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A BIBLIOMETRIC ANALYSIS ON THE GREEN INVESTMENT

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Abstract

Implementation green investment sustainable and responsible has become a priority for *every* company and investor because the more rising high alarm signal on environmental issues as well as for maximizing profits and harmonious development with the environment. Studies it focused on 3 research questions . Information was collected to examine the above research questions and a network map was applied. This study aims to check the publication of documents based on most influential articles, country co-authors, and appearances with green investment keywords. Key words categorized as into some cluster. The type of analysis used is bibliometric analysis . Study This retrieve the latest data A total of 701 articles from a scientific database that is SCOPUS of 2018- 2023 and network analysis use VOSviewer software. This study find that There are 2 most influential articles to green investment research with citation the most, the country that contributes the most in green investment research with amount article the most and the most frequent keywords used. This study has certain limitations and is concluded by providing implications and suggestions for future studies. The end this study will provide more insights to researchers, academics, and others to find research gaps in the field of green investment.

Keyword: Bibliometric Analysis, Green Investment, and Issues Environment

Introduction

Changes in the environment and climate in the world are driving investors For more attention to resource efficiency and environmental issues has increased greatly. Since 1924, the issue of corporate social responsibility has been approached as a phenomenon that reflects organizational activities from an environmental, social, and economic perspective (Han et al., 2020) . As a result, it was shown that companies are not only responsible for generating profits, but also for developing societies and economies in harmony with the natural

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environment. Hence, socially responsible investments, originating from ethical and religious movements, have been made in the market (Han et al., 2020). Efficient and efficient social investment turns into the emergence of green investment. The long term goal of green investment is to achieve sustainable development. The motivation for choosing this theme is represented by the need to identify the factors that enhance green investment, as they generate multiple benefits for the economy, the environment, and implicitly for private organizations. As such, this article examines and analyzes the implications of green investments and the resulting organizational transformation to make them. In addition, this paper underscores the way in which Organizations that implement green investment are perceived by consumers and the tendency of stakeholders to choose "green" organizations, to the detriment of traditional organizations. Finally, this study identifies the main drivers influencing green investment decisions.

Green investment is a very broad term. It can be understood as an independent concept, part of a broader investment theme, or closely related to other investment approaches. This concept has become increasingly used with growing concern for a green economy and green growth, which received significant international attention in 2010–2011 as a tool for approaching the 2008 financial crisis. Green economy was also one of the two themes of the United Nations Conference on Sustainable Development in 2012 (Allen et al., 2012). This has led to a growing literature, including new publications on the green economy from various international organizations, national governments, think tanks, experts, and non-governmental organizations. Green investment is also referred to as environmentally friendly investment and responsible investment (RI) (Inderst , et al., 2008). This concept defines the company's investment activities aimed at protecting the environment, reducing pollution, reducing carbon emissions, using alternative energy sources, and conserving natural resources.

Despite all the articles and research in the field, there is still no clear evidence for the relationship between environmental practices and the performance of an organization. There are many studies that discuss it a number of positive and negative aspects. Better environmental performance due to green investment can lead to increased revenue and profitability of the organization . In addition, increasing access to “green” markets, achieving product differentiation based on the company's environmental reputation, reducing material costs and energy consumption, access to green or ethical mutual funds, decreasing labor costs (increasing loyalty or commitment) (Ambec and Lanoie , 2008 , Falcone, 2018). However,

the adoption of green technologies usually requires higher investment compared to traditional ones, and the payback period is much longer (Zhang et al., 2015). Green supply chain sustainability is influenced mainly by two main aspects. Firstly, green technologies involve high costs that developing companies cannot afford, and secondly, organizations have to face demand uncertainties when they develop investments for the creation of green products, bearing in mind that, at the consumer level, the concept of green consumption has not been recognized (Xing and Xia, 2019). Green investments do not have a major effect on the economic performance of an organization, and only increase profits . Moreover, studies show that only limited green investments are profitable. Moreover , companies are encouraged to improve their performance related to the environment on a voluntary basis, as environmental regulations prove unnecessary (Pekovic, 2018) . In addition, in the implementation of green projects, there are two main obstacles: lower returns and much higher risks compared to fossil fuel projects (Taghizadeh , 2018). Although the implementation of green projects is characterized by high risks, sustainable development should primarily aim at rational use of natural resources without compromising present and future generations (Mokhov et al., 2018). The challenges faced by companies making green investments raise serious questions that must be answered. This article aims to provide a timely and necessary review of the literature on trends and drivers of green investment, through a bibliometric methodology, which provides a systematic and comprehensive overview of what is already known. The novelty of this research consists of several aspects. First, it brings order, clarity and systematization to the topic of drivers of green investment, through bibliometric analysis. Data extraction and bibliometric analysis minimize subjectivity and provide useful information to facilitate in-depth research. Another aspect is the integration of research mapping in a systematic literature review process to visualize the relationship between investment and the green/sustainable literature. In this way, the article contributes to both the investment and sustainability literature, integrating their findings when studying the factors influencing green investment. In addition, this study contributes to the theoretical progress of the field by organizing the findings into the research agenda, a key aspect for future researchers to undertake further research on the topic of driving green investment. The results are expected to provide researchers and practitioners with an in-depth description and understanding of green investment research. This research discusses the following research questions namely

1. Which articles have had the most influence on research on green investment?

2. Which countries contribute most often to the field study of green investment?
3. What are the main fields of study and keywords to study in green investment?

Literature Review

Rapid changes in market demand, increasing pressure from stakeholders, and increasing complexity of products and services are influencing organizations to adopt ability and new or different management practices to remain competitive and efficient (Rauter et al. 2019). Green investments have been studied in depth with reference to the definition of the concept of the benefits they generate for sustainable development and for company performance (Zang et al., 2015). Regarding the clarification of the concept, a study that , Inderst et al., (2012) examines how "green" investments are defined in different asset classes (stocks, bonds, and alternative investments), and presents estimates of the size of these investments in different approaches. The study concludes that, given the lack of consensus on the use and definition of the term "green", the most productive approach is to take an open and dynamic approach to definitions and standards. In its broadest sense, sustainable investment is considered as a concept that defines environmental, social and governance investment , responsible investment and sustainable investment. responsible answer socially (Utz, 2015, Escring et al., 2017).

Government-regulated environmental policies aim to reduce business carbon emissions. As a result, investments made by governments to protect the environment can lead to a reduction in investments made by private organizations. If there is no proper government regulations regarding environmental practices, supply chain players will not make sufficient environmental evidence (Zhang et al., 2020). In addition, environmental policy actions reinforce social responsibility promoting resource conservation [16]. The concept of green governance has become increasingly popular, both academically and practically, which consists of taking steps to support the ecological environment (conservation of resources), as well as creating mechanisms to regulate corporate ecological practices (Wang et al., 2018). Green investments are also considered environmental investments, referring to social investments made to improve the environment (individual environmental contributions, socially responsible companies, etc.). Green investment, or socially responsible investment, according to the concept of ecological civilization . Other authors define green investment as investment that aims to reduce greenhouse gases and air pollutants, without substantially reducing the production and consumption of non-energy products (Eyraud 2013). About

impact improvement of green systems and construction of ecological mechanisms are important guarantees for sustainable economic development . At the same time, increased green investment can indirectly lead to the development of industries related to environmental protection and create environmental protection fund (Shi et al., 2016). Green investment and environmental practices play a key role in many fields, so companies need to respond to growing concerns and challenges from stakeholders (Yen, 2018). The results of research conducted at the level of 63 CDP (Carbon Disclosure Project) companies in South Africa reveal the fact that organizations that integrate ecology, A green investment designed to reduce emission carbon can effectively manage financial performance (Ganda and Milondzo , 2018).

Investment in green technology can lead to a reduction in total supply chain costs, as well as a reduction in carbon emissions (Ghosh, 2020). After analyzing the data obtained from 16,119 companies, the results show that there is a positive relationship between corporate social responsibility (CSR) and the company's financial performance. Therefore, organizations must pay more attention to the environment, to retain and attract as many customers as possible (Mikolajek , 2016). Reducing greenhouse gas (GHG) emissions is a long-term problem that is further analyzed by the most developed countries (Karasek, 2016). By promoting sustainable investment, companies not only reduce their energy consumption and carbon emissions but also improve their financial performance by increasing fame, operational efficiency and maximizing new opportunities (Atif et al., 2019). Recently, the demand for green and sustainable products has increased, and government regulation has become increasingly necessary (Iig , 2019). The adoption of green investment, to promote sustainable development and solve environmental problems, is causing changes in consumer behavior, as more and more people prefer to buy organic products at the expense of traditional ones . Investors are more receptive to companies where managers disclose to the public the benefits of green investments implemented by them (Martin et al., 2016). Thus, companies and implicitly interested parties must invest in projects and, implicitly, in ecological technologies (Pimonenko et al., 2020). In conclusion, the advantages of implementing green investment are numerous, including attracting funds due to government facilities, meeting customer requirements to consume green products and to protect the environment, using green technology which is exempt from certain taxes, and increasing stakeholder satisfaction, especially investors, who are happy that they invest their financial

resources in a responsible manner, which will attract a number of benefits to future generations as well.

Based on an analysis statistical data published by the China Statistical Yearbook from 2003 to 2016 and on a study of more than 1339 environmental policies from the official website of the department of environmental protection, show that the main factors influencing green investment are: politics, economics, and environment (Du et al. , 2019.) Political factors have a major impact on green investment by creating facilities and implementing rules / laws in order to protect the environment. Among these factors are: subsidies to companies for green investments, discounts given to consumers who buy organic products, environmental taxes, and fines for companies that do not comply with pollution regulations. Economic factors are some of the strongest drivers of green investment because they best express corporate practices for a healthy environment . They refer to the relationship between carbon emissions, energy consumption, and sustainable financial development. Environmental factors are very important because avoiding environmental crises and improving environmental health are the main goals of green investment. Their goal is the creation of green technology as well as a green industry. A relevant study conducted at the level of 462 companies, analyzing more than 5300 investment decisions in energy efficiency revealed that companies that rely on external factors of change take more profit of opportunities by achieving more sustainable investments .

Research Methods

Bibliometrics was chosen as the research method for making illustrative map of the research area. This map evaluates the interest of researchers in certain fields based on quantitative methods (Gonzalez et al., 2015). In addition, it provides a perspective on the time frame in which scientific researchers begin to deepen their research in the field . This research adopted some special bibliometric techniques, which meant analysis of keywords (more specifically their joint occurrence), co-author citations, citations made between countries, and journal networks. This analytical technique has been used for bibliometric reviews conducted on various topics (Cobo et al., 2011). In addition, cluster analysis has been used in conjunction with analyzes of author co-citation, country citations, keyword co-occurrence, and journal mapping, where the most popular research areas are represented. Although groups of citations represent research topics that are of real interest to researchers, some important elements may be missing because they do not yet have a sufficiently high

number of shared citations. Therefore, after cluster analysis, in some cases, content is valued to identify all the areas for which to analyze green investment. Content analysis methods include frequency, co-occurrence, and link strength. This analysis is mainly used in keyword matching analysis, which calculates the occurrence frequency and the strength of the relationship between keywords. During this stage, the author uses the VOSviewer text mining software developed by van Eck and Waltman in 2009. It is a bibliometric analysis tool based on Visualization of Similarities (VOS) technology, which has the important advantage of classifying fragmented knowledge from different fields according to similarities and relationships (Chitmiea et al., 2020).

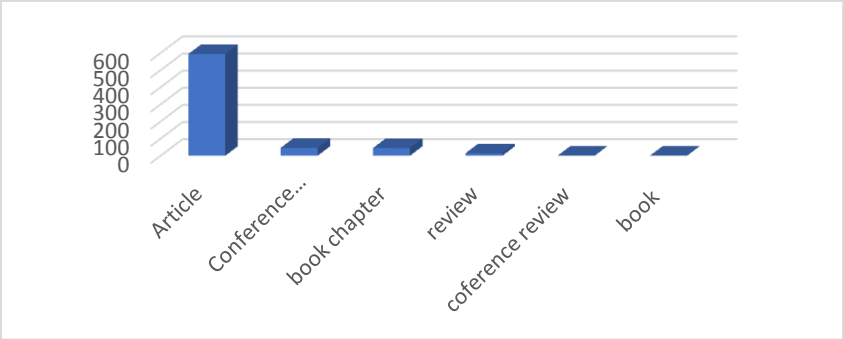
In study this, SCOPUS is used for literature and bibliometric analysis. Retrieval strategy is as following : Database = SCOPUS; Search topic = "green investment"; Study period = 2018 to 2023 (data collected from SCOPUS on May 19, 2023. We got 701 results document For our research . Publication results exported in form text , incl information citations , bibliography information , abstract , and keywords . Studies This in a manner dominant decipher fundamental feature of publication investment green from perspective documents , authors , countries and which ones most often contribute to the field of green finance and keywords for studies in green investment .

Results and Discussion

Analysis Based on Document

This study used article accredited scopus articles related scope _ with investment green investment, especially in 2018-2023. Based on results search on scopus there are 701 documents used in study this. Based on figure 1 below, can be seen that source collected documents _ sourced of 6 types document that consists of 594 articles, 46 conference papers, 45 book chapters, 14 reviews, 1 conference review and 1 book.

Figure 1. Research documents



Based on citation article seen that the most articles citation is research conducted by Falcone PM (2020 and 2018) entitled “Environmental regulation and green investments: The role of green finance” and “Green investment strategies and bank-firm relationships: A firm-level analysis”. this article citation 114 times, while the second that is articles written by Wang SY; Choi SH (2020, 2019) entitled "-efficient coordination of the contract-based MTO supply chain under flexible cap-and-trade emission constraints" and "The emission ordering strategy with green awareness under the Emission Trading System (ETS)". this article citation 114 times, and followed by articles Siedschlag I was cited 26 times. Yan W. (2023, 2021) cited 24 times , Magalhães N. (2021) cited 8 times, and finally Bhattacharjee N. article ; Sen N. (2022, 2021) cited 4 times . Description Read more can see in table 1.

Table 1: Most influential article on Green Investment

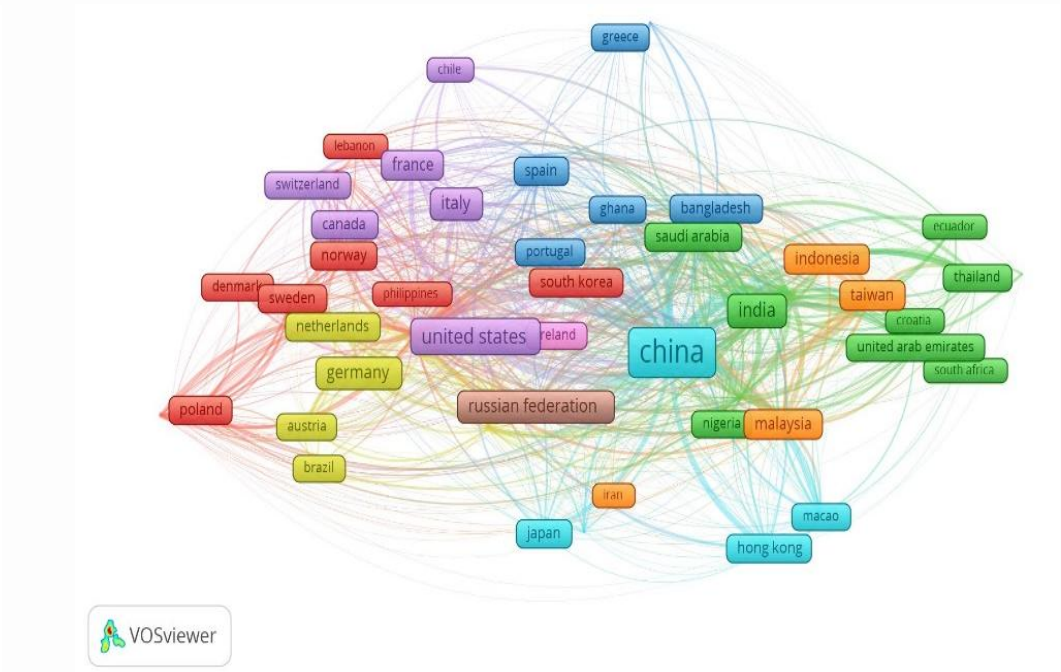
Rank	Author	Year	Title	Citation
1	Falcone PM	2020	Environmental regulation and green investments: The role of green finance	114
		2018	Green investment strategies and bank-firm relationships: A firm-level analysis	
2	Wang SY; Choi SH	2020	Pareto-efficient coordination of the contract-based MTO supply chain under flexible cap-and-trade emission constraints	26
		2019	The emission ordering strategy with green awareness under the Emission Trading System (ETS)	
3	Siedschlag I.; Yan W.	2023	Do green investments improve firm performance? Empirical evidence from Ireland	24
		2021	Firms' green investments: What factors matter?	
4	Magalhães N.	2021	The green investment paradigm: Another headlong rush	8
		2021	Divesting from the Green Investments Paradigm; [Desinvestir le paradigme des investissements verts]	
5	Bhattacharjee N.; Mon N.	2022	A sustainable production inventory model for profit maximization under optimum raw material input rate during production	4
		2021	A multi-item sustainable production inventory constrained model to study and analyze the effective green investment and replenishment quantity	
		2021	An Inventory Model to Study the Effect	

Rank	Author	Year	Title	Citation
			of The Probabilistic Rate of Carbon Emission on The Profit Earned by A Supplier	

Analysis based on the bibliographic coupling of country

Based on the bibliographic coupling of country with the amount of data processed as many as 58 countries in figure 2 below this, can see that There are 10 countries listed on the sequence top contributing _ in related research _ with green investments. China is the most numerous countries contribute to related research _ with green investment with amount document as many as 279 documents, Next followed by United States with 60 documents, United Kingdom with 56 documents, India with 47 documents, Italy with 39 documents, Russian Federation 38 documents, Pakistan 36 documents, Germany 32 documents, Malaysia 27 documents and finally France 27 documents. If seen of the total link strength of each country, the country with the highest own tattoo link strength , namely the country of China of 16824. Next followed by Pakistan with 7459, United Kingdom 6736, United States 5807, India 4426, Saudi Arabia 4331, Taiwan 3912, Malaysia 3676, Bangladesh 2976 and finally is Turkey with 2899. Bibliographic coupling of country results in study This is shown in Figure 2 below this.

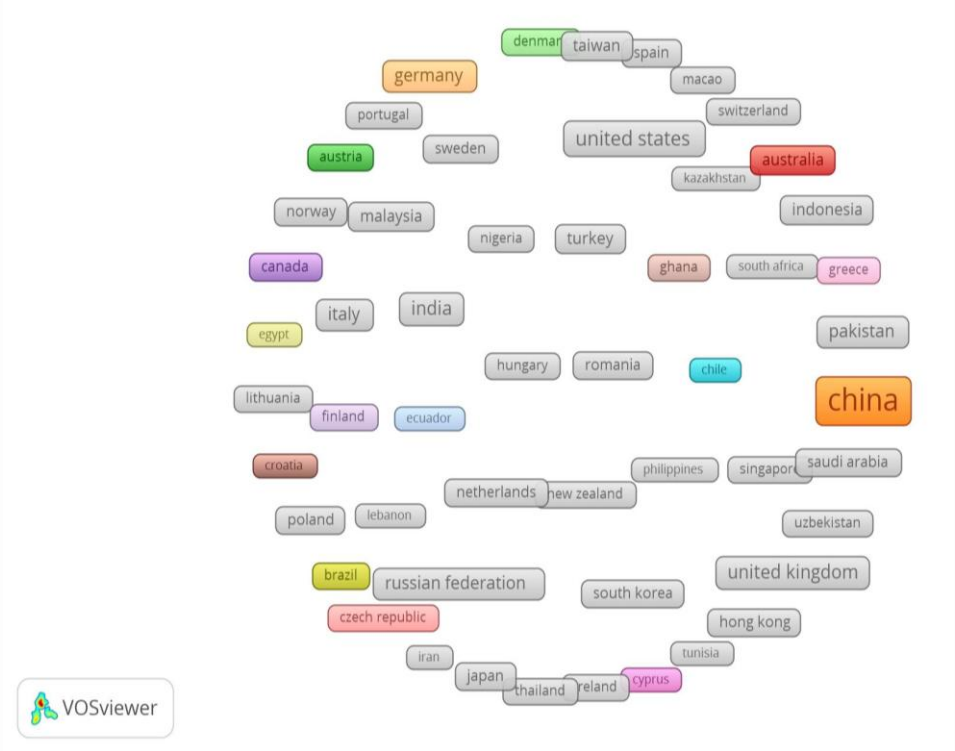
Figure 2. Bibliographic coupling of country results



Analysis based on citation of country

Based on citation of country with the amount of data processed as many as 58 countries in figure 3 below this, can see that there are 10 countries that have amount highest citation _ where China is the most numerous own amount citation 4516 times. Furthermore followed by the United Kingdom 1099 times, United States 685 times, Italy 637 times, Pakistan 528 times, Australia 528 times, Germany 487 times, France 458 times, India 341 times, and finally Taiwan 338 time. The results of the citation of country in study. This is shown in figure 3 below this.

Figure 3: Results of citation of country



Analysis Based on Co-Occurrences of All Keywords

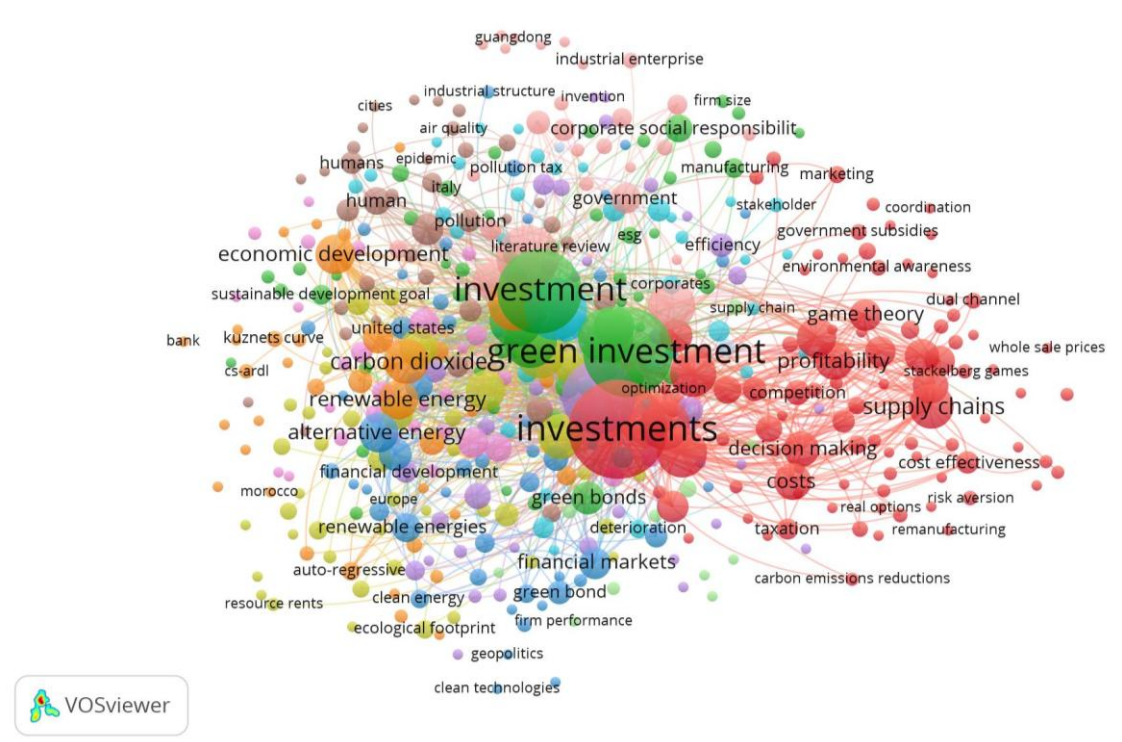
Based on Co-occurrences of all keywords with the amount of data processed as many as 472 keywords in table 2 below, get seen that there are the top 10 most frequent keywords used. The most frequent keywords used that is Investments with total Occurrence 216 and Total link strength 2209. Next followed by the keyword green investment with total Occurrence 175 and Total link strength 1255, Investment with total Occurrence 158 and Total link strength 1634, Sustainable development with total Occurrence 122 and Total link strength 1149, China with total Occurrence 89 and Total link strength 918, Green economy with total Occurrence 85 and Total link strength 811. Sustainability with total Occurrence 69 and Total link strength 600, Environmental economics with amount Occurrence 65 and Total

link strength 756, Climate change with total Occurrence 63 and Total link strength 473, and finally is green finance with total Occurrence 63 and Total link strength 340. The results of data processing are shown in figure 4 below this.

Table 2. Co-occurrence of all keywords

No.	Keyword	Occurrence	Total link strength
1	Investments	216	2209
2	Green investment	175	1255
3	Investments	158	1634
4	Sustainable deployment	122	1149
5	China	89	918
6	Greeneconomy	85	811
7	Sustainability	69	600
8	Environmental economics	65	756
9	climate change	63	473
10	Green finance	63	340

Figure 4. Co-occurrence results of all keywords



Conclusion

Green investment refers to the investment made in a project or company that has a positive to environment nature and contributes to sustainability. Objective main of green investment is For support transition going to more economy sustainable with reduce house gas emissions glass, promoting energy renewable, efficiency energy, management more waste well, and practice friendly business environment. The results of the bibliometric analysis show that :

1. Most influential articles to green investment research are articles entitled "Environmental regulation and green investments: The role of green finance" and "Green investment strategies and bank-firm relationships: A firm-level analysis" with amount citation the most i.e., 114 times.
2. China is the most numerous Country contribute to related research with green investment with amount document as many as 279 documents, tattoo link strength of 16824 and the number citation 4516 times.
3. Keyword of main study field most frequently for green investment - is Investments with number of Occurrence 216 and Total link strength 2209, then keywords on green investment is green investment with total Occurrence 175 and Total link strength 1255.

Suggestion

This study owns several limitations is the data used only sourced from the SCOPUS database, fetching range time article short and only research - using the VOSViewer software. Researcher furthermore suggested for use other data sources like Goggle Schoolar, WoS or else, add range time article research that use and get using other software for analysis *bibliometric* so can describe in a manner comprehensive issues and trends of green investment research.

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