IS REGIONAL ECONOMIC RESEARCH STILL RELEVANT?: A BIBLIOMETRIC APPROACH USING VOSVIEWER

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ABSTRACT

This research aims to find out about the latest trends in regional economic research topics. The research method used in this research is bibliometric analysis using the Voswiewer application. Bibliometric research method is a research method that can analyze a very large volume of research. The bibliometric techniques used in this research are performance analysis and science mapping. The results showed that the most productive and most influential journals in regional economic research topics are journals affiliated with environmental science. The most influential researchers in the field of regional economics are dominated by researchers affiliated with universities from China. Based on science mapping analysis, it can be seen that there are three most dominant elements in regional economic topics, namely environmental regulation, covid, and urban agglomeration. Meanwhile, based on network visualization analysis, it is known that there are several recent topics in the field of regional economics, namely economic resilience, industrial agglomeration, and digital economy.

Keywords: Regional Economic, Bibliometric, Vosviewer.

ABSTRAK

Penelitian ini bertujuan untuk mengetahui mengenai perkembangan terbaru dalam topik penelitian ekonomi regional. Metode penelitian yang digunakan dalam penelitian ini adalah analisis bibliometrik dengan menggunakan aplikasi Vosviewer. Metode penelitian bibliometrik yaitu metode penelitian yang dapat menganalisis volume penelitian yang sangat besar. Teknik bibliometrik yang digunakan dalam penelitian ini yaitu performance analysis dan science mapping. Hasil penelitian menunjukan bahwa jurnal paling produktif dan paling berpengaruh dalam topik penelitian ekonomi regional merupakan jurnal – jurnal yang terafiliasi dengan bidang ilmu lingkungan. Peneliti paling berpengaruh dalam bidang ekonomi regional di dominasi oleh para peneliti yang terafiliasi dengan universitas dari negara China. Berdasarkan analisis science mapping dapat diketahui terdapat tiga elemen paling dominan dalam topik ekonomi regional yaitu environmental regulation, covid, dan urban agglomeration. Sementara itu, berdasarkan analisis network visualization diketahui terdapat beberapa topik terbaru dalam bidang ekonomi regional yaitu economic resilience, industrial agglomeration, dan digital economy.

Kata Kunci: *Ekonomi Regional, Bibliometrik, Vosviewer.*

I. INTRODUCTION

The economic system is a dynamic entity where the nature and changes that occur in it are very important because it will affect the welfare of each individual which ultimately affects the social and political structure of a nation (Hoover & Giarratani, 2020). Modern growth theory often uses aggregate models such as income per capita as a measure of welfare and tries to find the main factors that influence growth (Ascani et al., 2012).

Economic growth at the national level is often fuelled by the performance of a small number of local economies where interactions are very dense. (Ascani et al., 2012). Starting from this, economists began to realize the importance of including spatial aspects in their economic analysis so that the resulting studies could be more comprehensive.

Spatial or geographical factors are beginning to be recognised as an important determinant of economic growth. These geographical factors are then supported by social and institutional factors owned by each region. These social and institutional factors function as a means to create regional advantages that are ultimately driven by the intensity of inter-regional interactions. (Ascani et al., 2012)

The characteristics of each region can certainly create differences in economic advantage so that it can lead to economic inequality. Iammarino et al. (2019) explained that there are two groups of forces that affect economic disparities between regions, the first is the long cycle of economic structural development caused by rapid technological development, and the second is the long cycle of regional evolution consisting of regional advantages such as the quality of human resources and regional-specific advantages such as the presence of companies or industries and the existence of formal and informal institutions.

The development of science in recent decades has increased exponentially. The same is true for regional economic research studies. This has led to an abundance of unstructured information. The consequence of this for researchers is that it is increasingly difficult for researchers to keep up with the latest developments in the topic they want to study. In addition, the large number of publications also makes it difficult for researchers to identify studies and evaluate quality and relevant publications to synthesize the available information (Linnenluecke et al., 2020).

Therefore, it is necessary to empirically investigate each published article to identify the latest developments and the contribution of each article to the development of science (Firmansyah, 2021). Bibliometric research is the answer to the vast amount of literature available. Bibliometric research is an important tool for assessing and analyzing the available literature (Moral-Muñoz et al., 2020) and can help researchers to find relevant literature among the abundance of information available (Firmansyah, 2021; Zhu & Guan, 2013). This type of research has gained increasing popularity in recent years (Donthu et al., 2021; Linnenluecke et al., 2020; Aria & Cuccurullo, 2017). The rapid development of software that assists bibliometric research such as VOSviewer and Gempi and the increasing accessibility to scientific databases such as Dimensions, Scopus, and Web of Science have fuelled the popularity of research in bibliometrics (Donthu et al., 2021).

This study uses bibliometric analysis to evaluate and synthesize research trends in the field of regional economics. Bibliometric analysis is useful for researchers to provide a good understanding of the field of study they want to study and find research gaps so that they can produce quality research.

II. RESEARCH METHODS

In this research, the author uses bibliometric research methods. The bibliometric research method is a popular and excellent method of finding and analyzing very large volumes of research data (Donthu et al., 2021; C. Li et al., 2017).

A. Research Procedures

The following is a general procedure for conducting bibliometric research as described by Donthu et al., (2021):

Step One: Define the purpose and scope of the research. Biblical research must be

conducted in a structured and systematic manner. Determining the purpose and scope at the initial stage aims to make the research run effectively and efficiently so as to avoid futile results. The purpose and scope of this research is to find out the latest development of research in the scope of regional economics so that it can be a reference for researchers to find research gaps.

Step Two: Selecting bibliometric analysis techniques. At this stage, the author must determine what analytical tools will be used in bibliometric research in order to achieve the objectives determined in the first step. There are several techniques commonly used by researchers in bibliometric research such as Performance Analyses and Science Mapping.

Step Three: Collecting data for analysis. Bibliometric research is the study of large volumes of databases. There are several journal databases commonly used by researchers such as Web of Science, Scopus, Dimension, and Google Scholar.

In this study, the author took data from the Dimension database because it is a reputable journal database and has a very large database. The keywords used in this research are: "regional economy", "spatial economy", "local economy", and "regional economy".
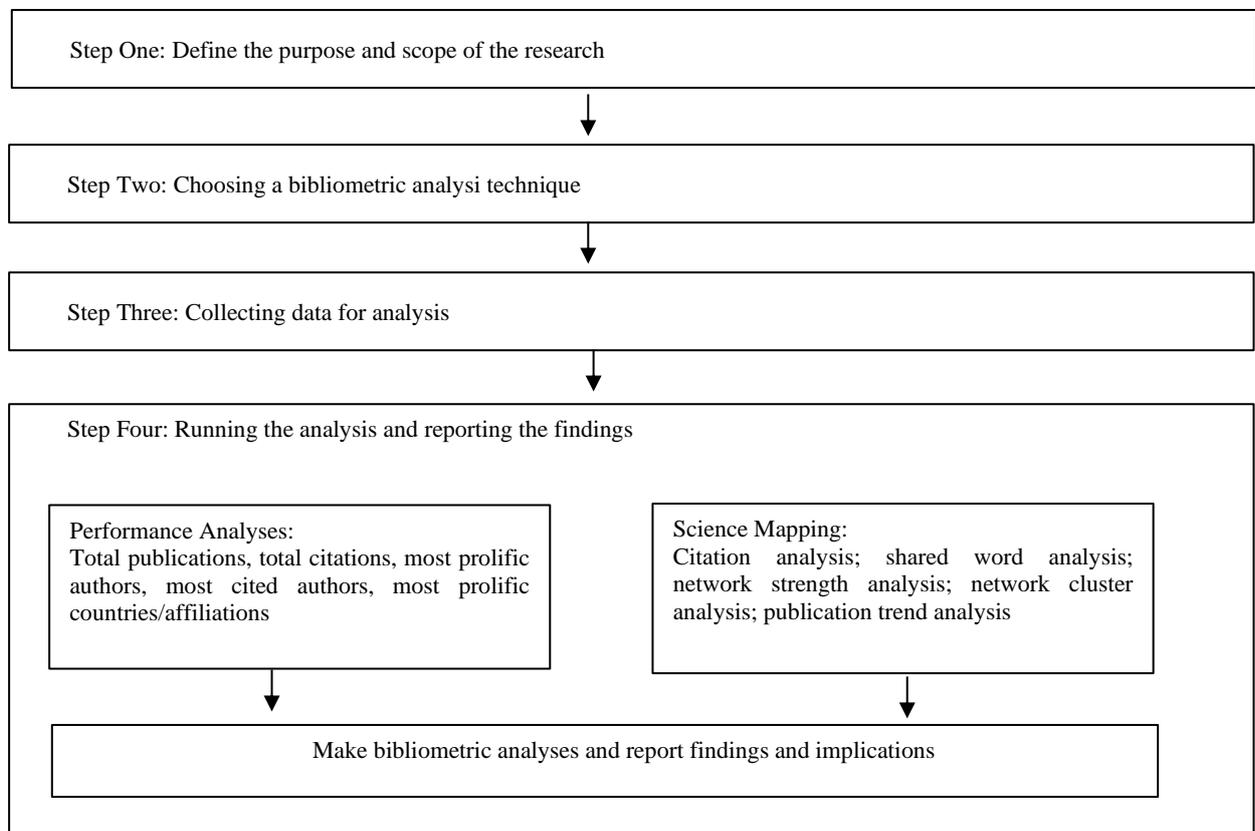

Figure 1. Bibliometric Research Procedure
Source: Donthu et al., (2021)

The time period used in this research is for four years starting from 2020 to 2023. The database collected from the four keywords totalled 2000 journals. Furthermore, the author conducted data cleaning using Mendeley software to eliminate duplicate journals so that 1508 unique journals were obtained which will then be used in bibliometric analysis in this study.

Step Four: Running the analyses and reporting the findings. The database that has previously been obtained is then analyzed using predetermined analysis techniques. In summary, the bibliometric data analysis procedure is described in Figure 1.

B. Supporting Software

Data processing and visualization carried out in this study used the help of several supporting software, namely Mendeley to clean and eliminate RIS (Research Information Systems) formatted data. Then

Microsoft Excel was used to conduct performance analyses using the pivot table feature. Furthermore, science mapping analysis was carried out using VOSviewer software.

III. RESULTS AND DISCUSSION

A. Total Publication and Citation

Based on table 1, it can be seen that the number of publishing articles with the theme of regional economics continues to increase every year except 2023. This is because this research was conducted at the beginning of 2023.

Table 1. Total Publications and Citations

Year	Total Publications	Total Cited
2020	200	4496
2021	468	5087
2022	708	2182
2023	132	22
Total	**1508**	**11787**

Source: Results of Data Processing Using Microsoft Excel

Meanwhile, when viewed based on the number of citations, it can be seen that in 2022 there is a significant decrease in the number of citations even though when viewed from the total publications it has increased.

B. Most Productive Journals

Table 2 shows the top 20 journals with the most regional economics articles published. Interestingly, the top five journals that published the most regional economic articles were journals that focus on environmental and health studies, namely International Journal of Environmental Research and Public Health; Environmental Science and Pollution Research; PLOS ONE; Journal of Environmental Management; and The Science of the Total Environment. In addition, articles on regional economics are also published in journals focusing on psychology, public health, regional studies, and sociology.

Based on this, we can understand that the study of regional economics is a multi-disciplinary study and synergises with other disciplines. In addition, it also shows that the latest trends in regional economic research topics are mostly about environmental issues.

C. Most Influential Journals

The number of citations can reflect the strength of an article's influence on a research topic. Table 3 shows the 20 journals with the highest number of citations. From table 3, it can be seen that the 5 journals with the most citations are still dominated by journals with environmental science fields of study. Meanwhile, although the top five journals are still dominated by environmental science journals, the rest are filled with economic science journals.

Some of the economics journals that are included in the category of the 20 most frequently cited journals for the field of regional economic studies include the Journal of Economic Behaviour & Organization; Journal of Public Economics; Oxford Review of Economic Policy; Socio-Economic Planning Sciences; China Economic Review; and American Journal of Agricultural Economics.

D. Most Influential Articles

The measure of the influence of an article on the development of a discipline can be seen from how much the article is cited. Table 4 shows the 10 most influential journals in regional economic studies. The first place is occupied by the article entitled "Modeling the role of environmental regulations in regional green economy efficiency of China: Empirical evidence from super efficiency DEA-Tobit model" written by Shuai & Fan, (2020) published in the Journal of Environmental Management. The analysis method used in this research is the efficiency measurement method using Data Envelopment Analysis (DEA) and regression using Tobit Model.

The second article is occupied by a journal entitled "Poverty and economic dislocation reduce compliance with COVID-19 shelter-in-place protocols' ' written by Wright et al., (2020). The journal was published in the Journal of Economic Behaviour & Organization. The third best article was written by Y. Li et al., (2021) published in the journal Environmental Science and Pollution Research with the title "Energy structure, digital economy, and carbon emissions: evidence from China". The method used in this study is the STIRPAT (Stochastic Impacs

by Regression on Pollution, Affluence and Technology) model to examine the effect of energy structure, and the digital economy on carbon emissions in China in 2011-2017.

Table 2. Top 20 Most Productive Journals Publishing Regional Economic Articles

Rank	Journals	Number of Publications
1	International Journal of Environmental Research and Public Health	302
2	Environmental Science and Pollution Research	289
3	PLOS ONE	130
4	Journal of Environmental Management	78
5	The Science of The Total Environment	53
6	Frontiers in Public Health	42
7	Computational Intelligence and Neuroscience	28
8	Frontiers in Psychology	22
9	Journal of Environmental and Public Health	19
10	Heliyon	15
11	The Annals of Regional Science	14
12	Scientific Reports	12
13	Regional Research of Russia	11
14	Environmental Monitoring and Assessment	10
15	Social Indicators Research	8
16	Health Economics	8
17	Environmental Pollution	7
18	Social Science & Medicine	5
19	Nature Communications	5
20	Frontiers in Sociology	5

Source: Results of Data Processing Using Microsoft Excel

Table 3. Most Influential Journals on Regional Economic Topics

Rank	Journals	Number of Citations
1	Environmental Science and Pollution Research	2771
2	Journal of Environmental Management	1876
3	International Journal of Environmental Research and Public Health	1698
4	The Science of The Total Environment	1293
5	PLOS ONE	600
6	Journal of Economic Behavior & Organization	179
7	Journal of Public Economics	117
8	Frontiers in Public Health	98
9	Environmental Pollution	95
10	Oxford Review of Economic Policy	86
11	Socio-Economic Planning Sciences	81
12	Transportation Research Part A Policy and Practice	73
13	Frontiers in Psychology	67
14	Proceedings of the National Academy of Sciences of the United States of America	66
15	Waste Management	65
16	Public Administration Review	63
17	Scientific Reports	63
18	China Economic Review	60
19	American Journal of Agricultural Economics	56
20	Policy and Society	56

Source: Results of Data Processing Using Microsoft Excel

The fourth article is "Spatial spillover effects of environmental regulations on air pollution: Evidence from urban agglomerations in China" written by Feng et al., (2020) by using the STIRPAT approach. The fifth article is entitled "Asocial capital: Civic culture and social distancing during COVID-19" written by Durante et al. (2021) and published in the Journal of Public Economics. This study discusses the impact of social distancing on the spread of Covid-19 and how the social values of citizens mediate this in Italy and Germany. The research method used is the SIR (Susceptible, Infected, Recovery) model to measure the impact of citizen mobility on the spread of Covid-19.

The sixth position is occupied by a journal with the title "Green economic efficiency and its influencing factors in China from 2008 to 2017: Based on the super-SBM model with undesirable output and Dubin spatial model" written by oleh Zhao et al., (2020) published in the journal The Science of the Total Environment. The research methods used in this study are Super SBM (Slack Based Measure) for efficiency measurement and Spatial Durbin Model to analyze the variables that affect the independent variables in a particular study area.

The seventh position is occupied by the article written by Tufail et al., (2021) entitled "Do fiscal decentralization and natural resource rents reduce carbon emissions? Evidence from developed countries". The research method used in this study is panel data. The eighth position is occupied by an article with the title "Economic effects analysis of environmental regulation policy in the process of industrial structure upgrading: Evidence from provincial panel data in China" written by Yu & Wang, (2020) by using the panel data method.

The ninth position is occupied by an article entitled "The effect of economic growth target constraints on green technology innovation" written by Shen et al., (2021) published in the Journal of Environmental Management. The research method used in this study is IV (Instrumental Variable). Then, the tenth article is "How financial development affects CO2 emissions: A spatial econometric analysis" written by Lv & Li, (2020) by using the Spatial Econometric Model method. The article was published in the Journal of Environmental Management.

E. Most Influential Authors

Table 5 shows data on the ten authors of articles with the highest number of citations on the topic of regional economic research. From the data, it can be seen that eight out of ten researchers are affiliated with universities from China. The rest are from universities in the United States and Spain. The number of citations in bibliometric research shows the strong influence of the author in a research topic. This is supported by the fact that China is a vast country with various spatial characteristics. This condition certainly encourages researchers in China to focus their research on regional economic topics. Therefore, the dominance of researchers from China in regional economic research topics is in line with the geographical conditions of the country

F. Network Visualisation

Figure 2 shows the network visualization diagram of the regional economic research database used in this study. Each element in the database is represented by a dot and the relationship between elements is shown by a line. The size of a dot indicates how often a word appears together in regional economic research. The larger the dot, the more often the word appears. Thus, the size of a dot represents its relevance to regional economic research topics.

The different colors in the figure indicate the different clusters present in the database. A set of points that have the same color represents the closeness of the relationship between elements. Based on Figure 2, we can see that there are several different colors that indicate their respective clusters. There are three major clusters designated by the colors green, blue and red

The first cluster is green with the most dominant words being environmental regulation, spatial spillover effect, green development, green technology innovation, and fiscal decentralization.

Table 4. Most Influential Regional Economic Articles

No.	Article Titles	Number of Citations
1	Modeling the role of environmental regulations in regional green economy efficiency of China: Empirical evidence from super efficiency DEA-Tobit model	193
2	Poverty and economic dislocation reduce compliance with COVID-19 shelter-in-place protocols	177
3	Energy structure, digital economy, and carbon emissions: evidence from China	164
4	Spatial spillover effects of environmental regulations on air pollution: Evidence from urban agglomerations in China	136
5	Asocial capital: Civic culture and social distancing during COVID-19	103
6	Green economic efficiency and its influencing factors in China from 2008 to 2017: Based on the super-SBM model with undesirable outputs and spatial Dubin model	100
7	Do fiscal decentralization and natural resources rent curb carbon emissions? Evidence from developed countries	99
8	Economic effects analysis of environmental regulation policy in the process of industrial structure upgrading: Evidence from Chinese provincial panel data	98
9	The effect of economic growth target constraints on green technology innovation	96
10	Exploring the effect of economic and environment factors on PM2.5 concentration: A case study of the Beijing-Tianjin-Hebei region	93

Source: Results of Data Processing Using Microsoft Excel

Table 5. Most Influential Authors

No.	Authors and Affiliations	Number of Citations
1	Su Shuai (Shandong University of Political Science and Law)	193
2	Austin L Wright (University of Chicago)	177
3	Yan Li (Xinjiang University)	164
4	Tong Feng (Tianjin University; University College London);	161
5	Ruben Durante (Barcelona School of Economics)	136
6	Peng-Jun Zhao (Peking University)	108
7	Muhammad Tufail (Xi'an Jiaotong University)	103
8	Xiao Yu (Shanghai Customs College)	102
9	Fei Shen (East China Normal University)	100
10	Zhike Lv (Xiangtan University)	99

Source: Results of Data Processing Using Microsoft Excel

This shows that the study topics on fiscal decentralization and spatial spillover effects are closely related to environmental issues or externalities

The second blue cluster shows several dominant words, namely urban agglomeration, yangtze river economic belt, yellow river basin, and cultivated land pressure (CPL). This shows that the research topic of urban agglomeration is closely related to CPL and usually occurs in riverine areas in China. It is undeniable that urban agglomeration has an impact on the surrounding areas, so the issue of externalities and the environment cannot be separated.

The third cluster is the red one with the most dominant words, namely covid, service, health, economic crisis, and lockdown. This can happen because the data period used in this study is from 2020 to 2023 where in that period all countries in the world were hit by the Covid 19 pandemic. The covid 19 pandemic itself has a considerable impact on the global, national and regional economies and in some cases causes a country to be hit by an economic crisis.
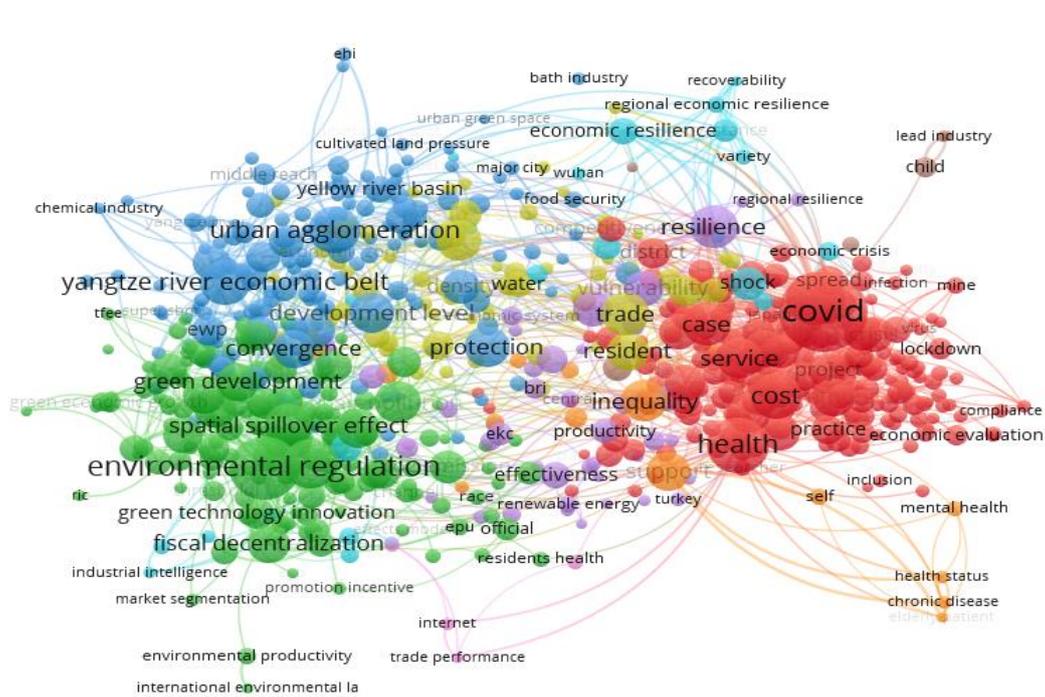
Figure 2. Network Visualisation with Vosviewer
Source: Results of Data Processing Using Voswiewer

In addition to the three large clusters previously described, there are several small clusters that are relevant to research on regional economics. This can certainly be a novelty or research novelty for researchers. These clusters are regional economic resilience, regional resilience, and recoverability. The topic of post-pandemic economic recovery can be a relevant typo in regional economic research.

This graph shows the research trends in the topic of regional economics and is divided into several clusters, mostly small clusters. The first cluster is economic resilience. This topic highlights the analysis of the economic recovery of a country or region after a pandemic. This is the most relevant topic given the world's much better condition after

the discovery of the covid 19 vaccine and starting to live normally again. The economic resilience cluster has a network of several elements, namely urban agglomeration, high quality economic development and covid. These elements are elements that often appear in research themes on economic recovery

G. Overlay Visualization

The analysis of overlay visualization is not much different from the network visualization analysis discussed earlier, the difference is in the color where the colors in the overlay visualization analysis do not represent clusters but time series. The lighter (yellow) the color of the point, the more recent the publication and vice versa.
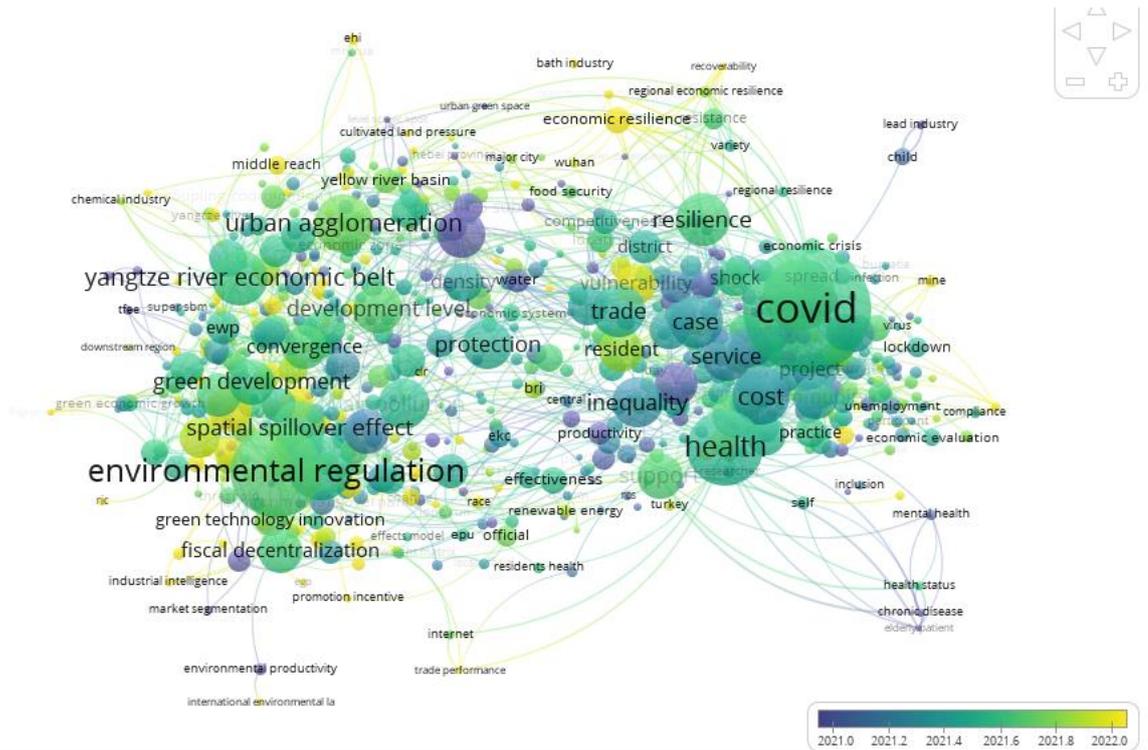
Figure 3. Overlay Visualization with Vosviewer
Source: Results of Data Processing Using Vosviewer

This graph shows the research trends in the topic of regional economics and is divided into several clusters, mostly small clusters. The first cluster is economic resilience (figure 4). This topic highlights the analysis of the economic recovery of a country or region after a pandemic. This is the most relevant topic given the world's much better condition after the discovery of the covid 19 vaccine and starting to live normally again. The economic resilience cluster has a network of several elements, namely urban agglomeration, high quality economic development and covid. These elements are elements that often appear in research themes on economic recovery.

The second cluster is the digital economy (figure 5). The topic of the digital economy has several links with other elements such as covid, environmental regulation, and high quality economic development. However, the most recent elements related to the digital economy are high quality economic development and environmental regulation.

This shows that the role of technology, especially the digital economy, is very important in quality economic development.

In addition, environmental issues are also an issue that is always embedded in the study of development economics. This is natural because we often have to make trade-offs between economic development and externalities, especially related to environmental issues. Therefore, the role of the government in formulating appropriate regulations on the environment is very important.

The next cluster is carbon emission efficiency (figure 6). Based on network analysis, it can be seen that carbon emission efficiency has a network of developed country elements. This shows that the issue of carbon emissions is still a problem in developing countries. The next network is connected to green technology innovation. This means that environmentally friendly technological innovations are still needed to reduce carbon emissions. Not only that, carbon emission efficiency also has a network to tourism industry agglomeration. This shows that there is a relevant relationship between environmental issues and the tourism sector.
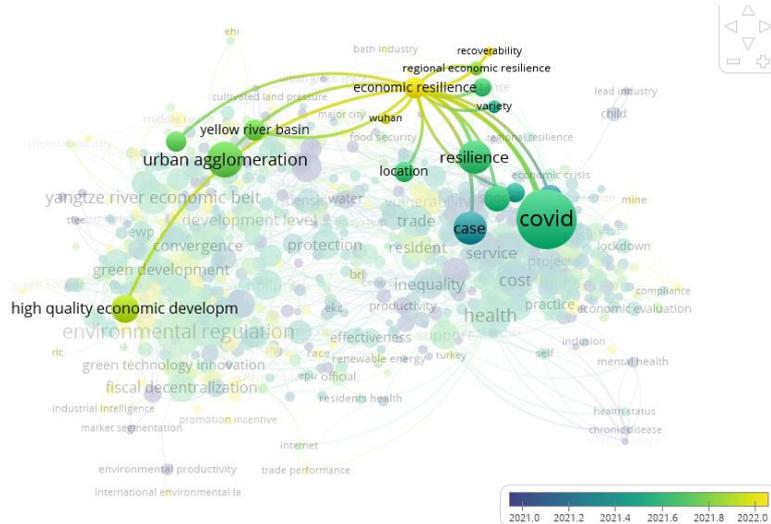
Figure 4. Economic Resilience Cluster
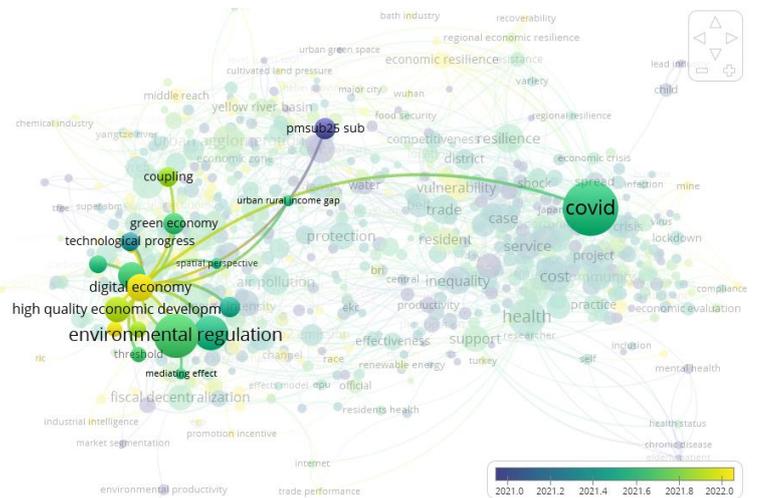*Source: Results of Data Processing Using Vosviewer*

Figure 5. Environmental Regulation Cluster
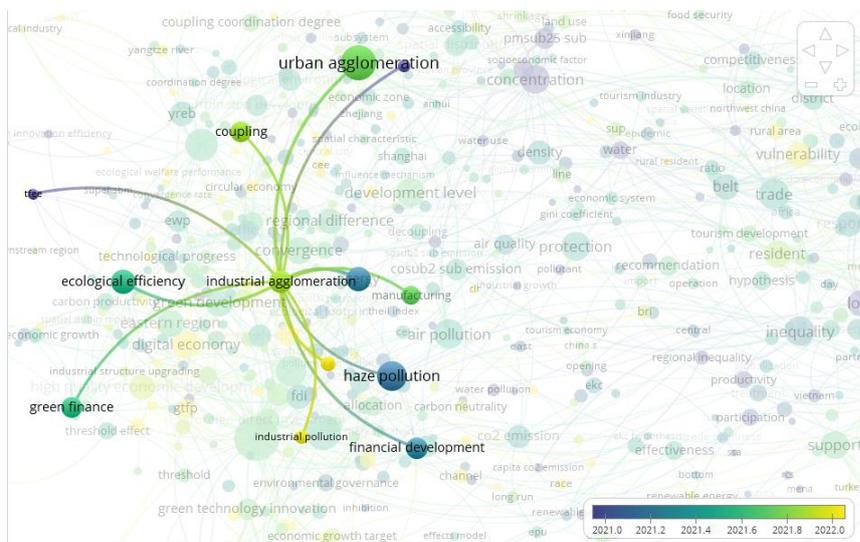*Source: Results of Data Processing Using Vosviewer*

Figure 6. Industrial Agglomeration Cluster
Source: Results of Data Processing Using Vosviewer

IV. CONCLUSIONS

This research aims to find out about the latest developments related to regional economic research topics. The research method used in this study is bibliometrics which is useful for analyzing very large research databases.

Performance analysis and science mapping techniques were used in this study using Microsoft Excel and Vosviewer software. Based on the results of performance analysis, it is known that the 20 most productive journals in the field of regional economics vary, but the top five journals are occupied by journals with environmental themes. The remaining journals are health, regional studies, psychology, and sociology. This shows that regional economic studies is a multi-disciplinary study and correlates with other fields of science.

Then, based on the analysis of the most influential journals, it is known that the variation of the 20 most influential journals is not too varied. The top five journals are still environmental journals but the rest are dominated by economic science journals.

Based on the analysis of the most influential authors, eight of the 10 influential authors come from China, and the rest from the United States and Spain. The dominance of researchers from China is relevant to the geographical conditions of the country which is a large country with regions that have different characteristics.

The science mapping analysis in this study can be seen based on network visualization and overlay visualization analysis. Based on the network visualization analysis, it is known that there are three large clusters. The largest element in the first cluster is environmental regulation. This shows that the topic of environmental issues is a topic that is often mentioned in regional economic studies.

In the second cluster, the largest element is urban agglomeration. Agglomeration is one of the main topics of study in regional economics where it shows the interaction between regions. Based on the line analysis, it is known that urban agglomeration also has relevance to the topics of environmental regulation and covid.

The third cluster is covid. This is reasonable because the database taken in this study is in the time span of 2020 to 2023 where the world is experiencing a pandemic.

Visualization overlay analysis can help us to understand the development of regional economic study topics based on time series. From the analysis, it can be seen that there are several new topics in regional economics, namely economic resilience, digital economy, and industrial agglomeration. These three topics are the most recent topics in regional economics which can be an opportunity for researchers to compile research in the field of regional economics..

V. RECOMMENDATIONS

Based on the discussion above, the authors can provide the following recommendations:
1. For future researchers who will conduct bibliometric research in the field of regional economics, they should use more specific keywords (such as urban agglomeration or digital economy) so that the results are more relevant. In addition, future researchers can also use the Web of Science and Scopus databases which have a good reputation and high-quality articles.
2. For researchers in the field of regional economics, there are several recent topics that can be developed, namely the digital economy, post-pandemic economic recovery, and urban agglomeration.
3. Some research methods that can be adopted for regional economic research include panel data, DEA efficiency model, SBM Super Efficiency model, Tobit Model, STIRPAT Model, and Dubin Model.

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