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Research Trends and Prospects of Green Economy in Economic Literature: A Bibliometric Analysis

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ABSTRACT

Over the past few decades, the global discourse on environmental sustainability and climate change has catalyzed a profound transformation in economic paradigms, giving rise to the concept of the green economy. This paradigm emphasizes the integration of economic activities with environmental preservation and social equity to achieve sustainable development goals. As scholarly interest and research output in the green economy burgeon, navigating through the vast body of literature becomes increasingly challenging. In response, this study conducts a bibliometric analysis of economic literature related to the green economy, aiming to map out research trends, identify influential authors, seminal works, and thematic clusters. Employing bibliometric techniques such as co-citation analysis, keyword analysis, and citation mapping, this research provides insights into the intellectual landscape of the green economy field. The analysis reveals key research gaps, such as uneven geographical distribution and the need for interdisciplinary studies, while also highlighting emerging areas of inquiry. By delineating future research trajectories, this study aims to inform policymakers, stakeholders, and researchers striving towards sustainable economic development goals.

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1. INTRODUCTION

In recent decades, global concerns regarding environmental degradation and climate change have spurred a significant shift in economic paradigms, fostering the emergence of the green economy as a prominent area of scholarly inquiry [1]. The concept of a green economy encompasses economic activities that aim to improve human well-being and social equity while significantly reducing environmental risks and ecological scarcities [2]. It underscores the importance of sustainable development and seeks to reconcile economic growth with environmental protection [3]. As the urgency to mitigate climate change intensifies, understanding the dynamics and trends within the green economy becomes imperative [4]. Consequently, scholars and policymakers alike have turned their attention to examining the multifaceted

dimensions of the green economy, leading to a burgeoning body of literature on the subject [5].

Amidst the expanding discourse surrounding the green economy, it becomes increasingly challenging for researchers and practitioners to navigate through the plethora of studies and discern the prevailing trends, gaps, and future directions [6]–[8]. Hence, conducting a bibliometric analysis provides a systematic approach to distilling insights from the vast repository of scholarly articles within economic literature pertaining to the green economy [9][10]. By employing bibliometric techniques, this research endeavors to map out the intellectual landscape, identify influential authors, seminal works, and thematic clusters, thus offering a comprehensive overview of the research trends and prospects within this burgeoning field. Through such an analysis, this study aims to contribute to the scholarly understanding of the green economy while providing valuable insights for policymakers and stakeholders striving towards sustainable development goals.

Despite the growing interest and scholarly output concerning the green economy, several key research gaps persist, warranting further investigation [11]. One such gap pertains to the uneven geographical distribution of research, wherein certain regions may be underrepresented in the academic discourse [12]. Moreover, there remains a need to assess the interdisciplinary nature of research within the green economy, particularly its intersection with fields such as environmental science, sociology, and political economy [13]. Additionally, while numerous studies like [14], [15] have explored the macroeconomic implications of transitioning towards a green economy, there is a dearth of research focusing on micro-level analyses, such as the adoption of sustainable practices by businesses or the behavioral aspects of green consumption. Addressing these gaps forms the basis of this research's problem statement.

The primary objective of this study is to conduct a comprehensive bibliometric analysis of economic literature pertaining to the green economy, with the aim of identifying prevailing research trends, key contributors, and emerging areas of inquiry. By employing bibliometric techniques such as co-citation analysis, keyword analysis, and citation mapping, this research seeks to uncover patterns, connections, and knowledge networks within the field. Furthermore, the study aims to delineate future research trajectories and highlight areas ripe for further exploration, thereby facilitating informed decision-making and advancing scholarly discourse on sustainable economic development. Ultimately, this research endeavors to provide a roadmap for researchers, policymakers, and practitioners seeking to navigate and contribute to the evolving landscape of the green economy.

2. LITERATURE REVIEW

A Green Economy is an economic approach that emphasizes sustainable development by integrating economic, environmental, and social aspects [16]–[19]. It aims to reduce negative environmental impacts, such as greenhouse gas emissions, biodiversity loss, and water resource depletion, while also focusing on social welfare and economic growth. Transitioning to a Green Economy involves changes in mindset, lifestyle, policies, and investments in renewable energy, sustainable infrastructure, and community empowerment. The concept of a Green Economy is crucial for achieving social equality, environmental sustainability, and economic well-being by minimizing environmental risks and ensuring resource efficiency. It plays a significant role in addressing crises, fighting poverty, and promoting green investments for a more sustainable future. of product development now includes considerations for materials, manufacturing processes, and the product life cycle [16]. There is a growing focus on the circular economy, with an emphasis on remanufacturing,

Green Economy in economic literature refers to a sustainable development

approach prioritizing environmental preservation and social welfare enhancement [20], [21]. It involves concepts like green jobs, green tourism, green financing, and investments, aiming to reduce environmental risks significantly [19]. The implementation of Green Economy involves shifting economic activities towards environmentally friendly practices, such as using renewable energy sources and promoting circular economy principles [2], [22]. Studies also highlight the importance of green finance in supporting the transition to a Green Economy, emphasizing the need for coherence between legal frameworks and financial incentives to attract investors towards sustainability initiatives. Overall, the Green Economy concept in economic literature underscores the crucial balance between economic growth, environmental protection, and social equity.

3. METHODS

This research employs a bibliometric approach to analyze the economic literature pertaining to the green economy. Firstly, a comprehensive search will be conducted in relevant academic databases such as Web of Science, Scopus, and Google Scholar using a combination of keywords such as "green economy," "sustainable development," and "environmental economics." The retrieved articles will then undergo screening based on predefined inclusion criteria, including relevance to the green economy and publication within a specified timeframe (1970-2024). Subsequently, bibliometric software such as VOSviewer will be utilized to analyze the bibliographic data, including citation patterns, co-authorship networks, and keyword co-occurrence. Co-citation analysis will be employed to identify seminal works and influential authors, while keyword analysis will reveal prevailing research themes and emerging topics. By employing these bibliometric techniques, this research aims to provide a systematic and comprehensive analysis of the trends and prospects within the economic literature on the green economy, thereby facilitating insights for future research and policy formulation.

4. RESULTS AND DISCUSSION

4.1 Research Data Metrics

Table 1. Data Citation Metrics

Publication years	1970-2024
Citation years	54 (1970-2024)
Paper	980
Citations	282295
Cites/year	5227.69
Cites/paper	288.06
Cites/author	174870.60
Papers/author	523.31
Author/paper	2.59
h-index	203
g-index	523
hI,norm	165
hI,annual	3.06
hA-index	83
Papers with ACC	: 1,2,5,10,20:915,830,669,501,317

Source: Publish or Perish Output, 2024

Table 1 provides an overview of data citation metrics derived from the Publish or Perish Output for the period spanning from 1970 to 2024. It includes key indicators such as the number of publications, citations received, and various citation-based indices. Over the 54-year period, a total of 980 papers were published, accumulating a substantial citation count of 282,295, resulting in an average of 5,227.69 citations per year. On average, each paper received 288.06 citations, showcasing the impact and visibility of the research output. Notably, the h-index, a measure of both productivity and citation impact, stands at 203, indicating that there are 203 papers with at least 203 citations each. The g-index, which accounts for the distribution of citations among publications, is 523. Additionally, the table presents hI,norm (a normalized h-index considering the publication age), hI,annual (average h-index per year), and hA-index (h-index accounting for co-authorship). Furthermore, it highlights the distribution of papers with different levels of accumulated citation counts,

demonstrating the reach and influence of the research within the academic community. Overall, these metrics provide a comprehensive understanding of the scholarly impact and productivity of the research output in the specified timeframe.

Table 2. Top Cited Research

Citations	Authors and year	Title
17319	[23]	Microeconomic theory
7485	[24]	The science of monetary policy: a new Keynesian perspective
6141	[25]	Entrepreneurial discovery and the competitive market process: An Austrian approach
6019	[26]	Two agency-cost explanations of dividends
5546	[27]	Green supply-chain management: a state-of-the-art literature review
5048	[28]	Technical change, inequality, and the labor market
4766	[29]	The purchasing power parity puzzle
3962	[30]	Field experiments
3330	[31]	Environmental regulation and the competitiveness of US manufacturing: what does the evidence tell us?
3239	[32]	The role of cognitive skills in economic development

Source: Publish or Perish Output, 2024

Table 2 provides a glimpse into the most influential research articles within the specified dataset, as indicated by their citation counts. Topping the list is "Microeconomic Theory" by Mas-Colell, Whinston, and Green (1995), with a remarkable citation count of 17,319. This seminal work is widely regarded as a cornerstone in microeconomic theory, offering comprehensive coverage of fundamental concepts and analytical techniques. Similarly, "The Science of Monetary Policy: A New Keynesian Perspective" by Clarida, Gali, and Gertler (1990) has garnered significant attention, with 7,485 citations, contributing substantially to the understanding of monetary policy in a New Keynesian framework. Additionally, "Entrepreneurial Discovery and the Competitive Market Process: An Austrian Approach" by Kirzner (1997) stands out for its exploration of entrepreneurial dynamics within competitive markets, influencing discussions on market processes and economic coordination. Furthermore, "Green Supply-Chain Management: A State-of-the-Art Literature Review" by Srivastava (2007) has made a notable impact in the domain of sustainability and supply chain management, guiding research and practices towards environmentally conscious approaches. Each of the top-cited articles in Table 2 represents seminal contributions to their respective fields, shaping scholarly discourse, informing policy discussions, and inspiring further research endeavors

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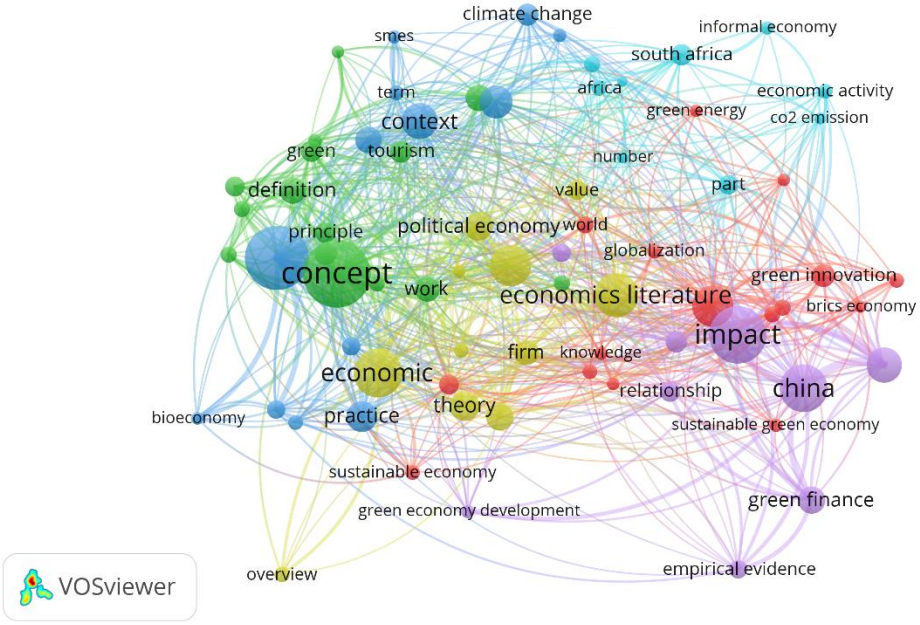

Figure 1. Network Visualization
Source: Data Analysis Result, 2024

In such a visualization, the size of the nodes (the circles) typically correlates with the frequency of the term's occurrence within the literature, while the thickness of the lines between the nodes indicates the strength of the terms' association with one another, suggesting how often they co-occur in the literature. The color clusters might represent thematical groupings based on a similarity or relatedness measure—terms that are more closely related are grouped in the same color. For example, we can observe that green cluster includes terms like "green," "definition," "principle," "concept," and "economic," suggesting a focus on defining principles and concepts within the green economy. While the blue cluster connects "economic," "practice," "bioeconomy," and "sustainable economy," possibly indicating a discussion around practical economic approaches to sustainability and bioeconomics.

Furthermore, the red cluster has terms such as "green innovation," "china," "BRICS economy," and "green finance," implying a focus on innovation and financial aspects within the economies of emerging countries, particularly China and the BRICS nations (Brazil, Russia, India, China, and South Africa). The yellow cluster with terms like "overview," "sustainable green economy," and "green economy development" might be more about broad overviews and developmental aspects of green economies. The purple cluster seems to have a focus on "impact," "relationship," and "empirical evidence," suggesting a concentration on the impact of green economic practices and their empirical analysis. The overall network indicates a comprehensive discourse on various aspects of green and sustainable economic development, with a focus on definitions, practices, innovations, financial mechanisms, and empirical assessments of impact.

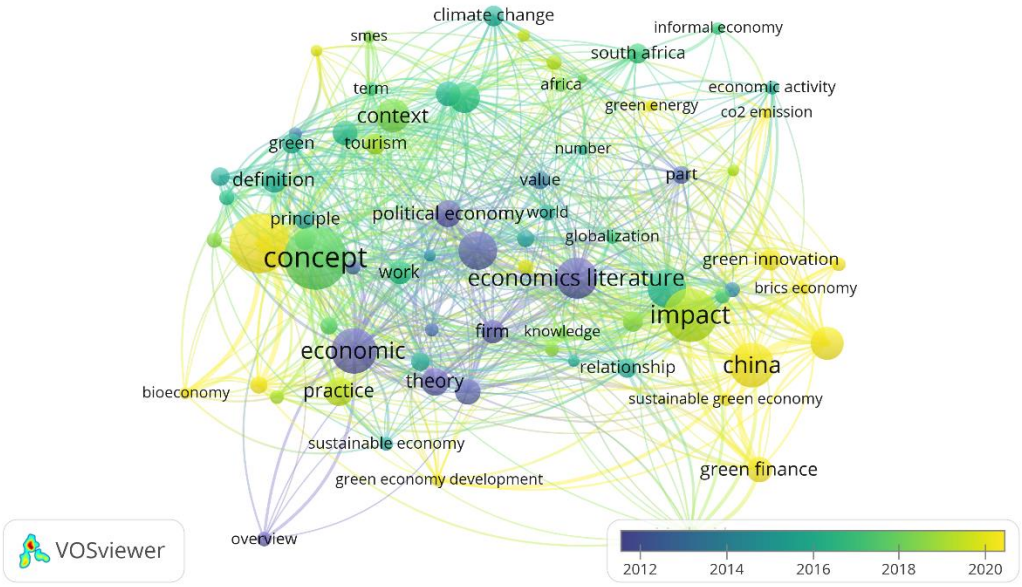

Figure 2. Overlay Visualization
Source: Data Analysis Result, 2024

This image adds a temporal dimension to the network visualization of terms, with colors now seemingly representing different years or periods in time. This type of visualization helps identify the evolution of research trends over time. The blue nodes likely represent earlier years in the dataset, possibly around 2012. These nodes include terms like "bioeconomy," "economic practice," and "sustainable economy," indicating an initial focus on sustainable economic practices and bioeconomic principles. As we transition to shades of green, we see terms like "green," "concept," and "definition" becoming prominent. This suggests that in the intermediate years, perhaps around 2014-2016, there was a consolidation and clarification of key concepts in green economics. Moving towards the yellow nodes, which probably signify the most recent years in the dataset, terms such as "china," "green finance," and "green innovation" become more significant. This trend indicates a shift in focus towards the practical application of green concepts in finance and innovation, with particular attention to China's role in the green economy, potentially around 2018-2020.

The early period is characterized by foundational discussions on sustainable and bioeconomic practices. This evolves into a mid-period focus on defining and conceptualizing green economic principles. The latest trends indicate a pivot towards the practical application of these principles, with an emphasis on green finance and innovation in specific economies, especially China, suggesting a real-world impact and integration of these concepts into the economic strategies of emerging markets.

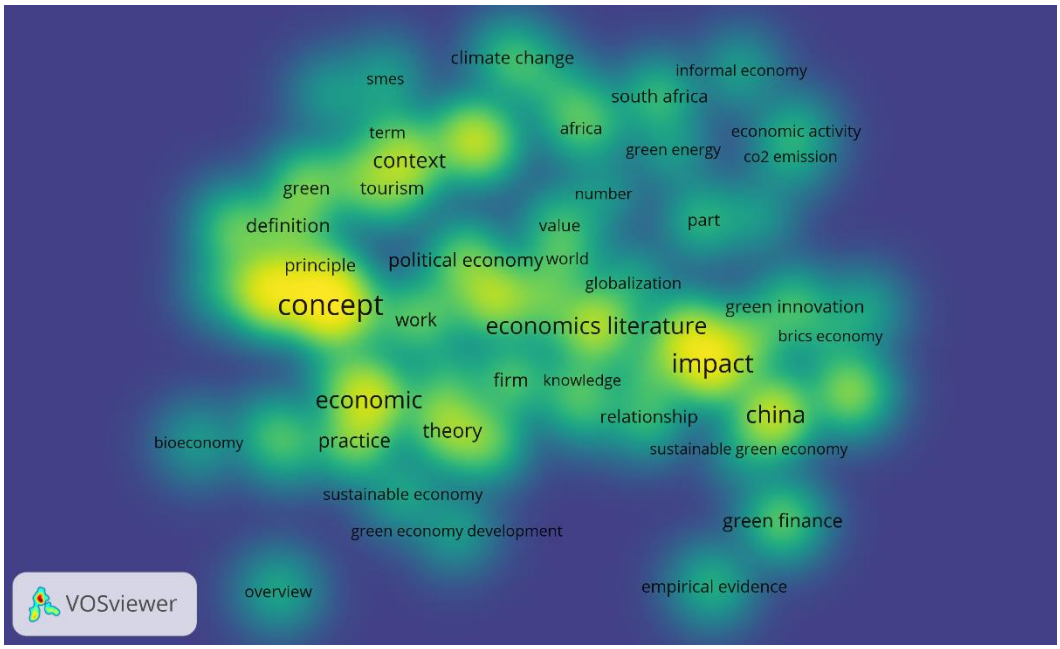

Figure 3. Density Visualization

Source: Data Analysis, 2024

In the third network visualization, the less bright areas could represent terms that are currently less central or less connected within the field of study, suggesting they may hold potential for future research. Looking at the less bright areas, there are several terms that stand out as less emphasized: "political economy," "theory," "relationship," and "empirical evidence." These suggest a few potential avenues for future research. "Political economy" indicates that incorporating a political aspect into the study of green economics could be a rich vein to explore, examining how government policies and political contexts influence green economic practices and principles. "Theory" suggests that there may be room for developing or refining theoretical frameworks that underpin green economic concepts, providing a deeper understanding and potentially new insights into sustainable economic models. The term "relationship" points to a possible need for more research into the interconnections between various elements of the green economy, such as the relationship between green technology adoption and economic growth or the impact of green finance on reducing carbon emissions. "Empirical evidence" indicates a potential gap in studies that provide empirical data and validation of theories in green economics. This could include case studies, comparative analyses, or longitudinal studies that track the impact of green initiatives over time.

While the current research seems focused on the practical application of green economic principles, the less bright areas hint at a need for deeper theoretical development, understanding the political implications, exploring relationships within the green economy, and backing up theory with empirical data. These are all areas that could yield valuable insights as the field matures.

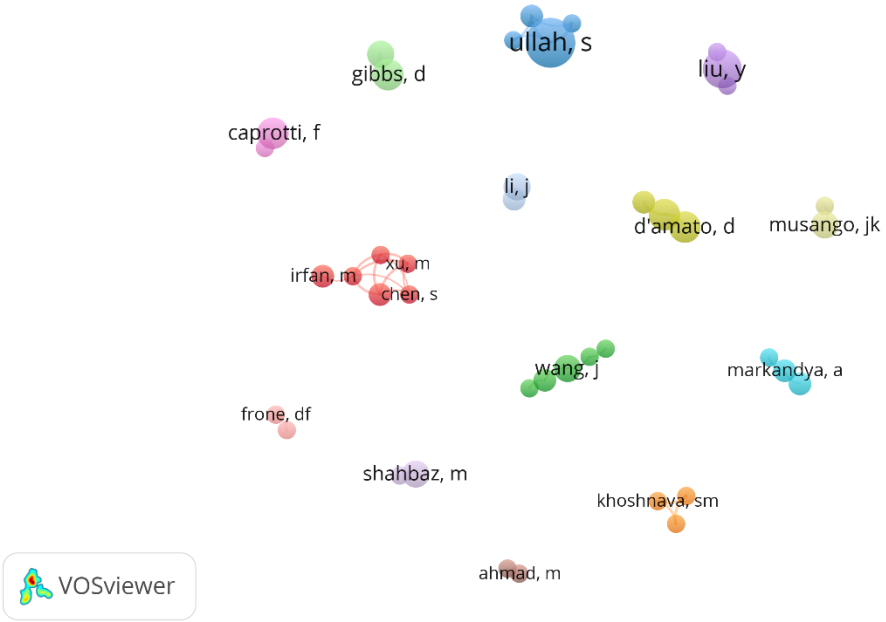

Figure 4. Author Collaboration Visualization
Source: Data Analysis, 2024

The last image appears to be a bibliometric visualization of author collaborations, indicating how researchers are connected based on their joint publications. The nodes represent individual authors, and the lines between them show co-authorship links. The proximity of nodes and the thickness of the lines typically illustrate the frequency and strength of collaborations between the researchers.

In the center of the graph, there's a cluster of nodes in red, which likely indicates a strong network of collaborations among these authors (Irfan, M., Xu, M., Chen, S., and others). The density and overlap of connections here suggest they frequently work together or are part of a research group with common interests.

Other nodes, such as those in blue (Ullah, S., Li, J., and others) and green (Wang, J., Shahbaz, M., and others), are less densely connected but still indicate collaborative ties. These might be secondary or interdisciplinary collaborations that extend the reach of research across different fields or institutions.

Authors represented by isolated nodes or those with fewer connections (Gibbs, D., Caprotti, F., Liu, Y., and others) may be emerging researchers in the field or those who have more independent research tracks. They could also represent peripheral members of research networks or scholars who collaborate outside this network.

5. CONCLUSION

Through the series of network visualizations, we've uncovered a rich landscape of research themes, trends, and collaborations within the field of green and sustainable economics. Initially, we discerned key thematic clusters highlighting foundational concepts, practical applications, and the role of innovation and finance in green economic development. Temporal analysis revealed a progression from fundamental discussions to a contemporary focus on green finance and China's significant role in green innovation. Potential for future research emerged in areas like political economy, theoretical development, relationship analysis, and empirical work—areas less bright in the visualization but ripe for exploration. Lastly, we examined a network of scholarly collaboration, identifying central figures in the research community and their interconnections. These

collective insights paint a picture of a dynamic and evolving field, where the flow of ideas and collaborations continues to shape our understanding and implementation of sustainable economic practices.

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