

# A Scientometric Mapping of Green Economy Academic Publication

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## **Abstract**

The green economy is needed to improve human welfare by reducing environmental risks based on an entrepreneurial spirit. This paper aims to review the status and visual map position of research in the internationally green economy publication indexed Scopus that used a bibliometric perspective. The research was carried out using bibliometric techniques. Data analysis as well as visualization utilizing VOSViewer program and the Scopus function for analyze search results. In this review, the details collected applied to 2319 documents issued from 1990 through 2019. The study reveals that Nhamo, G. and Bucharest University of Economic Studies were the most active individual scientists and affiliated institutions in green economy publication. In the green economy, Environmental Science and Journal of Sustainability Switzerland were the most areas of study and dissemination sources. There were five worldwide group maps with collaborative researchers. In order to identify the body of knowledge created from twenty-nine years of publication, this study constructed a convergence axis grouping comprising of green economy

publication: Green Innovation, Economic Development, Global Warming, Environmental Economic, Economic Effect and Research Work, abbreviated as GERGEE themes.

## Keywords

bibliometric, green economy, Scopus, VOSviewer

## 1. Introduction

The green economy as a modern economic model aims to improve individual welfare and assure social justice while considerably lowering environmental degradation and risk. The need to modernize economic structures to make certain sustainable growth is recognized as the main task in the green economy thought [1]. Global warming is among the problems that cause damage to the ozone layer, forest areas are decreasing, glaciers are starting to melt, and water resources have been contaminated [2]. At present, rising standards of living as a consequence of rapid economic development, world population growth, large-scale urbanization, and changes in people's lifestyles imply that the generation of solid waste has increased rapidly [3]. The economic improvement indicators in energy performance have already been evaluated and measured and internationally [4]. The economy should build to target on certain requirements of protecting cultural and natural heritage by the international sustainable development concept [5].

The green economy includes the successful utilization of social inclusion, reduced carbon economic actions, and natural resources [6]. The green economy exists to overcome the high level of climate change, air pollution, population density, and lack of planning making it necessary to change the way of thinking of public administration and local government. This is done based on new responsibilities such as for instance economic growth, regional energy generation, improved competitiveness, and natural environment protection [7]. Based on the United Nations Department of Economic and Social Affairs (UNDESA), the green economy concept could be explained as something which affects in increased social justice and human welfare, while considerably ecological scarcity and environmental risks [8]. The green economy concepts centers on initiatives that are economic proportions, reduced carbon, socially inclusive, highlighting environmental, and resource-saving [9]. The green economy makes the world a better and more beneficial place for sustainable development because being green can enable companies to get tangible resources and intangible resources [10]. A green economy can be realized with a sustainable entrepreneurial spirit.

The green economy goal would be to grow in income, employment development, encourage economic progress, and while maintaining the prevention of environmental disasters and different externalities [11]. On the other hand, also to discover how to reduce energy usage, reduce pollution, and optimally minimize the environmental injury that has become a critical problem now [12], [13]. In general, however, previous studies relating to the green economy have restricted themselves to examining one sector [14] and one notion [15]. Unfortunately, despite presenting a broad image map visualized year over year with details from several published studies at the global scale, there has not been much published on the green economy. The strong positive relationship regarding affiliation, scholars, and the impact of scholarly studies has also not been explicitly discussed by any publication. This paper aims to review the status and visual map position of research in the internationally green economy publication indexed Scopus that used a bibliometric perspective.

## 2. Research Methods

This review mapped the status of the study conducted in the last 29 years at the global level on the basis of the Green Economy. In July 2020, this study collected data from Scopus utilizing document search queries [16]. The research was carried out using bibliometric techniques. Data analysis as well as visualization utilizing VOSViewer program and the Scopus function for analyze search results. The VOSViewer tool is used to create and visualize bibliometric networks, namely the number of studies, nations, academic affiliations, keywords, researchers, fields, and author collaborations [17]–[20].

This study identifies green economy keywords to recognize and look for Scopus database publications with 2319 globally published documents from 1990 through 2019. The research confined the collection of data to 2019 and excluding 2020. In order to reflect the state of the study over the entire year, the annual academic data collected from January to December. (TITLE-ABS-KEY ('green economy') AND PUBYEAR <2020) is the query input command which is implemented while mining academic publication data on the online database of Scopus.

The research applies a co-authorship analysis with authors' analysis units and full calculation systematic techniques utilizing VOSViewer to gain the collaborative research network of the international researcher. The research conducted an in-depth co-occurrence analysis with keyword relation analysis as well as a full systematic technique of calculation utilizing VOSViewer to generate a keyword map network.

### 3. Result and Discussion

This section describes the growing results of data based on the most common organizational affiliation, nations, individual studies, the largest frequency of subject areas, types of fields, yearly source documents, annual documents and cited papers, the publication of the map, and networks of authorship in the field of the green economy.

#### 3.1 Green Economy Publications Most Common Organizational Affiliations

The higher research organization in green economy publications was Bucharest University of Economic Studies with 42 documents. Then followed by Stellenbosch University, Chinese Academy of Sciences, University of South Africa, Wageningen University and Research Center, Università degli Studi di Roma La Sapienza, University of Chinese Academy of Sciences, Helsingin Yliopisto, and Russian Academy of Sciences.

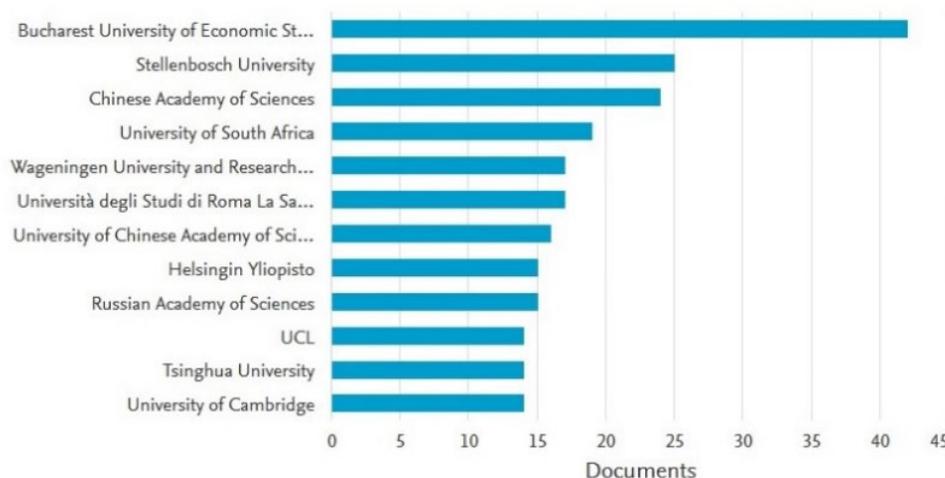


Figure 1. Organizational Affiliation Number of Annual Publication of Green Economy

#### 3.2 Green Economy Publications Most Individual Researcher

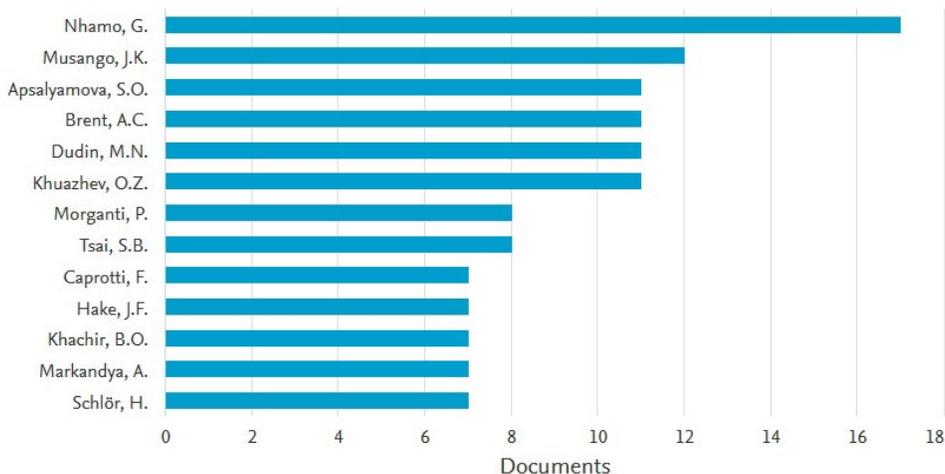


Figure 2. Most individual Green Economy Publication Researcher

The researcher in the area of the green economy to the most writings was Nhamo, G. 17 documents with it. Pursued by Musango, J.K. with 12 documents, Apsalyamova, S.O. with 11 documents, Brent, A.C. with 11 documents, Dudin, M.N. with 11 documents, Khuazhev, O.Z. with 11 documents, Morganti, P. with eight documents, Tsai, S.B. with eight documents, Caprotti, F. with seven documents, Hake, J.F. with seven documents and Khachir, B.O. with seven documents.

### 3.3. Green Economy Publications Most Common Nation

In green economy publications, China with 372 academic documents was the leading research nation. Then, with 285 articles, the United States followed. Then the United Kingdom, Russian, Italy, Germany, South Africa, Australia, Romania, and Canada followed.

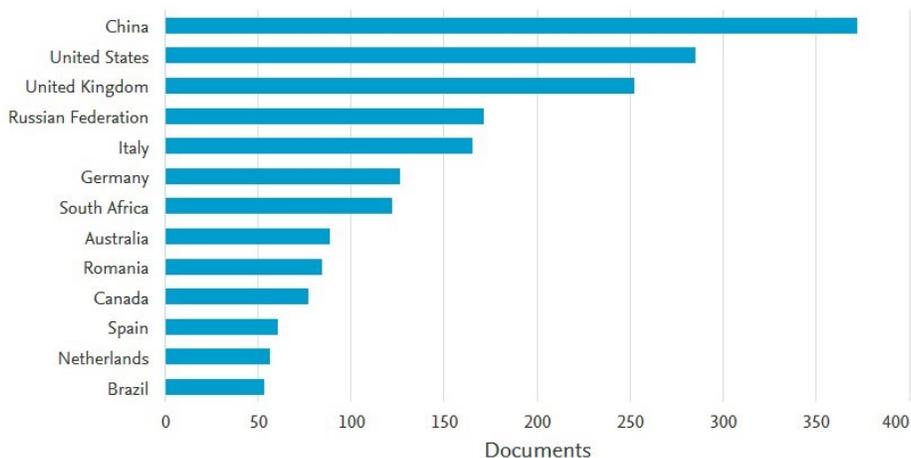


Figure 3. Nation Number of Annual Publication of Green Economy

### 3.4 Green Economy Sector Publication on Sponsor Funding

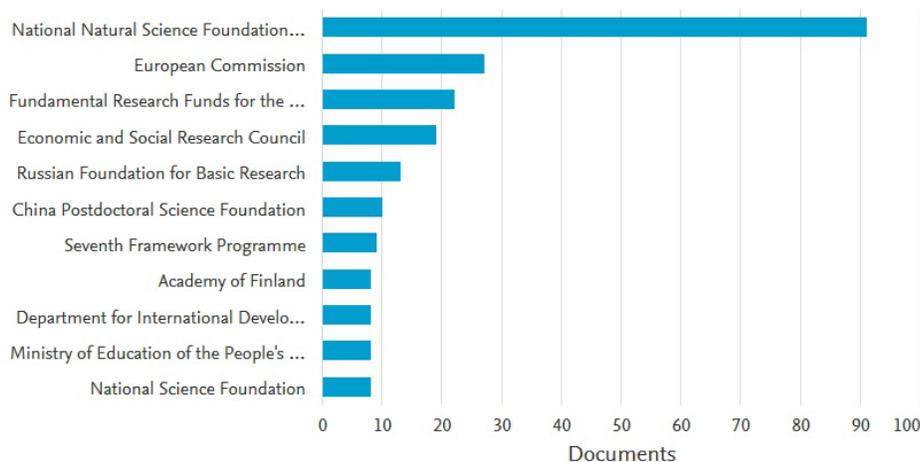


Figure 4. Number of Green Economy Sector Publication on Sponsor Funding

The National Natural Science Foundation of China with 91 documents was the most funded fund in foreign academic publications in the area of the green economy. The European Commission followed with 27 documents, the Fundamental Research Funds for Central Universities with 22 documents, and the Economic and Social Research Council with 19 documents, 13 documents from the Russian Foundation for Basic Research, 10 documents from the China Postdoctoral Science Foundation, 9 documents from the Seventh Framework Program, and 8 documents from the Academy of Finland.

### 3.5 The Largest Frequency of Publication of Green Economy by Subject Area

Environmental science with 1038 papers (22.3 percent) was the highest subject area in international academic publications in the field of the green economy. With 927 documents (19.9 percent), business, management, and accounting with 466 documents (10.0 percent), economics, econometrics, and finance with 466 documents (10.0 percent), followed by social sciences with 466 documents (10.0 percent), Energy with 449 papers (9.7%), engineering with 351 papers (7.6%), agricultural and biological science with 185 papers (4.0%) and earth and planetary science with 152 papers (3.3%).

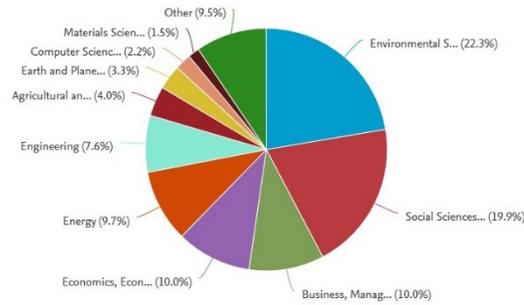


Figure 5. The Largest Frequency of Publication of Green Economy by Subject Area

### 3.6 The Largest Publication of Green Economy Sector by Types

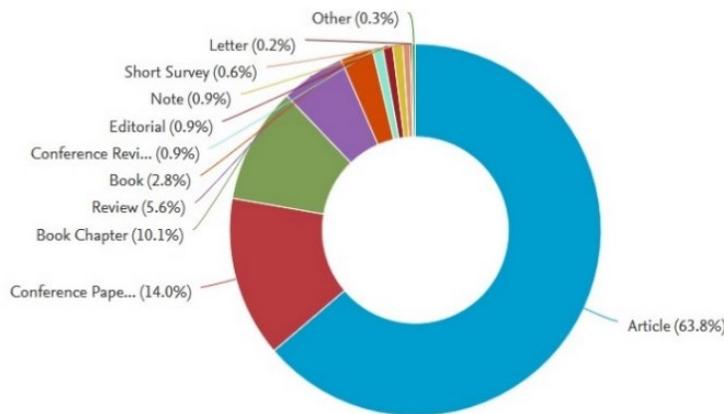


Figure 6. The Largest Publication of Green Economy Sector by Types

Papers with 1479 documents (63.8 percent) were the most types of documents in academic Green Economy publications. This was followed by a conference paper with 324 papers (14.0 percent), a book chapter with 234 papers (10.1 percent), a study with 130 papers (5.6 percent), and a book with 66 papers (2.8 percent).

### 3.7 Year Documents of Green Economy Publication Sources

The leader in the annual number of sources of green economy publications is the “Journal of Sustainability Switzerland” with 128 documents. Then followed by “Journal of Cleaner Production” with 41 documents, “Quality Access to Success” with 35 documents, “IOP Conference Series Earth, and Environmental Science” with 32 documents, “International Journal of Green Economics” with 27 documents, and “Energy Policy” with 25 documents.

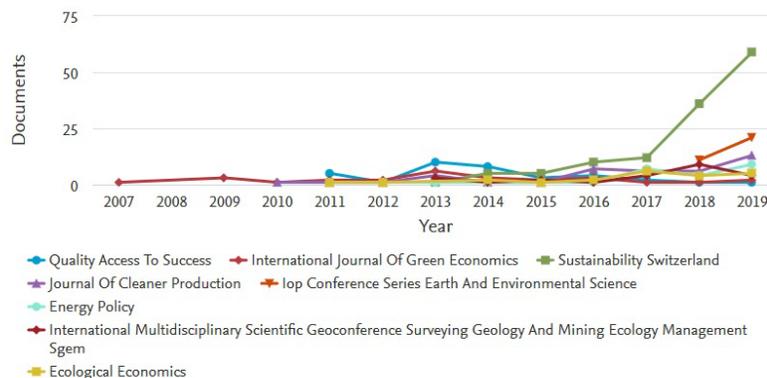


Figure 7. Number of Annual Documents Based on the Green Economy Publication's Sources



From Figure 9. there were six publication theme groups dependent on study keywords regarding the international academic publication of green economy, simplified as well as abbreviated as GERGEE themes.

1. Green Innovation Cluster (Green). The keywords of innovation, green innovation, environmental regulation, economic growth, marketing, manufacturing, supply chain management, and environmental management dominated this cluster. Many of these keywords are linked to themes in green innovation.
2. Economic Development Cluster (Light Blue). We can find economy themes in this cluster. The world population growth, large-scale urbanization, and changes in people's lifestyle are fast economic development keywords were connected to this cluster.
3. Global Warming Cluster (Red). We can find global warming themes in this cluster. The economics, alternative energy, ecosystem, renewable energies, agriculture, and recycling.
4. Environmental Economic Cluster (Yellow). We can find environmental economic themes in this cluster. The green growth, carbon dioxide, and carbon dioxide dominated this cluster. Many of these keywords are linked to themes in environmental economic.
5. Economic Effect Cluster (Purple). We can find economic effect themes in this cluster. The regional planning, efficiency and planning.
6. Research Work Cluster (Blue). The keywords of research work empirical analysis, qualitative analysis, and analytical hierarchy process dominated this cluster. Many of these keywords are linked to themes in research work.

### 3.11 Network of Authorship

With the VOSViewer program, construction was developed on the green economy researcher framework for the authorship network map. Three document was three of the requirements for the minimum collection of publications per author. Thus, out of 1,350 researchers, 26 researchers who reached the thresholds were recognized. As shown in figure 11, there were five group partnership networks between international researchers in green economy publications. The green cluster of green economy publication which contains Chen, x.; Liu, l.; & zhang, x. The blue cluster which contains chen, w.; li, j.; liu, y.; & li, g. The red cluster which contains y.; xu, y.; liu, c.; chen, h.; wang, y.; & wang, x. The yellow cluster which contains wang, q.; zhang, l.; & wang, h. Purple Cluster: li, y.; zhang, y.; & li, c. The purple cluster which contains Zhang, Y., Li, Y. and Li, C.

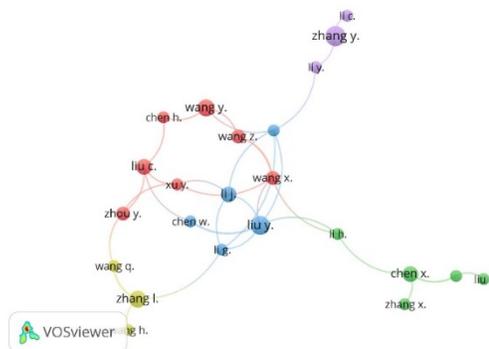


Figure 10. Authorship Network Map

## 4. Conclusion

The results of this research revealed that there is an annual trend towards a spike in the amount of international publications on the green economy, there were maps and visual patterns. With 372 papers, China was the country with the greatest contribution to publications in Green Economy studies. In the publication of the green economy publications, the University of Economic Studies was the most active research institution with 42 papers. In the green economy publication, the individual academic researcher with the most prolific publications was Nhamo, G. 17 papers with it. With 1038 documents (22.3 percent), the most intensively studied areas published in the green economy publication were Environmental Science. The National Natural Science Foundation of China, with 91 papers, was the most funding sponsor of academic publications in the green economy sector. The “Swiss journal of sustainability” with 128 documents was the majority of annual documents by the source in the green economy publication. With 411 papers, the highest publication of worldwide scholarly publications in green economy studies was in 2019. The works of Koen Binnemans, Peter Tom Jones, Bart Blanpain, Tom Van Gervenc, Yongxiang Yang, Allan Walton, Matthias Buchert were mostly publications with the most citations. In 2013, the “Journal of Cleaner Production” cited 980

documents entitled "Recycling of Rare Earths: A Critical Review". There were five researcher partnership groups linked to the publication of green economy.

In terms of contributing knowledge implications, this study recommends a classification of the convergence axis comprising of publication in green economy to classify the body of knowledge created from twenty-nine years of academic publication: Green Innovation, Economic Development, Global Warming, Environmental Economic, Economic Effect and Research Work, abbreviated as GERGEE themes. The identification of key themes in the green economy area, as practical implication, contributes to an awareness of the creation of practical studies to clarify general contexts and topics, as well as research gaps. All this will lead to fresh research addressing a lack of study and specialized expertise in the disciplines. The most studied themes often reflect the ability to contribute to Green Economy to entrepreneurs, marketing, and sustainability.

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