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Humanus
Jurnal Ilmiah Ilmu-ilmu Humaniora
Published by *Pusat Kajian Humaniora* (Center for Humanities Studies)
FBS Universitas Negeri Padang, Indonesia

PRINTED ISSN 1410-8062
ONLINE ISSN 2928-3936
Vol. 21 No. 1, 2022
Page 41-67

Gender Equality in the Global Research Publication: The Bibliometric Review and Scientific Visualization

Gender Equality in the Global Research Publication: The Bibliometric Review and Scientific Visualization

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Submitted: 2021-12-16
Accepted: 2022-04-22
Published: 2022-04-23
DOI: 10.24036/humanus.v21i1.115645

Abstract

Despite the progress over the years, there are still many challenges to achieving basic human rights, namely “gender equality”. The language of “gender equality” was mobilized by feminists as a way to incorporate women's rights into the international development agenda. Using bibliometric analysis of scientific journal articles taken from the Scopus database, which totaled 504 journal articles, this study aims to document evidence of research activities in 2012-2021 in the Scopus database, and visualize it using VOSviewer and NVivo 12 plus software. The article reports on the publication and its citation structure, key trends, and its growing push toward co-authoring. This study also visualizes the most prominent topics and authors in the form of a network, using VOSviewer's bibliometric analysis and mapping of themes and their correlations using NVivo 12 plus. The novelty of this research is the composition of limitations in the Scopus database, as well as data processing using VOSviewer and NVivo 12 plus software. Further research, it is necessary to enrich the composition of limitations in the Scopus database, and compare it with the Web of Science database.

Keywords: *Gender equality, bibliometrics, Scopus, VOSviewer, NVivo 12 plus*

Abstrak

Terlepas dari kemajuan selama bertahun-tahun, masih banyak tantangan untuk mencapai hak asasi manusia yang mendasar, yakni “gender equality”. Bahasa “gender equality” dimobilisasi oleh kaum feminis sebagai cara untuk memasukkan hak-hak perempuan ke dalam agenda pembangunan internasional. Menggunakan analisis bibliometrik pada artikel jurnal ilmiah yang diambil dari database Scopus, yang kesemuanya berjumlah 504 artikel jurnal, penelitian ini bertujuan untuk mendokumentasikan bukti kegiatan penelitian pada tahun 2012-2021 dalam database Scopus, serta memvisualisasikannya menggunakan software VOSviewer dan NVivo 12 plus. Artikel tersebut melaporkan publikasi dan struktur kutipannya, tren utama, dan dorongannya yang meningkat menuju penulisan bersama. Penelitian ini juga memvisualisasikan topik serta penulis yang paling menonjol dalam bentuk jaringan,

dengan analisis bibliometrik VOSviewer serta pemetaan tema dan korelasinya menggunakan NVivo 12 plus. Novelty dari penelitian ini adalah komposisi limitasi pada database Scopus, serta pengolahan data yang menggunakan software VOSviewer dan NVivo 12 plus. Penelitian lanjutan, perlu untuk memperkaya komposisi limitasi dalam database Scopus, serta membandingkannya dengan database Web of Science.

Kata kunci: *Kesetaraan gender, bibliometrik, Scopus, VOSviewer, NVivo 12 plus*

Introduction

Despite the progress over the years, there are still many challenges to achieving basic human rights, namely "gender equality" (United Nations, 2015). The language of "gender equality" (including "women empowerment") was mobilized by feminists in the 1980s and 1990s as a way to incorporate women's rights into the international development agenda (Cornwall & Rivas, 2015). Peace Corps (2021) in Majumder et al. (2021), explained that gender as a term describes socially constructed roles and responsibilities, which are considered appropriate by different societies for men and women. Situations of discrimination and inequality, which are reflected in organizations, families, and society, must be transcended to achieve gender equality (Carvalho et al., 2018; Araújo-Vila et al., 2021). Furthermore, to be empowered, women must not only have the same capabilities (such as education and health) and equal access to resources and opportunities (such as land and jobs), but they must also have the agency to exercise rights, and capabilities over resources. these resources, and opportunities for making choices and strategic decisions (as provided through opportunities for leadership and participation in political institutions) (Araújo-Vila et al., 2021).

Gender equality is a major theme that is studied in various aspects. There are various aspects studied by scientific journal articles, in relation to gender equality, for example in agriculture (Alkire et al., 2013), policy (Ciccia & Verloo, 2012; Power, 2020), employment (Chung & van der Lippe, 2018; Craig & Churchill, 2021), development (Cornwall & Rivas, 2015), to aspects of education (Elihami et al., 2021). However, most of the studies conducted on "gender equality," are phenomenal studies and case studies, which at the same time show that research with a systematic review has not been done much on "gender equality". Usually, previous studies were conducted empirically through field data, using qualitative and quantitative approaches (Sulistyaningsih et al., 2021) as significant themes. In contrast to that, this study uses a systematic review with bibliometric analysis (meta-analysis), to evaluate the publication of scientific journal articles related to "gender equality," which can then be visualized in the form of bibliometric maps and other data. The journal articles were obtained from the Scopus database, where Scopus itself is the most accurate and largest multidisciplinary bibliometric database in the world (Chadegani et al., 2013; Franceschini et al., 2016; Tupan et al., 2018).

Several previous studies have examined bibliometric analysis on the topic of gender equality, but with different compositional limitations in the Scopus database. Research from Bendels et al. (2018) with the title "Gender disparities in high-quality dermatology research: a descriptive bibliometric study on scientific authorships," used the Gendermetrics Platform to analyze articles published in 23 Q1 quartile journals, in the period 2008-2017. The study entitled "Twenty-five years of Gender, Work and

Organization: A bibliometric analysis" oleh Kataria et al. (2021), seeks to see documentation of evidence of research activities carried out by the Journal of Gender, Work, and Organization (GWO) during the period 1994 to 2018 in the Scopus database, using Gephi and VOSviewer software. Meanwhile, research conducted by Araújo-Vila et al. (2021) with the title "Seeking Gender Equality in the Tourism Sector: A Systematic Bibliometric Review," focusing on the tourism sector in relation to gender equality in the period 1996-2021. In a study Ruggieri et al., (2021) entitled "An intersectional approach to analyse gender productivity and open access: a bibliometric analysis of the Italian National Research Council," where the research was conducted by analyzing articles published by the Web of Science database, in the period 2016-2018. The next research entitled "Measuring the Global Research Output and Visualization on Gender Equality: A Bibliometric Analysis" written by Majumder et al. (2021), aims to explore the bibliometric features of scientific production in the domain of gender studies for the period 2011-2020, using R Studio, MS Excel, and VOSviewer and without any limitations.

This research specifically aims to examine the trend of scientific publications in the study of gender equality over the last decade (2012-2020) and the dynamics of the structure of the network of researchers, institutions, and research areas in the study of gender equality. Bibliometric analysis was carried out by researchers with the publication of scientific articles in the Scopus database, and supported by data processing tools such as VOSviewer and NVivo 12 plus, to see research trends that have formed over the last 10 years. The use of bibliometric analysis is expected to be able to overcome research gaps involving the main actors, such as: authors, affiliations, as well as countries and research areas. In addition, this research is expected to provide information and global discourse from scientific publications that have been published in the last ten years related to "gender equality".

Furthermore, data in the form of scientific journal articles taken from the Scopus database, were limited first as the focus of analysis in research. The limitations in question, raised by the Scopus database, are:

> TITLE-ABS-KEY ("gender equality") AND (LIMIT-TO (OA, "all")) AND (LIMIT-TO (PUBYEAR,2021) OR LIMIT-TO (PUBYEAR, 2020) OR LIMIT-TO (PUBYEAR, 2019) OR LIMIT-TO (PUBYEAR, 2018) OR LIMIT-TO (PUBYEAR, 2017) OR LIMIT-TO (PUBYEAR, 2016) OR LIMIT-TO (PUBYEAR, 2015) OR LIMIT-TO (PUBYEAR, 2014) OR LIMIT-TO (PUBYEAR, 2013) OR LIMIT-TO (PUBYEAR, 2012) AND (LIMIT-TO (DOCTYPE, "ar")) AND (LIMIT-TO (SUBJAREA, "SOCI")) AND (LIMIT-TO (EXACTKEYWORD, "Gender Equality")) AND (LIMIT-TO (LANGUAGE, "English)) AND (LIMIT-TO (SRCTYPE, "j"))

As for the purpose of the limitations, as written above, namely;

1. Search keywords: *"Gender Equality"*
2. Types of open access available in the Scopus database; *All open access*
3. Year: *2012-2020*
4. Document type: *Article*
5. Subject Area: *Social Sciences*
6. Derivative keywords: *"Gender Equality"*
7. Language: *English*
8. Source type: *Journal*

Limitations made in searching the data in the Scopus database, as well as novelty and research gaps. This also applies to the composition of the data processor, namely the VOSviewer and NVivo 12 plus software used in this study.

Method

This study uses a mapping method (bibliometric analysis), which involves bibliographic data and is related to a collection of documents taken from each field of study (Garrigos-Simon et al., 2018). Bibliometric analysis can facilitate the mapping of large volumes of scientific literature (González-Torres et al., 2020). Bibliometric analysis with strict techniques ensures the quality of the information presented and the output produced (Fahimnia et al., 2015; Keathley-Herring et al., 2016; Tang et al., 2018). The reason the researcher uses the bibliometric method is that research studies with data are considered more relevant than subjective evaluations, and synopsis of subjective and critical scientific works can be obtained through traditional reviews. Therefore, the bibliometric method helps in obtaining scientific reviews (van Eck & Waltman, 2017). Furthermore, this study takes a collection of scientific documents exported from the Scopus database (which is owned by Elsevier), as one of the most important bibliographical databases (Niñerola et al., 2019). This study also uses analytical tools in the form of software VOSviewer and NVivo 12 plus, to visualize data networks (bibliometric maps) and relationships between study topics related to the research theme (Liao et al., 2018; Sulistyaningsih et al., 2021).

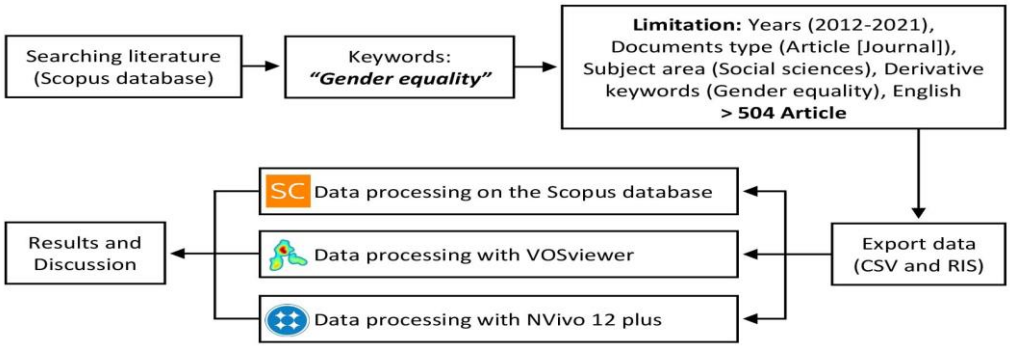


Figure 1. Analytical framework for "gender equality"

Researchers explored the Scopus database on December 11, 2021 to find journals and articles related to "Gender Equality". The bibliographic archive has a record of 11,914 documents, with a time span of 1982-2022 and consists of 28 disciplines (subject areas). The keyword "gender equality" is then limited by several kinds of filters, namely: selection of time range (2012-2021), type of document (journal article), subject area (social sciences), derived keywords (gender equality), and english, which was then obtained as many as 504 journal articles related to "gender equality". Furthermore, this data is then processed using VOSviewer software with keyword specifications to create mapping (Jeong & Koo, 2016), as well as NVivo 12 plus software with Auto Code, Cluster Analysis, and Word Frequency features to see the categorization and relationships between themes (Abbas et al., 2020), as well as the most dominant topics in the research development map (Amrutha & Geetha, 2020; Rossolatos, 2019).

Data analysis consisted of three stages, namely: analysis by browsing the Scopus database, processing data using VOSviewer software, and processing data using NVivo 12 plus software. In the first stage, bibliographic data that has been limited or filtered, such as; author, title, year of publication, name of publication source, author affiliation, keywords, and citation data (Hallinger & Suriyankietkaew, 2018), extracted into CSV and RIS formats for later processing using VOSviewer and NVivo 12 plus software. Furthermore, statistical analysis of metadata was identified by exploring the Scopus database under the "analyze search results" section, to obtain document publications by year; list of top authors, sources, affiliations, and countries; the most cited documents; and the SJR (Scimago Journal Rank) indicator (Herrera-Franco et al., 2020).

In the second stage, the elements of scientific publications that have been summarized in the bibliography (Montalván-Burbano et al., 2020), are then processed using VOSviewer software, where VOSviewer itself is software that focuses on graphical representation of bibliometric maps, which allows readers to easily easy to judge and interpret because of its large display function (Hockerts et al., 2018). Bibliometric map generation is intended for the construction, visualization, and evaluation of bibliometric networks, where the techniques applied include author citation analysis, co-authorship, and co-occurrence of keywords (Nobanee et al., 2021). Words in similar groups allow each group (cluster) with each color to be connected, which can further be analyzed by grouping (van Eck & Waltman, 2017).

In the third stage, the author uses the NVivo 12 plus software to classify study topics (themes), relationships between topics (Jaccard coefficient), to the most dominant word intensity (wordcloud) (Sulistyaningsih et al., 2021) in bibliographic documents about " gender equality". In classifying themes, the author uses the autocode feature, where this feature supports processing large volumes of data (automatically), and reduces subjectivity through manual coding or without intervention from coding users (Rojas-Figueroa et al., 2019; Amrutha & Geetha, 2020). Autocode intends to generate themes (classifications) as well as visualize themes (Machmud et al., 2021). The author then uses the cluster analysis feature with the selection of the Jaccard coefficient to see the correlation value between themes (Gómez-Corona et al., 2017; Sulistyaningsih et al., 2021). Furthermore, word frequency analysis intends to show the most frequently used words in the sample data set, which helps improve understanding of the research characteristics of the responses received (Jhamb et al., 2021). Words that have no meaning or are not related to the topic are then deleted to obtain more relevant research findings (Wayan et al., 2021).

The reason for using VOSviewer software is due to its superiority in visualizing bibliometric maps (Knapczyk et al., 2018) and grouping publications (van Eck & Waltman, 2017). Meanwhile, the selection of Nvivo 12 plus was based on the quality of its very significant and flexible features in analyzing the literature, structuring the data (Rojas-Figueroa et al., 2019) as well as being effective and efficient in strengthening the validity and reliability of data, both digital and non-digital. digital (Utama et al., 2019).

Results and Discussion

Publication Document on "Gender Equality"

From the search results in the Scopus database with the keyword "gender equality" and after being limited, 504 journal articles were obtained that discussed gender

equality. The frequency of research on gender equality has increased from year to year, with a culmination in 2020 and 2021, with a total of 107 journal articles and 119 documents (**Figure 2**).

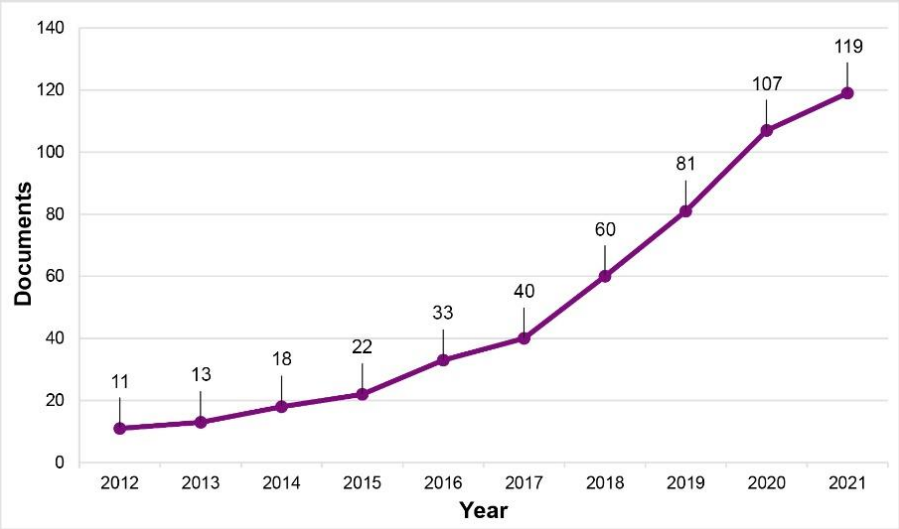


Figure 2. Publication of documents on "Gender Equality"
(Processed by the author in the Scopus database)

Furthermore, from 504 journal articles that talk about gender equality, all of them were written by 160 different authors, with 160 different sources and affiliations. At the **Table 1**, showed list of 10 most cited journal articles on gender equality, along with publication sources, publishers, and their ranking in the Scopus database.

Table 1. List of the top 10 journal articles on "Gender Equality" with the most citations (Created by authors in the Scopus database)

Rank	Title	Authors	Year	Journal	Publishers	Scopus quartiles	Citations
1st	The Women's Empowerment in Agriculture Index	Sabina Alkire, RuthMeinzen-Dick, Amber Peterman, Agnes Quisumbing, Greg Seymour, Ana Vaz	2013	World Development	Elsevier BV	Q1	317
2nd	The COVID-19 pandemic has increased the care burden of women and families	Kate Power	2020	Sustainability: Science, Practice, and Policy	Taylor and Francis Ltd.	Q1	195
3rd	From 'gender equality and 'women's empowerment' to global justice:	Andrea Cornwall, Althea-Maria Rivas	2015	Third World Quarterly	Routledge	Q1	141

4th	reclaiming a transformative agenda for gender and development Informal Institutions, Institutional Change, and Gender Equality	Georgina Waylen	2014	Political Research Quarterly	SAGE Publications Inc.	Q1	109
5th	Parental leave regulations and the persistence of the male breadwinner model: Using fuzzy-set ideal type analysis to assess gender equality in an enlarged Europe	Rossella Ciccia, Mieke Verloo	2012	Journal of European Social Policy	SAGE Publications Ltd	Q1	89
6th	Dual-earner parent couples' work and care during COVID-19	Lyn Craig, Brendan Churchill	2021	Gender, Work and Organization	Wiley-Blackwell Publishing Ltd	Q1	83
7th	Women, girls and world poverty: empowerment, equality or essentialism?	Chant, Sylvia	2016	International Development Planning Review	Liverpool University Press	Q1	68
8th	Flexible Working, Work-Life Balance, and Gender Equality: Introduction	Heejung Chung & Tanja van der Lippe	2020	Social Indicators Research	Springer Netherlands	Q1	64
9th	Closing the gender leadership gap: a multi-centre cross-country comparison of women in management and leadership in academic health centres in the European Union	Ellen Kuhlmann, Pavel V. Ovseiko, Christine Kurmeyer, Karin Gutiérrez-Lobos, Sandra Steinböck, Mia von Knorring, Alastair M. Buchan & Mats Brommels	2017	Human Resources for Health	BioMed Central Ltd.	Q1	63
10th	Work with men to end violence	Michael Flood	2015	Culture, Health and Sexuality	Routledge	Q1	63

against women: a critical stocktake

From Table 1, it can be seen that the journal article entitled “The Women's Empowerment in Agriculture Index” written by Alkire et al. (2013), is the most frequently cited journal article, with a total of 317 citations, from 2013-2021. In second place, the article with the title “The COVID-19 pandemic has increased the care burden of women and families” written by Power (2020), with a total of 195 citations. Meanwhile, in third place is a journal article entitled “From ' gender equality' and 'women's empowerment' to global justice: reclaiming a transformative agenda for gender and development” written by Cornwall & Rivas (2015), with a total of 141 citations. In Table 1 also, it can be seen that the articles published by Routledge and SAGE Publications are the two publishers with the most citations, regarding gender equality.

Contributions by Country, Author, Affiliation and Source

Based on bibliometric metadata in the Scopus database, there are 78 countries from 160 author affiliations, which present research on the theme of “gender equality,” and the top 10 countries illustrated in **Figure 2.** The UK is the most productive country with 113 journal articles (22.42%) of the total journal articles), followed by Sweden with 58 journal articles (11.50%), and the United States with 56 journal articles (11.11%). The results of bibliometric analysis using VOSviewer software show that there are 10 authors' network clusters based on their country of affiliation. The country cluster was formed by considering the minimum number of documents as much as 1 document with a minimum citation of 0. Of the 78 countries that have written about "gender equality", VOSviewer identified 69 countries that meet the threshold to form a bibliometric network/connect to each other **(Figure 3).**

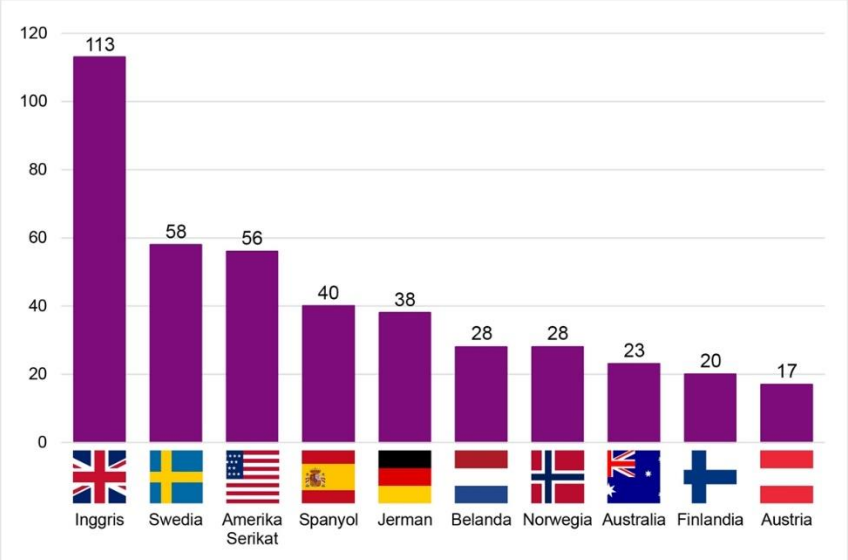


Figure 2. Publication of documents on “Gender Equality” by country (Processed by the author in the Scopus database)

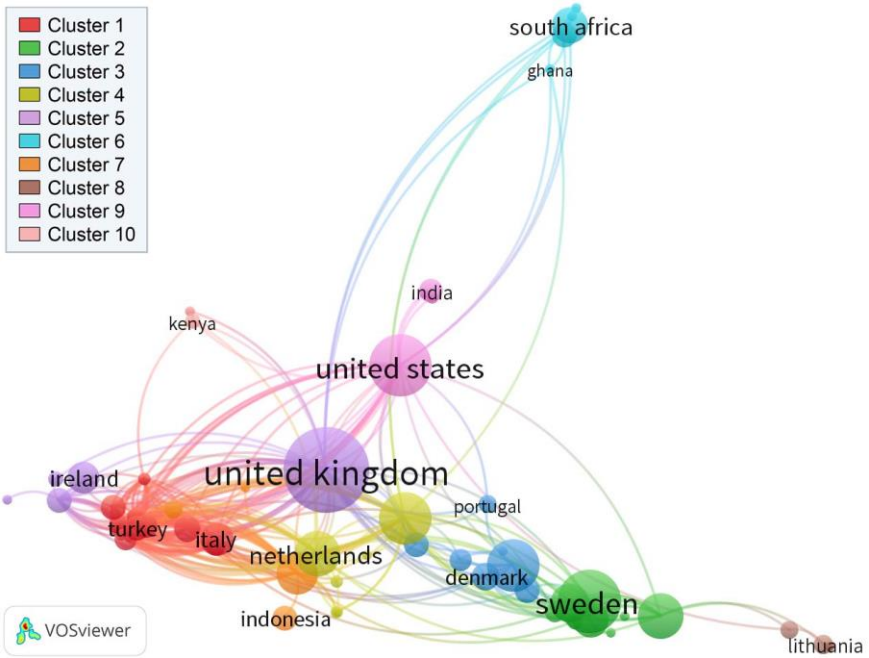


Figure 3. Network Visualization (countries) that collaborate to produce journal articles about "Gender Equality" (Processed by the author using VOSviewer software)

In the VOSviewer bibliometric analysis shown in **Figure 3,** it can be seen that Cluster 1 (in red) consists of 18 countries, which include: Argentina, Armenia, Brazil, Canada, Chile, China, Georgia, Greece, Hong Kong, Iraq, Italy, Mexico, Pakistan, Romania, Russia, Saudi Arabia, Thailand and Turkey. In cluster 1, it can be seen that two countries (Italy and Turkey) have published the most research on the topic of "gender equality", which is described by a node size that is larger than other countries in cluster 1. In cluster 2 (in green), there are 9 countries, including: Austria, Republic of the Congo, Ethiopia, Finland, France, New Zealand, Norway, Slovenia and Sweden. Sweden, Norway, Finland, and Austria, which are the four countries listed as countries with the most research publications on the topic of "gender equality" in the Scopus database, are members of this cluster, where Sweden, Norway, Finland, and Austria have been correlated. with 12 (Sweden), 13 (Norway), and 11 (Finland and Austria) other countries to publish scientific research on gender equality. This also explains that, even though Sweden has more publications of scientific research, on the other hand Norway actually collaborates more with writers with affiliates from other countries, even though the number of journal articles is far less than Sweden. The relationship with other countries in the publication of scientific research on gender equality by Sweden can also be seen in **Figure 5.** The inclusion of a Swedish affiliated country in the list of the 10 most productive affiliated countries confirms previous research that Sweden is the most equal country in the world (Lundgren et al., 2015).

Furthermore, in cluster 3 (in blue), there are 7 countries, namely: Belgium, the Republic of Chad, Denmark, Hungary, Portugal, Spain, and Switzerland. In this cluster, Spain, which is the fourth most published country in the Scopus database, has links with 12 other countries to conduct research on gender equality. Furthermore, in cluster 4 (yellow), four countries are occupied, namely: Colombia, Germany, Luxembourg.

Netherlands, Uganda and Vietnam. In this cluster, two countries that are included in the list of 10 countries with the most publications in the Scopus database, have quite a lot of connectivity with other countries, namely Germany (has connectivity with 42 other countries) and the Netherlands (has connectivity with 33 other countries).

Meanwhile, the UK, which is the country with the most scientific research on gender equality, is joined by four other countries in cluster 5 (in purple), which in this cluster consist of: UK, Ireland, Japan, Nepal, and Afghanistan.UK itself, has collaborated with 44 other countries, to publish research on the topic of gender equality **(Figure 4).** Cluster 6 (in light blue), consists of five countries: Republic of Benin, Republic of Botswana, Ghana, Nigeria and South Africa. Indonesia itself, joined with four other countries in cluster 7 (in orange), namely: Australia, Cambodia, Malaysia, and Solomon Islands. As the eighth country in the list of the top 10 countries in the Scopus database, Australia has collaborated with writers from other country affiliates in as many as 33 countries. Cluster 8 (colored brown), is occupied by four countries, namely: Iceland, Latvia, Lithuania, and Ukraine. The United States, which is the country with the highest number of journal articles published in the records in the Scopus database, is joined with three other countries in cluster 9 (in pink), yaki: Costa Rica, India, and Taiwan. The United States itself, has collaborated with 37 other countries to conduct scientific research related to gender equality **(Figure 6).** Cluster 10 (colored light brown), contains three countries, namely: the Democratic Republic of the Congo, Kenya, and Mozambique. Furthermore, the comparison of bibliometric maps by the top three countries conducting scientific research on gender equality can be seen in **Figure 4, Figure 5,** and **Figure 6.**

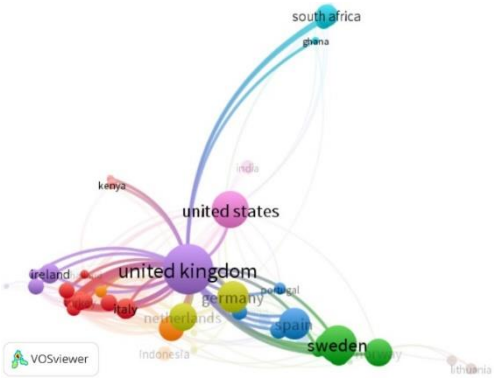


Figure 4. Network visualization in the UK on "Gender Equality" (Processed by the author using VOSviewer software)

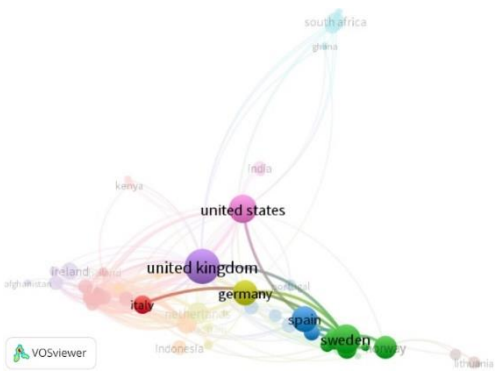


Figure 5. Network visualization in the Sweden on "Gender Equality" (Processed by the author using VOSviewer software)

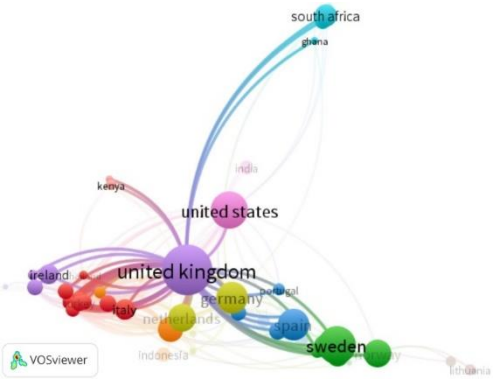


Figure 6. Network visualization in the United States on "Gender Equality" (Processed by the author using VOSviewer software)

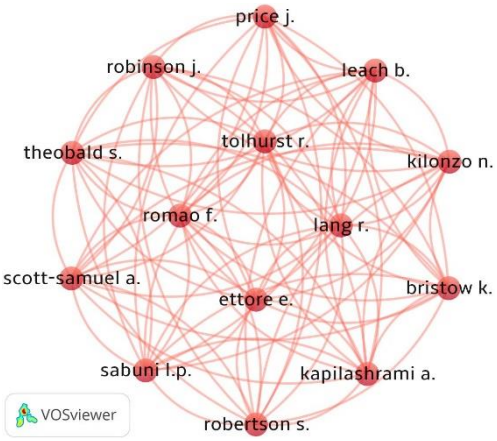
In **Figure 4, Figure 5,** and **Figure 6,** the authors show a comparison of network visualizations between the top three countries that publish journal articles on gender equality topics. Authors with country affiliations who have conducted the most research on the topic of gender equality, the bibliometric map shown in **Figure 4** (UK), have more bibliometric networks or collaborate with other countries, which are represented by thick lines between nodes. Likewise with the United States **(Figure 6),** which has more cooperation in writing journal articles with other countries than Sweden. This also explains that, despite having less scientific research on gender equality than Sweden, the United States collaborates much more with authors from other country affiliates.

Furthermore, from 160 authors with 160 affiliations from 78 different countries listed in the Scopus database, a list of the top 10 authors who conducted scientific research on the topic of gender equality was shown. **Table 2** shows a list of the top 10 authors who wrote journal articles on gender equality, accompanied by source name, affiliation, and number of citations. Meanwhile, network visualization using VOSviewer (with co-authorship analysis type, full counting method, author as the unit of analysis), obtained 1086 authors which were read by VOSviewer. From 1086 authors, with a minimum document limit of two documents, and a minimum of 1 citation, it was found that 807 authors met the threshold. Furthermore, of the 807 authors who met the threshold, only 14 were found to have collaborated to write a journal article on gender equality **(Figure 7).**

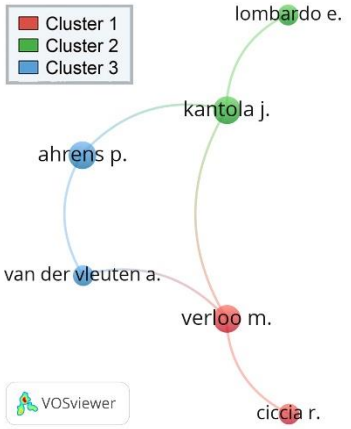
Table 2. List of the top 10 "Gender Equality" authors based on the number of journal articles published (Created by authors in the Scopus database)

Rank	Name	Institution	Country	Number of documents	Citations
1st	Duvander, Ann Zofie E.	Stockholms universitet	Sweden	5	20
2nd	Ahrens, Petra	Tampere University	Finland	4	15
3rd	Kantola, Johanna	Tampere University	Finland	4	28
4th	Verloo, Mieke	Radboud Universiteit	Netherlands	4	122
5th	Zabaniotou, Anastasia A.	Aristotle University of Thessaloniki	Greece	4	8
6th	Ciccia, Rossella	University of Oxford	UK	3	110

7th	Lombardo, Emanuela	Universidad Complutense de Madrid	Spain	3	17
8th	Malhotra, Gayatri	The George Washington University	United States	3	7
9th	Meinzen-Dick, Ruth S.	International Food Policy Research Institute	United States	3	358
10th	Olivius, Elisabeth	Umeå Universitet	Sweden	3	44



Gambar 7. Visualization of the network of writers who collaborated to produce journal articles about "Gender Equality" (Processed by the author using VOSviewer software)



Gambar 8. Visualization of the network of the most productive writers, who collaborated to produce journal articles about "Gender Equality" (Processed by the author using VOSviewer software)

Table 2 shows that the authors who produce the most "gender equality" journal articles come from three countries (Sweden, Finland, and the United States), with two authors each, followed by authors from the Netherlands, Greece, England, and United States affiliates. Spain, with as many as one author each. Furthermore, even though Duvander, Ann Zofie E from Stockholms university (Sweden) has the most publications (5 journal articles), the number of citations obtained is still significantly different from authors from other affiliations who have journal articles of 4 and 3 documents. As for the order of citations, namely: Meinzen-Dick, Ruth S from the International Food Policy Research Institute (United States) with 358 citations; Verloo, Mieke from Radboud Universiteit (Netherlands) with 122 citations; Ciccia, Rossella from the University of Oxford (UK) with 110 citations; Olivius, Elisabeth from Umeå Universitet (Sweden) with 44 citations; Kantola, Johanna from Tampere University (Finland) with 28 citations; Duvander, Ann Zofie E. from Stockholms University (Sweden) with 20 citations; Lombardo, Emanuela from Universidad Complutense de Madrid (Spain) with 17 citations; Ahrens, Petra from Tampere University (Finland) with 15 citations; Zabaniotou, Anastasia A from Aristotle University of Thessaloniki (Greece) with 8 citations; and Malhotra, Gayatri from The George Washington University (United States) with 7 citations. Meanwhile, with the bibliometric analysis (co-authorship) of VOSviewer as shown in **Figure 7,** it was found that the list of the top 10 authors of "gender equality"

journal articles recorded in the Scopus database was not included in the list of authors who collaborated to produce journal articles on gender equality.

Furthermore, the authors carried out processing by following the threshold in accordance with **Table 2,** namely the number of documents at least 3 and the number of citations at least 7, found 13 out of 1086 authors, where in the image visualization, only 6 of the most productive authors collaborated to produce research articles. on gender equality **(Figure 8).** Based on the network visualization shown in **Figure 8**, it can be seen that the bibliometric map divides each of the 2 authors into one group (cluster), namely: cluster 1 (in red), cluster 2 (in green), and cluster 3 (in blue). The details of the authors who have collaborated with more than one author are Kantola j. (in collaboration with three authors namely Lombardo E, Ahrens P, and Verloo M), Verloo M. (in collaboration with three authors namely Ciccia R, Kantola J, and Van der Vleuten A), Ahrens P. (in collaboration with two authors, namely vander vleuten a and kantola j.), and van der vleuten a. (in collaboration with two authors, namely Verloo M. and Ahrens P.). Meanwhile, Ciccia R and Lombardo E., each only collaborated with one writer, namely with Verloo M. and cantola j. Of the six most productive writers who collaborated with each other to produce journal articles on "gender equality", five of them are included in the list of the 10 most productive authors, namely Ahrens P. (second most), cantola j. (third most), verloo m. (fourth most), ciccia r. (sixth most), and Lombardo e. (seventh most). Furthermore, in **Tables 3** and **4,** a list of the top 10 affiliations and 10 sources, which resulted in the journal article "gender equality," is shown, along with the number of citations and quartiles in the Scopus database.

Table 3. List of top 10 institutions/author affiliations researching “Gender Equality” (Created by authors in the Scopus database)

Rank	Institution	Country	Number of documents	Citations
1st	Stockholms universitet	Sweden	13	71
2nd	Radboud Universiteit	Netherlands	11	156
3rd	Umeå Universitet	Sweden	11	93
4th	Tampere University	Finland	10	44
5th	University of Oxford	UK	10	424
6th	Universitetet i Oslo	Norway	8	79
7th	Norges Teknisk-Naturvitenskapelige Universitet	Norway	8	13
8th	University College London	UK	8	124
9th	London School of Economics and Political Science	UK	7	124
10th	UCL Institute of Education	UK	6	69

From 2012 to 2021, 160 author affiliations related to the theme of “gender equality” published Scopus indexed scientific journal articles. However, the study only showed the 10 most productive institutions that wrote scientific journal articles related to “gender equality” (Table 3). Based on Table 3, it can be seen that Stockholms universitet from Sweden is the most productive institution with 13 articles (2.58% of the total number of journal articles), followed by Radboud Universiteit from the Netherlands and Umeå Universitet from Sweden with 11 scientific journal articles for each. -each institution

(2.18%), and Tampere University from Finland and University of Oxford from England with 10 scientific journal articles for each institution (1.98%). The list of 10 institutions for publishing "gender equality" journal articles was recorded from five countries, namely: England (4 institutions), Sweden and Norway (2 institutions each), and the Netherlands and Finland (1 institution each). This finding at the same time negates previous data, where the five countries with the most institutions contributing to publications are also included in the countries with the most productive number of publications of scientific journal articles related to "gender equality" (see **Figure 2**).

Table 4. List of the top 10 publication sources "Gender Equality" by number of publications (Created by authors in the Scopus database)

Rank	Jornal	Country	Publishers	Subject area	Scopus quartiles	Number of documents	Citations
1st	Sustainability Switzerland	Switzerland	Multidisciplinary Digital Publishing Institute (MDPI)	Social Sciences, Environmental Science, Energy	Q1	28	86
2nd	Gender Work and Organization	UK	Wiley-Blackwell	Social Sciences, Business, Management and Accounting	Q1	17	186
3rd	Sex Roles	United States	Springer Nature	Social Sciences, Psychology	Q1	14	203
4th	Social Sciences	Russia	Nauka Publishers	Social Sciences	Q4	11	43
5th	Men and Masculinities	United States	SAGE Publications Inc.	Arts and Humanities, Social Sciences	Q1	9	106
6th	Social Inclusion	Portugal	Cogitatio Press	Social Sciences, Psychology	Q2	9	14
7th	Education Sciences	Switzerland	Multidisciplinary Digital Publishing Institute (MDPI)	Social Sciences, Computer Science, Health Professions, Psychology	Q2	8	28
8th	Nora Nordic Journal of Feminist and Gender Research	UK	Taylor & Francis	Social Sciences	Q2	8	7
9th	Journal Of European Social Policy	UK	SAGE Publications Ltd	Social Sciences, Environmental Science	Q1	7	110

10th	Gender and Society	United States	SAGE Publications Inc.	Social Sciences, Arts and Humanities	Q1	6	51

In **Table 4,** it can be seen that from 2012-2021, from 504 scientific journal articles published on the topic of "gender equality" based on the Scopus database, sources from Sustainability Switzerland (publisher: Multidisciplinary Digital Publishing Institute / MDPI) are productive sources with 28 documents (5.55% of the total number of journal articles), followed by Gender Work and Organization (publisher: Wiley-Blackwell) with 17 journal articles (3.37%), and Sex Roles (publisher: Springer Nature) with 14 journal articles (2.77%). Furthermore, from the list of 10 sources that publish the most journal articles on "gender equality," the journals with the Scopus Q1 quartile are the ones with the most 81 documents, followed by the Scopus Q2 quartile with 25 documents, and the Scopus Q4 quartile with 11 documents. As for citations, Sex Roles (publisher: Springer Nature) is the most frequently cited with 203 citations, followed by Gender Work and Organization (publisher: Wiley-Blackwell) with 186 citations, and the Journal of European Social Policy (publisher: SAGE Publications Ltd) with 110 citations.

Furthermore, from 2012 to 2021, based on the 10 names of the most productive sources related to scientific journal articles "gender equality" as shown in Table 4, the details of publication intensity are: Sustainability Switzerland with a total of 28 journal articles (1 document in 2018 , 4 documents in 2019, 14 documents in 2020, and 9 documents in 2021, Gender Work And Organization with 17 documents (1 document each for 2015 and 2017, 2 documents in 2018 and 2020, 5 documents in 2019, and 6 documents in 2021), Sex Roles with 14 documents (2 documents in 2016, 3 documents in 2017 and 2019, 4 documents in 2018, and 1 document in 2020 and 2021), Social Sciences with 11 documents (1 document in 2017 and 2020, 3 and 4 documents in 2018 and 2019, respectively, and 2 documents in 2021), Men and Masculinities with 9 documents (2 documents in 2014, 2020, and 2021, and 1 document in 2016 to 2018), Social Inclusion with 9 documents (3 documents in 2018, 2 documents d 2020, and 4 documents in 2021), Education Sciences with 8 documents (2 documents in 2018 and 2021, 3 documents in 2019, and 1 document in 2020), Nora Nordic Journal of Feminist and Gender Research with 8 documents (1 document in 2018 and 2019, 4 documents in 2020, and 2 documents in 2021), Journal of European Social Policy with 7 documents (1 document each in 2012, 2015, 2018, and 2021, and 3 documents in 2019), and Gender and Society with 6 documents (2 documents in 2018 and 2021, and 1 document in 2019 and 2020).

Theme Categorization

Based on cluster analysis, through automatic coding using the autocode feature of 504 Scopus indexed scientific journal articles, there are five main themes that discuss "gender equality" (Figure 8), namely: gender, equality, policy, social, and work. Furthermore, the results of the categorization of research themes show that studies on gender equality, mostly discuss the five themes. Furthermore, from the five, it was identified by the NVivo 12 plus software that there are derived themes from each theme with different compositions. Table 5 shows a list of five derived themes/derivative

keywords, which relate to the major theme of "gender equality," for each of the derived topics that were analyzed using NVivo 12 plus.

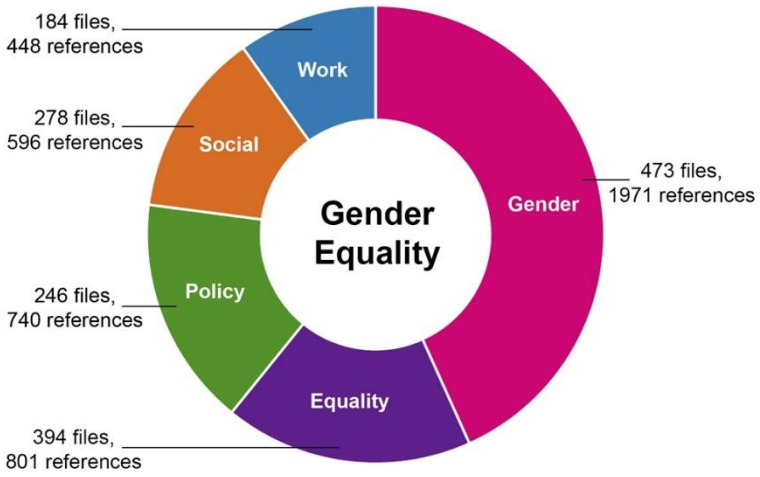


Figure 9. Themes categorization on "Gender Equality"
(Processed by the author using NVivo 12 plus software)

Table 5. Derived themes (Processed by the author using NVivo 12 plus software)

Theme	Derivative themes	Files	References
Equality	Gender equality	243	352
	Gender equality policies	23	38
	Equal opportunities	20	23
	Equality policies	8	9
	Equal rights	6	6
Gender	Gender equality	243	352
	Gender inequality	91	121
	Gender gap	56	78
	Gender issue	40	42
	Gender disparity	37	40
Policy	Public policy	26	29
	Gender equality policies	23	38
	Social policy	19	21
	Parental leave policies	16	23
	Family policy	13	16
Social	Social change	26	28
	Social policy	19	21
	Social sciences	13	14
	Social justice	13	13
	Social norms	12	16
Work	Unpaid work	19	20
	Domestic work	17	20

	Care work	11	12
	Working hours	11	12
	Work-life balance	8	10

Based on **Figure 9,** it can be seen that each theme has different file compositions and reference sources, where the themes of gender and equality have more file composition and reference sources, namely 473 files and 1971 reference sources (gender) and equality with 394 files. and 801 reference sources. The source of reference is the number of paragraphs containing about each relevant theme, in each file. This is based on the autocode feature in the NVivo 12 plus software, where the author chooses the paragraph option as a theme classification, so that the reading made by NVivo 12 plus is wider than browsing based on sentences. Meanwhile, in Table 5, it can be seen that the five derivative topics/derived keywords that talk about "gender equality" for each topic are dominated by the derived theme "gender equality" (243 files and 352 reference sources) for the "gender" theme. and “equality”, as well as “public policy” (26 files and 29 reference sources), “social change” (26 files and 28 reference sources”, and “unpaid work” (19 files and 20 reference sources) for the theme of policy, social, and work.

Furthermore, by using the Word Frequency Query feature in the NVivo 12 plus software, with the aim of exploring the words that appear most frequently in the research data, the authors limit the number of words to 50 words that appear most frequently in research articles on gender. equality ". With this analysis tool, words that have the same meaning can be categorized into the same group. Words that have no meaning or are not related to the research topic/keyword are entered into the list. ar omitted words, to get stronger and tighter results in the displayed word list. Based on the results of data analysis on 504 scientific journal articles "gender equality," the dominant words are: gender, equality, women, social, policy, and work, some of which are included as derived themes in the study. Based on these words, it can be interpreted that the overall focus of research on "gender equality", boils down to the list of words shown in Figure 10 and Table 6, especially on words that are in bold and large in size.

Figure 10. Visualization of the most dominant words in the research on "Gender Equality" (Processed by the author using NVivo 12 plus software)

Table 6. List of the most dominant words in the research on "Gender Equality" (Processed by the author using NVivo 12 plus software)

Word	Length	Count	Word	Length	Count
gender	6	19556	violence	8	934
equality	8	9140	society	7	922
women	5	6716	politics	8	896
social	6	4480	relations	9	874
policy	6	4212	employment	10	868
work	4	3504	working	7	866
policies	8	2488	participation	13	864
men	3	2424	feminist	8	862
family	6	2068	male	4	848
education	9	1630	parental	8	832
development	11	1520	national	8	768
change	6	1314	different	9	766
political	9	1232	practices	9	764
gendered	8	1202	market	6	762
rights	6	1198	impact	6	736
care	4	1178	attitudes	9	714
female	6	1120	human	5	692
public	6	1098	related	7	686
state	5	1078	management	10	682
international	13	1050	power	5	656
economic	8	1022	differences	11	632
support	7	1008	children	8	604
role	4	1004	domestic	8	594
equal	5	980	labour	6	592
inequality	10	962	norms	5	0

In **Figure 10,** it can be seen that the words in bold and bold in size, such as: gender, equality, women, social, policy, to work, are the words most frequently mentioned in research articles. Furthermore, there are also words, such as: political, politics, participation, support, rights, care, to change, all of which lead to the demand for equality. In addition, there is also a list of the lowest words such as: differences, children, domestic, labor, and norms, which have not been mentioned too much in research articles related to "gender equality". Thus, further research can correlate it with these words.

Correlation between Themes

To analyze the relationship between themes, Jaccard coefficients were calculated across the themes. The set of Jaccard coefficients was used by NVivo 12 plus to perform a dendogram depicting the relationships (similarities and differences) across themes (Gómez-Corona et al., 2017; Cuellar-Rojas et al., 2021). The results of a review of 504 scientific journal articles using the cluster analysis feature in NVivo 12 plus, show that there is a strong relationship between the themes of gender and equality, as well as correlations between other themes such as social, policy, and work themes **(Figure 11).** Although there are differences in values between the relationship between one theme and another, between gender and other topics, it is emphasized that this research is a cannot be separated from the aspects of equality, social, policy, and work **(Table 7).**

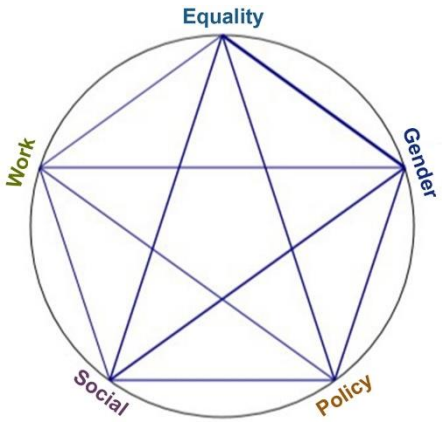


Figure 11. Correlation between themes (processed by the author using NVivo 12 plus software)

Table 7. Correlation values between themes/Jaccard coefficients (processed by the author using NVivo 12 plus software)

Code A	Code B	Jaccard's coefficient
Gender	Equality	0,802495
Social	Gender	0,554865
Policy	Gender	0,488613
Social	Equality	0,486726
Policy	Equality	0,454545
Social	Policy	0,404826
Work	Gender	0,36875
Work	Policy	0,356467
Work	Social	0,343023
Work	Equality	0,325688

Visualization in **Figure 11,** explains that there is a strong relationship between the themes of “gender” and “equality,” which can be seen by the line connecting the two themes in bold, as well as the Jaccard coefficient value shown in **Table 7.**

Furthermore, using the full counting method for all keywords to analyze keywords using the VOSviewer software, the authors set the minimum number of keyword occurrences to be 10, of which 41 keywords meet the threshold of 2273 keywords. After going through the selection stage (keyword selection) for keywords that are strongly related to the journal article "gender equality," it was found that 36 interrelated keywords formed 6 clusters **(Figure 12).** The analysis of the most frequent occurrences of keywords (co-occurrence) in VOSviewer provides additional insight into the main topics and research trends (Li et al., 2016). Furthermore, the closer two keywords (nodes) are located to each other, the stronger the relationship (Eck & Waltman, 2014; González-Torres et al., 2020).

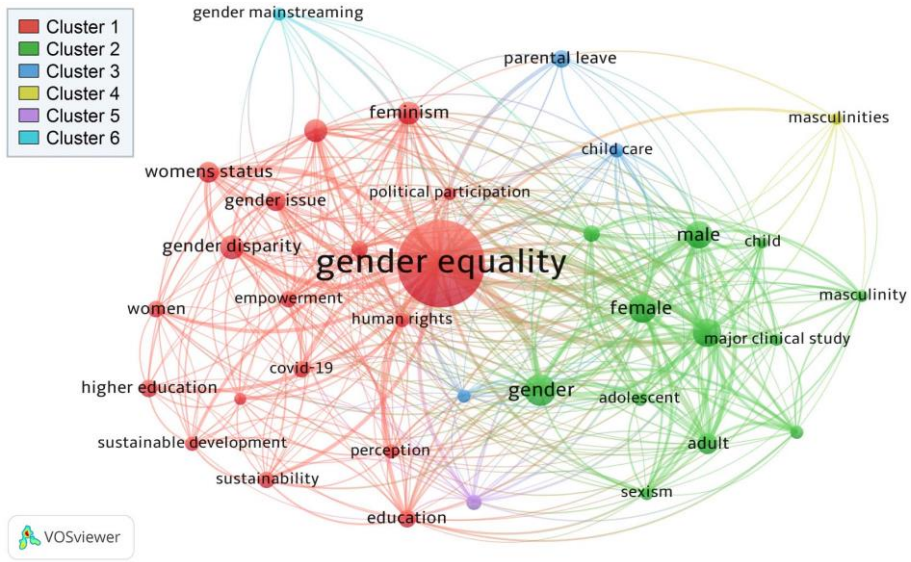


Figure 12. Network visualization of keywords about "Gender Equality" (Processed by the author using VOSviewer software)

In **Figure 12,** it can be seen that the bibliometric map of keyword occurrence reveals six groups of keywords together. The keywords that appear most often and are the strongest, are marked by increasing node sizes (Saleem et al., 2021). Cluster 1 (red color), is occupied by keywords: covid-19, education, empowerment, equity, feminism, gender disparity, gender equality, gender issue, gender relations, gender role, higher education, human rights, perception, political participation, sustainability, sustainable development, women, and women status. Cluster 2 (in green) consists of keywords: adolescent adult, child, female, gender, human, human experiment, humans, major clinical study, male, masculinity, and sexism. While cluster 3 (blue color) is occupied by keywords: child care, employment, and parental leave. Meanwhile, cluster 4 (yellow), cluster 5 (purple), and cluster 6 (light blue), occupied by one keyword for each cluster, namely: masculinities for cluster 4, leadership for cluster 5, and gender. mainstreaming for cluster 6.

Furthermore, to see the intensity of the discussion (keywords) about "gender equality" by year and the density level of discussion (keywords) related to "gender equality," it can be seen in **Figure 13** (overlay visualization) and **Figure 14** (density visualization)**.**

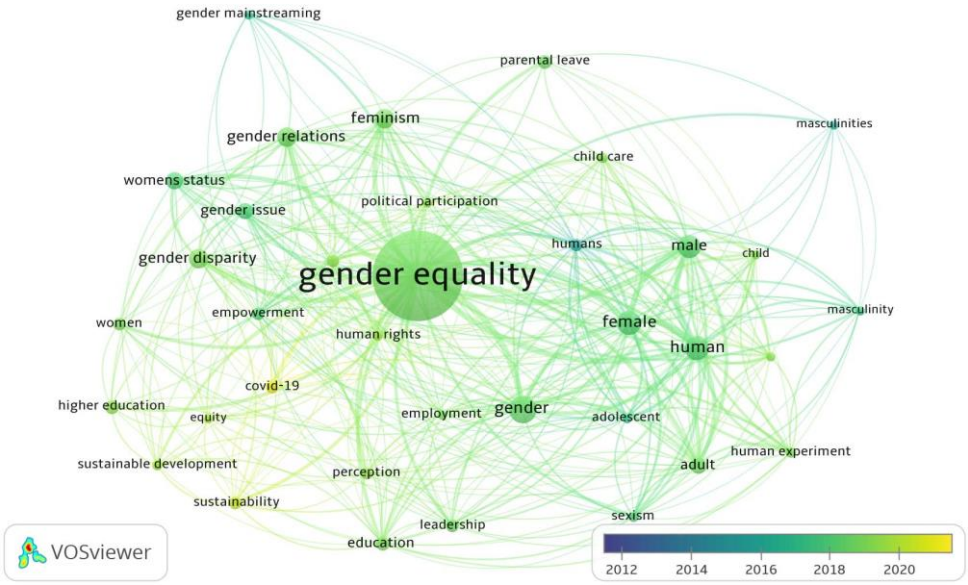


Figure 13. Network visualization related to the intensity of publications on "Gender Equality" (Processed by the author using VOSviewer software)

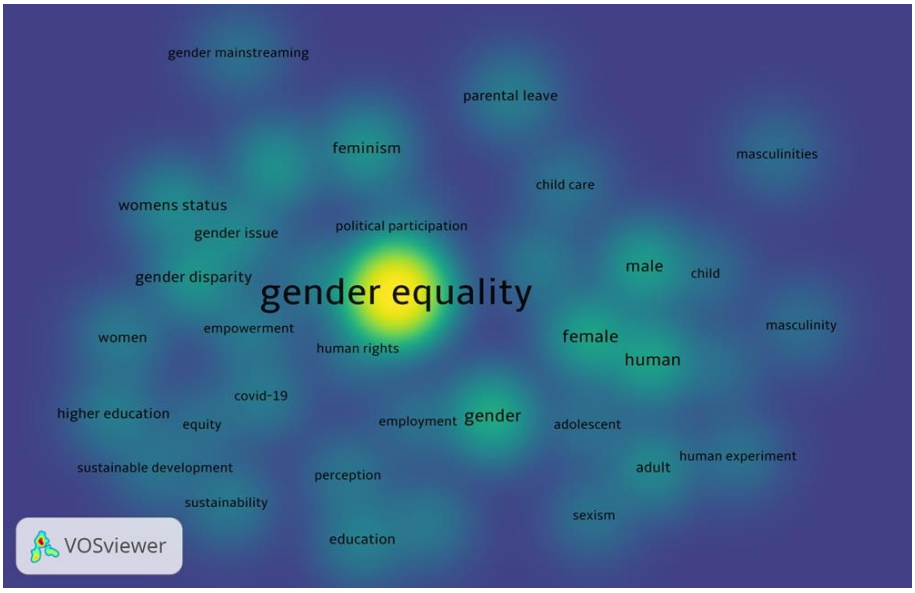


Figure 14. Visualization of publication density of journal articles on "Gender Equality" (Processed by the author using VOSviewer software)

Figure 13 shows the change in the topical focus in the "gender equality" literature over the last ten years. The lighter the color of a node, it reflects the latest trends of research conducted (Hallinger, 2019). **Figure 13** can be identified that nodes such as: covid, sustainability, and sustainable development, are the keywords that show the latest research trends, in relation to "gender equality," which is indicated by the yellow color of the nodes. The keyword "covid" in relation to "gender equality" is the latest trend of research due to its emergence that only occurred in 2019, especially related to the focus of research that talks about the impact of the pandemic on gender equality

(Power, 2020; Craig & Churchill, 2021). Furthermore, the keywords "sustainability" and sustainable development" are also included as the latest research trends due to their connection in efforts to overcome difficult situations and empower sustainability (especially for women) (Garrigos-Simon et al., 2018). In addition, the link between the keywords sustainability and sustainable development in relation to gender equality is also reflected in the 2030 agenda by the United Nations for the Sustainable Development Goals, one of which is gender equality (Nawangsari et al., 2020; Araújo-Vila et al., 2021; Majumder et al., 2021). Elsewhere, key words such as: humans, masculinity, masculinities, to gender mainstreaming, are some of the keywords that have not undergone research updates, in relation to "gender equality".

Meanwhile, the density visualization is that each node has a color that depends on the density of the item, where the color of the node on the bibliometric map depends on the number of nodes around it (Liao et al., 2018; Aribowo, 2019). In other words, the yellower and even redder the color of a node in the density visualization, reflecting the density of studies that intersect with the main topic, while those that are far away and tend to dim indicate that the topic has not been widely studied (Nurdin et al., 2021). Therefore, based on the results of the density visualization as shown in **Figure 14,** it shows the level of saturation which is indicated by key words adjacent to the main node, such as: human rights, political participation, as well as male, female, gender and human which are at the medium level. This indicates that the previously mentioned topics have been extensively researched. This is different from topics that tend to be dim and covered in green, such as: human experiment, sexism, masculinity, masculinities, to gender mainstreaming, which indicates that the topics mentioned last have not been studied much, in relation to gender. equality," so that there is an opportunity to conduct further research related to the topics that have been mentioned.

In terms of the number of research publications, this study is in line with the findings of Bendels et al. (2018), on "Gender disparities in high-quality dermatology research: a descriptive bibliometric study on scientific authorships," which concludes in general that this gender gap has narrowed in the last decade and is likely to decrease in the future. In this study, this can be harmonized with the increasing number of publications on the theme of gender equality from year to year. Furthermore, in more detail, this study also confirms the research of Araújo-Vila et al. (2021) on "Seeking Gender Equality in the Tourism Sector: A Systematic Bibliometric Review," that although it shows an increase in the number of publications, it will be relatively small if it is more detailed into research focuses. In this study, this can be seen in the visualization of themes using VOSviewer, where there are still many themes for which there is still a small amount of research. The difference is that in the research of Araújo-Vila et al. (2021), the tourism sector is the focus as well as the theme which is considered to have a small amount of research, this research actually reveals that the themes that have the least amount of research are the themes of gender equality, in relation to the SDGs. Meanwhile, regarding the most productive authors and affiliations, productive journals, country-specific productivity and other related indicators (which are counted as limitations in retrieving data) are also related to this research, only differing in terms of limitations and data processing software, where things This is also the novelty of this research.

Conclusion

Statistical results from 504 scientific journal articles "gender equality" during the period 2012-2021 indicate that there is an increase in publications from year to year. Meanwhile, out of 504 published journal articles, the most frequently cited research article is the research entitled “The Women's Empowerment in Agriculture Index” written by Alkire et al. (2013), “The COVID-19 pandemic has increased the care burden of women and families” written by Power (2020), and “From ‘gender equality and ‘women’s empowerment’ to global justice: reclaiming a transformative agenda for gender and development” written by Cornwall & Rivas (2015). Meanwhile, the countries of origin of the most productive affiliates in publishing about “gender equality” are England, Sweden, and the United States. Furthermore, based on network visualization using VOSviewer, an affiliate of the UK itself, has collaborated with 44 other affiliated countries, to publish research on the topic of gender equality. Authors such as Ann Zofie E Duvander from Stockholms University (Sweden), Petra Ahrens from Tampere University (Finland), and Johanna Kantola from Tampere University (Finland), are the most prolific authors in publishing journal articles on "gender equality". Furthermore, a bibliometric analysis with co-authorship on VOSviewer, showed Johanna Kantola from the Tampere University affiliate (Finland), and Mieke Verloo from the Radboud Universiteit affiliate (Netherlands), being the two authors who collaborated the most with authors from other affiliates. The affiliations/institutions that publish the most journal articles on “gender equality” are Stockholms universitet (Sweden), Radboud Universiteit (Netherlands), and Umeå Universitet (Sweden). The Swiss Journal of Sustainability with the publisher’s name Multidisciplinary Digital Publishing Institute (MDPI) is the most productive journal in publishing scientific journal articles on "gender equality". Sustainability Switzerland has journal subject areas: Social Sciences, Environmental Science, and Energy. Based on the analysis of NVivo 12 plus using the autocode feature, it was found that there were five themes related to the main theme of “gender equality,” namely: gender, equality, policy, social, and work. The list of words that appear most often based on word frequency analysis are: gender, equality, women, social, policy, and work. Furthermore, cluster analysis using the Jaccard coefficient shows a strong relationship between the topic of gender and equality, with a value of 0.802495. Furthermore, network visualization using VOSviewer based on keyword occurrence shows that nodes adjacent to the parent theme have a strong relationship with “gender equality,” such as keywords: human rights, empowerment, and political participation. Meanwhile, based on the overlay visualization, it shows that keywords such as: covid-19, sustainability, and sustainable development, are keywords that are the latest trends in research related to "gender equality". Meanwhile, density visualization shows that the keywords: sexism, masculinity, masculinities, to gender mainstreaming, are keywords that are still rarely studied, in relation to "gender equality".

The limitation in the bibliometric analysis in this study is the composition of the limitations in the Scopus database which does not cover many points, for example: document selection focused on journal articles, year ranges, language, as well as the composition of derived keywords and subject areas. Furthermore, the research also uses the Scopus database as a database to obtain articles from different scientific journals, which the authors evaluate through bibliometrics. There are various other databases,

such as: Web of Science, which are not found in the Scopus database. Therefore, the limitations of this study can be used as recommendations for further research.

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