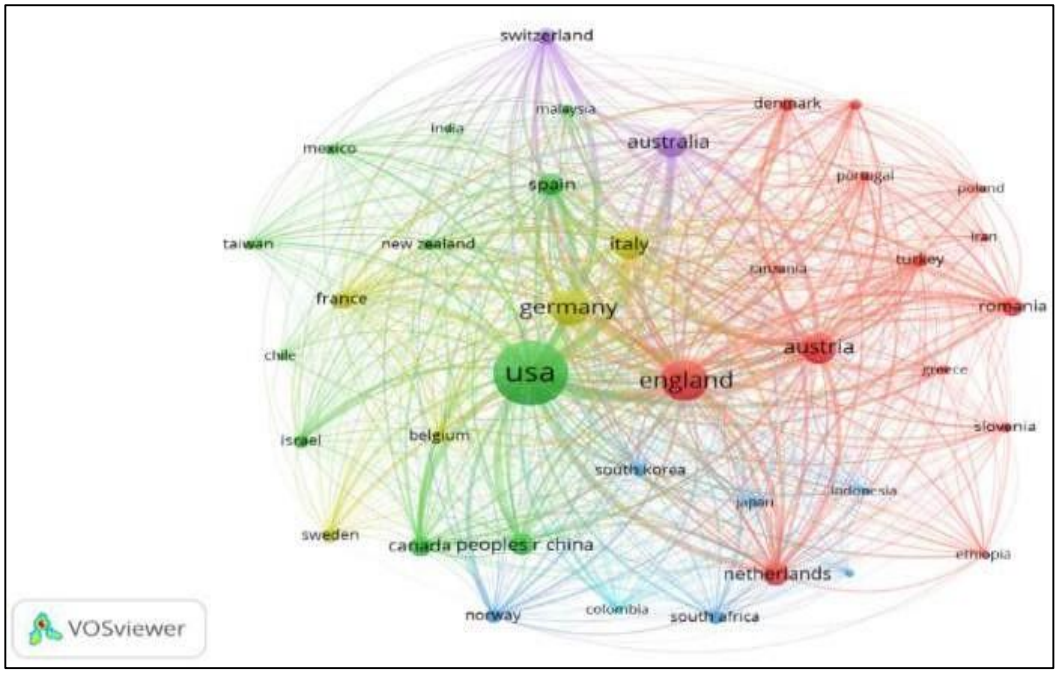
(c)



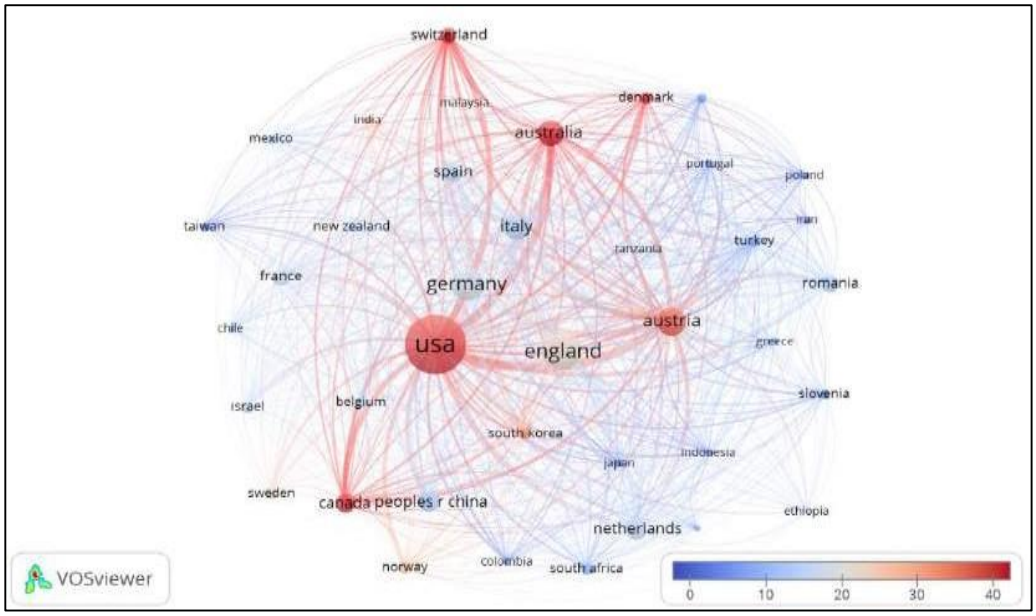
Notes: *(a) Network visualization based on citation weight; (b) Overlay visualization based on citation weights and average citation score; (c) Density visualization based on citation weights.*
Source: Drawn from bibliographic data.

Figure 12: Bibliographic Coupling Considers Countries as Units of Analysis

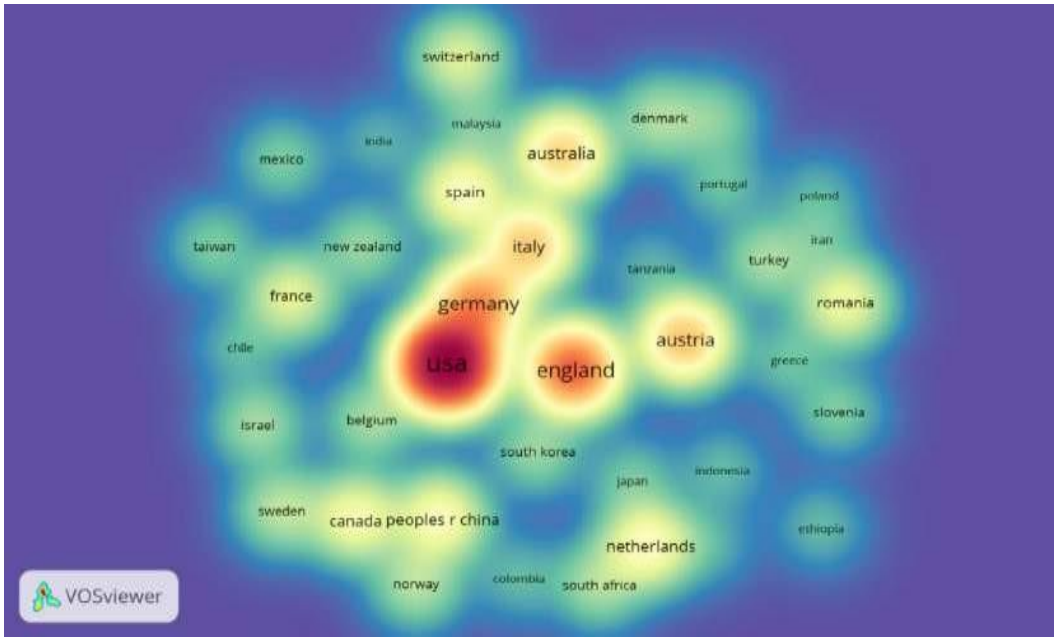
(a)



(b)

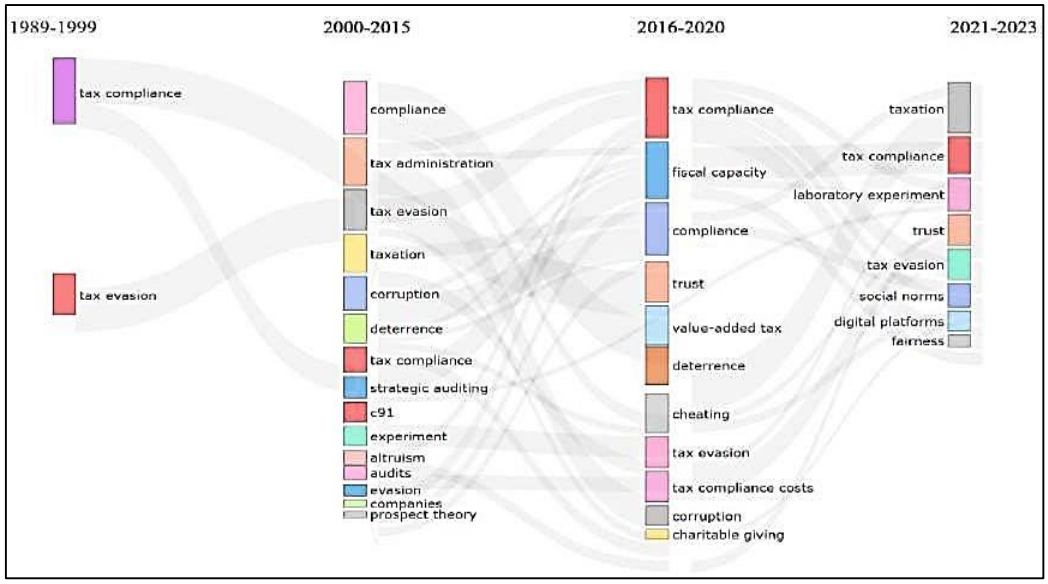


(c)



Notes: *(a) Network visualization based on document weight; (b) Overlay visualization based on document weights and average citation score; (c) Density visualization based on document weights for 39 countries*
Source: Drawn from bibliographic data.

Figure 13: Thematic Evolution of Tax Compliance as a Research Field using Sankey Diagram



Source: Biblioshiny using RStudio

5.0 Discussion and Conclusion

The article aims to enhance the knowledge base of tax compliance and related studies. A bibliometric analysis was conducted using VOSviewer and the Bibliometrix package of R to achieve the same. The relational technique for bibliometric studies applied five primary methods: co-authorship analysis, citation analysis, co-citation mapping analysis, keyword co-occurrence analysis and bibliographic coupling analysis. These methods were conducted on 993 Web of Science Core Collection database documents. The topic search for selecting these 993 documents was "tax compliance". The author's co-authorship analysis as the unit of analysis leads to identifying leading researchers in the network. "Kirchler E" "Alm J" "Torgler B" "Williams" "Kogler C" were the major contributors. When the unit of analysis was country, the strongest-link countries were "The USA," "England," "Netherlands" and "Germany."

Interestingly, the results also showed that countries having strong link-weights were "England" and "Germany," and "USA" and "Netherlands" had no direct author collaboration with each other. The keyword co-occurrence analysis indicates the occurrences of keywords in the documents, "tax compliance," "tax evasion", and

"taxation," had the most muscular strength out of all items, linked exclusively with "tax compliance" accordingly as their related topics, helping in analyzing the co-occurrence of keywords. The analysis of RStudio also revealed similar results. "Tax compliance" emerged as the most common keyword since 1989. The citation analysis where one document cites another helped in identifying Frey & Jegen (2001)", "Kirchler *et al.* (2008)", "Andreoni *et al.* (1998)", "Haw *et al.* (2004)", and "Gintis *et al.* (2003)" with higher average citation scores. The "Journal of Public Economy", "Journal of Economic Psychology" "National Tax Journal" and, "Journal of Economic Behaviour" were the most cited sources.

Interestingly, only "Journal of Cleaner Production" and "Journal of Business Venturing" topped the list with the most contributions. The bibliographic coupling when the unit of analysis was documents revealed that Frey & Jegen (2001)" with the highest citation score was coupled to "Kirchler *et al.* (2008)," "Alm *et al.* (1995)" and "Schols & Lubell (1998)," while "Andreoni *et al.* (1998)" was linked to "Mills *et al.* (2010)," "Sanchez & Sobel (1993)". Furthermore, in the case of countries, "USA," "Germany", "England", and "The Netherlands" were coupled together and had most documents to their credit. The evolution analysis of the themes shows the dynamic evolution and future development of tax compliance that revealed that constructs that established backgrounds and were responsible for a paradigm shift toward tax evasion and taxation have evolved into tax administration as a research theme. The bibliometric analysis, which employed multiple relational techniques, contributes to the available knowledge base on tax compliance. The findings intend to guide and encourage research scholars toward tax compliance and evasion and provide a baseline for future research development and research coordination across countries, authors and affiliating universities. This study is an initiative to recognize tax compliance as an essential research area. Based on the reference list of the documents, the networks and clusters generated, including title, keyword, authors, citations and sources, and affiliating institutions, help derive information about the research field. It is possible to determine which sources, papers, and writers use a variety of keywords by looking at the specifics of the documents. This study uses a bibliometric database and methods to analyse the scholarly literature on tax compliance. The theme evolution also reveals the development and potential future trend of tax compliance. A succinct summary of the contributions and the connections between them will demonstrate the continued necessity for its development as a study area.

The findings of this study will complement earlier qualitative reviews in this field of study. The research findings are intended to motivate tax academics toward compliance, serve as a starting point for the future growth of this field of study, and give a baseline for such development. Since the research demonstrates that the structures and definitions are

not agreed upon for tax compliance, the researcher proposes that a greater consensus be developed for establishing topic boundaries. The reference material and reference base of the articles used for analysis will aid in applying and developing tax-related procedures. Understanding the societal contexts that influence the morals and values of citizens, administrators, the community, and governmental institutions will also be helpful. We recommend adopting more complex, holistic and processual approaches to understand tax compliance by contributing conceptual papers, case studies and extensive quantitative studies. We attempted to address the fluidity of this construct by adopting broader viewpoints on tax compliance because the topic boundaries and conceptual definitions are ambiguous and dynamic. We employed co-citation analysis to incorporate non-WOS indexed materials for the initial investigation because the body of literature may be greater than the WOS documents. Other review strategies, like meta-analysis or systematic reviews, cannot be regarded as a replacement for this article alone. We should consider this bibliometric analysis as the first stage of a more thorough examination of tax compliance.

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