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# Green Economy in Southeast Asia: A Bibliometric Analysis and Future Research Directions

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## Abstract

*This study aims to evaluate scholarly publications on the green economy (GE) in Southeast Asia and provide some suggestions for future research topics. The dataset used was obtained from Scopus, comprising 204 documents published in 108 reputable journals and authored by 675 scholars. Bibliometric methods were employed to analyze the data extracted from Scopus with the assistance of machine learning tools in RStudio and VOSviewer. Utilizing thematic map, trend topics, and bibliographic coupling approach, this research offers several suggestions for future research, including issues related to renewable energy, topics concerning sustainability of SMEs, the relationship between GE and circular economy, fields related to the implementation of green innovation, practices of green human resource management, and themes concerning the achievement of SDGs. This study solely focuses on documents published in Scopus-indexed journals, thus articles published in journals indexed by other databases are not considered.*

**Key Words:** *Bibliometric, Green Economy, Scopus, Southeast Asia.*

## 1. INTRODUCTION

The transition from the brown economy to the green economy (GE) continues to be pursued by various countries as part of efforts to achieve sustainable development goals (Akalibey et al., 2023; Kar et al., 2015). The brown economy refers to an economy reliant on fossil fuels for electricity generation, transportation fuel, industrial raw materials, and other purposes (Lau et al., 2021). The various negative impacts necessitate an accelerated transition to GE to sustain, protect, and conserve the environment. The concept of GE provides guidance for both governments and the private sector to achieve integrated economic, social, and environmental objectives.

Efforts towards decarbonization and energy transition, which are essential components of the GE concept, continue to be pursued in


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various countries, including those in the Southeast Asian region. Despite governments in Southeast Asian countries setting climate and decarbonization targets, actions taken thus far have been deemed insufficient. The Southeast Asia's Green Economy 2023 report compiled by Hardcastle et al. (2023) indicates that Southeast Asia still heavily relies on fossil fuels for energy sources (80%). Additionally, green investments experienced a decline of 7% in 2022 due to insufficient infrastructure, financial attractiveness, and regulatory uncertainties in decarbonization efforts across Southeast Asia.

Based on the phenomenon, there are at least three reasons to minimize carbon and enhance environmental resilience in Southeast Asia. Firstly, it is to address the impacts of climate change and biodiversity loss, as well as the ensuing economic ramifications. Climate change can lead to an 11% decline in Southeast Asia's GDP by 2100. Secondly, green stimulus policies can provide an economic boost. For instance, government expenditure of $1 million on renewable energy can create five more jobs compared to allocating it to fossil fuel expenditure. Thirdly, adopting a green recovery approach can bolster Southeast Asia's long-term economic competitiveness (Asian Development Bank, 2022).

The current development of the GE, particularly in Southeast Asia, raises critical questions, such as to what extent the GE theme has been examined by scholars? Several publications on GE have yet to address this question. Several existing studies explore the adoption of GE in the private sector (Islam et al., 2023; Kumalawati et al., 2023; X. H. Nguyen et al., 2023; Ye & Dela, 2023), while others focus on macroeconomic contexts (Dong et al., 2023; Ridzuan et al., 2023; Satrianto & Juniardi, 2023; Yan et al., 2023). However, studies discussing the development of GE literature in this region remain significantly limited.

In this study, bibliometric analysis, a type of analytical data, was utilized to evaluate and comprehend the current status of scholarly publications on the theme of GE within the Southeast Asian context. Furthermore, this research aims to provide recommendations for future research directions concerning GE themes and other related fields. Ultimately, this study offers a comprehensive overview that can serve as a primary reference for understanding the latest developments in GE research.

The specific objectives of this study are to address the following research questions (RQ):

- *RQ1*: What are the research trends related to the green economy in Southeast Asia?
- *RQ2*: Which documents, countries, journals, authors, and institutions are the most productive?
- *RQ3*: Which authors and articles receive the highest number of citations?
- *RQ4*: What are the current trend topics related to green economy literature in Southeast Asia?
- *RQ5*: What are the suggestions for future research related to the green economy in Southeast Asia?

The remainder of this paper is structured as follows. Section 2 presents the literature review. Section 3 explains the methodology employed in this research. Section 4 provides the analysis results. Section 5 discusses future research directions. Finally, Section 6 contains the conclusion of this study.

## 2. LITERATURE REVIEW

GE is often associated with discourses concerning sustainability and national development worldwide (Bailey & Caprotti, 2014). The term 'green economy' was first introduced by a group of environmental economists in 1989 in a report addressed to the UK Government, entitled "Blueprint for a Green Economy" (Pearce et al., 1989). However, the term was only used in the title and there was no further discussion within the report, as noted by the authors (Allen & Clouth, 2012).

Thus far, there is no official consensus regarding the definition of GE. However, several definitions provided by international institutions can be referenced. For instance, UNEP (2011) defines GE as an economy that generates "increased human well-being and social equity while significantly reducing environmental risks and ecological scarcities." OECD (2011) defines GE as "fostering growth and development while ensuring that natural assets continue to provide the resources and environmental services that underpin our well-being." Additionally, the Green Economy Coalition (2012) defines a green economy as "an economy that produces better quality of life for all within the ecological limits of the planet." Furthermore, Al-Taai (2021) also explains that GE can act as a catalyst for accelerating economic growth and job creation with support from both public and private investments.

In simplest terms, a green economy entails low-carbon economic activities, efficient resource utilization, and social inclusivity (Vuola et al., 2020). In this regard, the adoption of renewable energy sources can drive the transition towards a green economy by producing lower carbon emissions and being environmentally friendly compared to conventional energy sources (Raihan & Tuspekova, 2022; Y. Sun et al., 2023; Z. Wang et al., 2023). In the context of Southeast Asia, governments in the region are continually promoting the development of renewable energy due to its rich and abundant energy resources (Chang & Li, 2015; Erdiwansyah et al., 2019; Pratiwi & Juerges, 2020). Cleaner energy sources are also seen as catalysts for economic growth, particularly in Southeast Asia (Ehigiamusoe et al., 2023; Khuong et al., 2019). Additionally, technological innovation plays a crucial role as a driver towards a green economy, especially in balancing production and consumption, and achieving efficiency in resource utilization to meet needs (Bach & Cong, 2024; Lorek & Spangenberg, 2014).

## 3. METHODOLOGY

### 3.1 Data Sources and Search Strategy

This study utilized a dataset of articles on GE in Southeast Asia that have been published by journals indexed in Scopus. The reason for using Scopus as the primary dataset is because it has a good reputation and is one of the largest international indexers of scholarly journals (Parlina et al., 2020). Figure 1 illustrates the flow of data collection regarding GE literature in Southeast Asia.


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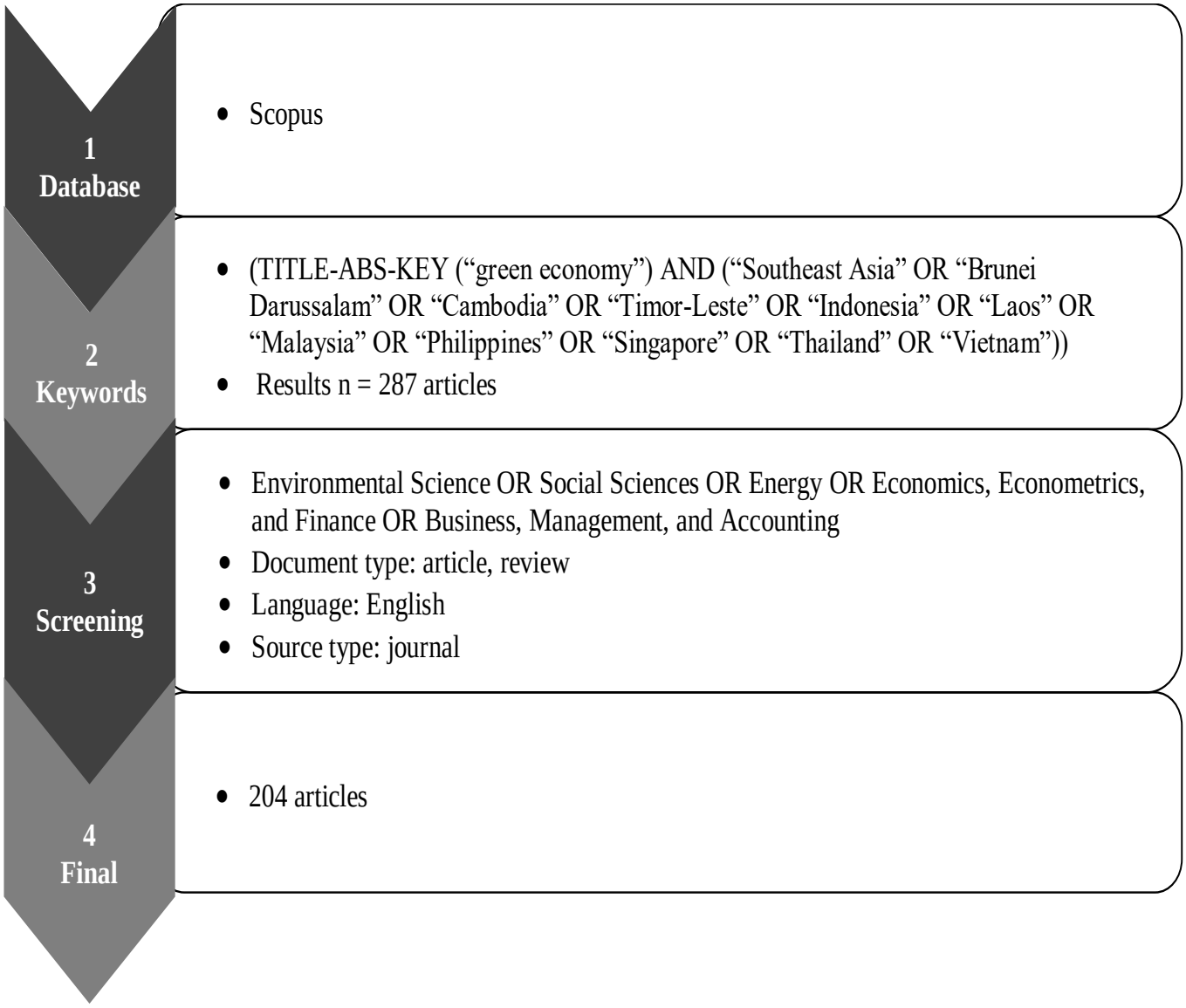


**Figure 1. Data Collection Flow**

Data retrieval was conducted on March 2, 2024, through the Scopus database. Subsequently, we determined the search keywords by entering the query as follows: (TITLE-ABS-KEY ("green economy") AND ("Southeast Asia" OR "Brunei Darussalam" OR "Cambodia" OR "Timor-Leste" OR "Indonesia" OR "Laos" OR "Malaysia" OR "Philippines" OR "Singapore" OR "Thailand" OR "Vietnam")), yielding an initial sample of n=287 articles. Then, data filtering was performed based on Scopus article categories for "Environmental Science; Social Sciences; Energy; Economics, Econometrics, and Finance; and Business, Management, and Accounting," as well as restricting document types to English-language articles and reviews. Based on this filtering process, a final sample of 204 articles was obtained for analysis using bibliometric methods.

### 3.2 Analytical Tools

This study employs bibliometric analysis tools to review the literature on GE research in Southeast Asia. Meanwhile, the machine learning tools utilized for data analysis in this research are the 'Bibliometrix' package in RStudio (Aria & Cuccurullo, 2017) and VOSviewer for constructing network visualizations (van Eck & Waltman, 2010).

## 4. RESULTS

### 4.1 Dataset Overview

Publications on the theme of GE in Southeast Asia have been documented between the years 2010 and 2024 based on the dataset obtained from Scopus. Table 1 presents a summary of information about the dataset used in this study. Specifically, this study has considered 204 articles and reviews published in 108 journals. Overall, these documents were authored by 675 authors, with only 28 authors identified as single authors. This statistic indicates that collaborative performance in GE research is trending. The study also notes that the percentage of reviews is 2.5% of the total documents, suggesting a lack of review articles conducted in this field. Additionally, research on GE in Southeast Asia has emerged for over a decade.

Figure 2 illustrates the annual growth of GE-themed publications and the average citations per year. According to the Scopus database, GE publications in Southeast Asia commenced in 2010, with the number of publications starting to increase in 2015 and reaching its highest point in 2023 with 62 publications, while the average citations ranged from 0.12 to 9.31.


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**Table 1. Dataset Summary**

| Description | Criteria | Result |
|---|---|---|
| *Main information about data* | Timespan | 2010-2024 |
| | Sources | 108 |
| | Documents | 204 |
| | Annual growth rate % | 11.34 |
| | Document average age | 3.71 |
| | Average citations per doc | 19.9 |
| | References | 13193 |
| *Document contents* | Keyword plus (ID) | 802 |
| | Author's keyword (DE) | 707 |
| *Authors* | Authors | 675 |
| | Authors of single-authored docs | 28 |
| *Authors collaboration* | Single-authored docs | 28 |
| | Co-authors per docs | 3.56 |
| | International co-authorships % | 29.41 |
| *Document types* | Article | 199 |
| | Review | 5 |

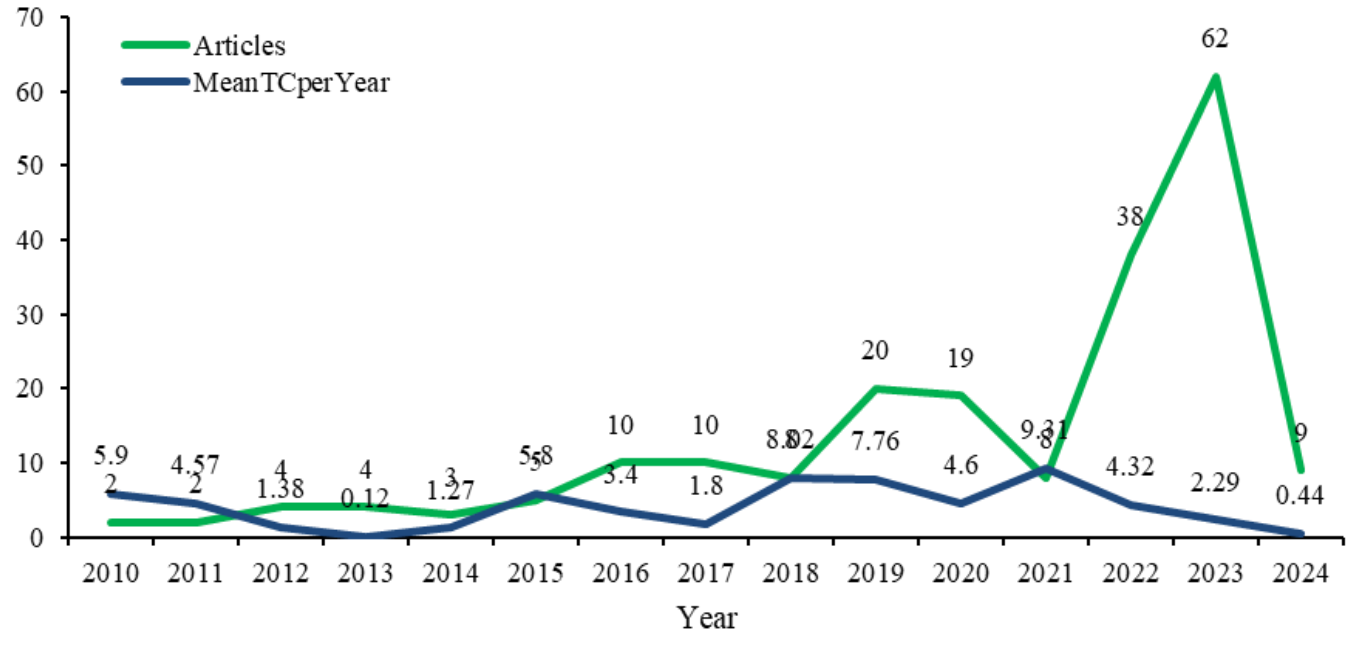


**Figure 2. Annual Scientific Production and Average Citation**

The three-field plot presented in Figure 3 depicts the interconnection of three fields using a Sankey graph. The left section represents the authors, the middle section denotes the keywords, and the right section displays the publishing journals. In general, thicker streams indicate higher levels of contribution. In this instance, Mahanty S is the main contributor and is connected to the top keyword stream, which is green economy. Meanwhile, Sustainability (Switzerland) is the journal that provides the highest contribution in this field.


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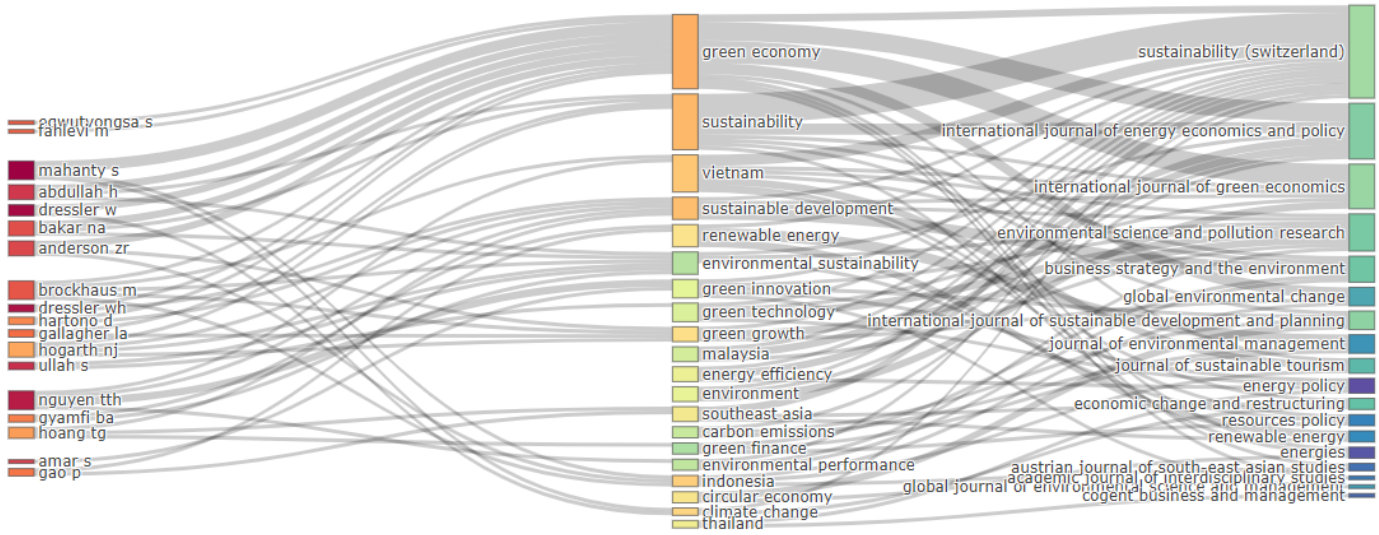


**Figure 3. Three-Field Plot of Authors, Keyword, and Journal**

Figure 4 displays the scholarly output of each country regarding GE. Regions with the darkest blue color indicate the highest number of publications. Based on the map, the countries conducting the most GE research within the Southeast Asian context are Indonesia (179 publications), Malaysia (134 publications), China (81 publications), and Thailand (52 publications).

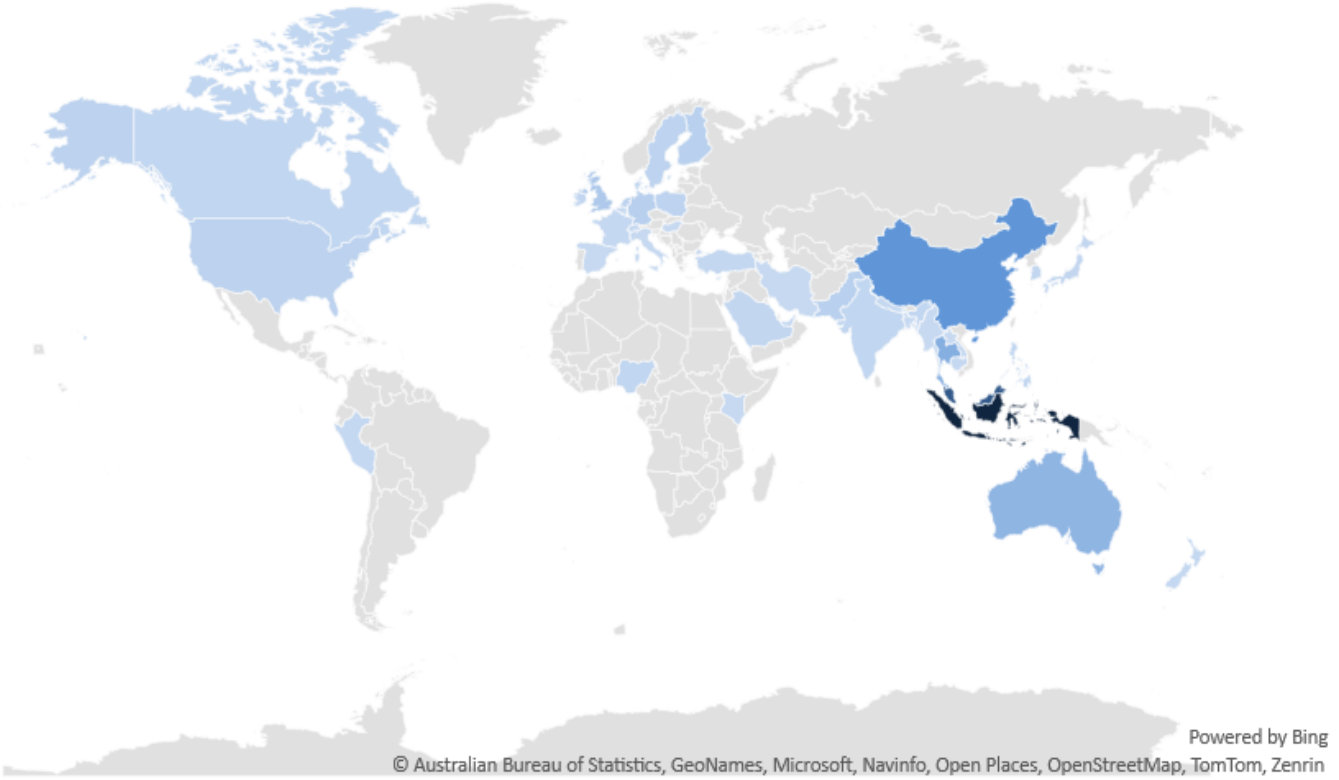


**Figure 4. Countries' Scientific Production**

### 4.2. Source Analysis

204 documents published in 108 reputable journals were analyzed to identify the most influential sources in the research topic of GE in Southeast Asia. Several measurement indicators such as h-index, g-index, m-index, number of publications, and total citations (TC) were used to determine the most impactful sources.

Table 2 presents the top 10 most influential journals based on impact measurements, number of publications, and total local citations. Sustainability (Switzerland) emerges as the most influential journal based on impact measurements, with an h-index of 11, g-index of 18, and m-index of 2.2. This journal also has the highest number of publications in Southeast Asian GE research, totaling 28 articles. The next most influential journals based on impact measurements are Business Strategy and the Environment, with an h-index of 4, g-index of 4, and m-index of 0.57, and International Journal of Green Economics, with an h-index of 4, g-index of 5, and m-index of 0.27. Meanwhile, in terms of total local citations, Energy Policy ranks highest with 464 TC, followed by Sustainability (Switzerland) and Journal of Environmental Management with 347 and 279 TC, respectively.


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**Table 2. Top 10 Journals Covering the Topic of Green Economy**

| No | Impact Measurements | | | | Number of Publications | | Total Local Citations (TC) | |
|---|---|---|---|---|---|---|---|---|
| | Sources | h-index | g-index | m-index | Sources | Total | Sources | TC |
| 1 | Sustainability (Switzerland) | 11 | 18 | 2.20 | Sustainability (Switzerland) | 28 | Energy Policy | 464 |
| 2 | Business Strategy and the Environment | 4 | 4 | 0.57 | International Journal of Green Economics | 12 | Sustainability (Switzerland) | 347 |
| 3 | International Journal of Green Economics | 4 | 5 | 0.27 | International Journal of Sustainable Development and Planning | 11 | Journal of Environmental Management | 279 |
| 4 | Journal of Sustainable Tourism | 4 | 4 | 0.50 | International Journal of Energy Economics and Policy | 7 | Renewable and Sustainable Energy Reviews | 251 |
| 5 | Economic Change and Restructuring | 3 | 4 | 1 | Environmental Science and Pollution Research | 6 | Journal of Sustainable Tourism | 219 |
| 6 | Global Environmental Change | 3 | 3 | 0.33 | Business Strategy and the Environment | 4 | International Journal of Life Cycle Assessment | 176 |
| 7 | International Journal of Energy Economics and Policy | 3 | 7 | 0.38 | Economic Change and Restructuring | 4 | International Journal of Environmental Research and Public Health | 163 |
| 8 | International Journal of Sustainable Development and Planning | 3 | 3 | 0.75 | Journal of Sustainable Tourism | 4 | Business Strategy and the Environment | 142 |
| 9 | Journal of Environmental Management | 3 | 3 | 0.75 | Economic Research-Ekonomska Istrazivanja | 3 | International Journal of Energy Economics and Policy | 135 |
| 10 | Austrian Journal of South-East Asian Studies | 2 | 2 | 0.22 | Global Environmental Change | 3 | Renewable Energy | 114 |

Furthermore, Bradford's Law is applied to assess the core journals that most frequently publish research on GE themes in Southeast Asia (see Figure 5). Bradford's Law identifies 6 core journals: Sustainability (Switzerland), International Journal of Green Economics, International Journal of Sustainable Development and Planning, International Journal of Energy Economics and Policy, Environmental Science and Pollution Research, and Business Strategy and the Environment, as core journals in this field. These journals have published research on GE themes in Southeast Asia, with the number of published articles ranging from 4 to 28 articles.

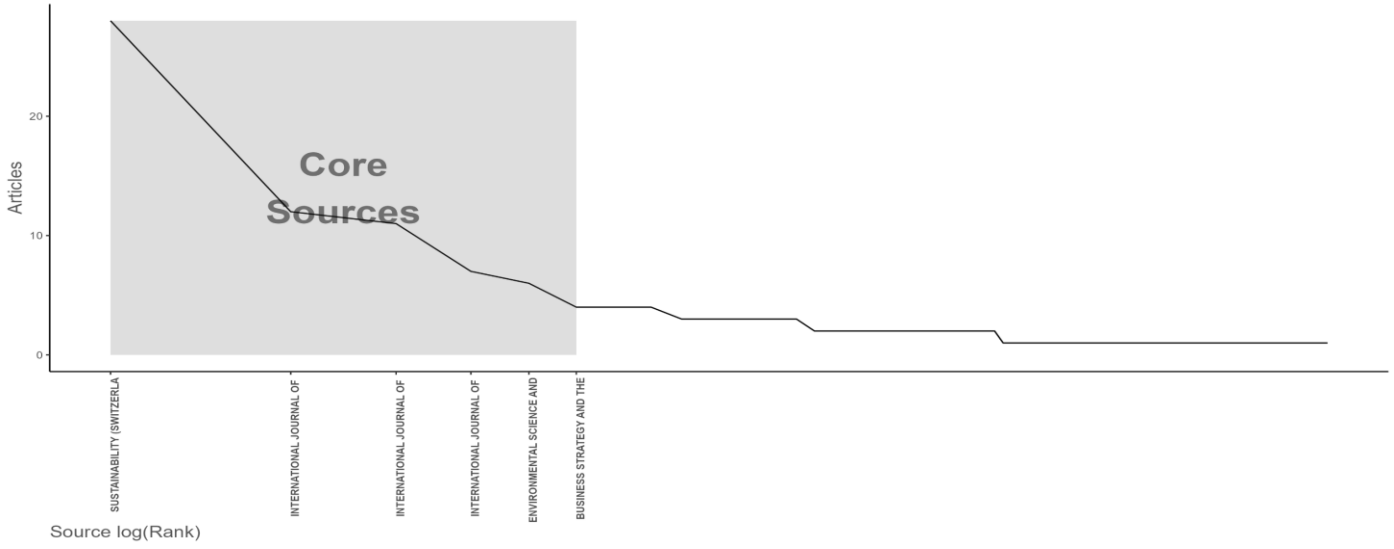


**Figure 5. Bradford's Law**


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### 4.1 Author Analysis

Author analysis was used to investigate the most influential authors in GE studies in Southeast Asia. Table 3 presents information on the top 10 authors out of 675 authors based on impact measurements, number of publications, and total local citations (LC). Mahanty S emerges as the most influential author in this field based on impact measurements with an h-index of 4, g-index of 4, and m-index of 0.57, as well as the author with the highest number of publications with 4 articles. Following closely with an h-index of 3, g-index of 3, m-index of 0.33, and the same number of publications (3 articles) are Dressler W and Dressler WH. Additionally, based on total LC, Edziah BK, Kporsu AK, Sun C, and Sun H rank the highest with 423 LC. Meanwhile, Figure 6 displays the author network visualization. Out of 675 authors, only 21 authors are interconnected. Therefore, collaboration in GE research in Southeast Asia needs to be enhanced.

Based on the top 10 affiliations, the number of published articles ranges from 8 to 17 articles (Table 3). National Economics University emerges as the most impactful affiliation in terms of GE research in Southeast Asia with 17 articles. The next positions are followed by Universiti Teknologi Malaysia, Research Center for Behavioral and Economic Circular, Universiti Teknologi Mara, Universiti Utara Malaysia, and Universiti Malaysia Terengganu, which sequentially have 15, 11, 11, 10, and 9 articles, respectively, while other institutions each produce 8 publications.

**Table 3. Top 10 Authors and Affiliations Discussing the Topic of Green Economy in Southeast Asia**

| No | Impact Measurements | | | | Number of Publications | | Total Local Citations | | Top 10 Affiliations | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Authors | h-index | g-index | m-index | Authors | Total | Authors | LC | Affiliation | Total |
| 1 | Mahanty S | 4 | 4 | 0.57 | Mahanty S | 4 | Edziah BK | 423 | National Economics University | 17 |
| 2 | Dressler W | 3 | 3 | 0.33 | Dressler W | 3 | Kporsu AK | 423 | Universiti Teknologi Malaysia | 15 |
| 3 | Dressler WH | 3 | 3 | 0.33 | Dressler WH | 3 | Sun C | 423 | Research Center for Behavioral and Economic Circular | 11 |
| 4 | Ramayah T | 3 | 3 | 1 | Nguyen TTH | 3 | Sun H | 423 | Universiti Teknologi Mara | 11 |
| 5 | Ullah S | 3 | 3 | 1 | Ramayah T | 3 | Chien F | 228 | Universiti Utara Malaysia | 10 |
| 6 | Abdullah H | 2 | 2 | 0.25 | Ullah S | 3 | Hussain MS | 228 | Universiti Malaysia Terengganu | 9 |
| 7 | Anderson ZR | 2 | 2 | 0.22 | Abdullah H | 2 | Le Thanh T | 228 | Australian National University | 8 |
| 8 | Bakar NA | 2 | 2 | 0.25 | Amar S | 2 | Nawaz MA | 228 | Jiangsu University | 8 |
| 9 | Brockhaus M | 2 | 2 | 0.25 | Anderson ZR | 2 | Sadiq M | 228 | Universitas Negeri Padang | 8 |
| 10 | Fahlevi M | 2 | 2 | 1 | Bakar NA | 2 | Tran TD | 228 | University of Economics Ho Chi Minh City | 8 |

Notes: The h-index focuses on the total citations in previous papers. The g-index considers the total number of publications. The m-index takes into account the h-index value and the year of publication (Hassan et al., 2021).

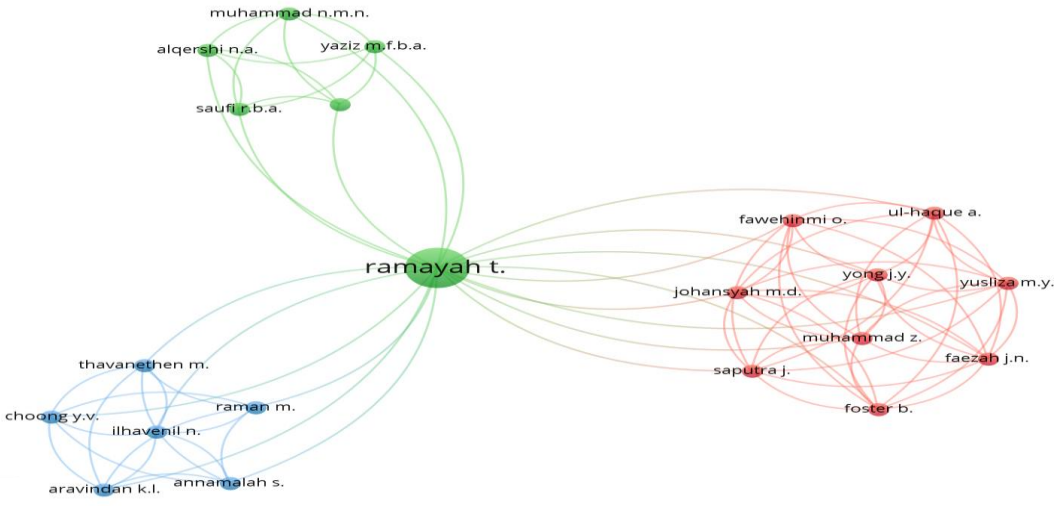


**Figure 6. Author Network Visualization**


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Figure 7 presents the top 10 countries collaborating with other countries. This performance is measured based on single country publication (SCP) and multiple country publication (MCP). Indonesia leads in the highest research collaboration in this field, yet the number of MCP is lower compared to the number of SCP, indicating that authors from Indonesia tend to collaborate more with colleagues from the same country rather than authors from other countries. Similar results are observed in other countries such as Malaysia, Thailand, China, Australia, and Korea. Meanwhile, Germany has an MCP ratio of zero, indicating that this country publishes articles without collaboration with other countries. On the other hand, Finland has an MCP ratio of 1, indicating that this country produces all articles through collaboration with other countries.

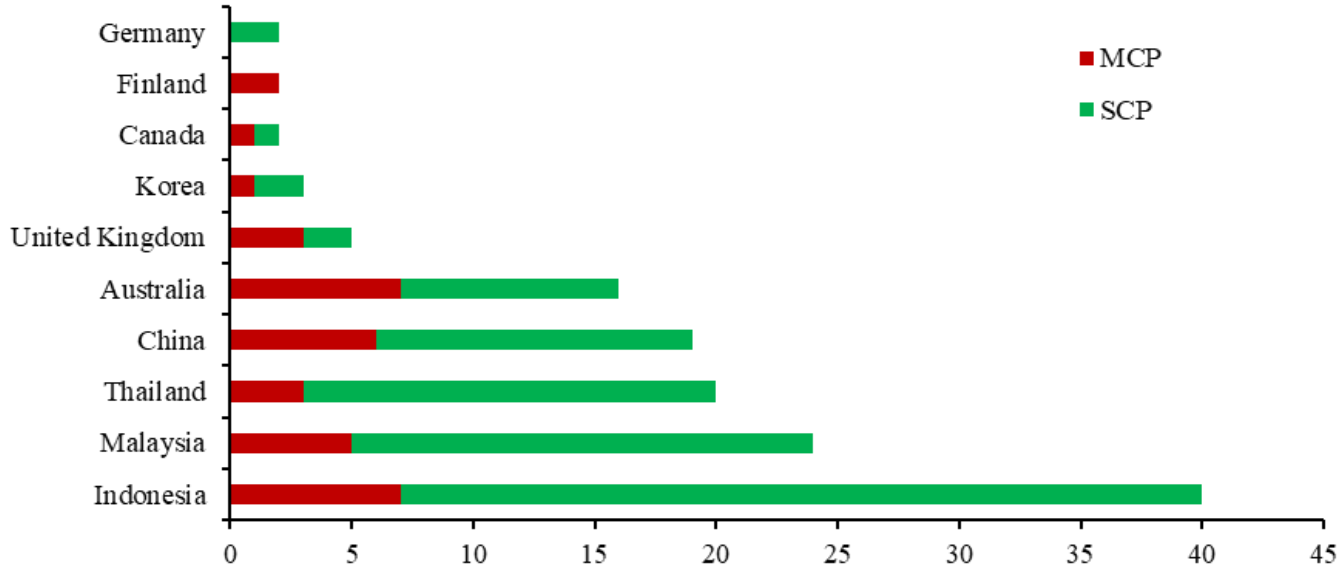


**Figure 7. Corresponding Author's Countries**

### 4.2 Document Analysis

Document analysis is an important part of bibliometric analysis to investigate the most impactful articles. This section presents the articles that are most frequently cited in the theme of GE in Southeast Asia, as well as introduces readers to the most cited authors, article titles, and journals. Table 4 presents the top 10 most impactful articles that have received the highest number of citations in GE-themed research.

Out of 204 articles, the work by H. Sun et al. (2019) titled "*Institutional Quality, Green Innovation, and Energy Efficiency*" ranks first with 423 citations. In the second position, Chien et al. (2021) with the article titled "*A Step Toward Reducing Air Pollution in Top Asian Economies: The Role of Green Energy, Eco-Innovation, and Environmental Taxes*" has received 228 citations. In the third position is occupied by Groot & Borén (2010) with the work titled "*Life Cycle Assessment of the Manufacture of Lactide and PLA Biopolymers from Sugarcane in Thailand*," which has obtained 176 citations. The table also indicates citations in other articles. The article titled "*Environmental Sustainability and its Growth in Malaysia by Elaborating the Green Economy and Environmental Efficiency*" by Kasayanond et al. (2019) received the lowest citations among the top 10 articles, with only 100 citations.

**Table 4. Top 10 Articles**

| Author (Year) | Title | Journal | Citations |
|---|---|---|---|
| H. Sun et al. (2019) | "Institutional quality, green innovation and energy efficiency" | Energy Policy | 423 |
| Chien et al. (2021) | "A step toward reducing air pollution in top Asian economies: The role of green energy, eco-innovation, and environmental taxes" | Journal of Environmental Management | 228 |
| Groot & Borén (2010) | "Life cycle assessment of the manufacture of lactide and PLA biopolymers from sugarcane in Thailand" | International Journal of Life Cycle Assessment | 176 |
| H. Nguyen et al. (2019) | "Organic Food Purchases in an Emerging Market: The Influence of Consumers' Personal Factors and Green Marketing Practices of Food Stores" | International Journal of Environmental Research and Public Health | 160 |
| Chua & Oh (2011) | "Green progress and prospect in Malaysia" | Renewable and Sustainable Energy Reviews | 128 |
| Sadhukhan et al. (2018) | "Role of bioenergy, biorefinery and bioeconomy in sustainable development: Strategic pathways for Malaysia" | Renewable and Sustainable Energy Reviews | 123 |


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| | | | |
|---|---|---|---|
| Tuan (2020) | "Environmentally-specific servant leadership and green creativity among tourism employees: dual mediation paths" | Journal of Sustainable Tourism | 107 |
| S. Wang et al. (2022) | "Green financing role on renewable energy dependence and energy transition in E7 economies" | Renewable Energy | 106 |
| Wong et al. (2018) | "How Does Sustainable Development of Supply Chains Make Firms Lean, Green and Profitable? A Resource Orchestration Perspective" | Business Strategy and the Environment | 101 |
| Kasayanond et al. (2019) | "Environmental Sustainability and its Growth in Malaysia by Elaborating the Green Economy and Environmental Efficiency" | International Journal of Energy Economics and Policy | 100 |
| Kasayanond et al. (2019) | "Environmental Sustainability and its Growth in Malaysia by Elaborating the Green Economy and Environmental Efficiency" | International Journal of Energy Economics and Policy | 100 |

### 4.3 Keyword Analysis

Keyword analysis is used to understand the dynamics and development of GE literature in Southeast Asia. Figure 8 visualizes the most frequently occurring keywords in the literature. From 707 author keywords and given a minimum threshold of 4 occurrences, 29 keywords are obtained and divided into five clusters. Cluster 1 (red) contains keywords such as climate change, environment, governance, Philippines, Southeast Asia, sustainability, and sustainable development. Cluster 2 (green) includes terms such as energy efficiency, environmental performance, green building, green human resource management, green innovation, green technology, and Malaysia. Cluster 3 (blue) refers to keywords such as carbon emissions, circular economy, environmental sustainability, green finance, green investment, renewable energy, and sustainable development goals. Cluster 4 (yellow) contains keywords such as green economy, green growth, Indonesia, REDD+, SMEs, and Thailand. Finally, Cluster 5 (purple) includes keywords such as green marketing and Vietnam.

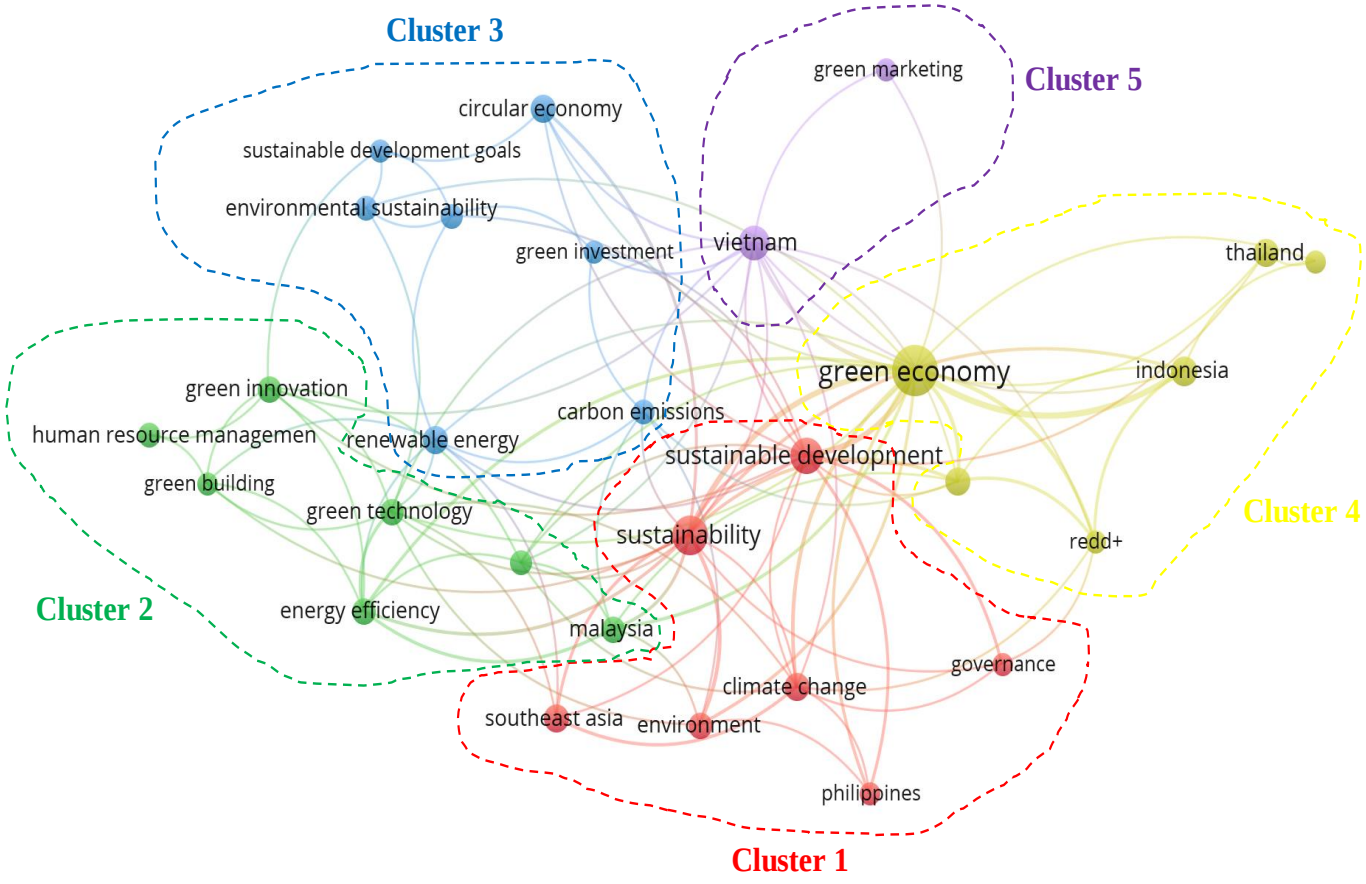


**Figure 8. Main Keyword in GE Research**

Furthermore, word cloud analysis is one of the text mining analyses to uncover the most frequently used keywords by authors in GE research in Southeast Asia. The keywords positioned in the center indicate that these words are the most commonly used in the subject matter. Meanwhile, the smaller and more distant keywords from the center indicate words that are less frequently used. Figure 9 shows that the most commonly used keywords are green economy (freq=52), sustainability (freq=22), and sustainable development (freq=18).


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**Figure 9. Word Cloud**

Figure 10 depicts a thematic map of the most frequently occurring keywords in GE research in Southeast Asia. The categorization of these keywords is divided into four quadrants, with the upper right and left quadrants representing highly specialized themes, and the lower right and left quadrants representing basic and emerging themes. Keywords in the upper right quadrant (such as renewable energy, SMEs, circular economy, green economic growth, and others) represent motor themes. Keywords in the upper left quadrant (such as $CO_2$ emissions, green production, inclusive green growth, inclusive human development, and others) represent niche themes. Keywords in the lower right quadrant (such as green economy, sustainable development goals, green innovation, environmental sustainability, green marketing, green human resource management, and others) represent basic themes. Meanwhile, keywords in the lower left quadrant (such as green supply chain management, business performance, palm oil, and others) represent emerging themes. These themes represent important issues in GE studies in Southeast Asia as recorded in the Scopus database.

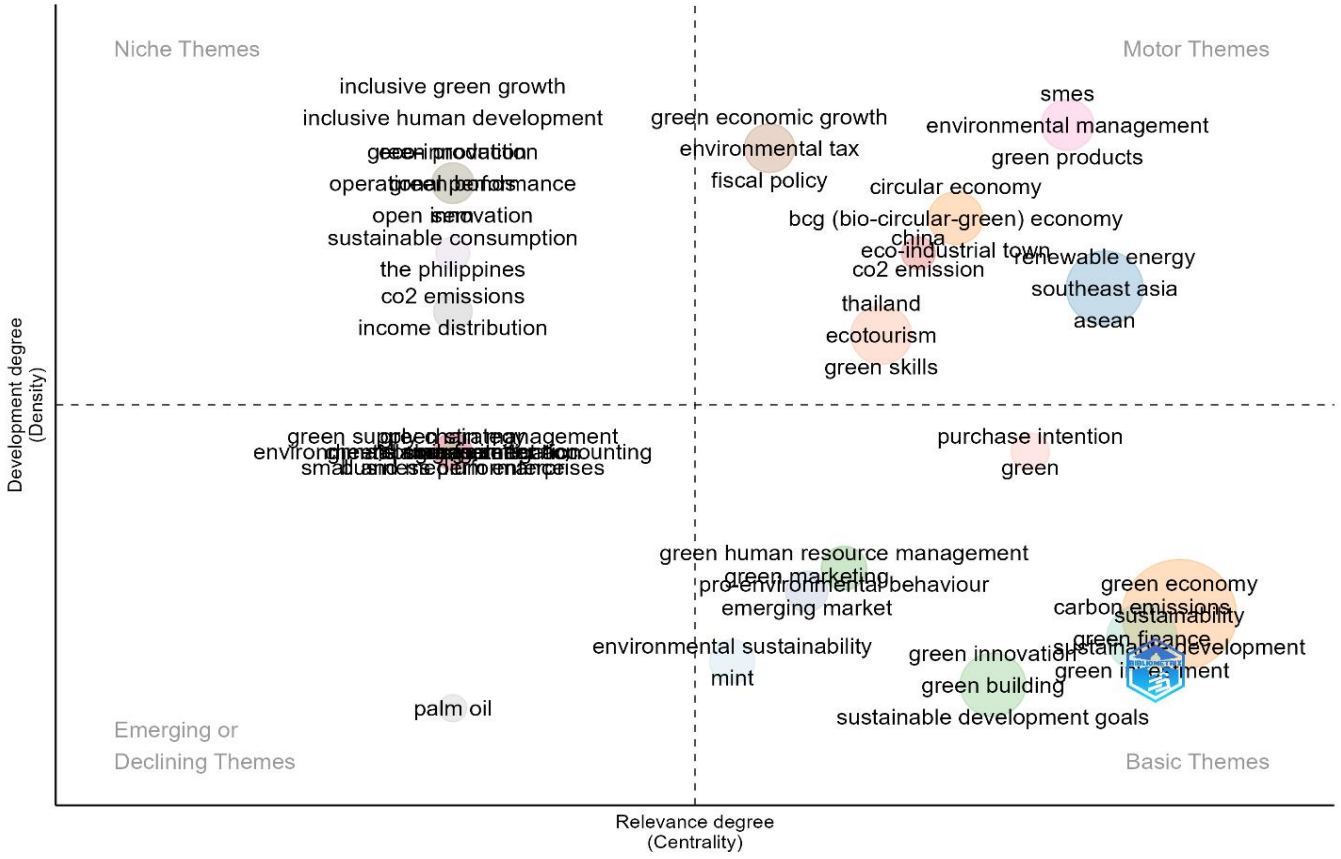


**Figure 10. Thematic Map**

Figure 11 presents a visualization of trend topics derived from keywords, particularly keywords from articles published between 2014 and 2024. The blue line indicates the initial and final years of the occurrence of keywords. Meanwhile, the blue circles indicate the frequency of keyword occurrences, with larger circles indicating higher frequency of keyword occurrences. The frequency of the keyword 'green economy' is the highest and has a relatively long period, considering that this keyword is the main term in this study. Additionally, in recent publications,


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keywords such as 'renewable energy,' 'circular economy,' 'green innovation,' and 'carbon emissions' are newly emerging keywords appearing between 2021 and 2023 in GE-themed research in Southeast Asia.

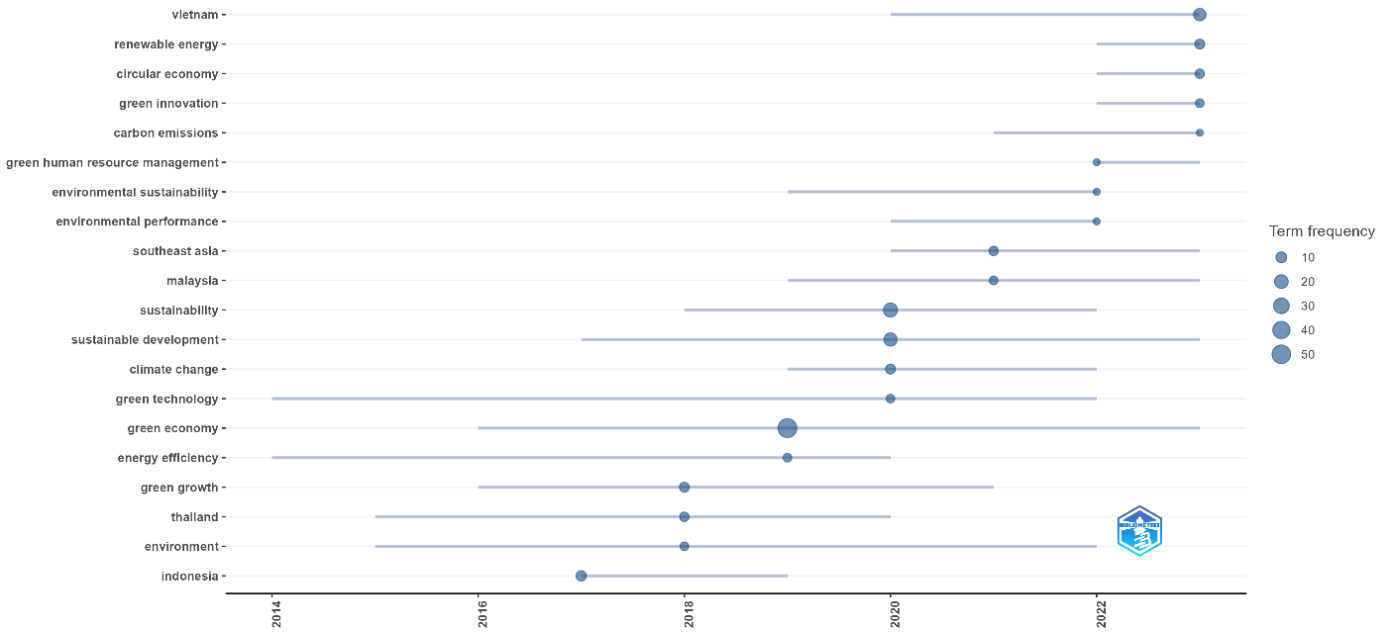


**Figure 11. Trend Topics**

### 4.4 Bibliographic Coupling

Bibliographic coupling analysis is used to investigate relationships among published articles based on the number of citations they receive. In this study, normalized citations are used to group the data. Figure 12 presents a visualization of bibliographic coupling analysis from 204 articles. By increasing the minimum citation count to 5, there remain 106 articles, with only 84 articles being interconnected and forming eight clusters. Generally, the number of documents grouped in each cluster is as follows: 20 articles in Cluster 1 (red), 17 articles in Cluster 2 (green), 14 articles in Cluster 3 (dark blue), 13 articles in Cluster 4 (yellow), 9 articles in Cluster 5 (purple), 4 articles in both Cluster 6 (light blue) and Cluster 7 (orange), and 2 articles in Cluster 8 (brown).

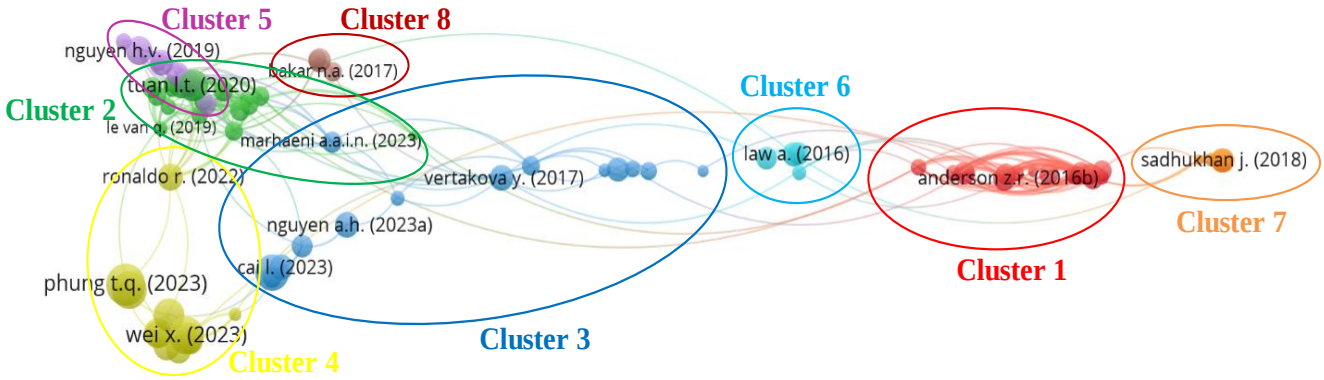


**Figure 12. Bibliographic Coupling**

## 5. DISCUSSION AND FUTURE RESEARCH DIRECTIONS

In this section, the study discusses several recommendations and directions for future research based on the literature extraction results. The approach used to determine potential topics for further investigation is informed by bibliographic coupling analysis in Figure 12, as well as the review of results from the thematic map analysis in Figure 10 and trend topics in Figure 11.

Firstly, issues related to renewable energy are highlighted. Renewable energy emerges as a crucial motor theme (see Figure 10) and one of the trend topics (see Figure 11) in GE research in Southeast Asia. Cluster 3 in Figure 12 represents works by S. Wang et al. (2022) and Dong et al. (2023), providing evidence of the importance of green financing in driving the transition towards renewable energy. However, the limited studies on green financing present ample opportunities for further research, particularly in advancing the transition to renewable energy in Southeast Asian countries. Additionally, studies concerning the use of renewable energy to address environmental degradation are also emerging topics in this field, necessitating further investigations, especially in the context of Southeast Asia. Studies by Chien et al. (2021), Li et al. (2022), and Sarpong et al. (2023) highlighted in Cluster 4 in Figure 12 represent empirical evidence of the significance of using renewable energy to tackle environmental degradation.

Secondly, this study suggests analyzing the sustainability of small and medium enterprises (SMEs). This keyword represents both motor and emerging themes (see Figure 10). Gorondutse et al. (2020) have investigated green entrepreneurial practices in SMEs. As environmentally friendly entrepreneurial practices are still in


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their infancy, it is crucial to explore key factors. Additionally, in Cluster 2 (Figure 12), the study by Fadly (2020) highlights the importance of implementing environmental management system (EMS) certificates among SMEs. Identifying determinants of EMS adoption can contribute to business sustainability. Moreover, digitization in SMEs and green product certification are also crucial factors in enhancing the implementation of the green economy (Islam et al., 2023; Noranarttakun & Pharino, 2021). Hence, future research is expected to explore the impact of digitization on SMEs, which can drive the implementation of the green economy.

Thirdly, investigating the relationship between GE and circular economy (CE). CE is one of the trend topics in the field of GE in Southeast Asia (see Figure 11). This trend topic also highlights the research by Muafi (2021) in Cluster 2 in Figure 12, which investigates the influence of green culture and green strategy on the implementation of CE. By selecting Indonesia as the sample, the results indicate that both factors impact the implementation of CE. Determinants of CE implementation may still be largely unexplored, thus providing opportunities for further research.

Fourthly, issues related to the implementation of green innovation should be explored. This keyword represents basic themes (see Figure 10) and is one of the recent trend topics (see Figure 11). Cluster 2 in Figure 12 represents studies by Yusr et al. (2020), Huang et al. (2022), and Imran & Jingzu (2022) examining the implementation of green innovation in companies to achieve sustainable green economy. Future research is expected to focus on identifying the drivers and barriers in green innovation practices. Additionally, future studies are also expected to evaluate the impact of green economy on energy efficiency (H. Sun et al., 2019).

Fifthly, themes related to green human resource management (GHRM) are among the significant trend topics found in the sample (see Figure 11), also identified as basic themes in the literature of GE in Southeast Asia (see Figure 10). Regarding the GHRM theme, this study suggests analyzing the impact of GHRM in driving business performance sustainability (Maskuroh et al., 2023; Setyaningrum & Muafi, 2023), and how GHRM practices can explain pro-environmental behavior among employees (Yusop et al., 2023). Furthermore, future research could examine how GHRM practices contribute to creating a sustainability-oriented organizational culture and how sustainable leadership practices influence employee behavior and attitudes towards the green economy.

Sixthly, topics related to sustainable development goals (SDGs) are considered crucial in the context of green economy, as green economy is seen as an approach or economic model supporting the achievement of SDGs. SDGs are basic themes in GE research in Southeast Asia (see Figure 10). Cluster 3 in Figure 12 represents the study by Vertakova & Plotnikov (2017), which identifies challenges in social, economic, and environmental domains. They emphasize the importance of developing GE to ensure economic stability. This topic still requires critical debate in future research. Additionally, Cluster 4 in Figure 12, highlighting the study by Ronaldo & Suryanto (2022) examining the role of green finance in advancing SDGs, focusing on Indonesia. They suggest that green finance can contribute to achieving environmental and economic sustainability, which are among the SDGs targets. Future studies can refer to this research to explore green finance for SDGs achievement in Southeast Asian countries. Moreover, other targets within the SDGs framework could also be potential topics for investigation in the field of GE in Southeast Asia.

## 6. CONCLUSION

This study contributes significantly by evaluating and providing a comprehensive overview of the literature structure of GE published in reputable journals from 2010 to 2024. The research investigates impactful sources and authors, reviews influential articles, and offers suggestions for future research. The study provides six potential topic recommendations in the field of GE within the Southeast Asian context, including issues related to renewable energy, sustainability of SMEs, the relationship between GE and CE, implementation of green innovation, practices of green human resource management, and topics related to SDGs.

Furthermore, this study has limitations, as it only focuses on GE papers published in Scopus-indexed journals, thus excluding GE literature published in journals indexed by other databases. However, the study has attempted to utilize literature published in reputable journals available in Scopus from 2010 to 2024. Therefore, this research provides a comprehensive overview of the development and potential topics in the field of GE within the Southeast Asian context.

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