

# A spike in the scientific output on social sciences in Vietnam for recent three years: Evidence from bibliometric analysis in Scopus database (2000–2019)

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## Abstract

Bibliometric analysis of 3105 publications retrieved from the Scopus database was conducted to evaluate bibliographic content of scientific output on social sciences in Vietnam, for the 2000–2019 period. Our main findings show that the number of publications on social sciences from Vietnam has increased significantly over the last two decades, and there was a spike in the scientific output for the recent three years when the number of publications accounted for 53.76% of the collection. The most productive authors came from a few public research institutes with strong resources as the top 10 institutions participated in 44.22% of the collection. Vietnamese scholars tend not to submit their works to high-ranking journals since five Q1 journals in the top 10 publishing journals published only 6.17% of the collection. For international collaboration, Australia and the United States ranked first and second based on the number of publications and citations. Other countries in top 10 mostly located in Europe and Asia. Research topics were diverse focusing on gender, poverty, HIV, higher education and sustainable development. We suggest that supporting policies and funding need to be provided to help Vietnamese scholars improve their works, and to boost their scientific production in the future.

## Keywords

Bibliometrics analysis; scientometrics analysis; social sciences; Vietnam

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## 1. Introduction

Several qualitative and quantitative literature reviewing approaches have been used to analyse historical scientific papers in order to extract the most relevant knowledge, as well as research trends [1]. Among them, bibliometric analysis, introduced by Pritchard [2], is a very useful method to measure scientific activities based on statistical measurement of quantitative data provided by scientific literature [3]. Bibliometric analysis is a mathematical and statistical approach for literature analysing in order to identify the research trends and its time evolution, and it can be applied in various specific research fields [4–6]. With many advances compared with other approaches, bibliometric analysis has been widely used to analyse academic literature in many aspects such as (1) the evolution of publication over times, (2) the most productive authors, research institutions, countries and their co-authorships, (3) the core journals publishing and (4) the most popular research topics. Global, continental and local bibliometric analyses on different research fields have been introduced in many studies [7–12].

Scientific output is one of the important determinants of economic development of countries [13]. Since the launch of the Higher Education Reform Agenda for the 2006–2020 period [14], Vietnam has strived to internationalise its academic sector [15,16]. Under this reform, several national scientific foundations, especially the National Foundation of Science and Technology Development (NAFOSTED), were created to support Vietnamese researchers in enhancing scientific output using international standards. In addition, three national projects have been implemented for training more than 20000 PhD candidates domestically and internationally following international standards (Project 322 since 2000 [17], Project 911 since 2010 [18], and Project 89 since 2019 [19]). Recently, the Ministry of Education and Training [20] required all PhD candidates to have at least two international publications, with at least one paper on an ISI/Scopus journal in order to complete their training programme. All these changes in policy were expected to improve scientific output of Vietnamese researchers. Several studies have estimated the effectiveness of the reform by analysing bibliographic data from Vietnam. Research output of Vietnam were compared with results from 10 other countries in East and Southeast Asia [21]. Scientific publications in various research fields in Vietnam indexed in the Scopus database from 1996 to 2013 were summarised in the study by Manh [22]. Trend and impact of international collaboration in scientific research in Vietnam for the 2001–2015 period were analysed in the study by Nguyen et al. [23]. Research collaboration network and overview of the development of social sciences in Vietnam were studied in literature [24–26], which pointed out that scientific publishing on social sciences and humanities in Vietnam will become increasingly integrated into the international community. However, a complete bibliometric analysis of social sciences from Vietnam is still absent. In this study, we bridge the gap by exploring the complete development of social science scientific output from Vietnam, using bibliographic data extracted from Scopus database between 2000 and 2019. We limited the start year to 2000 as it was the beginning of the first national project to improve scientific output of the country following international standard [17].

This study is aimed to answer the following questions.

1. How many publications on social sciences were published by scholars with Vietnamese affiliations in this period?
2. What were the most active categories in social sciences in Vietnam, and their publication trends in this period?
3. Which were the core publications on social sciences in Vietnam in this period?
4. Which authors and Vietnamese research institutions contributed the most publications in this period?
5. Which journals published the most papers on social sciences from Vietnam in this period?
6. Which partner countries Vietnamese scholars collaborated the most in this period?
7. What were the main topic researches, and its evolution in this period?

Results from this study provide information that could be helpful for Vietnamese scholars, research institutions and especially for decision makers in preparing future plans and funding to support for the development of social science researches in Vietnam in order to meet international standard and to improve scientific productivity.

## 2. Materials and methods

### 2.1. Database survey and search query

In order to perform a bibliometric analysis, the first step is to select the best data source that fits the most with the objectives of the study. Although the number of bibliographic databases is high, there are five main bibliographic databases that are used the most in bibliometric analysis: Web of Science (WoS), Scopus, Google Scholar (GS), Microsoft Academic (MA) and Dimensions [27]. Among these databases, Scopus was chosen as the research engine for this study

because it features a wider range of documents than the other databases for reviews of researches in education and social sciences [28,29]. In addition, Scopus also provides different format options for data exporting (BIB, RIS and CSV formats) that are supported in various bibliometric science mapping analysis tools [27].

The literature from the Scopus database (<http://www.scopus.com>) was retrieved on 15 August 2020 using the search query string outlined in Box 1. We searched all publications published by scholars having affiliation country as Vietnam or Viet Nam in the social science subject area during the 2000–2019 period. Then, we excluded all publications (1) written in languages other than English and (2) having document types other than Article or Review. The final publication collection ( $n = 3,015$ ) was exported in BIB and CSV formats for post-processing in the two most popular and effective bibliometric analysis tools: biblioshiny [1] and VOSviewer [30].

Box 1. Search query string.

```
AFFILCOUNTRY('Viet Nam' OR Vietnam) AND DOCTYPE(ar OR re) AND PUBYEAR > 1999
AND PUBYEAR < 2020 AND (LIMIT-TO (SUBJAREA, 'SOC')) AND (LIMIT-TO (LANGUAGE,
'English'))
```

## 2.2. Publication output and growth trend

General characteristics of the publication collection were summarised using the biblioshiny tool. Annual number and temporal trends of the number of papers published between 2000 and 2019 were analysed. We separated the whole study period into three annual intervals based on the number of publications. In addition, temporal trends of 10 categories with the most publications in social sciences in Vietnam were analysed during the same period.

## 2.3. Historical direct citation

A historical direct citation network analysis was performed to identify the core publications related to social science researches in Vietnam [31], using a specific function designed in the biblioshiny tool. The most local cited and relevant papers in the publication collection were plotted and connected based on the co-citations network. Papers were plotted in proposition to published years, and arrows were used to represent the relationship of citation across papers.

## 2.4. Publication by Vietnamese scholars

The top 10 most productive authors based on total publications and citations were identified, as well as their institutions and their countries. The h-indexes of authors in the top 10 were obtained to analyse their influences on the community [32]. Publication histories of these authors were also analysed to identify old authors and newcomers in the research fields. A co-authorship network analysis of 112 co-authors with at least seven papers was conducted using the VOSviewer tool, to visualise their co-authorship.

## 2.5. Contribution by Vietnamese institutions

The total number of research institutions participated in the publication collection was retrieved, then the top 10 Vietnamese research institutions were identified based on the total number of publications. Temporal trends of publications of these institutions were analysed and compared with the general temporal trends of publications on social sciences from Vietnam.

## 2.6. Journals publishing

The number of papers published in all journals was calculated to identify the core journals publishing on social sciences from Vietnam. The top 10 journals based on the total number of publications was extracted, and their h-indexes were calculated using the biblioshiny tool. Bibliographic coupling among the top 10 most active journals was generated using VOSviewer tool to visualise the relationship between them.

**Table 1.** Main information regarding the collection.

Description	
Articles	2878
Reviews	137
Sources (journals, books, etc.)	1000
Period	2000–2019
Average citations per document	8.4
Authors	7506
Author appearances	11662
Authors of single-author documents	393
Authors of multi-author documents	7113
Single-authored documents	536
Authors per document	2.5
Co-authors per document	3.9
Documents per author	0.4

### 2.7. Global collaboration

VOSviewer tool was used for the statistics of all countries contributed to the publication collection, then the top 10 partner countries publishing with Vietnamese scholars on social sciences were extracted, based on the total number of publications and citations. A co-authorship network of 60 countries with at least seven papers was generated to visualise their collaboration network.

### 2.8. Keywords and terms analysis

To identify the most frequent research topics, word clouds of the 100 most frequent keywords plus in the publication collection was built. VOSviewer was used to conduct deeper analyses on the co-occurrence of 270 authors' keywords that appeared at least five times, to visualise the links between authors' keywords.

### 2.9. Research topics evolution

Thematic maps of authors' keywords for the three annual intervals were plotted using the biblioshiny tool to trace the temporal trend of the main research topics on social sciences from Vietnam. Research topics are classified into four different themes of a thematic map based on their levels of centrality and density. Centrality measures the strength of external ties to other themes. This value can be understood as a measure of the importance of the theme in the development of the entire research field. On the contrary, density measures the strength of internal ties among all keywords describing the research theme. This value can be understood as a measure of the theme's development [33]. Thematic maps allow the identification of the most important research topics, developed and isolated research topics, emerging or declining research topics and basic and transversal research topics in each interval, as well as for the whole study period.

## 3. Results

### 3.1. Publication output and growth trend

General characteristics of the publication collection are shown in Table 1. There was a total of 3015 papers related to social sciences, published in 1000 different Scopus sources (journals, books, etc.) by scholars with Vietnamese affiliations over the last two decades. Articles accounted for 95.45% of the collection ( $n = 2878$ ), while review papers only accounted for 4.55% ( $n = 137$ ). We identified 7506 authors with 11662 author appearances in 3015 papers. Single-author papers accounted for 17.78% of the collection ( $n = 536$ ), and they were published by 393 single authors (5.24%). In average, documents per author was 0.4, authors and co-authors per document were 2.5 and 3.9, respectively, and each document has average 8.4 citations.

The growth trend of the publication collection is illustrated in Figure 1. In general, the number of publications has shown a steady increase over the last two decades, starting with only nine papers in 2000, the number of publications increased nearly 95 times in 2019 ( $n = 853$ ). The evolution of the publications can be divided into three sub-periods. The first one was the 2000–2007 period, when the total number of publications was lower than 50 per year. The second

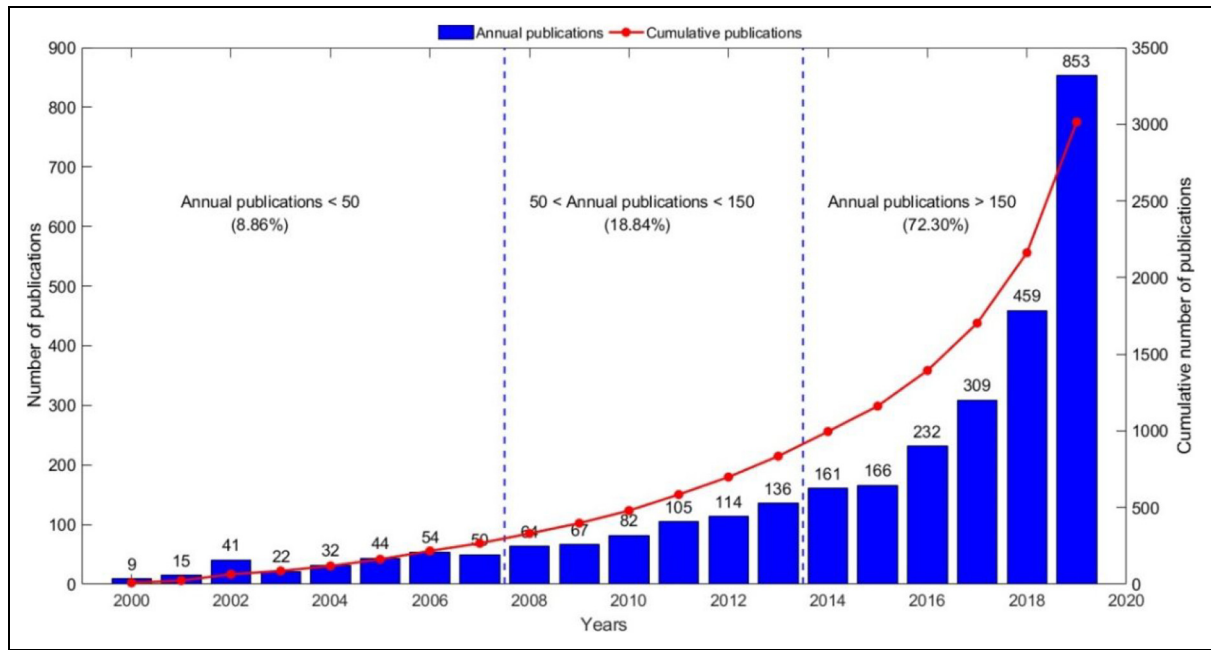


Figure 1. Annual number of publications and its cumulative values on social sciences in Vietnam.

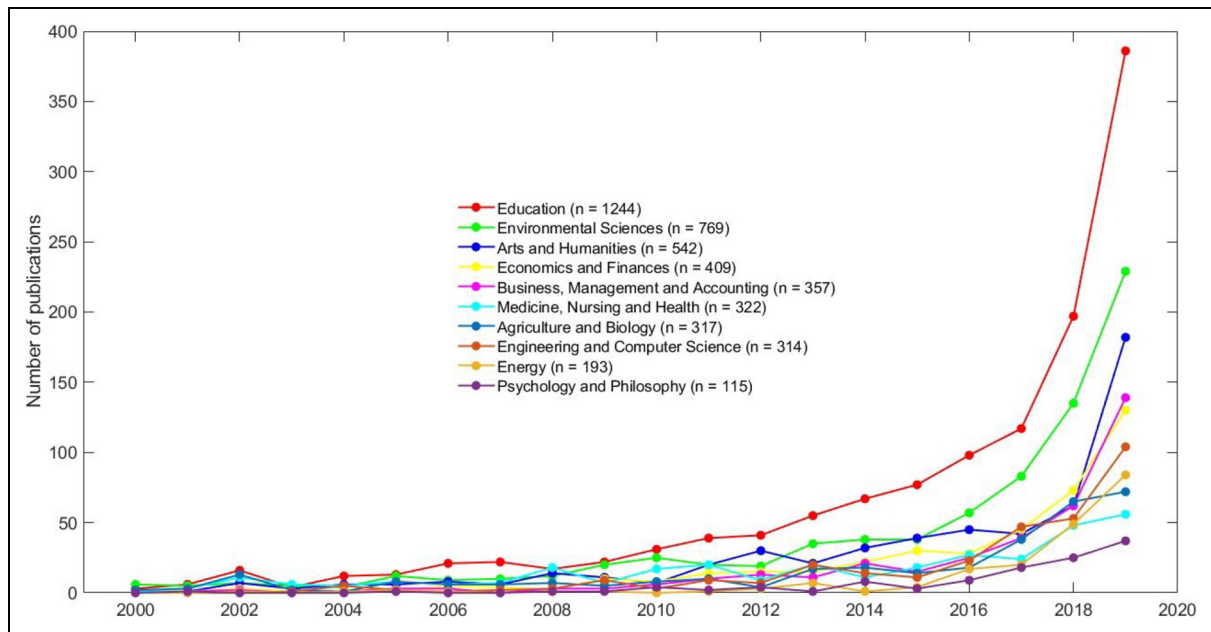
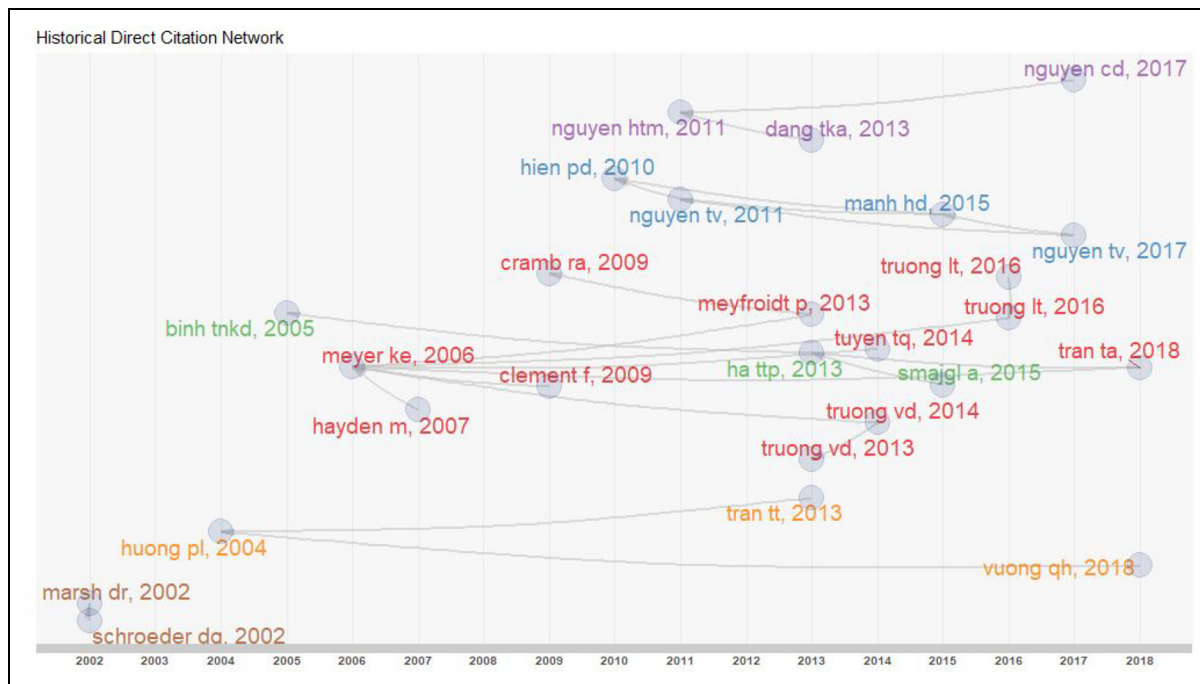


Figure 2. Annual number of publications of 10 categories with the most publications in social sciences in Vietnam.

sub-period (2008–2013) witnessed a steady growth in the number of publications with average 94.67 papers per year. The last sub-period (2014–2019) was the fastest growth period when there were at least 160 publications per year. These three sub-periods account for 8.86%, 18.84% and 72.30% of the collection, however, the last three years (2017–2019) contributed to more than a half of the collection ( $n = 1621$ ; 53.76%).

Figure 2 shows the growth trends of 10 categories with the most publications in social sciences in Vietnam. The total number of publications in these 10 categories accounted for nearly 76% of the collection ( $n = 2291$ ). All categories shared similar publication trends as shown in Figure 1, but there are a few notable points to emphasise. Education



**Figure 3.** Historical direct citation networks of the top 26 most local cited articles in the publication collection. Each node represents a document and each edge represents a direct citation. Nodes and edges are plotted on an oriented graph where the horizontal axis represents the publication years. Artwork was generated with biblioshiny tool [1].

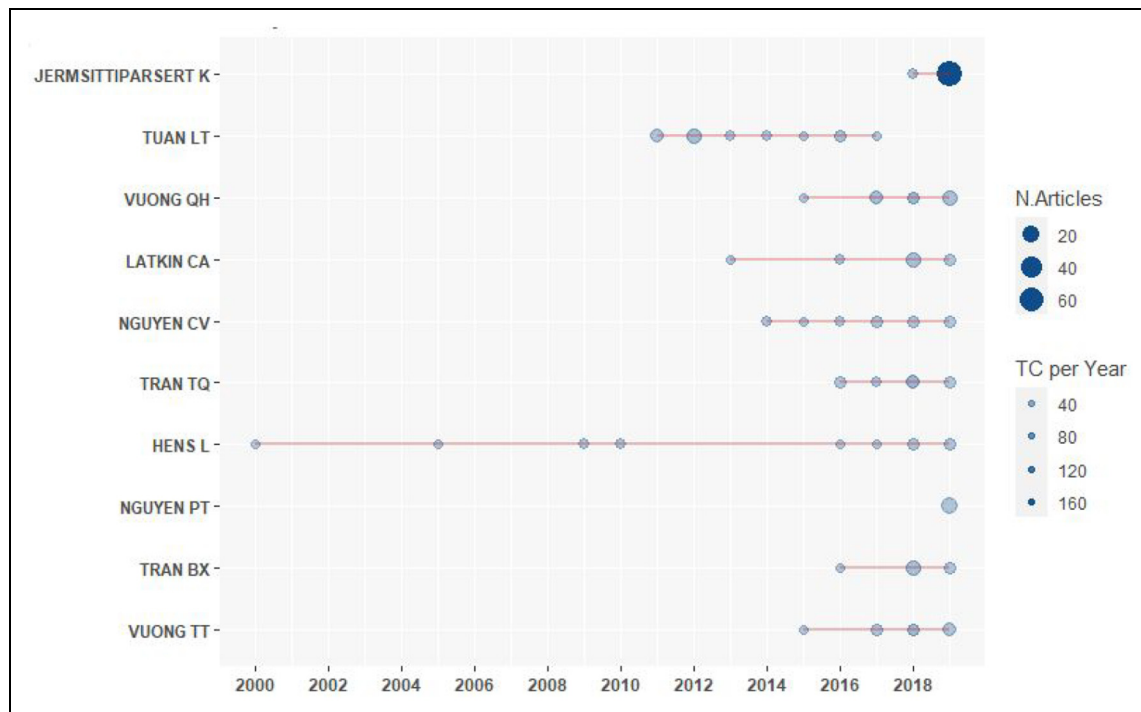
showed the biggest increase in the number of publications, especially over the last three years with 117, 197 and 386 publications, respectively. Social science researches related to Environmental Sciences, and Arts and Humanities were in the second group with more than 540 publications in each category over the last two decades. The third group includes the following categories with more than 300 publications over the study period: Economics and Finances ( $n = 409$ ); Business, Management and Accounting ( $n = 357$ ); Medicine, Nursing and Health ( $n = 322$ ); and Agriculture and Biology ( $n = 314$ ). Energy ( $n = 193$ ), and Psychology and Philosophy ( $n = 115$ ) were in the last group with the lowest number of publications.

### 3.2. Historical direct citation

Overall, the collection of 3015 papers was cited 25489 times in other published documents. There were 18 papers that had more than 100 citations, 5 papers had more than 200 citations and only 2 papers with more than 300 citations. Among the publication collection, there were 812 papers (26.93%) which have not been cited yet at the time of this study. The historical direct citation network of the top 26 most local cited papers in the collection is shown in Figure 3. Each node represents a paper, while each edge represents a direct citation between two papers and the positions of nodes and edges are proportionate to the publications years [31]. Figure 4 indicates the core literature on social science publications from Vietnam between 2000 and 2019. The most local cited and relevant papers can be identified and classified into different groups represented by different colours [21,34–36]. Huong and Fry [34] reviewed the complex relations among history, education, political economy and social changes in Vietnam. Meyer et al. [35] reviewed the Vietnamese economy, culture, society and policies towards foreign investment to inform those considering investing in Vietnam and also provided some practical advises. Hien [21] compared research capabilities of East Asian countries and provided suggestions for enhancing research capability and reshaping science and higher education system in Vietnam. Nguyen [36] studied the implementation of the primary English language education policy in Vietnam in 2010.

### 3.3. Publication by Vietnamese scholars

Top 10 authors based on total publications and citations, their institutions and their h-indexes, are shown in Table 2. Jermittiparsert K published most of the papers ( $n = 80$ ), followed by Tuan LT ( $n = 28$ ), Vuong QH ( $n = 25$ ), Latkin



**Figure 4.** Annual publications of the top 10 most productive authors publishing on social sciences in Vietnam. Artwork generated with biblioshiny tool [1].

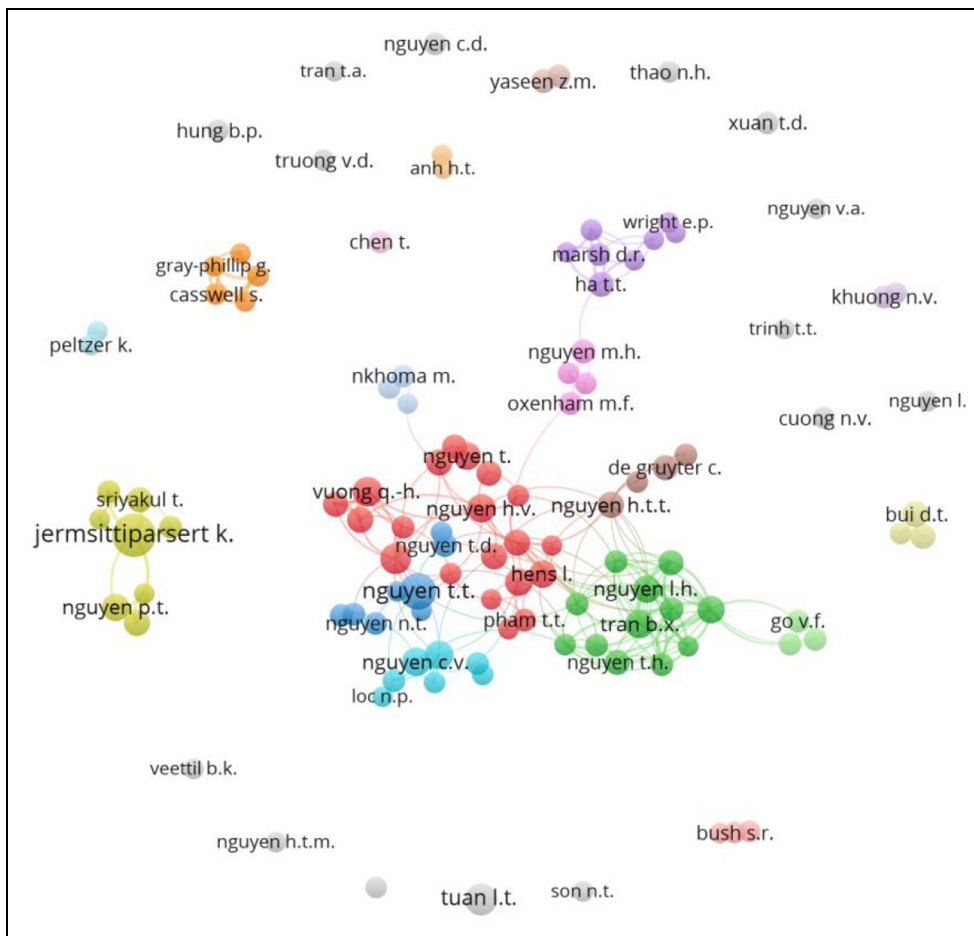
CA ( $n = 20$ ) and Nguyen CV ( $n = 20$ ). Seven out of ten authors have their current institutions located in two of the biggest cities in Vietnam (three authors in Hanoi and four authors in Ho Chi Minh City (HCM City)). The three remaining authors are located in the United States, Belgium and France. Ton Duc Thang University is the only institution having two authors in the top 10 (i.e. Jernsittiparsert K and Nguyen CV). The top 10 authors published totally 222 papers, which accounts for 7.36% of the collection.

As seen in Figure 4, Jernsittiparsert K has the highest number of publications and citations, however, all the papers from this author on social sciences in Vietnam were published only in two years (2018 and 2019). Hens L has the longest publication history, starting from 2000, while Nguyen PT is a newcomer in the research area with the first papers published in 2019. The remaining authors in the top 10 mostly started publishing after 2011.

The visualisation of the co-authorship network of 112 co-authors is shown in Figure 5, after applying the cut-off of seven publications for each author. Authors are grouped into clusters where the position of an author within the constellation represents how frequent their co-occurrence was with other authors [9]. The size of the circles represents the number of publications while the thickness of lines between authors represents their strength of collaborations, which was determined by the number of publications they appeared together as co-authors. The most productive authors normally have strong collaborations with others, and appear at the centres of their clusters. Such authors are Jernsittiparsert K (yellow cluster), Tran BX (green cluster), Nguyen CV (cyan cluster) and Vuong QH and Hens L (red cluster). On the contrary, stand-alone and isolated authors have fewer connections with others, as well as fewer publications.

### 3.4. Contribution by Vietnamese institutions

A total of 3353 different research institutions participated in the collection of 3015 publications. Note that one author can be affiliated to more than one research institution, or a paper can be contributed by authors from several institutions. As this study investigates the picture of international publication trend on social sciences in Vietnam, the top 10 most productive Vietnamese research institutions is presented in Table 3. Top 10 most productive Vietnamese institutions produced 42.22% of the publication collection ( $n = 1273$ ), with six out of ten having more than 100 published papers on social sciences over the last two decades. Five institutions are located in the north (Hanoi), three located in the south (HCM City), one located in the centre (Da Nang) and one located in the southwest (Can Tho). There are two private



**Figure 5.** The network of 112 co-authors publishing on social sciences in Vietnam. Each node represents an author. The size of the nodes indicates the number of publications, while the thickness of the lines between nodes shows the strength of collaboration. Artwork generated with VOSviewer tool [30].

**Table 2.** Top 10 most productive authors publishing on social sciences in Vietnam based on total number of publications.

Order	Authors	Institutions	Country	No. of articles	No. of citations	h-index
1	Jermsittiparsert K	Ton Duc Thang University	Vietnam	80	366	11
2	Tuan LT	School of Government, University of Economics	Vietnam	28	200	8
3	Vuong QH	Phenikaa University	Vietnam	25	114	6
4	Latkin CA	Johns Hopkins University	The United States	20	82	4
5	Nguyen CV	Ton Duc Thang University	Vietnam	20	76	6
6	Tran TQ	National University Hanoi	Vietnam	19	91	6
7	Hens L	Vlaamse Instelling voor Technologisch Onderzoek	Belgium	18	135	6
8	Vuong TT	Campus de Dijon, Sciences Po	France	18	87	6
9	Tran BX	Hanoi Medical University	Vietnam	18	44	4
10	Nguyen PT	Ho Chi Minh City Open University	Vietnam	18	4	2

universities in the top 10, which are RMIT University (ninth) and Duy Tan University (tenth), while the remaining eight are public universities.

Annual publications of the top 10 Vietnamese institutions are shown in Figure 6. It is clear that the publication trends of these institutions are similar to the general publication trend of social sciences presented in Figure 1. The number of



**Table 3.** Top 10 most productive Vietnamese institutions publishing on social science based on total number of publications.

Order	Institutions	Location	No. of articles	%
1	National University Hanoi (NUH)	North	331	10.96
2	Ton Duc Thang University (TDTU)	South	286	9.47
3	National University HCM City (NUHCM)	South	148	4.90
4	Hanoi University (HNU)	North	116	3.84
5	National Economics University Hanoi (NEUHN)	North	108	3.58
6	Can Tho University (CTU)	Southwest	103	3.41
7	University of Economics HCM City (UEHCM)	South	91	3.01
8	Hanoi Medical University (HMU)	North	77	2.55
9	RMIT International University Vietnam (RMIT)	North	73	2.42
10	Duy Tan University (DTU)	Centre	68	2.25

publications from these institutions were very low before 2009 with a maximum of 15 publications per year in 2006 and 2008. Then, it started to increase slowly for the 2009–2016 period before it rose sharply from 2017. The total number of publications in 2019 ( $n = 519$ ) is double that of 2018 ( $n = 256$ ), and nearly four times higher than 2017 ( $n = 138$ ). National University Hanoi (NUH; first), National University HCM City (NUHCM; third) and Hanoi University (HNU; fourth) had the longest publication history with a share of 10.96% ( $n = 331$ ), 4.90% ( $n = 148$ ) and 3.84% ( $n = 116$ ) in the publication collection, respectively (Table 3). Ton Duc Thang University (TDTU; second) contributed to 9.47% ( $n = 286$ ) of the collection, but only entered into the research fields from 2013, and the number of publications from TDTU only rocketed in the last three years. Other newcomers in the research fields are RMIT and Duy Tan University (DTU) with their first papers having appeared in 2011 and 2016, respectively.

### 3.5. Journals publishing

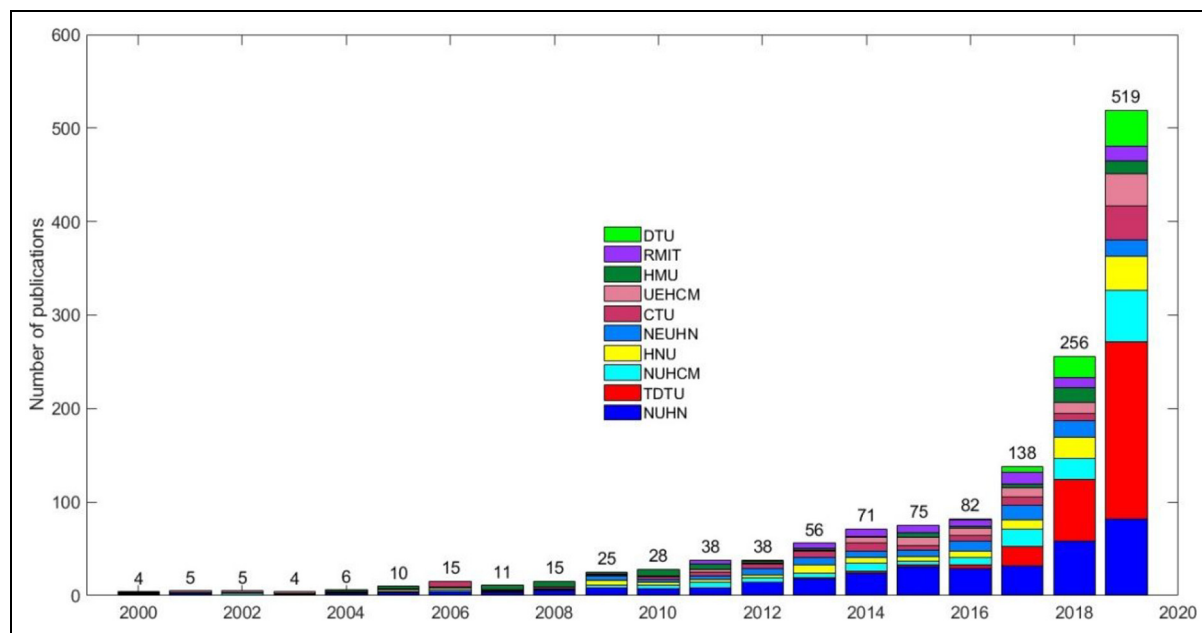
The collection of 3015 papers was published in 1000 different sources (Table 1), including journals, books and so on. According to the Bradford's law [37], 50% of these sources published less than nine papers. Table 4 shows the list of the top 10 most active journals publishing researches on social sciences from Vietnam, based on the total number of publications. Sustainability published the highest number of papers ( $n = 128$ ), followed by Water ( $n = 70$ ) and IJICC ( $n = 62$ ). The remaining seven journals published between 27 and 37 papers during the study period. The top 10 most active journals published 15.62% ( $n = 471$ ) of the publication collection. Five out of ten journals belong to the first quartile (Q1), two journals belong to the second quartile (Q2), two journals belong to the third quartile (Q3) and one journal belongs to the fourth quartile (Q4).

Consistent with the publication trend on social sciences in Vietnam (Figures 1, 2 and 6), the number of papers from Vietnam scholars published in these journals was very low before 2014 and only started to increase after 2016 (Figure 7). In addition, recent papers over the last four years were mostly published in the first four journals in the top 10.

The co-citation analysis of the top 10 journals indicates the bibliographic coupling between them, with four different groups (Figure 8). The first group included Sustainability, International Journal of Innovation Creativity and Change (IJICC), Asian Social Science and Asian Economic and Financial Review (AEFR). Social Science and Medicine, Culture Health and Sexuality, and AIDS Care composed the second group. The third group contained Environment Development and Sustainability, and Land Use Policy, while only Water formed the last group.

### 3.6. Global collaboration

According to the retrieved results, the collection of 3015 publications were published by authors from 149 countries (or territories, hereafter referred to as 'countries' for simplification). The top 10 most productive partner countries publishing on social sciences with Vietnamese scholars is illustrated in Table 5. Australia ranked first based on the total papers ( $n = 450$ ; 14.92%), but second based on the total citations ( $n = 4639$ ; 18.20%). In contrast, the United States ranked second based on the total papers ( $n = 430$ ; 14.26%), but moved to the first position based on the total citations ( $n = 6336$ ; 24.86%). The remaining countries were from Asia (Japan, Thailand and China), Europe (The United Kingdom, France, The Netherlands and Germany) and New Zealand. The top 10 most productive partner countries contributed to 55.06% of papers in the publication collection ( $n = 1660$ ).



**Figure 6.** Annual publications of the top 10 most productive Vietnamese institutions on social sciences.

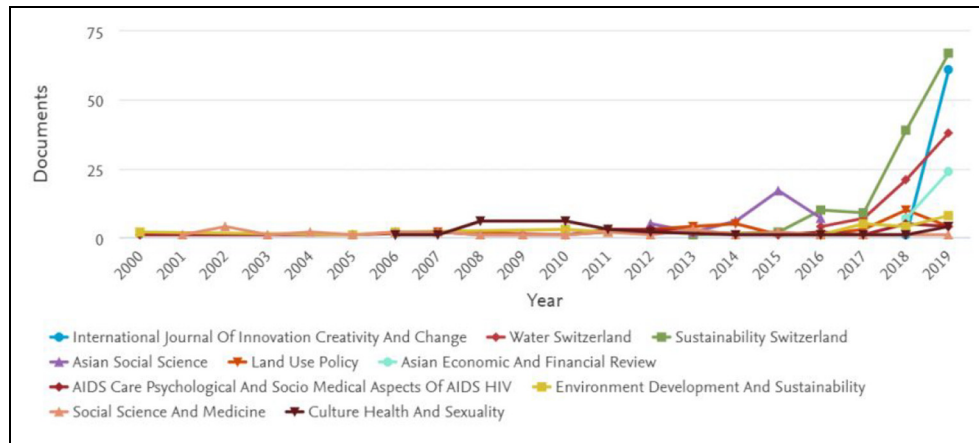
**Table 4.** Top 10 most active journals publishing researches on social sciences from Vietnam based on total number of publications.

Order	Journals	Publishing house	No. of articles	h-index <sup>a</sup>	Quartile <sup>a</sup>
1	Sustainability	MDPI	128	68	Q2
2	Water	MDPI	70	42	Q1
3	International Journal of Innovation Creativity and Change (IJICC)	Primrose Hall Publishing Group	62	11	Q3
4	Asian Social Science	Canadian Center of Science and Education	37	25	Q4
5	Land Use Policy	Elsevier	32	103	Q1
6	Asian Economic and Financial Review (AEFR)	Asian Economic and Social Society	31	8	Q3
7	AIDS Care-Psychological and Social-Medical Aspects of AIDS/HIV (AIDS Care)	Routledge	29	92	Q1
8	Environment Development and Sustainability	Springer	28	52	Q2
9	Culture Health and Sexuality	Routledge	28	60	Q1
10	Social Science and Medicine	Elsevier	27	229	Q1

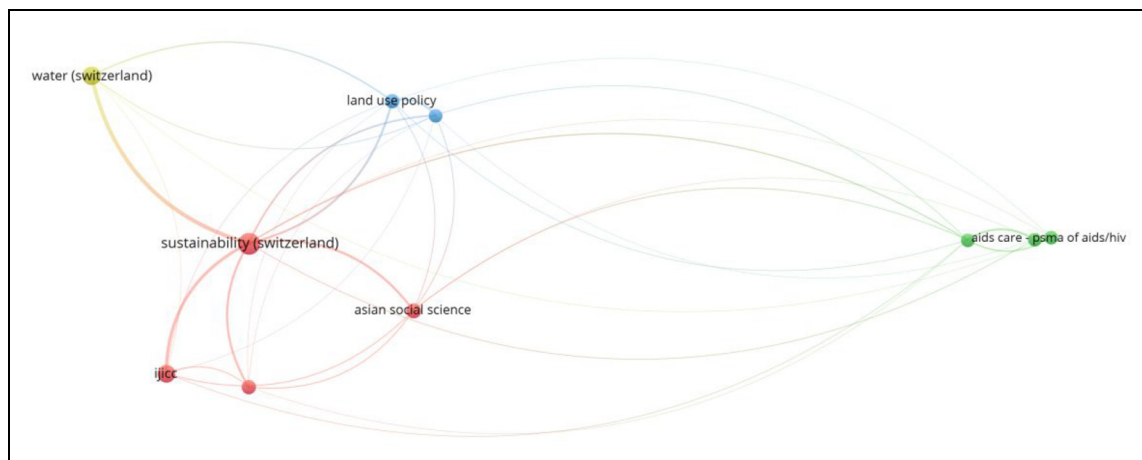
MDPI: Multidisciplinary Digital Publishing Institute.

<sup>a</sup>According to SCImago Journal & Country Rank (<https://www.scimagojr.com/>) dated 17 October 2020.

After applying the cut-off of seven publications for each country, the visualisation of the co-authorship network of 60 countries is presented in Figure 9. Each node represents a country. The size of nodes represents the number of publications while the thickness of lines between countries represents their strength of collaborations. Sixty countries were classified into seven different clusters, and the top 10 countries were in the centre of their clusters. The largest cluster (red) showed strong collaboration between European countries (France, The Netherlands, Italy, Ireland and so on) and Asian countries/regions (Hong Kong, Taiwan, South Korea and Singapore). The second largest cluster (green) included many countries in Africa (Ethiopia, Ghana, Kenya, Nigeria, Zimbabwe and South Africa). The third cluster (blue) was mostly formed by other Asian countries (India, Indonesia, Iran, Malaysia, Nepal and Philippine). There were three clusters with only one country (Australia, the United States and Japan).



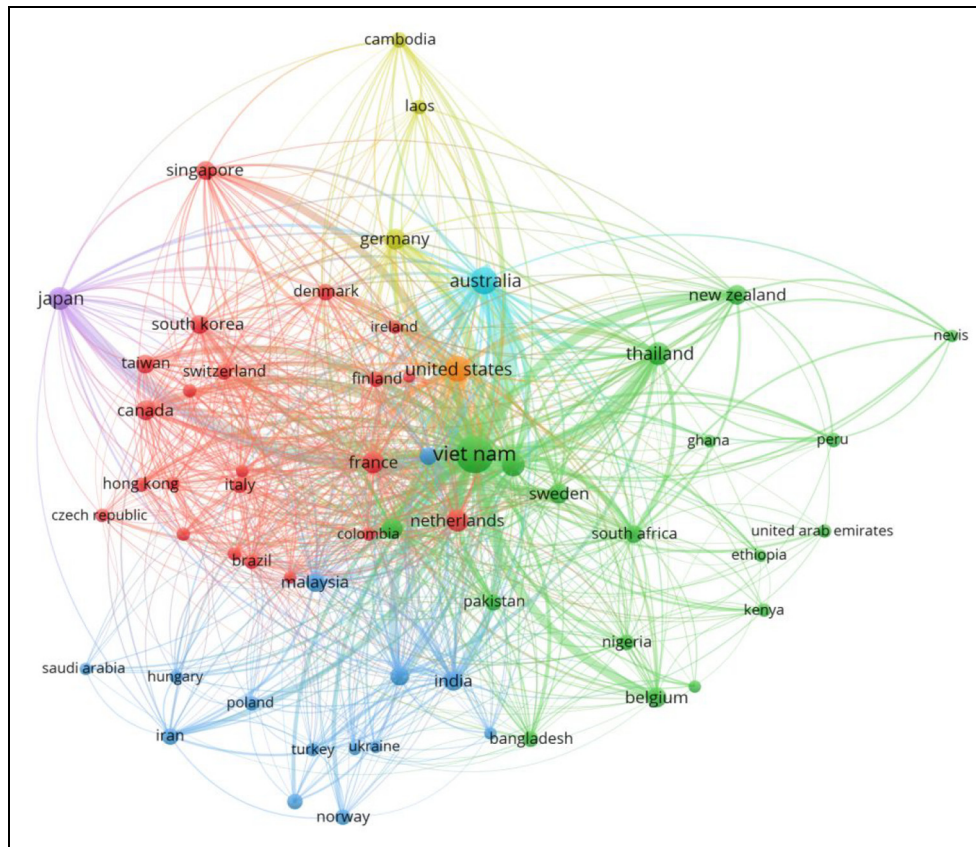
**Figure 7.** Annual publications of the top 10 most active journals publishing researches on social sciences from Vietnam.



**Figure 8.** Bibliographic coupling among the top 10 most active journals publishing researches on social sciences from Vietnam. Artwork generated with VOSviewer tool [30]. Journal full names are shown in Figure 7.

**Table 5.** Top 10 most productive partner countries publishing on social science with Vietnamese scholars based on total number of publications.

Order	Country	Total papers	% Papers	Total citations	% Citation
1	Australia	450	14.92	4639	18.20
2	The United States	430	14.26	6336	24.86
3	Japan	202	6.70	2170	8.52
4	Thailand	201	6.66	2129	8.35
5	The United Kingdom	197	6.53	3228	12.66
6	France	146	4.84	2641	10.36
7	The Netherlands	146	4.84	2362	9.26
8	Germany	121	4.00	1680	6.60
9	China	112	3.72	1754	6.88
10	New Zealand	94	3.12	950	3.72



**Figure 9.** Cooperation network of 60 partner countries (at least seven papers) and Vietnam on social sciences. The size of the nodes indicates the number of publications, while the thickness of the lines between nodes shows the strength of collaboration. Artwork generated with VOSviewer tool [30].

### 3.7. Keywords and terms analysis

Word clouds analyses of the 100 most frequent keywords plus in the publication collection is presented in Figure 10 where a higher frequency results in a larger font size. Keywords plus are words or phrases that frequently appear in the titles of an article's references, but do not appear in the title of the article itself [38]. Since keywords plus are generated from cited articles, they cannot be changed. Note that the keyword 'Viet Nam', which appeared in nearly one-third of the collection ( $n = 972$ ) was removed to increase the visibility of other keywords. The trends of published researches focused on expected terms such as humans, male, female, adult, young adult and adolescent. The most frequent geographical areas in the collection were Eurasia, Asia, Southeast Asia, Vietnam and China.

A deeper analysis was conducted on the co-occurrence of 270 author's keywords which appeared at least five times in the collection (Figure 11). Each node represents a keyword (or topic) and the thickness of lines between two nodes represents the strength of the relationship between them, which was determined by the frequency they appeared together in published papers. Some core research areas were highlighted: climate change, gender, poverty, higher education, HIV, culture, sustainable development, migration, inequality and education. Consistent with the results in Figure 10, the co-occurrence map shows clearly that the most frequent geographical study areas were Vietnam, China, Indonesia and other regions in Asia. The 270 most frequent authors keywords were classified into 16 different clusters coded in different colours as shown in Figure 11.

### 3.8. Research topics evolution

In order to trace the temporal trend of the main research topics on social sciences from Vietnam, the study period was separated into three annual intervals as introduced in Figure 1 (2000–2007, 2008–2013 and 2014–2019). Thematic maps of authors' keywords for each interval, and for the whole period were generated as shown in Figure 12. A thematic map

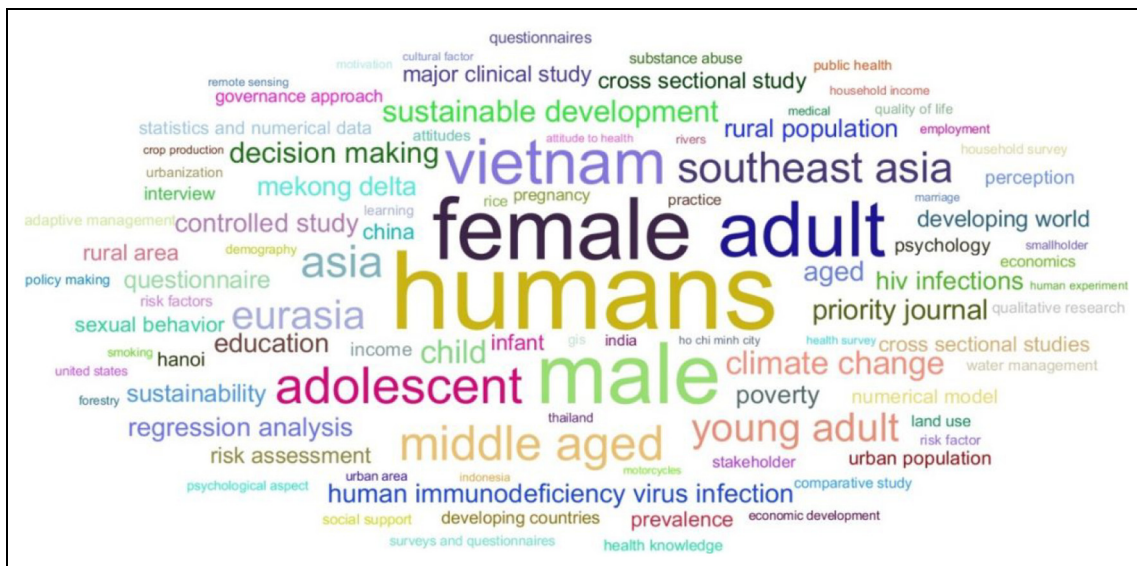


Figure 10. Word clouds of the 100 most frequent keywords plus.

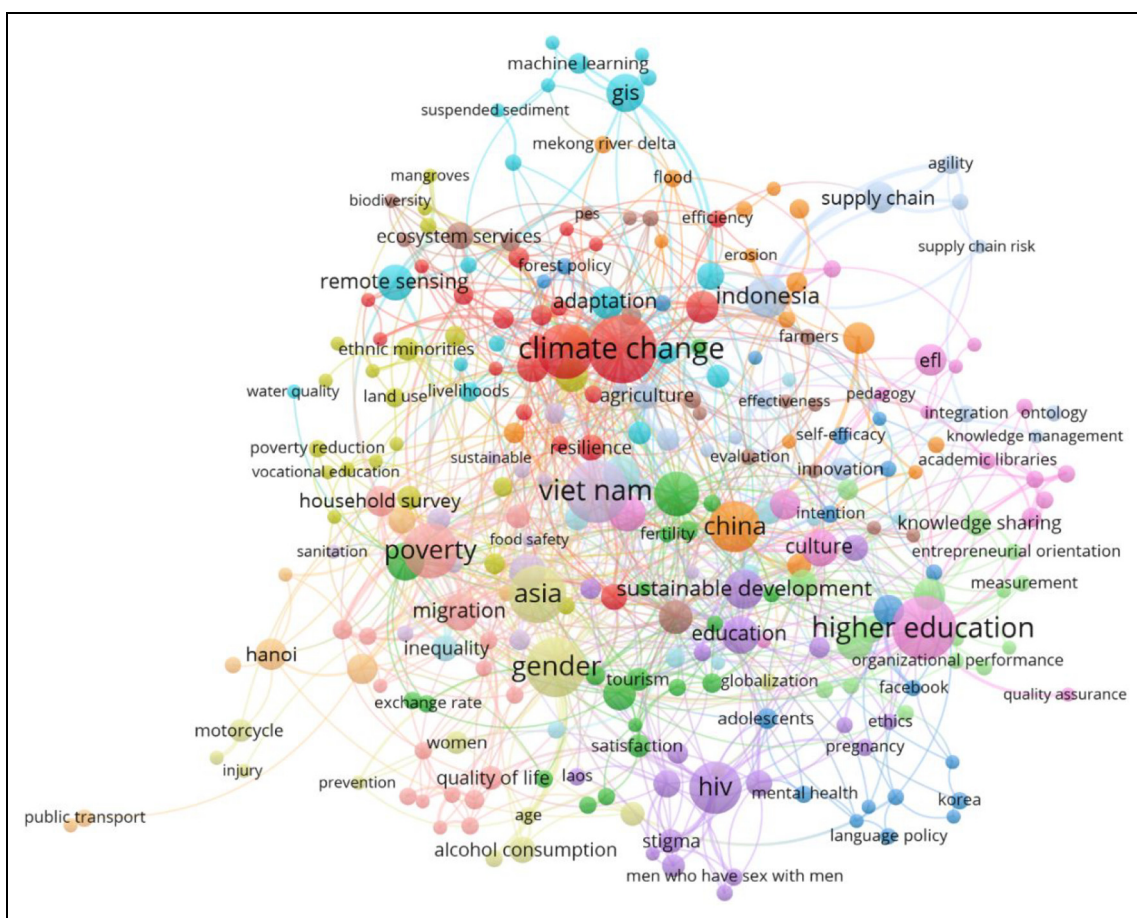
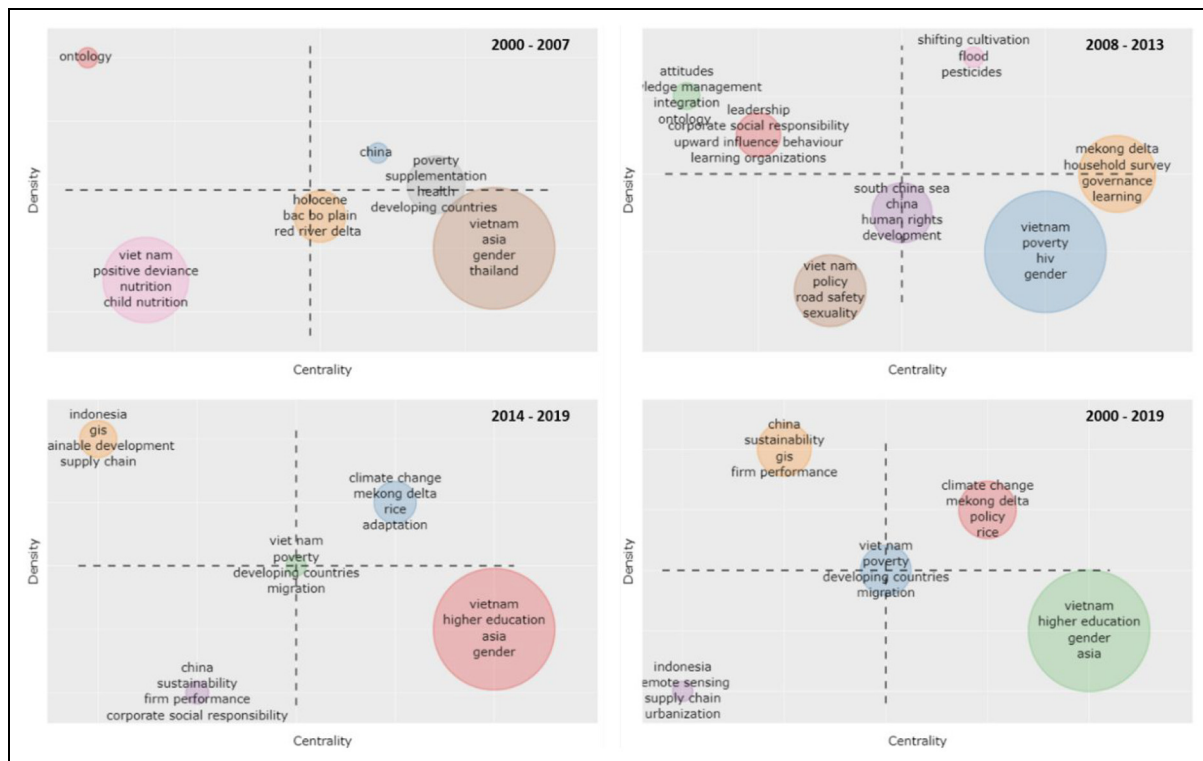


Figure 11. The co-occurrence of 270 authors' keywords (at least five times). The thickness of lines represents the strength of the relationship between keywords, which was determined by the frequency they appeared together in published papers. Artwork generated with VOSviewer tool [30].



**Figure 12.** Evolution of research topics on social sciences in Vietnam. Artwork was generated with biblioshiny tool [1].

allows a visualisation of four different typologies of themes. The upper-right quadrant shows the motor themes which are characterised by both high centrality and high density. Therefore, motor themes are important in the research field. The upper-left quadrant is characterised by high density but low centrality. These themes are highly developed and isolated topics. Emerging or declining topics are located in the lower-left quadrant, and finally, basic and transversal topics are located in the lower-right quadrant. Note that only the four most frequent keywords were presented in each node in Figure 12. Studies related to poverty moved from motor themes in the first sub-period, to basic themes in the second sub-period and finally centred of the thematic map in the last sub-period. China-related studies moved from motor themes in the first period to declining topics in the last sub-period. For the whole study period, the most important research topics were identified as climate change, Mekong delta, policy and rice. Studies related to remote sensing, supply chain, urbanisation and Indonesia were identified as emerging topics. Vietnam, higher education, gender and Asia were identified as basic and transversal topics.

#### 4. Discussion and conclusion

In this study, bibliometric and content analysis were applied to investigate the development in scientific output of social science researches in Vietnam over the last two decades, using bibliographic data from the Scopus database for the 2000–2019 period.

The number of publications on social sciences from Vietnam has increased significantly over time, and can be divided into three sub-periods as can be seen in Figure 1 (2000–2007, 2008–2013 and 2014–2019). There has been a spike in the scientific output for the recent three years (2017–2019) when the number of publications rocketed and accounted for 53.76% of the collection. Similar increasing trends were observed in the top 10 categories of social sciences, but the development was not equal between them (Figure 2). Education, Environmental Sciences, Arts and Humanities, and Economics and Finances witnessed the biggest increases, while the increase in Psychology and Philosophy was lowest. This is an issue that needs government policy investment because the development of psychology is essential for the development of education, as well as of many other fields in the modern society. The increase in the number of publications in the recent three years was significant in all categories. Except in Medicine, Nursing and Health for the year 2017–2019, which accounted for 39.75% of the papers, the contributions of this period in other categories were always

higher than 52%, such as 56.27% in Education, 58.12% in Environmental Sciences, 52.76% in Arts and Humanities, 60.64% in Economics and Finances and 67.24% in Business, Management and Accounting. Policy changes from the government and from universities and research institutions was one of the main reasons given as explanation for this incensement of scientific output. For example, decision number 08/2017/TT-BGDĐT of the Ministry of Education and Training [20] set higher requirements for all PhD candidates and their scientific supervisors. PhD candidates now are required to publish at least two international publications, with at least one paper on an ISI/Scopus journal to qualify for graduation. In addition, the money-rewarding policies for authors having publications in high-ranking ISI/Scopus journals was another important reason because it helped to improve authors' motivation and research productivity. Last but not least, the establishment of national scientific foundations, such as the NAFOSTED in 2008, provided considerable funding and facilities for scholars to conduct high-quality researches. Our results found that the NAFOSTED foundation was the biggest sponsor for social science researches in Vietnam over the last two decades with 73 projects.

Considering the author contribution, seven out of ten most productive authors were from two of the biggest cities in Vietnam (Hanoi and HCM City), and the three others were from the United States, Belgium and France, respectively (Table 2). One author among these three has Vietnamese origin (Vuong TT). Two of the three authors have strong collaboration with other Vietnamese authors in the top 10 (Vuong TT with Vuong QH (third position) and Latkin CA with Tran BX (ninth position)), while author Hens L has strong collaboration with Vietnamese authors outside the top 10. In general, authors in the top 10 regularly have international publications, but mostly focusing over the last 10 years (Figure 4). There were only four authors having more than 100 citations, and only one paper [39] from the top 10 authors appeared in the historical direct citation network (Figure 3). The historical direct citation network is important as it identifies the most relevant and contributing papers in the research fields. It would be very useful for young researchers when studying the literature. Vietnamese scholars highly contributed to nearly half of the collection as we found that the corresponding authors of 1414 papers (46.90%) were from Vietnam. In analysing the co-authorship network of 112 authors (with at least seven papers), we showed that a large part (69 authors) had connections (Figure 5). This suggests that having a large network was very important as isolated scholars tend to have fewer publications.

When analysing the contribution of Vietnamese research institutions, we concluded that most of the studies were conducted in only a few highly developed institutions (mostly located in Hanoi and HCM City) as 44.22% of the papers in the collection came from the top 10 most productive institutions (Table 3). Eight out of ten institutions in the top 10 were public universities because they have strong resources for development and research. However, other large Vietnamese research centres on social sciences were not in the top 10, for instance, Vietnam Academy of Social Sciences or Vietnam Institute of Educational Sciences. With the presence of two private universities in the top 10 (although they were at the ninth and tenth positions), it is expected that the contribution from private sector continues to increase in the future. As expected, there has been a similar spike in the scientific output from the top 10 institutions, for the recent three years (Figure 6). The number of publications from these institutions for the 2017–2019 period was 913 or a share of 65.16% of the collection. Ton Duc Thang University has experienced the highest increase with 519 papers in 2019, nearly three times higher than 2018 ( $n = 256$ ) and nine times higher than 2017 ( $n = 138$ ). This was the direct result of the creation of strong research groups, which proved effective in other countries [40], and this model needs to be expanded in other research institutions and universities.

Considering the source analyses, we showed that the total number of journals publishing social science researches from Vietnam was high ( $n = 1000$ ; Table 1) and the top 10 journals published only 15.62% of the collection. Vietnamese scholars tend to not submit their works to high-ranking journals as in the top 10; there were only five Q1 journals with 186 publications (6.17% of the collection). In addition, most of the papers in 2019 were published in Q2 (Sustainability) and Q3 (IJICC) journals (Figure 7). These findings suggest that Vietnamese scholars need to improve the quality of their works in order to meet the standard of high-ranking journals in social sciences.

Vietnamese scholars had collaborations with 149 other partner countries, but the contribution of the top 10 most productive partner countries was dominant, accounting for 55.06% of the collection. Australia and the United States were at the two first positions, for both the number of papers and the number of citations. In addition to the countries listed in Table 5, Vietnamese scholars also had wide collaborations with other partners in Europe (Sweden, Finland, Denmark and Switzerland), Asian countries/regions (India, Hong Kong, Taiwan and Singapore) and some countries in South America (Colombia and Brazil) and Africa (South Africa, Nigeria, Kenya and Ghana).

Keywords analyses showed that the research topics were diverse. The most basic and transversal topics focused on gender, poverty, HIV, higher education and sustainable development. Climate change was also a hot topic, to investigate how climate change affected the lives of people, mostly over the Mekong Delta [41,42]. Researches about China were popular topics in the past, but recently became a declining topic.

There are several limitations remaining in this study. First, the use of only the Scopus database might not cover all scientific papers on social sciences from Vietnam. Using complementary bibliographic sources, such as Web of Science,

Google Scholar and Dimension, will reduce omissions in the analysis. Second, two most popular and effective bibliometric analysis tools were used for the analyses (biblioshiny and VOSviewer), but there were some function restrictions that could not be done for the moment, such as the statistic of scholars by gender or statistic of new scholars by years. Third, author names and their institutions are not standardised in the Scopus database. One author can have several names in different orders, and manual correction was impossible. As our results totally depended on the quality of input data extracted from the Scopus database, this was the main source of error of our analyses. In addition, document type (DT) filter was used for the collection of the dataset in this study, however, it was previously reported that DT error rate of Scopus was higher than WoS and PubMed [43].

To summarise, this study used bibliographic data from the Scopus database to investigate the growth trend of social science publications in Vietnam over the last two decades. We showed that the number of papers increased gradually over the years, especially rocketed in the last three years (2017–2019) in most important categories of social sciences. Although the number of publications rose quickly, it mostly focused on a few public research institutions with strong resources, and Vietnamese scholars need to strengthen the quality of the works to meet international standard of high-ranking journals. We recommend that government, universities and research institutions need to provide supporting policies, plans and funding to help Vietnamese scholars boost their scientific productivity in the future.

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