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POLICY INITIATIVES BASED ON RESEARCH TRENDS ON CLIMATE CHANGE AND CORPORATE SOCIAL RESPONSIBILITY STRATEGY: BIBLIOMETRIC ANALYSIS

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Abstract

Research on climate change and corporate social responsibility (CSR) has an important role in understanding the impacts of climate change and developing responsible business practices. The purpose of this research is to further explore the tangibility between the two topics by maximizing the assessment results in the available literature and considering helpful policy recommendations. This research method uses bibliometric analysis by relying on the Vosviewer analysis tool. The results of this study indicate that research on climate change and CSR has become an increasingly relevant topic in recent years. Countries such as the United States (US), China, and the United Kingdom (UK) show a strong interest and commitment to studying the impacts of climate change and adopting responsible business practices. Various topics, such as carbon emissions, environmental management, decision-making, energy efficiency, and sustainable development, are the main focus of this research. Initiating policies based on these research trends is important to direct corporate actions towards sustainability. Collaboration with the government is also a key factor in creating a policy framework that supports CSR practices. This research reflects the importance of the concerted efforts of various countries and stakeholders in tackling the challenge of climate change and promoting socially and environmentally responsible business practices.

Keywords: Climate Change, Corporate Social Responsibility, Adaptive Policies, Sustainable Development, Risk Assessment

Authors' individual contribution: Conceptualization — M.D.W.; Methodology — Y.K., B.H.V., J.C.B.; Investigation — M.D.W. and B.I.P.; Resources — M.; Writing — M.D.W.; Supervision — M.D.W.; Funding Acquisition — M.D.W. and B.I.P.

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1. INTRODUCTION

Climate change is one of the most pressing problems faced by humans and our planet today (Aminipouri et al., 2019; Lawrence & Vandecar, 2015; Yu et al., 2019). Its urgency is critical because of its pervasive and detrimental impact on our daily lives, the environment, and the global economy. Climate change has caused a significant increase in global temperatures, impacting changing weather patterns, rising sea levels, droughts, floods, and many more. This threatens biodiversity, natural habitats, and marine and terrestrial ecosystems. Climate change hurts human health. Rising global temperatures can cause deadly heat waves, wider spread of disease, and respiratory problems due to air pollution. It also affects the availability of clean water and food, triggering conflict and migration (Einecker & Kirby, 2020; Nordhaus, 2019; Rochedo et al., 2018; Shwom et al., 2010).

Climate change also contributes to decreased food production due to frequent climate disturbances, such as extreme droughts or floods. This can lead to food scarcity, rising prices, and increasing risks of hunger and malnutrition worldwide (Akpoti et al., 2019; Hsiang et al., 2019; Myers et al., 2017). Climate change also has significant economic impacts. Natural disasters linked to climate change cause large economic losses, whether through damage to infrastructure, loss of natural resources, or disruption to economic sectors such as agriculture, tourism, and energy. Climate change can trigger mass migration due to environmental damage, resource scarcity, or conflict caused by competition for available resources. This can lead to social tensions and conflicts between groups competing for increasingly limited resources (Dogru et al., 2019; Howes, 2018; Yu et al., 2019).

Concrete steps need to be taken to deal with the urgency of climate change. This includes reducing greenhouse gas emissions, adopting renewable energy, securing water resources, increasing energy efficiency, increasing community resilience to climate change, and encouraging international cooperation in overcoming this problem (Malik et al., 2023). It is important to understand that climate change is not only a problem of the future but also one that affects our lives today. Actions taken now will impact the world we live in and future generations. In addition, another step that can be taken is to encourage the involvement of many parties, including the private sector or companies. Companies through corporate social responsibility (CSR) is a concept in which companies integrate social and environmental concerns into their business activities (Allen & Craig, 2016; Puppim de Oliveira & Jabbour, 2017).

CSR can play a very important role in addressing climate change issues. Companies can adopt CSR strategies that aim to reduce greenhouse gas emissions resulting from their operations. These include using renewable energy, energy efficiency, better waste management, and reduced transport emissions. By doing this, companies can contribute directly to climate change mitigation efforts. In addition, companies can use their resources to research and develop more environmentally friendly technologies and contribute to climate change solutions. Through CSR, companies can support innovation and technology projects that focus on renewable energy, energy saving, and other environmentally friendly solutions (Cosma et al., 2022; Rahmawati et al., 2019).

This study aims to fill in the gaps in previous research on climate change and CSR using bibliometric analysis methods. Through this approach, this research will collect and analyze relevant bibliographical data on climate change and CSR globally. There are two research questions to be answered:

RQ1: What are the trends and evolution of research on climate change and corporate social responsibility?

RQ2: How can the results of this research contribute to the development and initiation of policies to address climate change issues?

Answers to existing research questions are useful for evaluating research contributions to developing studies on environmental change and CSR, including finding helpful policy recommendations for the future.

The structure of this article is as follows. Section 2 provides a comprehensive literature review. Section 3 analyses the methodology that has been used to conduct empirical research. Section 4 reviews the research results, research trends, and policies to overcome the problem. Finally, Section 5 reviews the research conclusion.

2. LITERATURE REVIEW

Many studies on climate change have been carried out, especially in the last few years. The topic of CSR has also been widely carried out. However, few specific and simultaneous research results are related to the two topics, especially in studying available research documents and initiating accommodative policies. However, there are still some results of previous studies that are considered adequate to support the analysis of this study. First, climate change refers to long-term changes in weather patterns and the Earth's average temperature (Malik et al., 2021; Munang et al., 2013). This is caused by increasing concentrations of greenhouse gases in the atmosphere caused by human activities such as the burning of fossil fuels, deforestation, and industrialization. Second, CSR involves corporate responsibility to seek financial gain and be socially and environmentally responsible (Puppim de Oliveira & Jabbour, 2017; Tanimoto, 2019). Third, bibliometric analysis can assist in mapping studies and providing policy recommendations based on existing literature (Baharuddin et al., 2022).

Companies must implement effective sustainability strategies to control environmental problems and achieve long-term business goals. Strategic actions related to sustainability result in better sustainability performance, and CSR strategies have better sustainability performance.

A positive relationship between an effective CSR strategy and corporate sustainability disclosures from United Kingdom (UK)-listed companies. Using Global 100 index data (Wang et al., 2024), concluded that an effective CSR strategy has a positive impact on corporate social performance. Recent findings by Homroy et al. (2021) show that companies with an effective CSR strategy perform better on sustainability in the UK context. Other studies also provide evidence that effective CSR and sustainability strategies have a positive impact on

corporate sustainability performance. A successful CSR strategy can reduce financial distress and bankruptcy (Hubert Ta & Campbell, 2023). The legitimacy theory assumes that companies implement CSR strategies to influence CSR performance and reporting following stakeholder expectations.

In Indonesia, effective CSR and corporate governance (CG) practices are an important business strategy as shareholders and other stakeholders become more critical and aware of their rights and power to influence company behavior (Maury, 2022). Previous research has found that CSR can be used as an effective strategy for companies with dispersed ownership structures to increase employee commitment and retention (Orazalin, 2020). Companies can increase viability by garnering political support, finding solutions to problems more easily without spending a lot of money, building broader coalitions, and having access to key policymakers. Therefore, they tend to receive awards in the social and political fields to enhance their character, image, and prominence. This can influence the views of stakeholders, thereby strengthening their good relationship with CSR activities (Li et al., 2019). According to Wang et al. (2024), this industry usually takes advantage of government connections by helping those who are socially responsible for certain activities to overcome social problems. This is because they know more about the types of events that society needs.

According to Orazalin and Baydauletov (2020), hundreds of companies have joined local governments, universities, and nonprofit organizations to voice their support for national and international climate change mitigation commitments and implementation of CSR strategies. Examples of CSR strategy interactions also emerge from the social world, such as when Emmanuel Faber, chief executive officer (CEO) of Danone, pushed for French civil law reform to revise its meaning, allowing new companies to enjoy public benefits in France (Prihatin et al., 2024). Another similar incident occurred when Apple CEO Tim Cook publicly opposed a proposed religious law that would allow critics to discriminate against same-sex couples. CSR interaction strategies are socially and politically planned, long-term activities to reduce the negative effects of company operations.

3. RESEARCH METHODOLOGY

This study uses the Scopus database as a data source for research publication documents. The Scopus database was selected because we wanted to observe the development of global studies related to climate change and CSR. The document search was conducted in June 2023, with a publication year limit between 2013 and 2022. In searching and filtering published documents, no restrictions are applied regarding a particular researcher or author, geographic location, type of article, or journal. The filtering process is carried out using keywords that focus on literature related to climate change and CSR. After applying the filter, the search results show that 373 document results are relevant to that topic.

Figure 1. Data analysis process

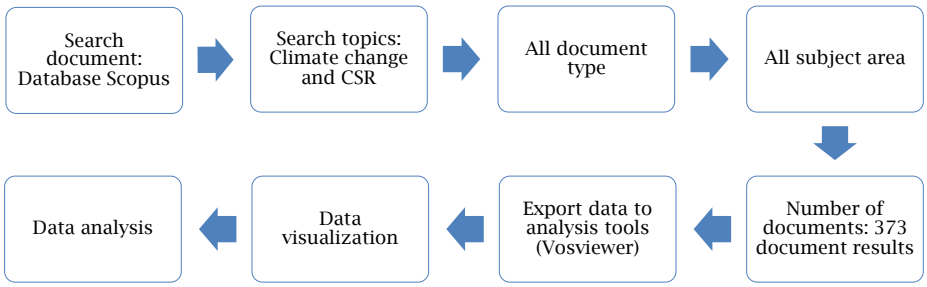


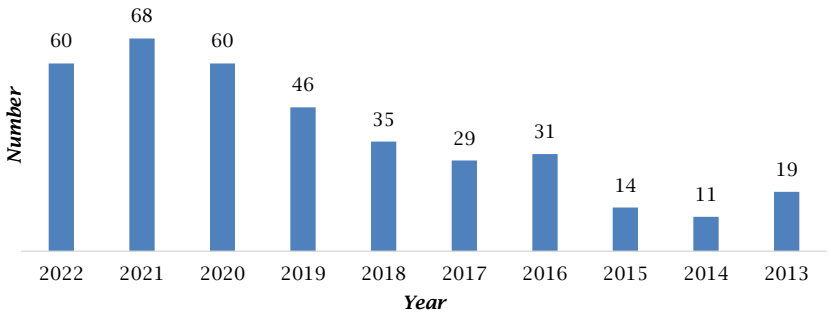
Figure 1 describes the entire data analysis process, where the research data analysis process is focused on data sources from research articles indexed in the Scopus database. The choice fell to the Scopus database because it is popular and selective. Scopus follows a strict global research document selection policy and independent research panel process to ensure the highest quality before indexing. Therefore, using Scopus as a data source provides access to high-quality research documents. After filtering, the collected data is transferred to the VOSviewer bibliometric analysis tool. VOSviewer is an analysis tool to identify published and indexed literature from the Scopus database. With VOSviewer, the material can be visualized and thoroughly analyzed to answer the research questions presented.

4. RESULT AND DISCUSSIONS

4.1. Research trends: Number of documents, country affiliation, and citation

Publication trends based on the number of published documents can be analyzed by looking at the data collected from the Scopus database. This study's data has been filtered based on the publication year limit between 2013 and 2022. In this analysis, we will look at the development of the number of published documents per year. In addition, several documents are mapped based on country affiliation and the number of citations in the research documents analyzed. The publication trends based on the number of published documents on climate change and CSR are seen as follows in Figure 2.

Figure 2. Number of published documents related to climate change and CSR



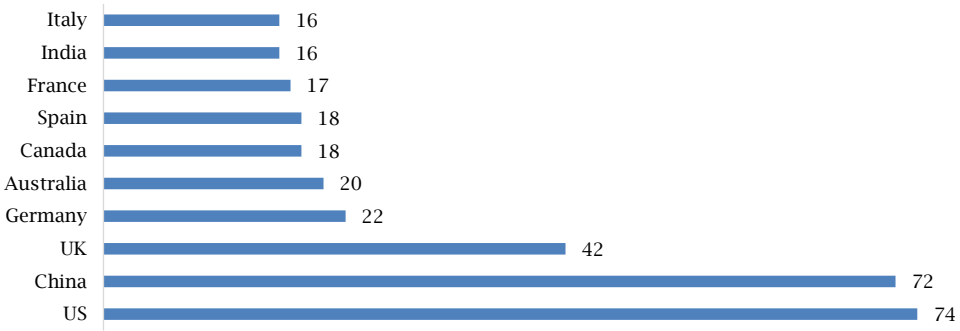
Source: Data from the Scopus database.

There are several interesting findings in the analysis of publication trends based on the number of published documents from 2013 to 2022. First, there has been a significant increase in published documents since 2013. In 2013, there were 19 published documents, which experienced a steady increase until 2018, when it reached 35 published documents. However, after 2018, there has been a sharper increase in published documents related to climate change and CSR. In 2019, the number of published documents increased to 46 and continued to increase to 68 in 2021. Although in 2022, there was a slight decrease to 60 published documents, the overall trend shows a positive increase in publication activities related to climate change and CSR.

This trend indicates an increased interest in and research focus on climate change and CSR during this period. The increasing number of published documents indicates that climate change and CSR have become increasingly relevant and important topics in the academic community. This analysis provides an overview of climate change and CSR research development from year to year. It provides an understanding of the interest of researchers in exploring this topic. This can be the basis for identifying research areas that still need further exploration and provide a foundation for future research development. The high trend in the number of published documents has several benefits that can be highlighted, including a deeper understanding, identification of trends and developments, and provision of a basis for policy and practice (Baharuddin et al., 2022; Malik et al., 2023; Widayat et al., 2022).

In addition to the number of documents based on the year of publication, there is also the number of documents based on the researcher's affiliation. The number of documents based on country affiliation is described as follows in Figure 3.

Figure 3. Number of publication documents based on country affiliation



Source: Data from the Scopus database.

Research on climate change and CSR shows significant differences in the number of published documents related to the country's affiliation. The United States (US), with 74 published documents, demonstrates a strong commitment to studying the impact of climate change and CSR. This country tops the ranking, indicating high interest from researchers affiliated with institutions in the US. In the second place, China has 72 published documents, indicating that this country also significantly contributed to this research. The UK, with 42 published documents, is ranked third and strongly focuses on climate change and CSR. Furthermore, Germany and Australia have 22 and 20 published documents, respectively, demonstrating these two countries' important roles in this field. Although with smaller numbers, other countries such as Canada, Spain, France, India, and Italy contribute to understanding climate change and CSR. As such, this research reflects collaborative efforts across countries to address climate change challenges and promote socially responsible business practices.

Based on these data, Indonesia is not directly mentioned in the list of countries with many published documents related to climate change and CSR (Prihatin et al., 2024). However, the potential contribution that Indonesia can make in this field is still the same. As one of the countries with abundant environmental diversity and natural resources, Indonesia has significant challenges related to climate change. The country faces risks such as deforestation, habitat loss, increasing global temperatures, and threats to biodiversity. Therefore, climate change and CSR research can contribute to understanding and addressing this challenge in

Indonesia. In addition, Indonesia has taken various steps to reduce greenhouse gas emissions and implement sustainable business practices. Examples are policies for developing renewable energy, sustainable forest management, and efforts to preserve marine ecosystems rich in biodiversity. Research can support this effort by providing a deeper understanding of the impacts of climate change and the solutions that can be implemented in Indonesia (Alisjahbana & Busch, 2017; Bohensky et al., 2013; Malik et al., 2023).

Apart from the number of published documents and documents based on affiliation, another trend is the frequent citing of published documents related to climate change and CSR. Documents that are frequently cited are described as follows (Table 1).

Table 1. Publication documents that are frequently cited

Document title (year)	*Authors*	*Cited*
Addressing the SDGs in sustainability reports: The relationship with institutional factors (2019)	Rosati, F. and Faria, L. G. D.	249
A bibliometric analysis of corporate social responsibility in sustainable development (2020)	Ye, N., Kueh, T.-B., Hou, L., Liu, Y., and Yu, H.	108
Stakeholder relevance for reporting: Explanatory factors of carbon disclosure (2016)	Guenther, E., Guenther, T., Schiemann, F., and Weber, G.	85
Environmental management, climate change, CSR, and governance in clusters of small firms in developing countries: Toward an integrated analytical framework (2017)	Puppim de Oliveira, J. A., and Jabbour, C. J. C.	67
Drivers that motivate energy companies to be responsible. A systematic literature review of corporate social responsibility in the energy sector (2020)	Latapí Agudelo, M. A., Johannsdottir, L., and Davidsdottir, B.	60

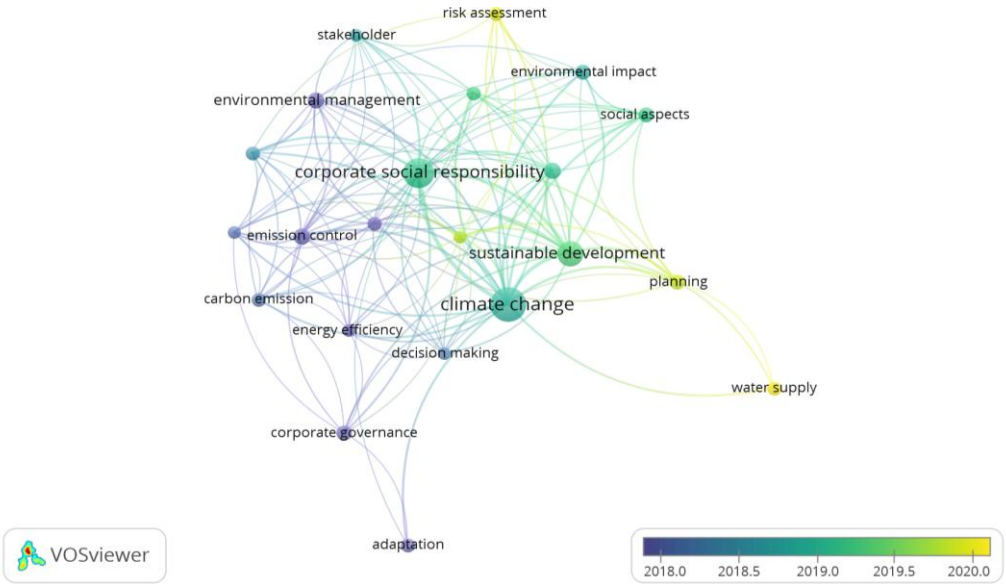
Source: Scopus database, 2023.

Research conducted by Rosati and Faria (2019) totals 249 publication document citations. This study's results explain that organizations worldwide can be important in advancing the sustainable development agenda. However, various factors may influence an organization's decision to address sustainability issues. The results show that organizations reporting sustainable development goals are more likely to be located in countries with higher levels of climate change vulnerability. This study contributes to the literature on sustainable development and sustainability reporting by investigating the institutional factors associated with addressing sustainable development goals in sustainability reports. This study can be useful for managers, investors, and decision-makers to develop country-specific strategies, investment plans, and policies to support organizations in contributing to sustainable development goals (Rosati & Faria, 2019).

Publication documents that are frequently cited have important benefits in scientific research and development. When other researchers frequently cite a published document, it shows recognition of the quality and contribution of the research. High citations indicate that the research is considered scientifically important, useful, and relevant. Frequently cited documents help build a strong foundation of knowledge in related fields and provide support and reference for other researchers in further study and exploration. High citations can also increase the visibility and reputation of the author or research team and provide broader influence and impact on the scientific community and practitioners in relevant fields. Thus, frequently cited published documents are important milestones in advancing research and broadening our understanding of the various phenomena and topics studied (Hallinger & Kovačević, 2019; Tahamtan et al., 2016).

The other trends based on the topics of discussion in the published documents under study are described as follows in Figure 4.

Figure 4. Mapping research topics based on trends



Source: Data from the Scopus database.

Figure 4 shows several related topics on climate change and CSR, including carbon emission, climate change, CG, CSR, decision-making, emission control, energy efficiency, environmental impact, environmental management, planning, risk assessment, social aspects, stakeholders, and sustainable development. Carbon emission is one of the most relevant environmental aspects in the context of CSR. Companies can adopt more environmentally friendly strategies and technologies to reduce their carbon emissions and contribute to climate change mitigation efforts. This includes using renewable energy sources, investing in clean technologies, and sustainable waste management (Bhardwaj, 2016).

Climate Change is a global challenge that requires collective action from various parties, including companies (Malik et al., 2023). In the context of CSR, companies can play a role in reducing the impact of climate change through emission reduction strategies, adaptation to unavoidable changes, and support for international efforts to address climate change. CG is the basis for strong CSR practices. Companies committed to CSR need a transparent, accountable, and fair governance structure. Through good governance mechanisms, companies can ensure that their business decisions properly integrate social, environmental, and economic aspects (Guenther et al., 2016).

CSR is inherently related to corporate responsibility towards the society and environment in which they operate. Through CSR practices, companies consider their impact on stakeholders, including employees, consumers, local communities, and the environment. CSR practices include sustainable environmental management, community involvement, social justice, and transparency. Decision-making becomes an integral part of CSR practice. In making decisions, companies need to consider long-term social and environmental consequences in addition to economic benefits. Companies can make decisions that consider their interests and sustainability by involving stakeholders (Bhardwaj, 2016; Doh & Guay, 2006).

In addition, emission control is a company's efforts to reduce pollutant and greenhouse gas emissions produced by their operations. This involves implementing cleaner technologies, planning sustainable production, and effective waste management. In the context of CSR, emission control is part of the company's commitment to protecting the environment and reducing the negative impact of climate change. Meanwhile, energy efficiency is important in reducing environmental impact and managing resources responsibly. Companies can adopt technologies and practices that are more energy efficient, such as optimizing production processes, reducing energy waste, and promoting the use of renewable energy. Thus, the company contributes to reducing emissions and maintaining the sustainability of energy resources (Jaworska, 2018; Li et al., 2021).

In addition, emission control is a company's efforts to reduce pollutant and greenhouse gas emissions produced by their operations. This involves implementing cleaner technologies, planning sustainable production, and effective waste management. In the context of CSR, emission control is part of the company's commitment to protecting the environment and reducing the negative impact of climate change. Meanwhile, energy efficiency is important in reducing environmental impact and managing resources responsibly. Companies can adopt technologies and practices that are more energy efficient, such as optimizing production processes, reducing energy waste, and promoting the use of renewable energy. Thus, the company contributes to reducing emissions and maintaining the sustainability of energy resources (Allen & Craig, 2016).

Of the several topics that have been linked and described above, research topics still require further exploration. Among these topics, some have recently been frequently discussed and linked to issues surrounding climate change and CSR, namely water supply and risk assessment. The sustainability of water supply has received increasing attention because climate change can impact the availability and quality of water in various regions. Companies and organizations increasingly realize the importance of maintaining a sustainable water supply in their operations and are taking responsibility for managing water resources efficiently and responsibly (Allen & Craig, 2016; Biró & Szalmáné Csete, 2021; Kleinman et al., 2017).

In addition, risk assessment is also an important topic in the context of climate change and CSR (Biró & Szalmáné Csete, 2021; Neitzert & Petras, 2022). Climate change carries complex risks and can affect various aspects of business and society. A comprehensive risk assessment helps companies to identify, measure, and manage the risks associated with climate change, both from an environmental and social perspective. In the context of CSR, risk assessment assists companies in making sustainable and responsible decisions related to climate change. These two topics, namely water supply and risk assessment, reflect recent developments in understanding and discussing climate change and CSR. By considering these two topics in more depth, companies and organizations can develop strategies and actions that are more effective in dealing with climate change and implementing sustainable and socially responsible business practices.

4.2. Policy initiatives addressing climate change issues: Corporate social responsibility and government response

In response to research trends related to climate change and CSR, policy initiation is important to direct corporate actions more sustainably. Through evolving research, companies can identify emerging trends and findings in this field. This provides an opportunity for them to adopt policies that are relevant and based on solid evidence. For example, companies can initiate ambitious emission reduction policies based on research trends on carbon emissions. They can set clear targets for reducing their carbon footprint and implement effective emission reduction strategies. Similarly, based on research on climate change, companies can develop adaptation policies that accommodate anticipated climate change and protect their operations from adverse impacts.

In terms of CSR, companies can refer to research trends related to CG and social aspects. This can encourage them to strengthen good CG, increase transparency, and pay attention to stakeholders' interests. In addition, research on stakeholder engagement can encourage implementing policies that promote dialogue and wider engagement with communities and other stakeholders. By keeping an eye on research trends in climate change and

CSR, companies can take proactive steps to develop appropriate policies (Prihatin et al., 2024). Policy initiatives based on these research trends help companies stay relevant, meet societal expectations, and contribute to global efforts to achieve sustainability.

In addition, a government response is needed to support the initiation of this policy (Douglas, 2017; Hackbarth & de Vries, 2021; Hasan et al., 2012; Malik et al., 2023; Monroe et al., 2019). The government has a crucial role in creating a policy framework that supports companies' efforts to deal with climate change and implement responsible CSR practices. The government can issue policies and regulations encouraging companies to reduce carbon emissions, implement sustainable environmental management practices, and involve stakeholders in decision-making. In this case, corporate policy initiatives can align with existing or developing government policies. In addition, the government can also provide incentives and support to companies that are moving towards sustainability and adopting good CSR practices. This could be done through tax reductions or subsidy programs for investment in greener technologies, training and mentoring to implement CSR practices or developing policy frameworks that facilitate cooperation between the public and private sectors in addressing climate change.

5. CONCLUSION

Overall, research on climate change and CSR provides important insights into understanding the impacts of climate change and how companies can act responsibly. This research is important and urgent to continue to be studied in the future because of the broad and detrimental impacts of climate change on our daily lives, the environment, and the global economy. Climate change has caused a significant increase in global temperatures, impacting changing weather patterns, rising sea levels, droughts, floods, and many more. This threatens biodiversity, natural habitats, and marine and terrestrial ecosystems. Climate change hurts human health. Rising global temperatures can cause deadly heat waves, the wider spread of disease, and respiratory problems due to air pollution. It also affects the availability of clean water and food, triggering conflict and migration. The limitation of this study lies in the fact that other stakeholders other than the government involved in climate change and CSR have not been discussed. So, this gap can be an opportunity for further research in the future related to climate change and the CSR Hexahelix model.

Through various published documents, countries such as the US, China, and the UK have demonstrated a strong commitment to studying and addressing this challenge. In this context, topics such as carbon emission, CG, decision-making, emission control, energy efficiency, environmental impact, environmental management, planning, risk assessment, social aspects, stakeholders, and sustainable development are very relevant. Each topic has its role in promoting socially and environmentally responsible business practices. In addition, initiating policies based on these research trends is important in directing corporate actions in a more sustainable direction. Companies can take concrete steps, such as reducing carbon emissions, implementing sustainable environmental management practices, and involving stakeholders in decision-making.

Linkages with the government are also very important in creating a policy framework that supports companies' efforts to deal with climate change and implement CSR practices. Through collaboration with governments, companies can accelerate changes toward sustainability and play a significant role in maintaining planetary sustainability and social well-being. Overall, this research reflects the importance of cooperation and collective commitment from various countries and stakeholders to tackle climate change and promote socially and environmentally responsible business practices. In this context, policy initiation and linkages with the government are important factors in achieving long-term sustainability goals. The recommendations for the next research are to explore further relatively new topics among global researchers, namely water supply and risk assessment. It is possible to explore more deeply to parse far more complex problems in the future and engage in global discussions.

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