

Bibliometric Analysis of Global Research on Corporate Sustainability Disclosure

Mohammed S. Bello^{1*}; Ridzwana Mohd Said²

^{1*}School of Business and Economics, Universiti Putra Malaysia, UPM Serdang, Selangor Darul Ehsan, Malaysia.

Yobe State University, Department of Accountancy, PMB, Damaturu, Yobe State, Nigeria.

^{1*}msabobello@yahoo.com

²School of Business and Economics, Universiti Putra Malaysia, UPM Serdang, Selangor Darul Ehsan, Malaysia.

Abstract

This bibliometric analysis is based on the global research in the domain of corporate sustainability disclosure. The analysis included 1,948 Scopus-indexed documents. The findings of the analysis show rapid increase in publication in recent years in field of corporate sustainability disclosures. The most popular subject categories within the field of corporate sustainability disclosure include business, management and accounting. The keywords analysis reveals sustainability reporting as the frequently used keyword used by authors in the field. Furthermore, the findings demonstrate co-authorship among scholars, with most collaboration in the United States, United Kingdom and Australia. The most productive authors and institutions in the area of Corporate Sustainability Disclosure (CSD) are in the United States, Canada, Australia and Malaysia. Moreover, the citation analysis shows the dominance of the Journal of Accounting, Auditing and Accountability Journal in the field.

Key-words: Corporate Disclosure, Sustainability Reporting, Sustainability, Bibliometric Analysis.

1. Introduction

Sustainability disclosure research is considered as a field of study for over four decades ago (Roberts & Wallace, 2015). The main rationale for corporate disclosure is to provide relevant information to a range of stakeholders on the affairs of an entity (IASB, 2012). The concept of corporate sustainability disclosure is not a new phenomenon. Its emergence can be traced back to early twentieth century (Guthrie and Parker, 1989). However, much relevance is given to the field in the last five decades (Roberts & Wallace, 2015). Corporate disclosures have been criticised to be inadequately lagged information quantity (Aprianto, 2016; Mohd Said et al., 2016; Sultana, 2017).

Over this period, there were divergent views as to the meaning of sustainability accounting. According to Joshua, Soares, & Domingos (2018) sustainability accounting involves corporate engagement in business transactions in a suitable manner while putting into cognizance the environmental, social and economic factors, with the aim of safeguarding the asset of an entity and further protect the interest of the larger society. Similarly, sustainability accounting and reporting as viewed by Maas, Schaltegger, & Crutzen (2016) entails an organizational response to social and environmental issues and also fulfilling the disclosure requirement of both the public and the regulatory authorities.

Corporate sustainability is viewed under Elkington (1997) triple bottom line (TBL). TBL capture an important idea which represents an organisation as environment, social as well economic entity. The result of adopting the TBL would lead to publishing an annual report with distinct section of financial, environment and social disclosures (Gray & Milne, 2004), but, in practical sense, corporations are designed to follow with due diligence the financial reporting, to the extent that non-compliance will lead to penalties from both market and regulatory authorities (Fineman, 1997). Horrigan (2002) suggest for a transition in corporate governance from “single” and “triple” bottom line framework to “quadruple bottom line” perspective. The idea of quadruple bottom line focuses on the systematic financial, social, environmental, and also government and regulatory concerns. A critical analysis of the past literature shows that the studies are fragmented in terms of methods and approaches (Cho, Laine, Roberts, & Rodrigue, 2016; Cormier, Dufour, Luu, Teller, & Teller, 2018; Patten, 2015; Rivière-Giordano, Giordano-Spring, & Cho, 2018; Sankara, Patten, & Lindberg, 2019)

This paper presents a bibliometric analysis of the literature in the area of corporate sustainability disclosure, with the effort to answer the following research questions (RQ): RQ1: What is the evolutionary trend of knowledge in the field of corporate sustainability disclosure? RQ2: What are the most popular subject categories in corporate sustainability disclosure studies? RQ3: What are the most active source in corporate sustainability disclosure research? RQ4: What are the hotspots/main? Keywords and term co-occurrence in the field of corporate sustainability disclosure? RQ5: Which countries and institutions contribute most in corporate sustainability disclosure research? RQ6: Who are the most productive authors and co-authorship network in the field of corporate sustainability disclosure? RQ7: What are the citation information in the field of corporate sustainability disclosure?

To enable the researchers answer the research question outlined, the paper is structured as follows; this section provides the background and the rationale for conducting the bibliometric analysis. The second section presents the methodological approach for the current analysis. The third

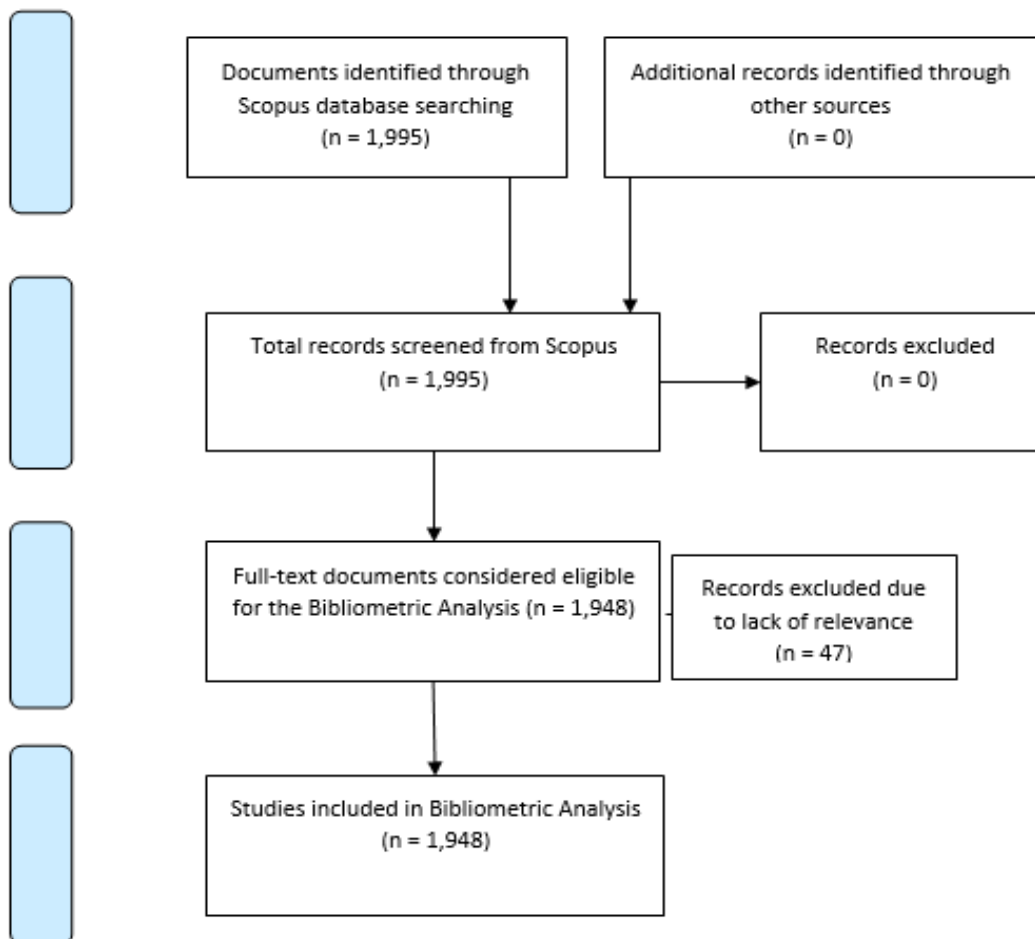
section discusses the result from the analysis. The final section presents conclusion and limitation of the analysis.

2. Methodology

This section provides detailed explanation on the source and nature of data used in the current analysis as well as the methodological approach in data analysis.

Data Collection

Figure 1- PRISMA Flow Diagram (Moher, Liberati, Tetzlaff, Altman, & Group, 2009)



In order to draw a comprehensive view of the literature related to corporate sustainability disclosure research, the Scopus database is selected as data depository, from which all documents related to this analysis is extracted. Scopus is considered as one of the prominent database with distinct indexing mechanism (de Winter, Zadpoor, & Dodou, 2014). The Scopus database has a

broader coverage of research materials in the area of economics and social science (Hallinger & Kovačević, 2019; Martín-martín, Orduna-malea, Delgado, València, & Martín-martín, 2018; Vieira & Gomes, 2009). The search query was applied in the Scopus database on 7th June 2020. An initial search produced a total of 1,995 as shown in Figure 1, in which the result is obtained from research protocol outlined in Table 1. However, a total of 1,948 document are considered eligible for the analysis, after excluding 47 less relevant documents comprising book series and trade journals.

Table 1 - Research Protocol

Criteria	Protocol Description
Database	Scopus
Search Phrases	sustainability reporting, voluntary disclosure, integrated reporting, ESG re- porting, social disclosure, environmental disclosure, CSR disclosure and disclosure compliance
Boolean Operator	OR between groups
Search String	("sustainability reporting" OR "voluntary disclosure" OR "integrated reporting" OR "ESG reporting" OR "social disclosure" OR "environmental disclosure" OR "CSR disclosure" OR "disclosure compliance") AND (EXCLUDE (SRCTYPE, "k") OR EXCLUDE (SRCTYPE, "d"))
Text Location	Article Title
Language	All

Bibliometric Analysis Methods

The current bibliometric analysis involves a quantitative analysis of scholarly materials and citation information related to documents obtained from the Scopus database as shown in Figure 1. For the purpose of the current study, the data obtained from the search results are exported in CSV and RIS file format. The analysis tools use in this analysis includes Harzing's publish or perish, VOSviewer and Microsoft Excel applications. The Harzing's publish or perish is used to obtain citation information and other impact matrices which include the h-index and g-index. The VOSviewer application is used to generate the visualization map of author keywords, co-authorship and term co-occurrence network.

3. Results

a. Evolution and Features of Published Studies

To answer the first research question (RQ1: what is the evolutionary trend of knowledge in the field of corporate sustainability disclosure?), this study analyses the trend in knowledge development in the field of corporate sustainability disclosure. A total number of 1,948 documents

were published in the Scopus database between 1974 to 2020 (see Figure 2), out of which 937 articles (representing 48.10%) are published in the last five years as presented in Table 2. This signifies recent growth in sustainability reporting research. The highest number of cited documents of 174 was recorded in the 2018. However, year 2002 is the year with the highest citation count (i.e. 4,885). The highest records of *h* and *g* indexes were recorded in the year 2013. Additionally, the distribution in Table 3 shows that journal articles are the most published documents, constituting 82.19% of total documents under review with 142 documents are conference papers, followed by 106 book chapters and 99 review papers.

Table 2 - Year of Publications

Year	Total Publication	Percentage (%)	Cumm. %	NCP	TC	C/P	C/CP	h	g
1974	1	0.05	0.05	0	0	0	0	0	0
1979	1	0.05	0.10	1	246	246.00	246.00	1	1
1982	1	0.05	0.15	1	487	487.00	487.00	1	1
1984	2	0.10	0.26	1	29	14.50	29.00	1	2
1988	2	0.10	0.36	2	41	20.50	20.50	2	2
1989	2	0.10	0.46	2	161	80.50	80.50	2	2
1990	1	0.05	0.51	1	301	301.00	301.00	1	1
1991	6	0.31	0.82	6	893	148.83	148.83	6	6
1992	3	0.15	0.98	3	781	260.33	260.33	3	3
1993	4	0.21	1.18	3	196	49.00	65.33	2	4
1994	6	0.31	1.49	5	766	127.67	153.20	5	6
1995	9	0.46	1.95	4	320	35.56	80.00	2	9
1996	14	0.72	2.67	11	2583	184.50	234.82	8	14
1997	9	0.46	3.13	8	363	40.33	45.38	6	9
1998	11	0.56	3.70	11	1296	117.82	117.82	10	11
1999	13	0.67	4.36	12	1874	144.15	156.17	9	13
2000	15	0.77	5.13	15	1599	106.60	106.60	11	15
2001	14	0.72	5.85	14	1883	134.50	134.50	10	14
2002	26	1.33	7.19	25	4885	187.88	195.40	20	26
2003	24	1.23	8.42	22	2178	90.75	99.00	16	24
2004	32	1.64	10.06	28	1920	60.00	68.57	18	32
2005	28	1.44	11.50	22	1931	68.96	87.77	16	28
2006	45	2.31	13.81	42	3077	68.38	73.26	22	45
2007	34	1.75	15.55	32	2550	75.00	79.69	20	34
2008	52	2.67	18.22	46	3715	71.44	80.76	24	52
2009	45	2.31	20.53	39	1828	40.62	46.87	20	42
2010	87	4.47	25.00	74	3235	37.18	43.72	32	56
2011	72	3.70	28.70	60	2956	41.06	49.27	27	54
2012	61	3.13	31.83	55	1630	26.72	29.64	22	39
2013	107	5.49	37.32	91	3102	28.99	34.09	29	54
2014	136	6.98	44.30	117	2944	21.65	25.16	29	52
2015	148	7.60	51.90	126	148	22.09	25.95	33	52
2016	147	7.55	59.45	123	2464	16.76	20.03	28	44
2017	171	8.78	68.22	136	1761	10.30	12.95	23	34
2018	215	11.04	79.26	174	1297	6.03	7.45	16	23
2019	258	13.24	92.51	150	593	2.30	3.95	10	14
2020	146	7.49	100.00	43	43	0.29	3.04	3	3
Total	1948	100.00							

Notes: TP=total number of publications; NCP=number of cited publications; TC=total citations; C/P=average citations per publication; C/CP=average citations per cited publication; h=h-index; and g=g-index.

Figure 2 - Number of Publications per Year

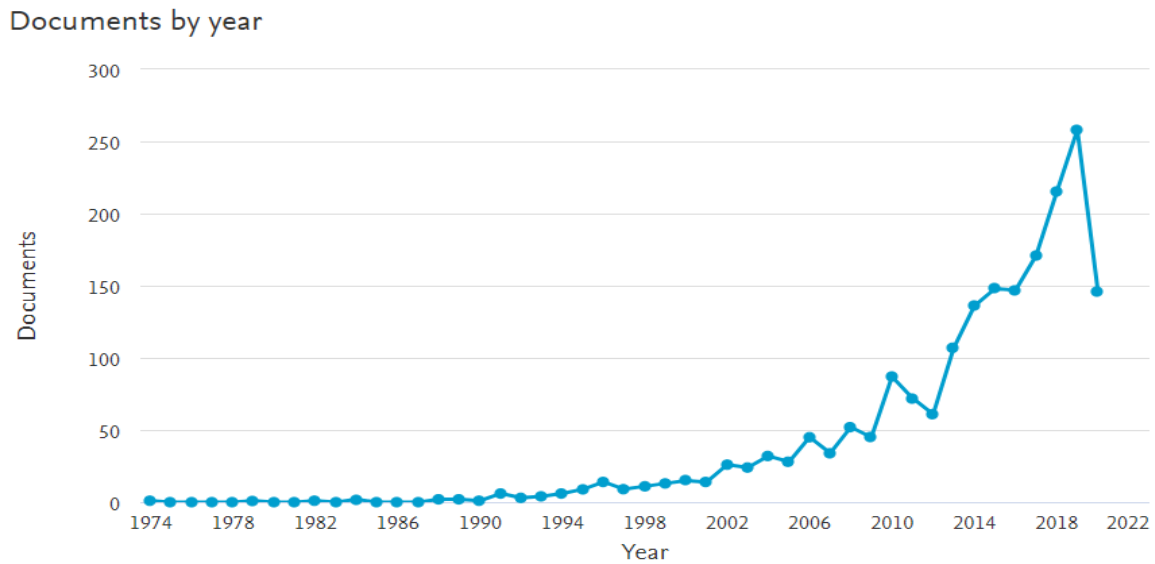


Table 3 - Document Type

Document Type	Total Publications (TP)	Percentage (%)
Article	1601	82.19
Conference Paper	142	7.29
Book Chapter	106	5.44
Review	99	5.08
Total	1948	100

English is considered to be the most common language, representing 97.55% of the published documents under analysis (see Table 4). Sixteen documents have been published in Portuguese and other publications are published in Spanish, German, French, Chinese, Afrikaans, Czech and Romanian. Additionally, 8 documents are published in dual languages.

Table 4 - Languages Used for Publications

Language	Total Publications (TP)*	Percentage (%)
English	1908	97.55
Portuguese	16	0.82
Spanish	14	0.72
German	9	0.46
French	4	0.20
Chinese	2	0.10
Afrikaans	1	0.05
Czech	1	0.05
Romanian	1	0.05
Total	1956	100

*Eight documents have been prepared in dual languages

b. Subject Area

For the purpose of answering the second research question, (RQ2: What are the most popular subject categories in corporate sustainability disclosure studies?) the current paper categories publications into field of sustainability disclosure based on subject areas. The most common subjects categories as shown in Table 5, include Business, Management and Accounting (1423 documents, representing 37.24% of total records); Economics, Econometrics and Finance (702 documents, 18.37%); Social Sciences (597 documents, 15.62%); Environmental Science (353 documents, 9.24%); Energy (174 documents, 4.55%); Engineering (134 documents, 3.51%); Decision Sciences (107 documents, 2.80%); Computer Science (87 documents, 2.28%); Arts and Humanities (76 documents, 1.99%); Medicine (44 documents, 1.15%). Other contributing fields include earth and planetary sciences, mathematics, psychology, agricultural and biological sciences and physics and astronomy.

Table 5 - Most Popular Subject Area

Subject Area	Total Publications (TP)	Percentage (%)
Business, Management and Accounting	1423	37.24
Economics, Econometrics and Finance	702	18.37
Social Sciences	597	15.62
Environmental Science	353	9.24
Energy	174	4.55
Engineering	134	3.51
Decision Sciences	107	2.80
Computer Science	87	2.28
Arts and Humanities	76	1.99
Medicine	44	1.15
Earth and Planetary Sciences	34	0.89
Mathematics	19	0.50
Psychology	17	0.44
Agricultural and Biological Sciences	15	0.39
Physics and Astronomy	6	0.16
Biochemistry, Genetics and Molecular Biology	5	0.13
Health Professions	5	0.13
Nursing	5	0.13
Chemical Engineering	4	0.10
Chemistry	4	0.10

c. Most Active Source Titles

This study further presents the most active source of documents in the field of corporate sustainability disclosure. The information is presented to answer the third research question (RQ3: what are most active source in corporate sustainability disclosure research?). The ranking related to these sources is presented in Table 6, included in the table is the publishers and other citation index. Top on the list are Business Strategy and The Environment (54 publications), Sustainability Switzerland (46 publications) and Journal of Business Ethics (42 publications). The Accounting, Auditing and Accountability Journal recorded the highest number of citation of 2902. Moreover, the journal of Business Strategy and The Environment has the highest h (27) and g (50) indexes accordingly.

Table 6 - Most Active Source Title

Source Title	TP	TC	C/P	Publisher	Cite Score	SJR 2018	SNIP 2018	Quartile	h	g
Business Strategy And The Environment	54	2579	47.76	Wiley-Blackwell	7.93	2.166	2.488	Q1	27	50
Sustainability Switzerland	46	333	7.24	Multidisciplinary Digital Publishing Institute (MDPI)	3.01	0.549	1.169	Q2	9	16
Journal Of Business Ethics	42	2398	57.10	Springer Nature	4.46	1.860	2.006	Q1	24	42
Accounting Auditing And Accountability Journal	41	2902	70.78	Emerald	3.90	1.456	1.563	Q1	26	41
Corporate Social Responsibility And Environmental Management	38	1765	46.45	Wiley-Blackwell	7.18	1.670	2.372	Q1	19	38
Journal Of Cleaner Production	37	2673	72.24	Elsevier	7.32	1.620	2.308	Q1	22	37
Social Responsibility Journal	35	437	12.49	Emerald	1.93	0.432	0.763	Q1	13	19
Sustainability Accounting Management And Policy Journal	32	622	19.44	Emerald	2.89	0.778	0.946	Q1	14	24
Corporate Ownership And Control	28	164	5.86	Virtus Interpress	0.11	0.155	0.307	Q3	5	12
Meditari Accountancy Research	25	532	21.28	Emerald	3.73	1.1795	0.903	Q1	12	23

Notes: TP=total number of publications; TC=total citations;

d. Keywords and Text Analysis

Hotspots Keywords Analysis

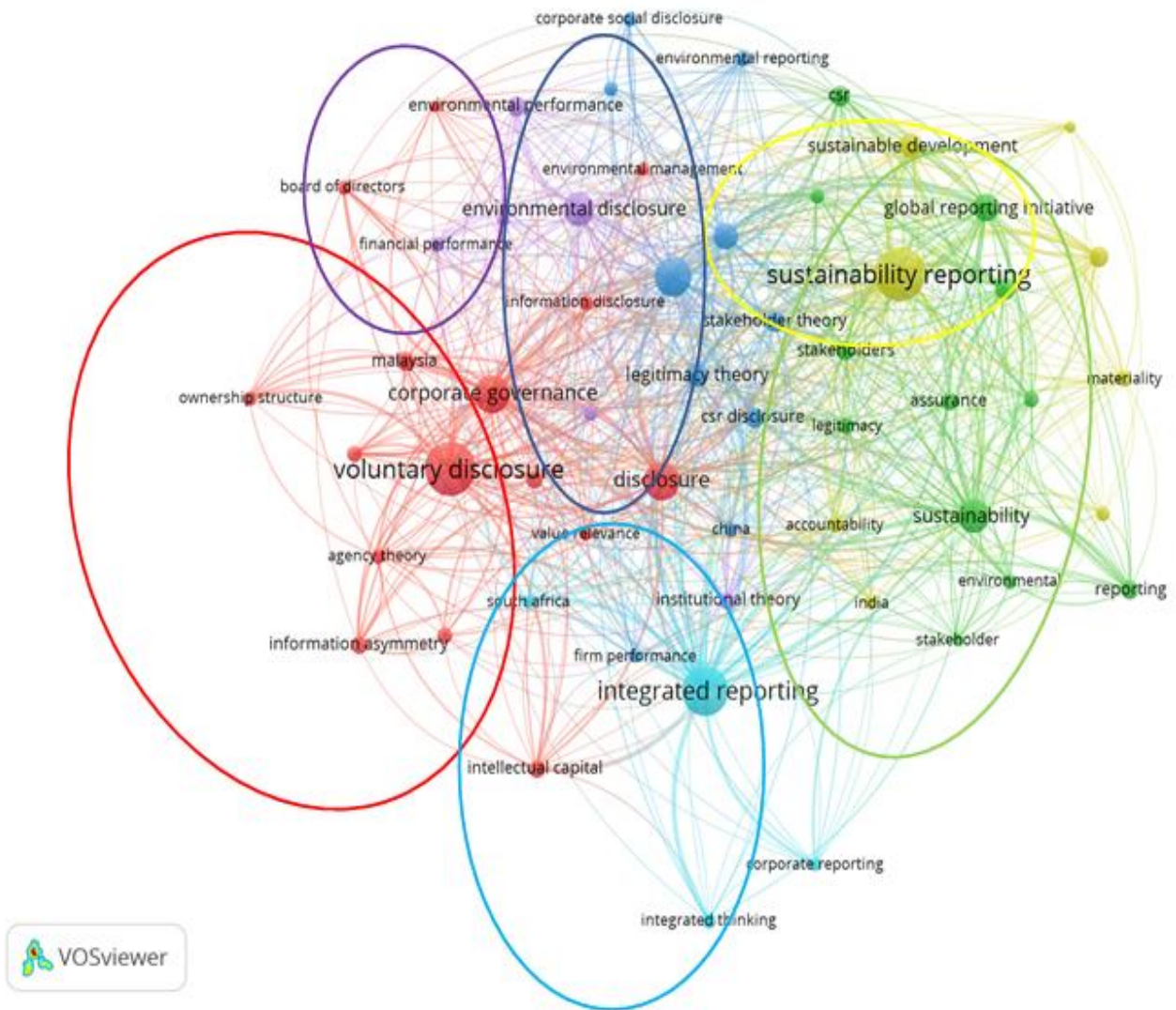
To answer research question four, (RQ4: What are the hotspots keywords and term co-occurrence in the field of corporate sustainability disclosure?) keywords such as sustainability reporting (315 publications), voluntary disclosure (263 publications), integrated reporting (226 publications), sustainable development (183 publications) and sustainability (175 publications) are found as the most frequently used keywords in sustainability disclosure research (see Table 7). Furthermore, the network visualisation of keywords used by authors in sustainability disclosure studies is mapped out using VOSviewer (see Figure 3). The line in the figure represent the link between various keywords.

Moreover, Figure 3 shows six distinct keywords clusters were identified in sustainability disclosure research. The first cluster indicated by red colour, comprises of voluntary disclosure, corporate governance, voluntary disclosure, intellectual capital, board of directors and ownership structure among other keywords. The second cluster labelled in sky blue colour indicates keywords such as integrated reporting, integrated thinking, and corporate reporting. Furthermore, keywords such as sustainability, reporting, global reporting initiative, legitimacy, stakeholder and environmental, can be observed in the third group with green label. The fourth group indicated by yellow colour comprises of sustainability, sustainable development and materiality. The final cluster displayed in purple colour comprise of keywords such as environmental performance, environmental disclosure and financial performance.

Table 7 - Top Fifteen Keywords

Author Keywords	Total Publications (TP)	Percentage (%)
Sustainability Reporting	315	13.87
Voluntary Disclosure	263	11.58
Integrated Reporting	226	9.95
Sustainable Development	183	8.06
Sustainability	175	7.71
Corporate Social Responsibility	162	7.13
Disclosure	137	6.03
Corporate Governance	133	5.86
Environmental Disclosure	110	4.84
Global Reporting Initiative	86	3.79
Content Analysis	73	3.21
Stakeholder	61	2.69
Legitimacy Theory	49	2.16
Environmental Management	46	2.03
Environmental Performance	46	2.03

Figure 3 - Network Visualization Map of the Author Keywords (Minimum Number of Occurrence = 15)



It is obviously interesting to examine the evolutionary trend of word cloud in the sustainability disclosure literature especially from the late 1990s, in which Figure 4 presents the word cloud of the more prominent keywords. The word in large font indicating the most frequent words used in past studies. The keyword voluntary reporting is the most predominant area in sustainability disclosure research from 1974 to 1985. Additionally, between 1986 and 1997 environmental also became a more frequent keyword used by researchers in the field of corporate sustainability disclosure. The word sustainability is mostly included in keywords between the years 1998 to 2009. Finally, integrated reporting and evidence-based research are currently considered as the most frequently used keywords.

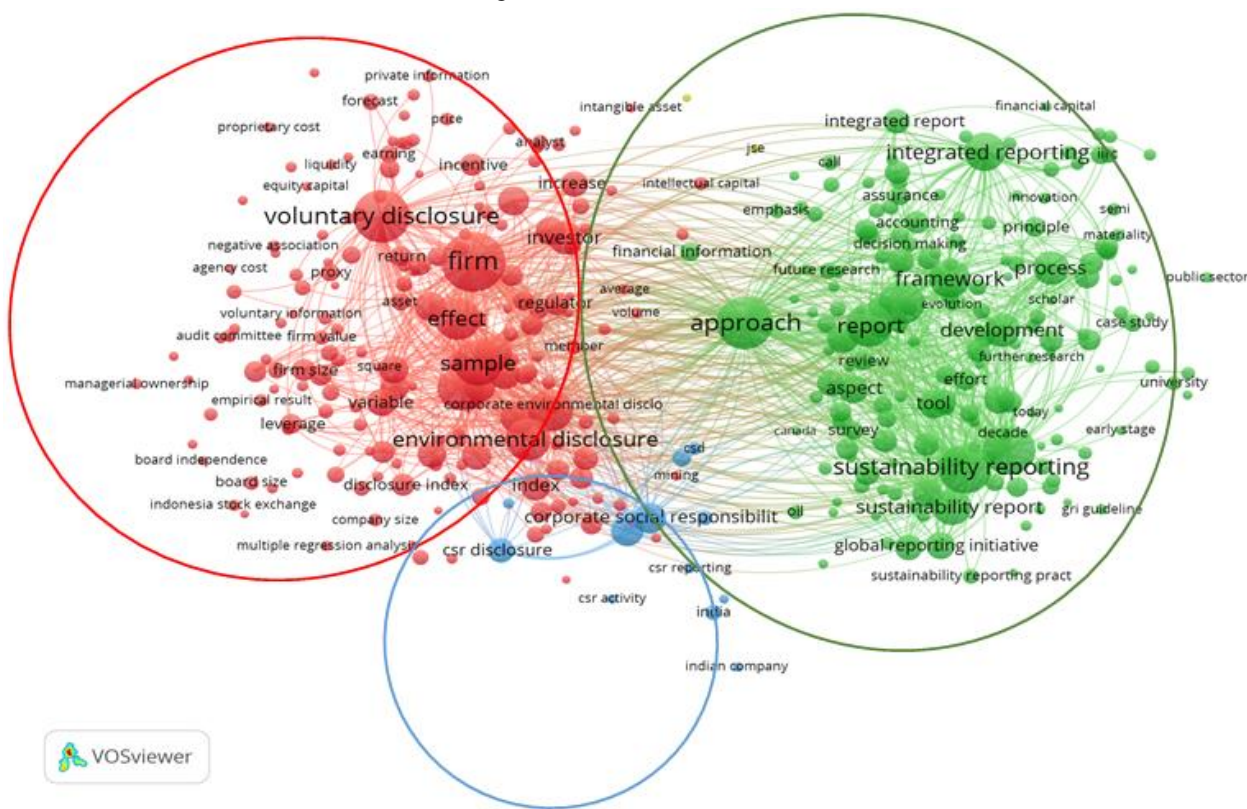
Figure 4 - The Evolution of the “Word Cloud” in Sustainability Disclosure Literature, 1974-2020



Title and Abstract Analysis

This paper also explores the term co-occurrences that appear in title and abstract of documents gathered. The co-occurrence network is presented using the binary counting. The binary counting is used in constructing the co-occurrence map, this implies that the frequency at which a noun phrase appears in the titles and abstracts plays no role in the selection process (Van Eck & Waltman, 2014). Based on Figure 5, we found that the title and abstract in corporate sustainability disclosure research can be classified into 3 broad clusters. The first cluster represented by red colour shows voluntary disclosure as the central point that connects a number of subject areas. On the other hand, CSR emerges as the most prevailing word in the second cluster (blue colour). While the final cluster represented by green colour shows that sustainability and integrated reporting as the focal point in the category.

Figure 5 - VOSviewer Visualization of a Term Co-occurrence Network based on Title and Abstract Fields (Binary Counting of Minimum of 15 Occurrence)



e. Geographical Distribution of Publications

Countries Contributed to the Publications

To address the fifth research question (RQ5: Which countries and institutions contribute most in corporate sustainability disclosure research?). This paper evaluated top fifteen countries and institutions that contributed tremendously to the development in the field of corporate sustainability disclosure research. Generally, a total of 89 countries were featured in the current analysis based on the search result. However, Table 8 shows the United States as the country with the highest publications (355 documents) and total citations (15,639). Australia is the second country with the highest publications (231) and overall citations (11,922). UK had the third highest publications (227) and total citations (9,804). Other contributing countries include; Italy (150 documents), Malaysia (113 documents), Canada (103 documents), Germany (102 documents), Spain (102 documents), Indonesia (84 documents) and China (71 documents). Similarly, considering the *h* and *g* indexes, United States (*h*=62 and *g*=120), Australia (*h*=53 and *g*=106) and United Kingdom (*h*=51 and *g*=97)

also play a leading role. However, Canada and Australia hold the highest average citation per publication of 55.42 and 51.61 respectively.

Table 8 - Top Fifteen Countries Contributed to the Publications

Country	TP	NCP	TC	C/P	C/CP	<i>h</i>	<i>g</i>
United States	355	300	15639	44.18	52.13	62	120
Australia	231	206	11922	51.61	57.87	53	106
United Kingdom	227	184	9894	43.59	53.77	51	97
Italy	150	119	2648	17.65	22.25	26	48
Malaysia	113	69	1446	12.80	20.96	20	37
Canada	103	86	5708	55.42	66.37	32	75
Germany	102	82	2121	20.79	25.87	24	44
Spain	102	92	2736	26.82	29.74	29	50
Indonesia	84	32	310	3.69	9.69	8	17
China	71	46	781	11.00	16.98	14	27
New Zealand	69	61	4736	71.76	77.64	29	66
South Africa	59	47	1128	19.12	24.00	17	33
France	53	44	1175	22.17	26.70	17	33
India	46	30	211	4.59	7.03	7	13
Brazil	42	22	294	7.00	13.36	8	17

Notes: TP=total number of publications; NCP=number of cited publications; TC=total citations; C/P=average citations per publication; C/CP=average citations per cited publication; *h*=*h*-index; and *g*=*g*-index.

Most Influential Institutions

As presented in Table 9, Macquarie University, Australia tops the list of most influential institutions with 27 publications. Followed by Universiti Teknologi Mara, Malaysia (26 publications) and Illinois State University, USA with (23). Four institutions from Australia were ranked 4th, 5th, 6th, and 7th on the list. Both Universiti Utara Malaysia and Universiteit van Pretoria, South Africa published 18 documents each to emerge as the 8th position. Moreover, institutions with the highest citations include, Illinois State University (3471), Concordia University (2129) and RMIT University (2067). Similarly, Illinois State University tops the list in the average citation per publication and citation per cited paper with an average of 150.91. In terms of influence level, Monash University is ranked highest with an *h*-index of 16 and Macquarie University is ranked first with *g*-index of 25.

Table 9 - Most Influential Institutions with Minimum of Fifteen Publications

Affiliation	Country	TP	NCP	TC	C/P	C/CP	<i>h</i>	<i>g</i>
Macquarie University	Australia	27	23	633	23.44	27.52	10	25
Universiti Teknologi Mara	Malaysia	26	17	253	9.73	14.88	8	15
Illinois State University	United States	23	23	3471	150.91	150.91	15	23
Monash University	Australia	22	20	1270	57.73	63.50	16	22
The University of Sydney	Australia	22	20	1197	54.41	59.85	15	22
RMIT University	Australia	20	18	2067	103.35	114.83	9	20
University of New South Wales UNSW Australia	Australia	20	18	1163	58.15	64.61	12	20
Universiti Utara Malaysia	Malaysia	18	12	122	6.78	10.17	3	11
Universiteit van Pretoria	South Africa	18	17	658	36.56	38.71	10	18
University of Auckland	New Zealand	17	16	541	31.82	33.81	10	17
Deakin University	Australia	16	15	464	29.00	30.93	10	16
Alma Mater Studiorum Università di Bologna	Italy	16	17	689	43.06	45.93	11	16
Concordia University	Canada	16	16	2129	133.06	133.06	12	16
La Trobe University	Australia	15	14	727	48.47	51.93	13	15
International Islamic University Malaysia	Malaysia	15	15	480	32.00	32.00	12	15

Notes: TP=total number of publications; NCP=number of cited publications; TC=total citations; C/P=average citations per publication; C/CP=average citations per cited publication; *h*=*h*-index; and *g*=*g*-index.

f. Authorship and Co-authorship Analysis

Most Productive Authors

To address the research question six (RQ6: Who are the most productive authors and co-authorship network in the field of corporate sustainability disclosure?), this paper presents the most productive authors and co-authorship in the field of CSD research. Table 10 depicts the CSD authors, total publication, citation information, *h* and *g* index accordingly. Considering contribution in terms number of publication, Patten, D.M. affiliated with the Illinois State University has the highest number of publication in the field of CSD based on Scopus index, with a total of 25 publications (to mention a few most popular; Patten, 2015; Sankara et al., 2019). Cornier, D. affiliated with École des sciences de la gestion is the runner up, contributing 14 articles to the field (Cormier et al., 2018;

Gomez-Gutierrez & Cormier, 2018). Cho, C.H. of York University and de Villiers, C. of University of Auckland Business School are tied for third contributing 13 documents (Cho et al., 2016; Rivière-Giordano et al., 2018).

In terms of number of citation (TC) and average citation per publication (C/P), Patten, D. M. equally leads with 4095 citations and C/P of 163.80. Followed by Cho, C. H. cited 1515 times and C/P of 116.54, and Magnan M. affiliated with Concordia University cited 1239 times and C/P of 112.64. Considering the extent of research impact, Patten, D. M. has the highest *h*-index (16) and *g*-index (25), followed by Cho, C. H. (10 *h*-index) and Cornier, D (14 *g*-index) respectively.

Table 10 - Most Productive Authors

Author's Name	Affiliation	Country	TP	NCP	TC	C/P	C/CP	<i>h</i>	<i>g</i>
Patten, D.M.	Illinois State University	United States	25	25	4095	163.80	163.80	16	25
Cormier, D.	École des sciences de la gestion	Canada	14	13	1200	85.71	92.31	8	14
Cho, C.H.	York University	Canada	13	13	1515	116.54	116.54	10	13
de Villiers, C.	University of Auckland Business School	New Zealand	13	13	746	57.38	57.38	9	13
Dumay, J.	Macquarie University	Australia	12	12	444	37.00	37.00	7	12
Hussainey, K.	University of Portsmouth	United Kingdom	12	11	283	23.58	25.73	6	12
Uyar, A.	La Rochelle Business School	France	12	8	170	14.17	21.25	5	12
Magnan, M.	Concordia University	Canada	11	11	1239	112.64	112.64	9	11
Guthrie, J.	Macquarie University	Australia	10	9	710	71.00	78.89	8	10
Maroun, W.	University of Witwatersrand	South Africa	10	8	213	21.30	26.63	6	10

Notes: TP=total number of publications; NCP=number of cited publications; TC=total citations; C/P=average citations per publication; C/CP=average citations per cited publication; *h*=*h*-index; and *g*=*g*-index.

Table 11 shows the distribution of total publications in CSD based on the number of authors. A total of 390 (20.02%) publications were single-authored documents, while approximately 80% of publications were co-authored. The largest number of publications of 691 documents (35.47%), is being authored by two researchers. 556 (28.54%) documents published by 3 authors, 235 (12.06%)

documents published by 4 authors, 37 (1.90%) documents published by 5 authors, 15 (0.77%) documents published by 6 authors, and 16 (0.81%) documents are published by authors between 7 to 18.

Table 11 - Number of Author(s) per Document

Author Count	Total Publications (TP)	Percentage (%)
1	390	20.02
2	691	35.47
3	556	28.54
4	235	12.06
5	37	1.90
6	15	0.77
7	7	0.36
8	1	0.05
9	3	0.15
10	2	0.10
11	1	0.05
12	1	0.05
18	1	0.05
0*	8	0.41
Total	1948	100.00

*Conference review document. No author is listed

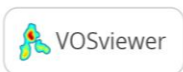
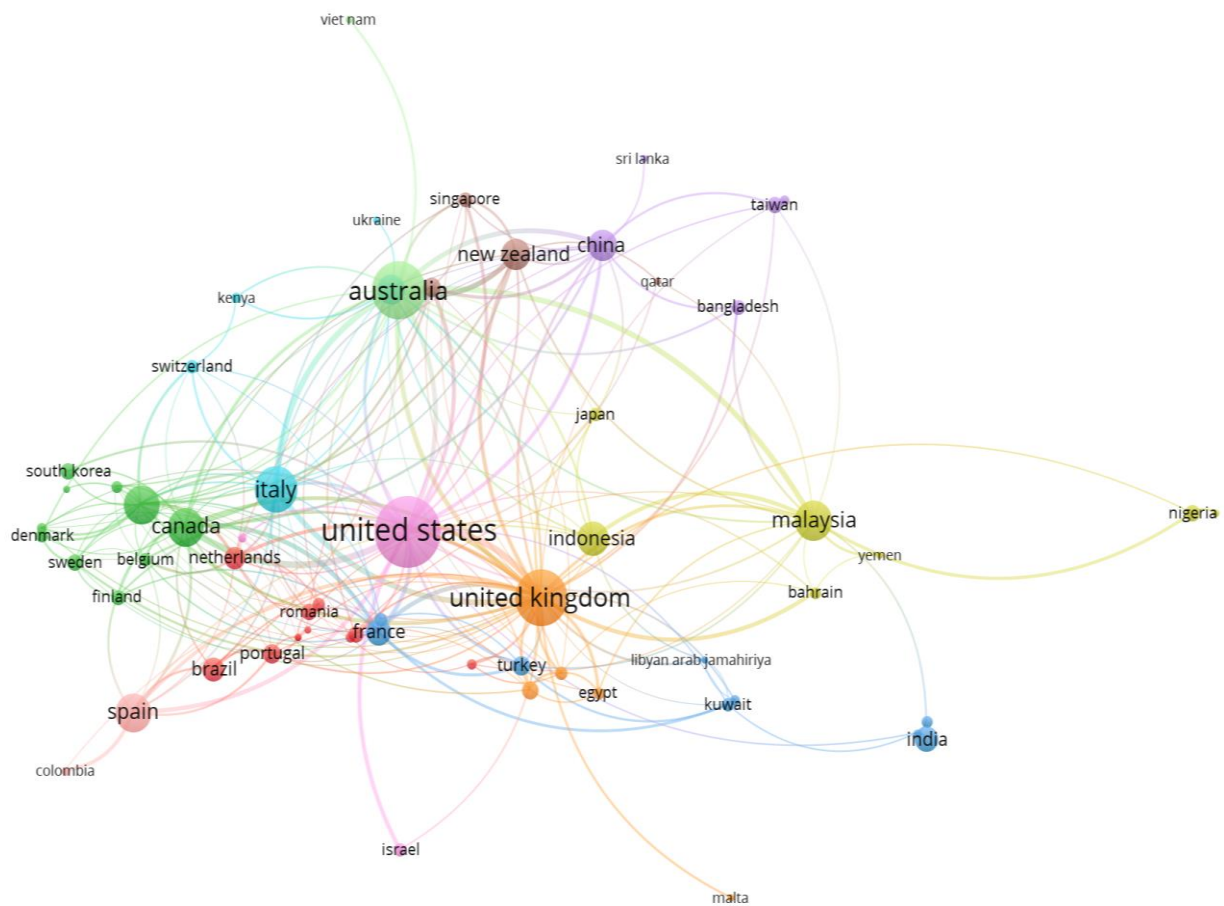
Visualization Map of Co-AUTHORSHIP

Figure 6 shows collaboration in corporate sustainability disclosure research. The output displays the countries with at least 3 publications and not less than 5 total citation. Findings show that most collaboration in CSD research come from the United States, United Kingdom, Australia, Canada, Italy, Malaysia, Spain, and China. These countries have equally contributed significantly to this body of knowledge in terms of number of publications. However, Germany was the first country to publish a research on CSD in Scopus indexed (Krasemann, 1974). Subsequently, USA has established close cooperation with most countries with high CSD research connections, and USA based articles has been published since year 1982 (Wiseman, 1982). The United Kingdom also has close research connections with countries such as USA, Indonesia and Turkey.

Figure 7 present the bibliometric coupling of co-authorship in CSD research. The threshold for the coupling is based on at least 3 authors with a minimum of 5 citations. Global research

collaboration provide knowledge sharing opportunity between researchers in developed countries with those in emerging and developing countries (Palacios-Callender & Roberts, 2018). Based on the output of the VOSviewer shows that Patten D.M. as the author with the highest collaboration with other researchers. The circle of network in red colour shows Cho C.H. has a group authors. Similarly, the research collaboration in dark blue colour indicates a joint authorship of three researchers, namely; Higgins C. Stubbs W. and Tweedie D. Moreover, the network equally indicates that the collaboration network in blue colour between Gray R. and Milne M. J. has contributed to the field of CSD.

Figure 6 - Network Visualization Map of the Co-authorship

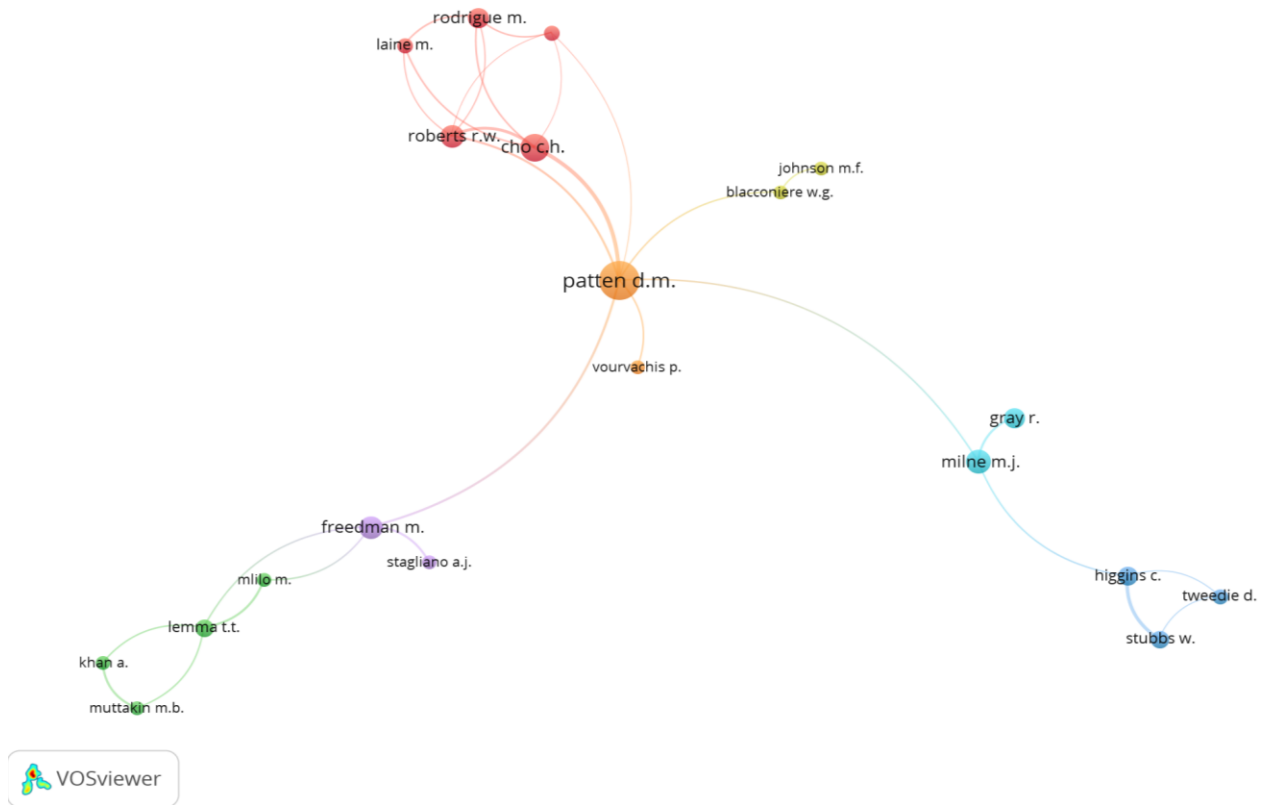


Unit of analysis = Countries

Minimum number of documents of a country = 3

Minimum number of citations of a country = 5

Figure 7 - Network Visualization Map of the Co-authorship



Unit of analysis = Authors

Minimum number of documents of an author = 3

Minimum number of citations of an author = 5

g. Citation Analysis

Highly Cited Articles

Table 12 presents the summary of citation metrics for the 1948 documents in the field of CSD, retrieved from Scopus database dated 7th June 2020. As shown below, a total of 59,198 citations were recorded between the period of 1974 and 2020. The average citation per year is approximately 1,287 with citation per paper of 30.39. However, the influential factors indicated by *h* and *g* indexes are 122 and 202 respectively. Specifically, Table 13 provide the list of highly cited articles in CSD research. The work of Deegan (2002) entitled “Introduction: The legitimising effect of social and environmental disclosures - a theoretical foundation” recorded the highest number of citations (1151 citations and average of 64 cites a year). This is followed by the article of Clarkson, Li, Richardson, & Vasvari (2008) entitled “Revisiting the relation between environmental performance and

environmental disclosure: An empirical analysis” with 931 citation and average cites per year of 77.58. In third position is the work of Hackston & Milne (1996) titled “Some determinants of social and environmental disclosures in New Zealand companies” which recorder 894 citations and 37.33. However, Table 13 also established the dominance of the *Journal of Accounting, Auditing & Accountability Journal* in the field of CSD, with 6 out of 15 top cited articles were published in the journal.

Table 12 - Citations Metrics

Metrics	Data
Publication years	1974-2020
Citation years	47 (1974-2020)
Papers	1948
Citations	59198
Citations/year	1286.91
Citations/paper	30.39
Citations/author	32141
Papers/author	919.43
h-index	122
g-index	202

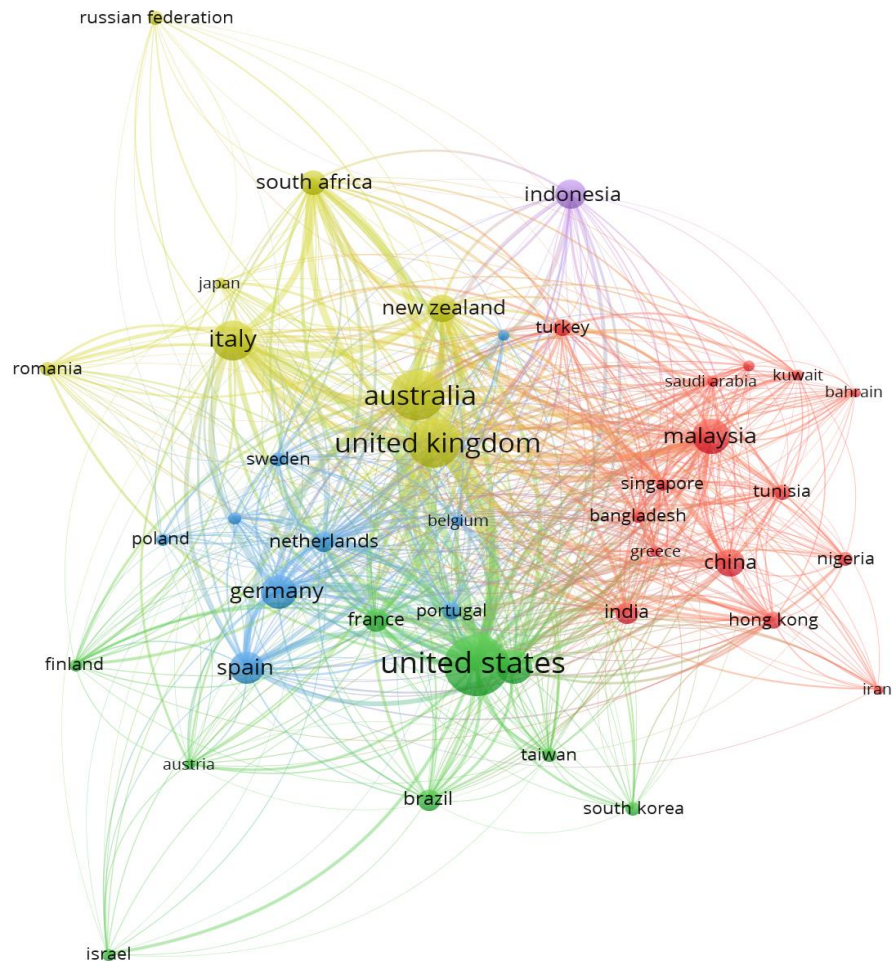
Table 13 - Highly Cited Articles

No.	Authors	Title	Year	Journal	Cites	Cites per Year
1	C. Deegan	Introduction: The legitimising effect of social and environmental disclosures - a theoretical foundation	2002	Accounting, Auditing & Accountability Journal	1151	63.94
2	P.M. Clarkson, Y. Li, G.D. Richardson, F.P. Vasvari	Revisiting the relation between environmental performance and environmental disclosure: An empirical analysis	2008	Accounting, Organizations and Society	931	77.58
3	D. Hackston, M.J. Milne	Some determinants of social and environmental disclosures in New Zealand companies	1996	Accounting, Auditing & Accountability Journal	896	37.33
4	D. Neu, H. Warsame, K. Pedwell	Managing Public Impressions: Environmental Disclosures in Annual Reports	1998	Accounting, Organizations and Society	831	37.77
5	L.L. Eng, Y.T. Mak	Corporate governance and voluntary disclosure	2003	Journal of Accounting and Public Policy	806	47.41
6	S.A. Al-Tuwaijri, T.E. Christensen, K.E. Hughes II	The relations among environmental disclosure, environmental performance, and economic performance: A simultaneous equations approach	2004	Accounting, Organizations and Society	760	47.5
7	C. Deegan, B. Gordon	A study of the environmental disclosure practices of Australian corporations	1996	Accounting and Business Research	710	29.58
8	D.M. Patten	Intra-industry environmental disclosures in response to the Alaskan oil spill: A note on legitimacy theory	1992	Accounting, Organizations and Society	657	23.46
9	C.H. Cho, D.M. Patten	The role of environmental disclosures as tools of legitimacy: A research note	2007	Accounting, Organizations and Society	653	50.23
10	M.J. Milne, R.W. Adler	Exploring the reliability of social and environmental disclosures content analysis	1999	Accounting, Auditing & Accountability Journal	594	28.29
11	D.M. Patten	The relation between environmental performance and environmental disclosure: A research note	2002	Accounting, Organizations and Society	590	32.78
12	C. Deegan, M. Rankin	Do Australian companies report environmental news objectively? An analysis of environmental disclosures by firms prosecuted successfully by the Environmental Protection Authority	1996	Accounting, Auditing & Accountability Journal	551	22.96
13	G. O'Donovan	Environmental disclosures in the annual report: Extending the applicability and predictive power of legitimacy theory	2002	Accounting, Auditing & Accountability Journal	547	30.39
14	D.M. Patten	Exposure, legitimacy, and social disclosure	1991	Journal of Accounting and Public Policy	537	18.52
15	C. Deegan, M. Rankin, J. Tobin	An examination of the corporate social and environmental disclosures of BHP from 1983-1997: A test of legitimacy theory	2002	Accounting, Auditing & Accountability Journal	516	28.67

Visualisation Map of Citation by Countries and Documents

Figure 8 present the network visualization map for citation based on countries for documents published in the field of CSD. The map shows 5 clusters labelled with yellow, green, red, blue and purple colors. The yellow cluster is dominated by countries such United Kingdom, Australia and Italy. The greater part of the nodes represented by the green color, shows the United States as the country with the most citations. Moreover, the red cluster reveal high citation in document published in Malaysia and China. Other prominent countries in the blue citations cluster are Spain and Germany. The final cluster represented by purple color if dominated by Indonesia.

Figure 8 - Network Visualization Map of the Citation by Countries



Minimum number of documents of an author = 10

Minimum number of citations of an author = 5

4. Summary and Conclusion

This bibliometric analysis has documented the emergence and development in literature in the field of corporate sustainability disclosure. Taking Scopus database as the data depository. The analysis cover document volume, source title, abstract analysis, global coverage, institutional and author relevance, and citation impacts. Publication in the area of CSD literature has rapidly increase in the last decade with the most popular subject in the area of business, management and accounting, due to the influence of corporate disclosure on financial performance, firm value, board attributes and corporate strategy. The analysis found that majority of articles are published in top journals in the field, such as *Business Strategy and The Environment*, *Sustainability Switzerland* and *Journal of Business Ethics*. These journals are top in terms of citations and influential documents.

Based on the hotspot keywords cluster, the most frequently used author keywords in the corporate sustainability disclosure literature are: sustainability reporting, voluntary disclosure, integrated reporting, sustainable development and sustainability. Furthermore, findings on the geographical distribution of CSD domain shows majority of the article are authored in the United States, Australia and United Kingdom. The findings also reveal Macquarie University, Universiti Teknologi Mara and Illinois State University as the most influential institution that contribute to the knowledge in CSD. Moreover, in terms of top productive authors, the analysis acknowledge the tremendous contributions of Patten, Dennis M., Cormier, Denis, Cho, Charles H., Villiers, Charl De and Dumay, John to the field of CSD. The works of these scholars focus on integrated reporting, sustainability disclosure, business model and strategy disclosure, disclosure of social information, mandatory social disclosure, relevance of voluntary disclosure, and CSR disclosure.

The visualisation map of the co-authorship by country demonstrate collaborations of scholars across different clusters of nations. However, findings from the analysis reveal that most collaboration occur in the United States, United Kingdom, Australia, Canada, Italy, Malaysia, Spain and China. Our citation analysis highlights the most cited documents in CSD literature. The work Deegan (2002), Clarkson et al. (2008) and Hackston & Milne (1996) are the most cited articles in the CSD domain. Moreover, the visualisation map shows United States, United Kingdom, Australia, Italy, Malaysia and Indonesia as leading countries in terms of citations.

Although, this review has contributed to the field of CSD, however, it has some limitations. First, the Scopus is considered as a prominent database, especially in the field of social sciences and economics (Zheng & Kouwenberg, 2019). However, the current analysis is based on data from the

Scopus, as such, it may omit other relevant studies on the subject area. Moreover, the citation analysis provides an insight beyond the Scopus database. Second, the bibliometric approach focuses on hotspots and evolutionary trends. Hence, the analysis does not provide deeper information on theoretical framework, methodologies and findings of each research work.

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