

Text Analytics on Green Economy using Bibliometrix

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Environmental damage, global warming and climate change are increasingly serious and frightening, and have caused tremendous negative impacts on the lives of mankind and become a frightening specter for the international community. Environmental damage and socio-environmental crises have been the result of development strategies and policies that are not environmentally friendly and pro-people. The government formulated strategic and operational measures to "green Indonesia" through a green economy approach. This study aims to determine the development of green economy research trends published by leading journals on Islamic financial economics. The data analyzed consisted of 1183 indexed research publications. The data is then processed and analyzed using R-studio and biblioshiny applications to determine the text analytic development of green economy research.

Keywords: Green Economy; Bibliometrix; R Biblioshiny; SDGs

OPEN ACCESS

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Received: 3 September 2023

Accepted: 30 November 2023

Published: 31 December 2023

Citation:

(2023) Text Analytics on Green
Economy using Bibliometrix.
Economics and Sustainability
1.1.

INTRODUCTION

In the last two decades, environmental degradation, global warming and climate change have become increasingly serious and frightening, and have caused tremendous negative impacts on the lives of mankind and become a frightening specter for the international community (EEA, 2013; Foster and Magdoff, 2009). Natural disasters such as floods, tidal surges, air, water and soil pollution, extreme climate change, extreme weather changes, and others occur everywhere. A number of analysis results show that the massive escalation of global warming and climate change is caused by massive environmental damage in various countries, including Indonesia. The environmental damage has not only caused an environmental crisis, but also caused a social crisis, economic crisis, energy and resource crisis, and other serious crises.

Various parties have pointed out that the main cause of environmental damage and socio-environmental crises over the years is the result of development strategies and policies that are not environmentally friendly and pro-people (EEA, 2013; Foster and Magdoff, 2009). National development strategies and policies prioritize the achievement of the economic interests of the state and capital owners over the interests of the environment and society. In fact, the environment and all natural resources attached to it as well as community economic resources are acquired and exploited greedily by the state and economic actors to realize the interests of state economic growth and corporate profits.

As a result, although on the one hand corporate profit growth and state (regional) economic growth continue to increase (EN), at the same time the escalation of social and environmental crises (EKSL) is also increasing. The social and environmental problems that arise are even more complex and dangerous. This phenomenon is often referred to as the "paradox of economic growth" resulting from greedy economic behavior.

Responding to this reality and also responding to the growing pressure from the international community for Indonesia to play an active role in global collaboration to address global warming and climate change, the Indonesian government under the leadership of President Susilo Bambang Yudhoyono (SBY) during 2009-2014 has indeed formulated strategic and operational steps to "green Indonesia" through sustainable development and green economy approaches (Barbier, 2012). The Indonesian

government even plays an active role in continuing to invite and mobilize heads of state and government as well as world business leaders for global collaboration to prevent greedy and environmentally destructive economic behavior.

In a speech entitled "Moving Towards Sustainability: Together We Must Create the Future We Want" at the Rio+20 Summit in Rio de Janeiro on June 20, 2012, President SBY loudly invited world leaders to shift from greed economy to green economy (environmentally friendly economic behavior) (UN-CEB, 2012). The goal is that the world's economic development and growth can be sustainable, poverty and destitution can be reduced, and justice and prosperity can be enjoyed by all. According to SBY, environmental damage and poverty occur due to greed, excessive consumption, and neglect of environmental sustainability. In the Rio+20 Summit forum, President SBY also stated Indonesia's commitment to implement green economy in the context of Sustainable Development and Poverty Eradication (UNDP, 2012).

LITERATURE REVIEW

It must be recognized that the development approach during the SBY-Boediono administration during 2004-2014 has resulted in high economic growth, which is above 5 percent per year (except 2009). However, along with this high growth, there has also been environmental damage and an increasingly serious and worrying socio-environmental crisis. Poverty, unemployment, economic inequality, environmental damage and natural disasters caused by the greedy behavior of economic and business actors are also increasing. The income gap between groups of people, reflected in the Gini Ratio, has continued to increase in the last ten years to reach above 0.41. This phenomenon shows that there is something wrong with the national development strategy based on the four pillars (pro-growth, pro-poor, pro-job, pro-green). It could be that development strategies and policies so far have unwittingly encouraged the emergence of greedy behavior of economic and business actors who sacrifice society and the environment for the sake of economic and business growth (Lako, A., 2015).

The strategy to green economic development to generate green economic growth is to green the economy and business. The formulation of the Indonesian Green Economy Development Blueprint (CBPEHI) by the new government under the leadership of Jokowi-JK in order to provide strategic, tactical and

operational direction in national sustainable development is very important.

In general, the first step that the central government needs to take is greening the structure and process of national economic development. The next step is to green fiscal and monetary policies and mechanisms. Furthermore, the greening of financial instruments and capital markets is carried out.

Furthermore, greening industry, business and corporations through attractive regulations and policies to encourage and even force industry and business actors to commit and behave environmentally friendly to support the sustainable development agenda and green economy. The last step is to green education, mass media and society (public). National education strategies from primary to tertiary levels also need to be greened

in an effort to educate and raise public awareness of the importance of environmentally friendly behavior and lifestyles in an effort to support the sustainability of the earth and improve the social and economic welfare of the community itself. The mass media also needs to be greened both in its business behavior and in its efforts to participate in educating and controlling the environmentally friendly behavior of the government, economic and business actors, and the wider community. Greening the public to have an environmentally friendly mindset and lifestyle is also very important.

RESEARCH METHOD

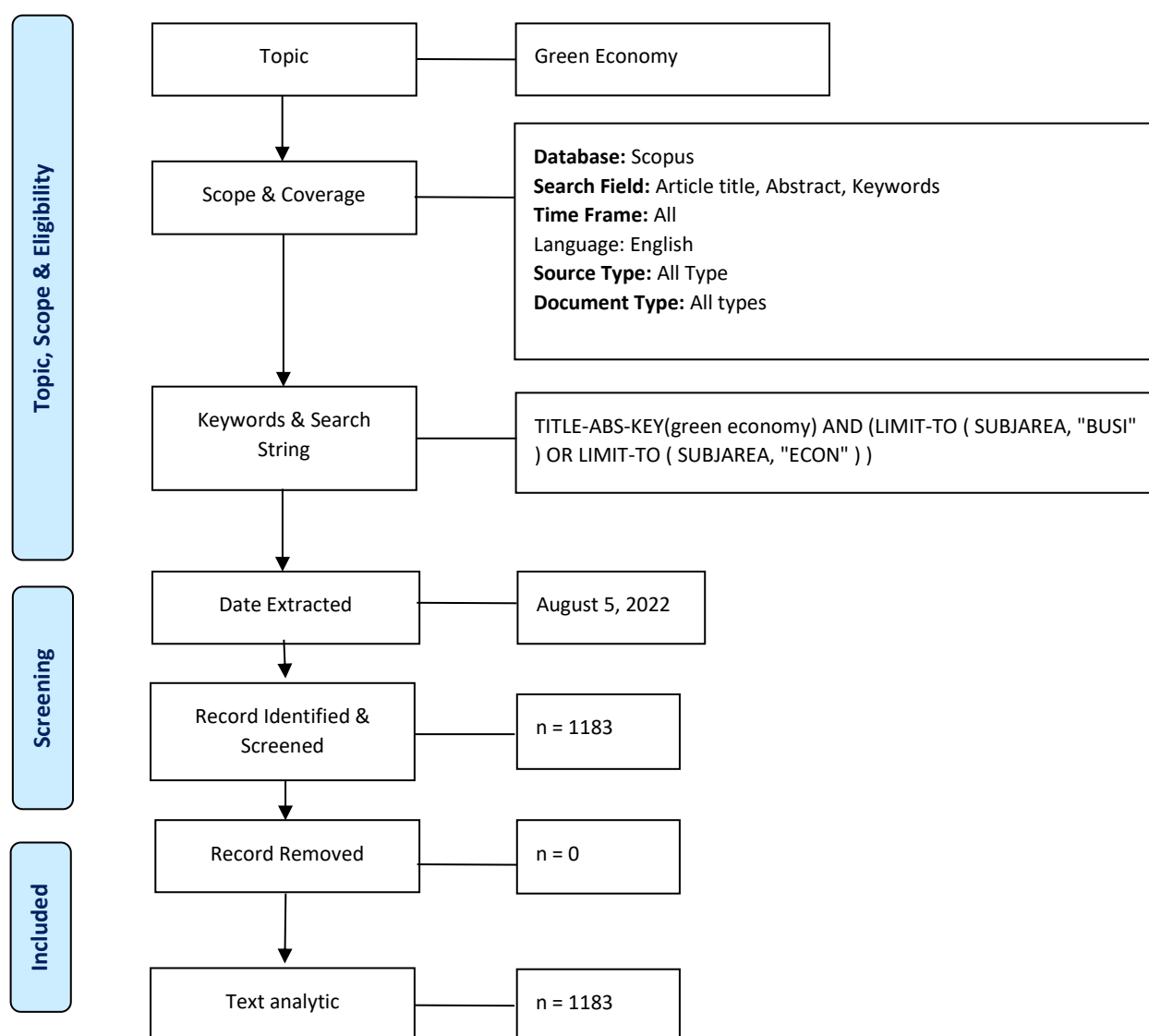


Figure 1: Flow diagram of the search strategy

Source: Zakaria et al. (2020), modified

The review process was conducted on August 5, 2022. Figure 1 illustrates the three steps in identifying research documents, namely eligibility, screening, and inclusion, involved in the systematic review process. The keywords that will be used in this study try to answer the research questions above. Some general statistics of the data set are presented to get an overview of research related to good governance. All articles that met the search query were evaluated from the aspect of text analysis.

Then the research documents were analyzed using biblioshiny software, a free software supported by the R environment ((CRAN, The Comprehensive R Archive Network, <https://cran.r-project.org/>) which provides a set of tools for quantitative research in bibliometrics and scientometrics (Aria & Cucurrolo, 2017). In the bibliometric literature, the greatest

attention has been on the construction of bibliometric maps. Research related to the effect of differences on similarity measures (Ahlgren et al., 2003), and they were tested with different mapping techniques (Boyack et al., 2005). Next, a text analysis of bibliometrix mapping results related to "word" will be conducted.

RESULTS AND DISCUSSION

Source

The following is a table of document types used in research with the keyword Green Economy. The number of documents analyzed is 1183 documents which are divided into 3 document types, including journal articles (796 documents), anthologies / book chapters (168 documents) and conference papers (219 documents).

Table 1: Document Types

No.	Document Type	Number of Articles	Percentage
1	Journal Article	796	67.28%
2	Book Chapter	168	14.20%
3	Conference Paper	219	18.52%
Total	1183		

Based on the results of the document type grouping above, the document type most widely used as a research subject with the keyword "Green Economy" is a document in the form of a journal article with a percentage of 67.28% or 796 documents, and the document with the smallest percentage is a book chapter, where the percentage is 14.20% or 168 documents. Based on the type of document, it can be concluded that the references used are quite valid because most of them come from scopus indexed scientific journals.

Text Analysis

Text analysis was conducted using R-studio and biblioshiny software developed by Massimo Aria and Corrado Cucurullo from the University of Naples and Luigi Vanvitelli from the University of Campania (Italy). Text analysis is carried out by analyzing more deeply on searches related to words that often appear in the Green Economy theme. This is intended to add to the treasures and references that can be done by the government in tackling environmental damage based on existing research from all over the world.

To explore the results of the meta-analysis, this section will present a visual mapping chart of 1183 documents related to the Green Economy. The results

of the keyword mapping analysis become the basis for mapping together important or unique terms contained in a particular document. Mapping is a process that allows one to recognize knowledge elements and their configurations, dynamics, interdependencies, and interactions.

Most Relevant Words

The most relevant word analysis was performed on the keywords of each document, where there were several words with a quantity of occurrences between 0 and 326 occurrences. The figure above shows the 30 most relevant words used in the research collection related to the keyword "Green Economy".

The top word with the highest quantity of occurrences and most relevant to the keyword Green Economy is the word Green Economy itself, with the highest quantity of occurrences of 326 times. The second most relevant word related to the Green Economy is sustainable development with 121 occurrences. Furthermore, the third and fourth most relevant words related to Green Economy keywords are circular economy and sustainability with the same word occurrence of 59 times. This explains that research with the keyword "Green Economy" so far is dominated by the economy sector.

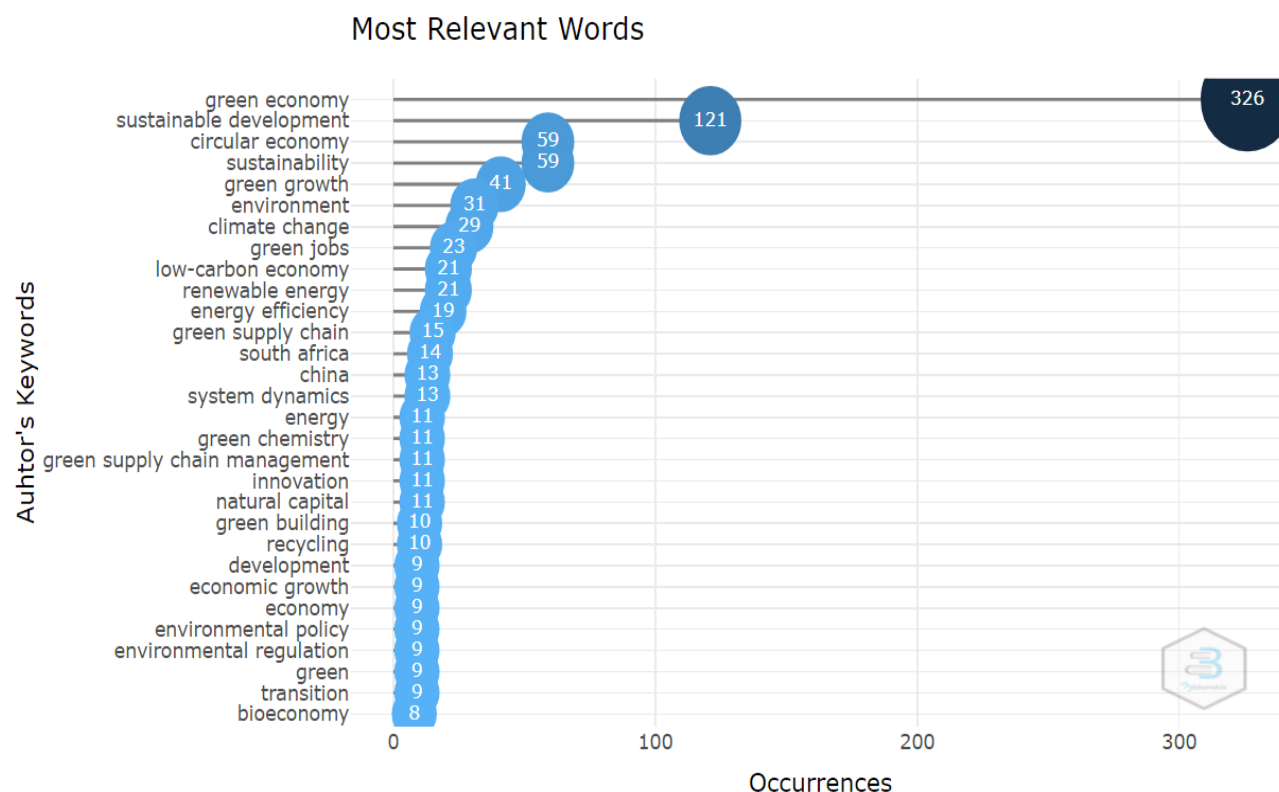


Figure 2: Most Relevant Words

The research entitled Green supply-chain management: A state-of-the-art literature review (Srivastava, S.K. 2007) describes the growing need to integrate environmentally friendly options into supply chain management research and practice. Reading the literature shows that a broad frame of reference for green supply chain management (GrSCM) is not adequately developed. Regulatory bodies that formulate regulations to meet social and ecological concerns to facilitate business and economic growth also suffer from its absence. A concise classification is needed to assist academics, researchers, and practitioners in understanding integrated GrSCM from a broader perspective. Furthermore, sufficient literature is available to warrant such a classification. This paper takes a fresh, integrated view into the GrSCM area. The literature on GrSCM is discussed in depth from its conceptualization, especially taking the 'reverse logistics angle'.

Word Cloud

Word cloud analysis is a technique used to visually represent the frequency of words within a given text or corpus. It involves generating a graphic where the size

of each word corresponds to its frequency or importance within the text. Word cloud analysis is commonly used in various fields, including text mining, sentiment analysis, market research, and content analysis. It provides a quick and intuitive way to visualize and interpret the key features of a text or corpus. However, it's important to note that word clouds are primarily qualitative rather than quantitative tools, and they should be used in conjunction with other analytical techniques for a more comprehensive understanding of the text.

Furthermore, relevant words will be displayed from the title in the research with the keyword Green Economy in the abstract and title of the document in the form of a word cloud. Word cloud is a description of the words that often appear in the collection of paper data studied with the keyword "Green Economy". Word cloud displays a picture of words displayed with various sizes according to the quantity of the word that appears. In terms of placement, word clouds tend to be random but the dominating words are placed in the center so that they are more visible with a relatively larger size. In this research, the results of the word cloud are obtained based on the analysis of document titles.



Figure 3: Word Cloud

Based on the picture of the results of the analysis of document titles, it is found that the most dominant words are related to the Green Economy, namely Economy, Green, Sustainable, Development. Most of the current research on the "Green Economy" discusses the "Green Economy". This is because the word "Green Economy" is relatively closely related to the environment. Research conducted on the Green Economy includes SiC-based semiconductor device technology, III-V nitride, and II-VI ZnSe large bandgap (Morkoç, H. , Strite, S. , Gao, GB , (...), Sverdlov, B. , Burns, M. 1994), Green supply chain management: A state-of-the-art literature review (Srivastava, SK, 2007), Comprehensive review on PEM water electrolysis

(Carmo, M. , Fritz, D.L. , Mergel, J. , Stolten, D. 2013), First and second generation biofuel production: A comprehensive review (Naik, S.N. , Goud, V.V. , Rout, PK, Dalai, AK. 2010) and Rare earth recycling: A critical review (Binnemans, K. , Jones, PT , Blanpain, B. , (...), Walton, A. , Buchert, M.. 2013).

WordTree Map

Furthermore, relevant words in the research with Green Economy will be displayed in the document abstract in the form of a word tree map. Word Tree Map displays words that appear frequently in boxes similar to regions or areas in a map, where the more the word appears, the larger the square area.

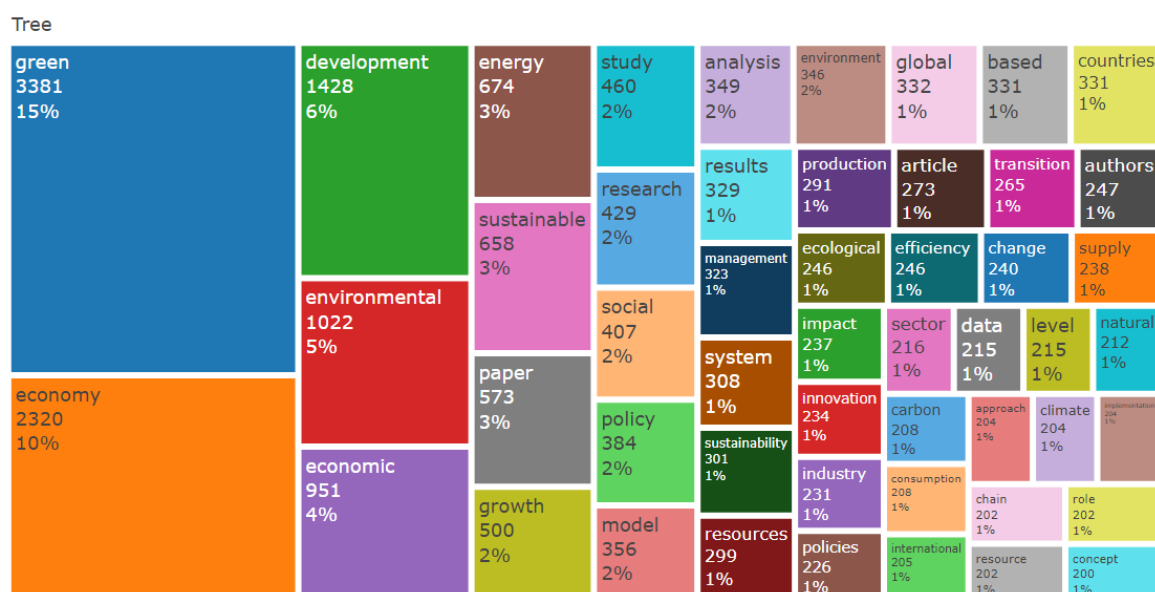


Figure 4: Word Tree Map

Based on the picture of the results of the analysis of document abstracts, it is found that the most dominant words are related to the theme of Green Economy, namely Green, Economic, Development, Environmental and Economic. Most of the current research on "Green Economy" discusses the "Green Economy". This is because in everyday life in the community the word "Green Economy" is relatively closely related to environmental problems that are currently rampant in Indonesia.

Research conducted on the Green Economy includes [Green economy and related concepts: An overview](#) (Loiseau, E., Saikku, L., Antikainen, R., (...), Kuikman, P., Thomsen, M. 2016) discusses how the idea of a green economy is becoming increasingly attractive to policymakers. However, the green economy encompasses many diverse concepts and is closely

related to sustainability. In this article, researchers focus on the definition of green economy and the concepts related to the evaluation of strong and weak sustainability criteria. This article has three objectives: First, we identify and explain the various theories, concepts, approaches and tools associated with the "green economy". Second, we develop a framework that demonstrates the capacity of green economy concepts, approaches and tools to support the transition to sustainability. Such a framework can serve as a heuristic for embedding diverse concepts and approaches into a green economy framework. Third, we briefly discuss green economy concepts with respect to their impact on strong and weak sustainability.

Word Dynamic

Word Growth

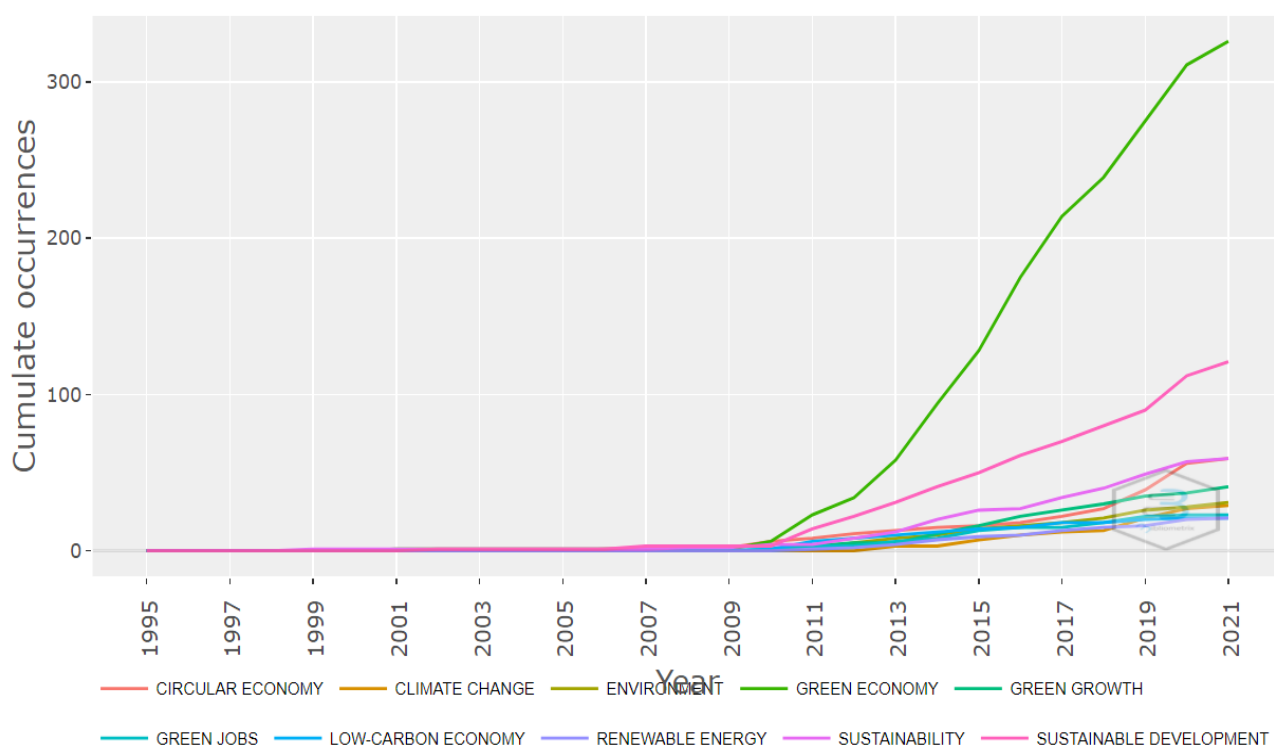


Figure 5: Word Dynamic

Based on the picture of the results of the analysis of document keywords, in this study, the words that often appear are also described in the form of a development curve for each year with the annual occurrence value. Where the results show the average quantity of occurrence of the word in the data collection

studied in the Green Economy theme each year. Figure 5 shows that the majority of frequently occurring words began to develop since 2009, and continued to increase until 2021. From the figure above, it can be concluded that the research with the most significant increase in occurrence is related to the green economy.

Trending Topics

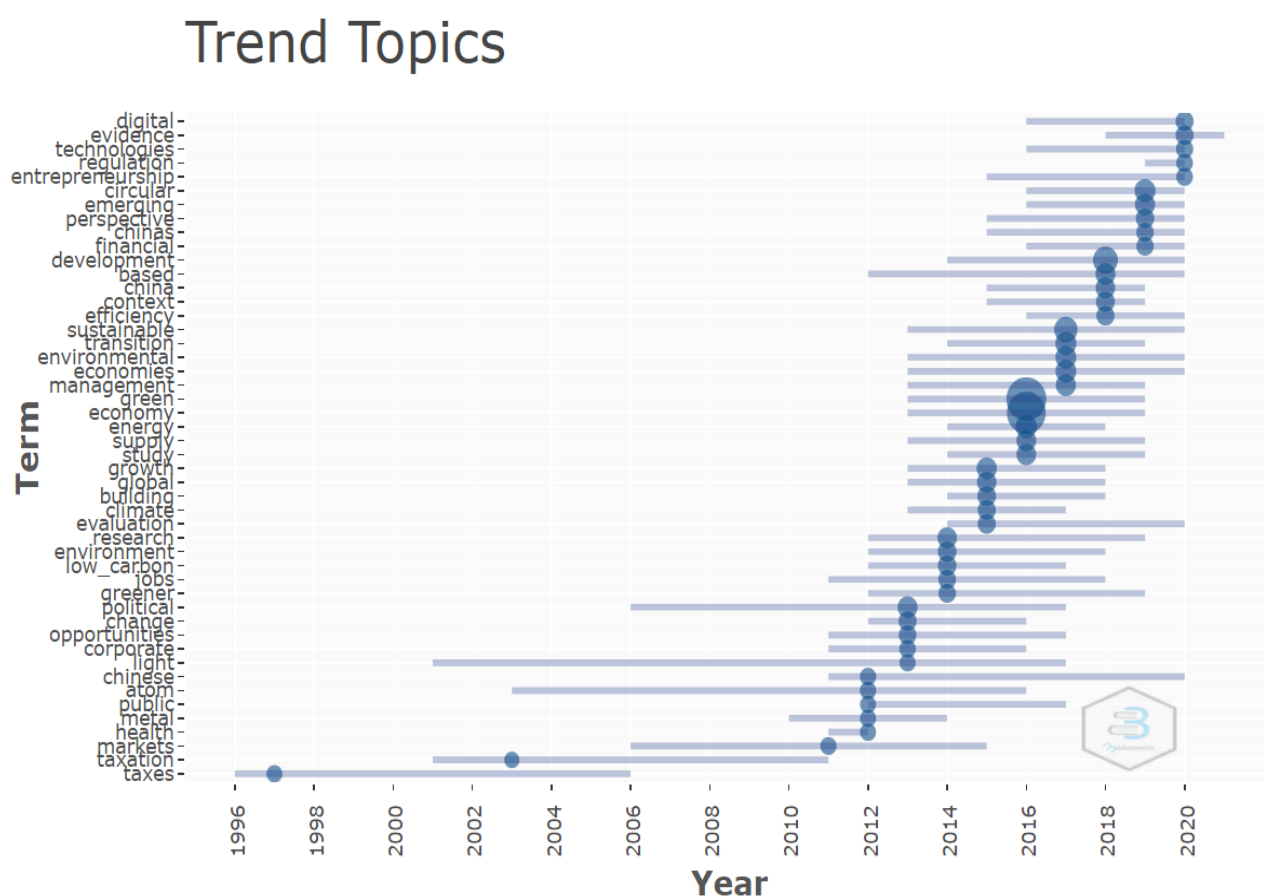


Figure 6: Trends in Topics

Based on the image of the results of the analysis of document titles, topic trends are also part of this study, where the image above displays an overview of the development of Green Economy topics over time with a division per year, so that it is known what topics have been used for a long time and what topics have recently been used. This topic trend also considers the frequency value of each word indicated by the log axis.

Thus, in addition to looking at the annual trend, the topic occurrence is also adjusted to the frequency of the quantity of the word's appearance in this Green Economy theme research. The higher indicates the more the word is used, and the more to the right, the more recently the word is used. The development of the Green Economy topic began to experience a significant increase since 2001.

Based on the description of the data above, the topics that have been used since 2001 in the Green Economy theme in Islamic economics and finance research is the word taxation and corporate. Furthermore, in 2006 the topic of Political appeared

with a fairly high quantity. Although it has been a long time ago, the quantity of the three topics that appeared under 2010 is still small. Topics that are widely used in 2020 include Corporate, Evaluation, Efficiency, Sustainable, Environmental, Economies, Development, Financial, Perspective, Emerging, Circular, Entrepreneurship, regulation, Technologies, and Digital.

Co-occurrence Network

Co-occurrence network displays words related to green economy keywords in the form of colored clusters by considering the relationship between one word and another. Based on the picture above there are 6 clusters with related keywords, with 6 different colors.

The red cluster is dominated by words related to the green economy. The words contained in this cluster are green economy, sustainable, development, environmental policy, green energy, energy efficiency, governance, ecosystem services, economic development, energy, green jobs, innovation, employment.

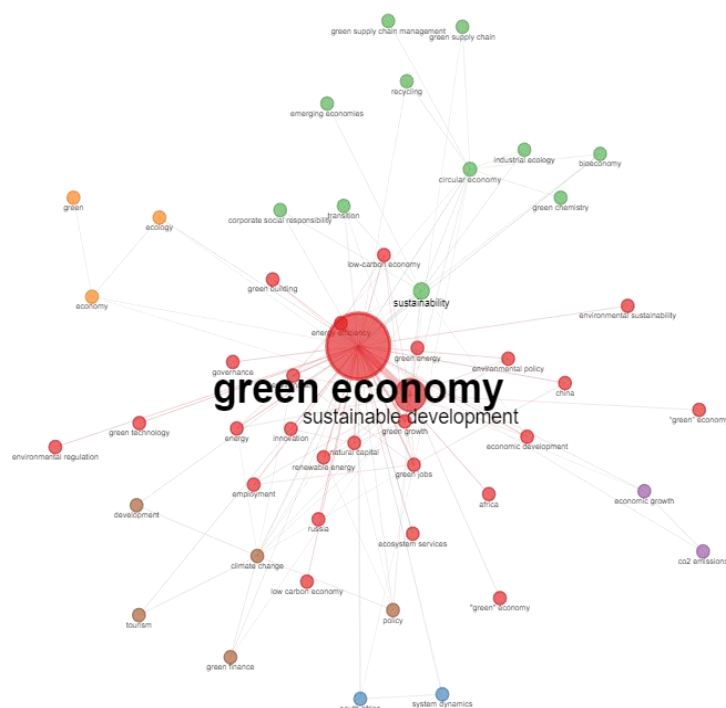


Figure 7: Co-occurrence Network

The green, purple, brown, orange and blue clusters are dominated by words related to those that tend to be common, where in the green cluster there are the words sustainability, transition, corporate social responsibility. In the purple cluster there are the words CO2 Emissions and Economic Growth. Furthermore, in the brown cluster there are the words Green Finance,

Policy, Climate Change and Development. In the orange cluster there are the words Ecology, Economy, and Green. Finally, the blue cluster contains the words System Dynamics and South Africa.

Thematic Map

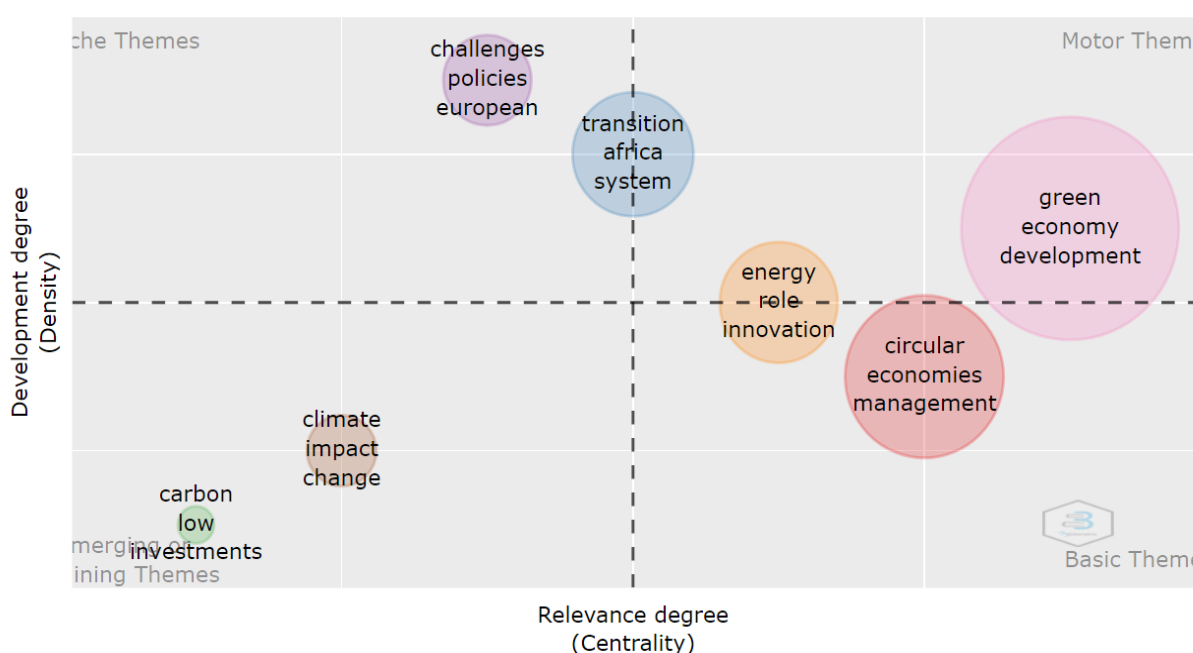


Figure 8: Thematic Map

This research will also analyze thematic maps that appear based on density and centrality which are analyzed based on titles with the theme of Green Economy research which is divided into 4 quadrants. These results are obtained from a semi-automatic algorithm by reviewing the titles of all references on the object of research.

The upper left quadrant represents *highly developed and isolated themes*. The quadrant shows themes that are specific and under-researched, but highly developed, as indicated by high density but low centrality. The themes in this quadrant are Challenges, Policies, and Europe. While the lower left quadrant is *emerging or declining themes*, this quadrant shows themes that have been used for a long time but are experiencing an increasing or decreasing trend with low density and centrality. The themes in this quadrant are Carbon, Low, Investemnt,

Climate, Impact and Change. Looking at the development of halal tourism sub-themes in recent years, the trend of words contained in this quadrant has increased.

While the upper right quadrant is a *motor theme* or driving theme characterized by high density and centrality, so it needs to be developed and is important to be studied in further research. Words that appear in this quadrant are Green, Economy, Development. Finally, the bottom right quadrant is the *basic and transversal themes* characterized by high centrality but low density. These themes are important to include in the research because they are common topics that are commonly used. The themes that appear in this quadrant are Circular, Economies and Management.

Thematic Evolution

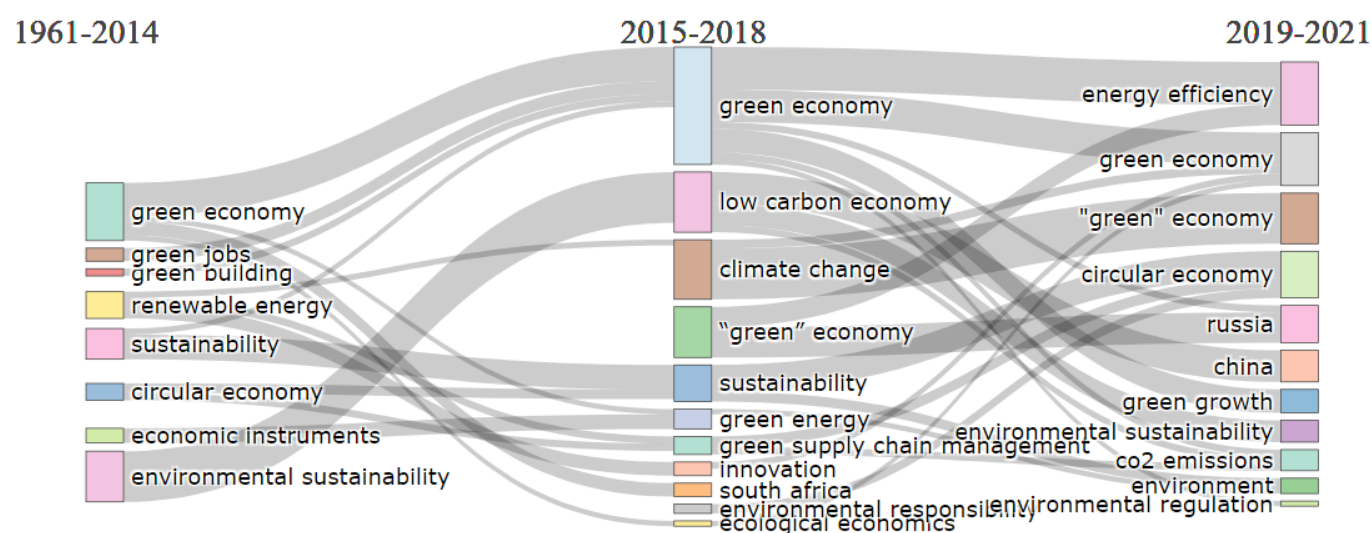


Figure 9: Thematic Evolution

The themes used in the papers that are the object of research continue to change, especially from recently published papers when compared to papers that have been published for a long time. The figure above shows the evolution analyzed based on keywords with research themes related to the Green Economy consisting of themes depicted by rectangles with the larger size, the more widely used. Although the theme of this research is about the Green Economy, the data obtained shows that there are several sub-themes that are widely used.

Thematic Evolution is divided into 3 sections. Where the left side shows some of the most widely used themes from 1961 to 2014, there are 8 themes listed with

different sizes depending on the quantity of use of the theme. The "green economy" theme ranks first, followed by the "environmental sustainability" theme.

The second or middle section shows the most frequently used themes in the period between 2015-2018. 11 themes are listed, of which 2 are evolutions of themes that appeared in the previous period, namely the themes 'green economy' and 'sustainability', which are extensions of some of the themes shown by the colorful grooves.

The last section on the right shows the most widely used themes from 2019-2021. There are 11 themes, of which there are 3 evolutionary themes from

the previous period namely 'green economy', 'sustainability' and "'green" economy' which are extensions of some of the themes shown by the colorful grooves.

CONCLUSION

This research attempts to evaluate the topic of Green Economy using text analysis from 1961-2021. The conceptual structure of R 'biblioshiny' provides key research networks and themes. We have identified two research networks in Green Economy literature using co-occurrence network. These research networks are 'green economy' and 'sustainable development'. Combining these two research networks will address many environmental issues.

Furthermore, in the conceptual structure, this study has deployed thematic maps to place themes and subthemes on the graph and divide them into four clusters (dropping or emerging themes, basic themes, highly developed and isolated themes, motor themes). Basic or transversal themes are represented by circular, economics and management. Carbon, low, investent, climate, impact and change are themes that appear in the dropping or emerging themes cluster. Green, economy and development are emerging themes in the motor themes cluster. Highly developed but isolated green economy literature themes are topics related to challenges, polices and european.

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