International Journal of Indonesian Business Review

Vol.4 No.1, 2025
e-ISSN: 2827-9840
pp.48-62

Risk Management and Sustainability Performance Research Map: A comprehensive Bibliometric analysis

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DOI: https://doi.org/10.54099/ijibr.v4i1.1195

DOI: https://doi.org/10.54099/ijibr.v4i1.1195

ARTICLE INFO

Research Paper

Article history:
Received: 15 November 2024
Revised: 25 December 2024
Accepted: 9 February 2025

Keywords: Risk Management, Sustainability performance, Biblioshiny, Cluster, Mapping

ABSTRACT

Purpose – This study aims to investigate research trends and patterns in the field of risk management and sustainability performance using bibliometric analysis methods.
Methodology/approach – By utilizing the Scopus database from 2000 - 2024, we collect data from relevant articles and conduct analysis of keywords, authors, journals, and institutional affiliates. To address this issue, our critical review examined 677 articles discussing research on risk management and sustainability. The analysis tools used for bibliometric analysis are Biblioshiny and Vos Viewer.
Findings – The results of the analysis show that there are eight main clusters covering various related aspects, such as corporate sustainability, supply chain management, environmental management, disaster risk management, credit risk management and green economy, business competition, decision management, and sustainable entrepreneurship. Each cluster is analyzed in depth to identify the contribution and relationship between the variables involved.
Novelty/value – These findings provide a comprehensive understanding of the current research landscape and point to potential directions for future research in the field of risk management and sustainability. This research also emphasizes the importance of a cross- disciplinary approach in addressing global sustainability challenges.

INTRODUCTION

Sustainability has become a significant issue worldwide that requires immediate attention from organizations and society (Olawumi & Chan, 2018). Sustainability comprises various broad-scale models integrating economic prosperity, social equity, and environmental integrity (Purvis et al., 2019). This significantly impacts organizational actions and community expectations (Huang, 2021). Economic sustainability guarantees that we use resources effectively, which can result in safe structures in the long run (Powers, 2006). Social sustainability shapes public progress, social accountability, investment, and dependence. The advantage of a better life results from an impartial, diverse, interconnected, and utonomous

society. Finally, since frequently used assets are usually not renewable, environmental sustainability recommends maintaining them at ecological frequencies. This shows that ecological resources are maintained, or at least not depleted.Sustainability is a multidisciplinary concept that allows companies to consider the best methods for analyzing responsible behavior, which may require thoughtful and impartial attention to the well- being of society. Prioritizing philanthropy was common for commercial organizations in the past. Currently, the sustainability framework is used to support moderate initiations that prioritize the interests of companies and the needs of the general public (Manab & Aziz, 2019). It is possible that the company reviews and evaluates unknown and unanticipated risks. Risks can come from dynamic or pure sources (Zhu & Hua, 2017).Static hazards are often pure risks (Purvis et al., 2019). The primary source comes from a pure type of hazard that poses a hazard or weakness and physically harms the assets or property of a particular company. Uncontrolled forces of nature, which usually arise during periods of external sources, are the pure cause of harm affecting the business. This may be caused by fires, tornadoes, floods, rainstorms, subsurface eruptions, power outages, or technological failures due to natural disasters. There are environmental problems at every stage of the business life cycle (Powers, 2006). On the other hand, business enterprises may be exposed to speculative risks for a variety of reasons, including competitive factors, changes in stock values, poor management of business operations, inadequate planning, inadequate control over the Company, changes in laws or regulations; shifts in contemporary trends; unethical behavior such as theft, fraud, or dishonesty; or exploiting business assets for personal gain (Powers, 2006). Various circumstances, especially the current socio-economic environment, have presented challenges for the business world, causing them to seek new opportunities and create new tactics to maintain and improve their competitive advantage (Maier et al., 2020). Successful adoption of innovation by the business world results in profitable and substantial gains such as increased revenue, expansion, and access to new markets (Bessant & Tidd, 2007).We recognize that risks can come from internal and external sources and affect the company's operational procedures and environmental sustainability. (Jurisch et al., 2016) Each company is dedicated to fulfilling its obligations to the public. To build and gain a deeper understanding of the importance of sustainability for individuals, organizations, and the economy as a whole, this paper uses a bibliometric analysis of risk management and sustainability (Martinez et al., 2019). The findings of this study will add to the existing knowledge about risk management and sustainability.The Scopus database can produce the most influential authors, counry distributions, citations and sources, document citations, organizations, and university affiliations. In addition, for cluster analysis, we have created eight streams: Sustainable Development, Supply Chain Management, Environmental Management, Disaster Risk Management, Green Economy, Business Competition and Risk Management, Decision Management, and Sustainable Entrepreneurship. At the end of this study, our suggestions for further research and conclusions will also be presented.

METHOD

This study compiled the literature on risk management and sustainable performance, we first used bibliometric references and citations (Galaz et al., 2015) and a background analysis framework for approximately 3952 document articles covering 24 years, from 2000 to 2024. The available literature has been analyzed using scientific mapping methods, which entails examining bibliographic information relating to the corpus of papers selected from the research topic (Garrigos-Simon et al., 2018). Mapping large amounts of scientific literature can be made easier with the use of bibliometric analysis (González-Torres et al., 2020). A similar thorough literature evaluation and appropriate methods that ensure the quality of the data used and the resulting outputs are anticipated with bibliometric analysis (Tang et al., 2018). In addition, we create and visualize bibliometric links using Biblioshiny and VOSviewer software.

We conducted a systematic literature assessment to ensure logical coherence in describing the understanding developed so far of the relationship between risk management and sustainability performance to achieve research objectives and exceed the given criteria. The three stages of assessment on risk management and sustainability performance aspects are documented as a result of our analysis, which is supported by a bibliometric process in the form of a correspondence display through bibliographic linkages. We found a way to extract the bibliometric details of a document into an Excel workbook (Nobanee et al., 2021). The company's goal of gaining support for risk management and sustainability performance has been one of the most important key trends in sustainability, which has continued for

several centuries earlier. Modern approaches favor unambiguous and uninterrupted vision over limited and reasonable reasoning, despite the fact that important risk management and sustainability experts are encouraged to disagree with each other (Herrera-Franco et al., 2020).

Researchers use bibliometric techniques for several reasons: First, data-driven research investigations are considered more relevant than subjective judgments. Second, traditional reviews can be used to obtain a critical and subjective summary of a scientific work. Finally, bibliometric techniques help obtain an overview of the scientific review (N. J. Van Eck & Waltman, 2014). In addition, Biblioshiny was selected for this study to generate, visualize, and evaluate tissues in bibliometrics. Although there are various computer programs that can help with bibliometric mapping, Biblioshiny and VOSviewer concentrate on the visual representation of bibliometric maps, which makes it easier for viewers to evaluate and understand bibliometric maps due to their large display functions (Muñoz et al., 2018). Many situations have made extensive use of bibliometrics, ranging from conventional evaluation of the impact of citations (Corsini et al., 2019) to identification to determine the elements that affect the environment (Zupic & Čater, 2015). A number of studies have used this program extensively to evaluate various articles and visualize data networks (Liao et al., 2018).

For a comprehensive literature analysis projection on risk management and sustainability performance dimensions, we used the Scopus database, accessible through Elsevier, for bibliographic research. On November 9, 2024, we searched the Scopus database for journals and articles on risk management and sustainability performance. We use bibliographic archival records of more than 2000 interdisciplinary subjects to support our bibliometric analysis, which focuses on similarity visualization methods. To find more relevant information, we filter data on risk management and sustainability performance, from which the files are retrieved by exporting the data to CVS File, exporting findings, abstracts, keywords, bibliographic details, citations, and other relevant data. We apply filters relating to risk management and sustainability performance with the allocation of search practices, and we use terms such as "risk management" and "sustainability performance". Since conducting a thorough investigation does not keep the relevant reports publicly, we focused our search on the title, abstract, and keywords (N. Van Eck & Waltman, 2010). The right keyword search display (Boolean string): ("risk management" OR "enterprise risk management" OR "ERM") AND ("sustainability" OR "sustainable performance" OR "sustainability performance").

We learned how to sort the dimensions of the analysis and units using bibliometric search. We used mixed citations for bibliometric analysis. Bibliographic incorporation that uses a number of references shared by both documents as a measure of comparison (Grandjean et al., 2011; Pizzi et al., 2020), common occurrences to understand the pattern of the underlying document set (Zhang et al., 2017), co-authoring, which helps in examining the social structure of the research field (Nobanee et al., 2021), and joint citations, which can help in determining the conceptual structure of the research topic (Jalal, 2019). We conducted a co-occurrence analysis of keywords, co-authoring analysis of influential authors and country distribution, co-citation analysis of cited sources, analysis of document and organizational citations, and analysis of co-citation reference networks in sustainability and risk management. to generate and generate numbers and data from the cited articles. create streams and clusters. Figure 1 shows the most frequently popped-up keywords. The keywords to choose the most

important journals to cite are risk management, sustainable development, risk assessment, sustainability, decision making, supply chain management, climate change, supply chain, and life cycle.

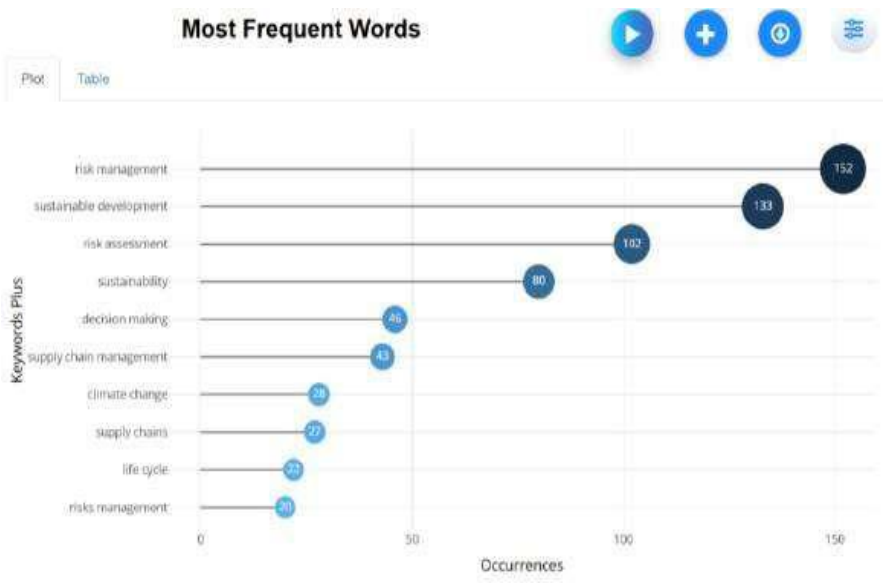


Figure 1. Most Frequent Words

This research includes all publications that contain all or one of these keywords. However, there are some exceptions; Papers published before 2000 are issued because they must be published between 2000 and 2024. Citations, events, and co-occurrences are examined to find related themes under each cluster to build a more in-depth evaluation of the relative significance of specific terms. in clusters (Small, 1973). To extract the subject more in-depth, our coverage of the extensive literature on the topic of Scopus resulted in more than 3952 articles. Articles that do not match based on Business, management, accounting, Economics, econometrics, and finance areas were issued so that data from 1134 articles were obtained. Documents in the form of Document Type Articles, as many as 732 articles; Publication Stage Final, as many as 694; and articles in English, as many as 677 articles. So, the final number of articles included in the analysis is 677. We will discuss the accumulation of representation in findings and analyses to understand bibliometric analysis better.

RESULT AND DISCUSSION

Publications on Risk Management and Sustainability Performance

Figure 2 shows the results of a comprehensive bibliometric study conducted with Scopus with Biblioshiny software. A total of 677 documents from 2000 to 2024 were included in our study.

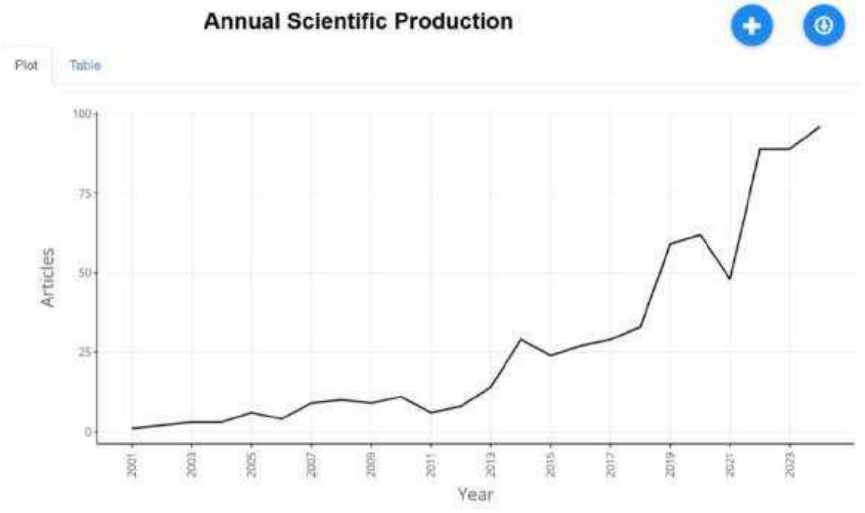


Figure 2. Number of Annual Publications

Influential Authors

Co-authorship analysis is a technique to find important institutions and researchers and analyze their relationships (Purvis et al., 2019). Co-authorship analysis can rank top authors based on documents and citations. The ten most important authors are described in the document's publication, and their citations are strongest in Figure 3 and Table 1. Table 1 shows that Kahkonen Ak, Lintukangas K, Seuring S, and Weber O (five documents) are the most powerful authors. Similarly, if we look at the authors represented by citations, we can see that Zou has 635 citations, followed by Škare M (535 citations) and Pusavec F (431 citations). In Biblioshiny, we find more than 1912 authors, where we center on the ten most popular authors, complete with their citations and material.

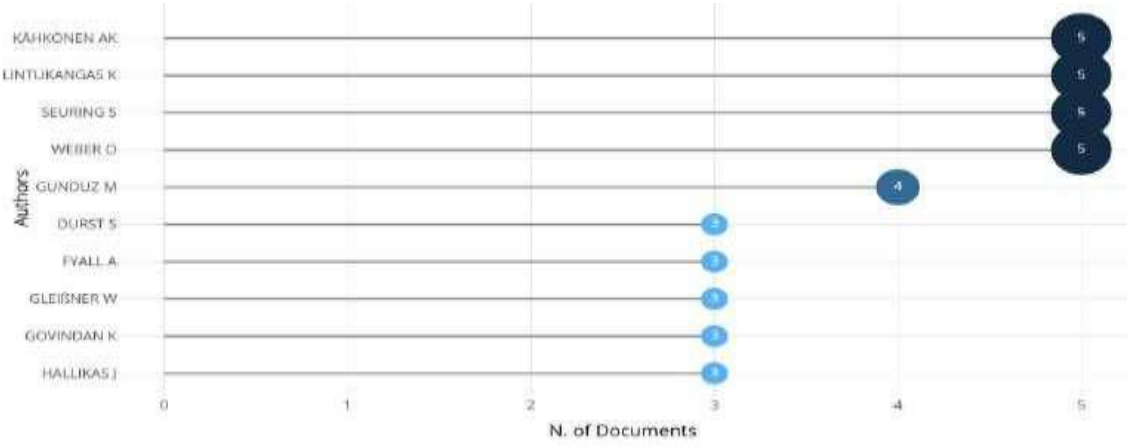
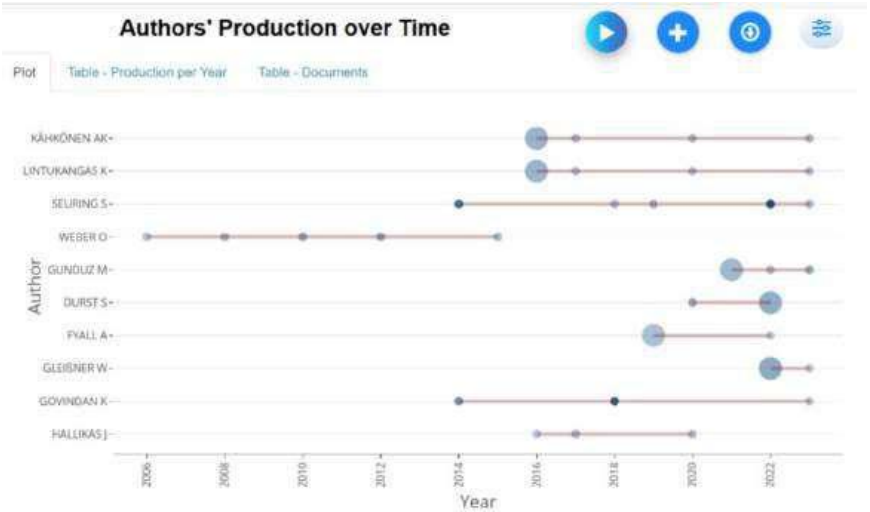


Figure 3. Most Relevant Authors

Table 1. Notable authors based

Author by Document	Document	Rank	Author by Rank	Citations	Citations
1	Kähkönen Ak	5	1	Zou	635
2	Lintukangas K	5	2	Škare M	535
3	Seur S	5	3	Pusavec F	431
4	Weber O	5	4	Beske P	402
5	Gunduz M	4	5	Adams Ca	355
6	Durst S	3	6	Foerstl K	354
7	Fyall A	3	7	Rostamzadeh R	319
8	Gleißner W	3	8	Christopher M	315



9	Govindan K	3	9	Ivanov D	304
10	Hallikas J	3	10	Hofmann H	285

Figure 4. Author's Production over time

Distribution by Country

The Biblioshiny software is used to identify a list of the top countries of origin that are influential in the network, as shown in Figure 5. The ranking of the states is based on citations from the last 24 years, and the countries are sorted by the number of documents. Trending cooperation between strong countries is evaluated using a co-authoring analysis (figure 5). We seek collaboration possibilities to find fresh information and knowledge, just like scientists [47]. Figure 6 shows that based on the corresponding author country, authors from China, the USA, Australia, and Italy collaborate more (MCP) than self-authorship (SCP). The United Kingdom writes more on its own than collaborating. The top 10 countries represent the highest-scoring documents in Table 4. The top-ranked citations from these countries show that China is a country that is investigating and initiating more efforts regarding risk management and sustainable work practices and examining the adverse impacts of sustainable work practices. The country is working hard to develop a summary of its progress related to risk assessments, mitigation measures, and sustainability indicators. Similarly, the United Kingdom came in second place, which was seen implementing the idea of lowering risk metrics in sustainable practices across various lines of business or related organizations. While the United States of America occupies the third country. Because sustainability considerations are still difficult to implement and require greater financial commitment, most companies may not do so. Therefore, developing countries must use sustainability to improve their economies and the environment and triple-line methods.

Table 4. Leading countries in terms of citations and documents.

Rank	Country by Documents	Documents	Rank	Country by Citations	Citations
1	CHINA	49	1	GERMANY	2030
2	UNITED KINGDOM	38	2	AUSTRALIA	1806
3	USA	36	3	UNITED KINGDOM	1461
4	AUSTRALIA	33	4	CHINA	1052
5	ITALY	30	5	USA	976
6	INDIA	26	6	CANADA	812
7	GERMANY	25	7	IRAN	555
8	MALAYSIA	19	8	CROATIA	537
9	CANADA	18	9	SWITZERLAND	512
10	INDONESIA	15	10	ITALY	470

Figure 5. Countries collaboration map

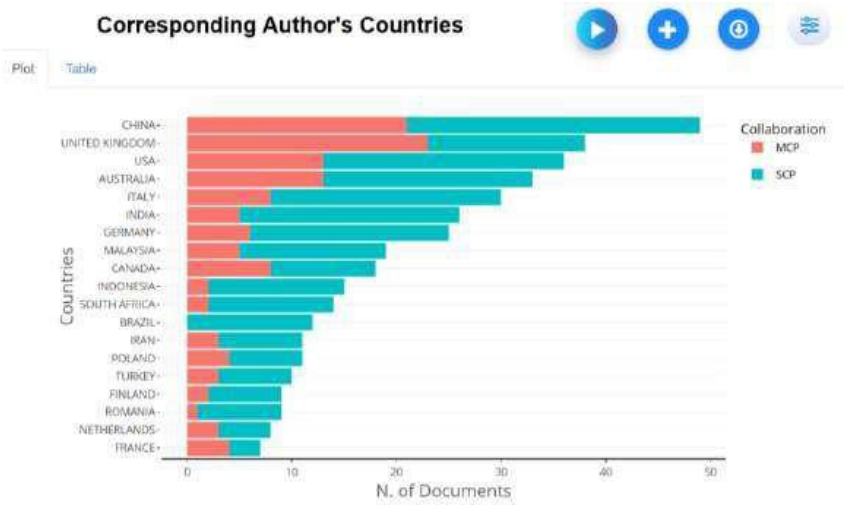


Figure 6. Corresponding Author Countries

Citations and Sources

With a higher availability of 47 papers, the Journal of Cleaner Production occupies the first position in Table 5, based on published journals on the subject. With 3313 citations, the Journal of Cleaner Production is also the highest-ranked journal publication in citations. About 17 documents listed in the journal Business Strategy And The Environment have 1358 citations, ranking second. Surprisingly, a publication in the risk management and sustainability performance sector with 326 document citations ranked ninth in citation sources, indicating that there are not many citation references that fit the theme of risk management and sustainability practice performance. Our analysis found that businesses and business journals ignore sustainability goals due to their low point of view. In addition, our citations regarding journal distribution networks show that supply chain management ignores and ignores less well-known journals, resulting in a bias in referenced papers, which are more at the top of the ranking list.

Table 5. The leading ten sources ranked for journals based on documents and citations.

Rank	Source By Documents	Documents	Rank	Source By Citations	Citations
1	Journal Of Cleaner Production	47	1	Journal Of Cleaner Production	3313
2	Business Strategy and The Environment	17	2	Business Strategy and The Environment	1358
3	Resources Policy	14	3	Technological Forecasting and Social Change	1059
4	Journal Of Risk and Financial Management	13	4	International Journal of Project Management	790
5	Resources, Conservation, and Recycling	10	5	International Journal of Production Research	653
6	Risks	10	6	Supply Chain Management	498
7	Technological Forecasting and Social Change	9	7	Journal Of Purchasing and Supply Management	412
8	Amfiteatru Economic	9	8	Accounting Forum	355
9	International Journal of Production Research	7	9	Accounting, Auditing and Accountability Journal	326
10	Journal Of Business Ethics	6	10	International Journal of Production Economics	322

Institution

Under the organization of the organizations in which this research accompanies their primary investigations on this subject, we compiled the top 10 affiliates in which we can view published journal documents on risk management and sustainability performance. The findings are shown in Table 6. Bibliometric analysis also considers the list of top ten affiliates and investigates published journals and references. We found that, with eight significant journal articles, La Trobe University published the

most journals on risk management and sustainability performance. In second place, eight of the most significant journal articles on risk management and sustainability performance were published by Universiti Technology Mara. Furthermore, it is in third place, with eight documents published by the University of Johannesburg.

Table 6. lists the top 10 colleges

Rank	Intitution	Country	Document
1	La Trobe University	Australia	8
2	Mara University of Technology	Malaysia	8
3	University Of Johannesburg	South Africa	8
4	University Of Kassel	Germany	7
5	Islamic Azad University	Iran	6
6	Manchester	United	

	Metropolitan University	Kingdom	6
7	Notreported		6
8	Rmit University	Australia	6
9	University Of Cambridge	UK	6
10	Qatar University	Qatar	5

University Collaboration

Based on figure 7 explains university collaborations. In document affiliation, documented articles often include the author's university collaborating in the context of sustainability. A bibliographic clutch is used to achieve this. A document on risk assessment and sustainability has been jointly published by La Trobe University in Australia with Nanyang Technological University (green), as seen in Figure 7. Universiti Teknology Mara (Malaysia) occupies the second position that publishes the most articles based on affiliation with eight documents in collaboration with the University Of Kentucky (brown color), followed by the University of Johannesburg (South Africa) in collaboration with the University of Ghana (light purple color), followed by Kharazmi University in collaboration with Islamic Azad University (Iran) (purple color), followed by Griffith University in collaboration with the Islamic University of Malaysia, Lincoln University and the University of Ijubljana in red. University College London, Imperial College London, and Arizona State University collaborate on risk management and sustainable performance in blue. This proves that people are increasingly interested in researching environmental and economic contexts.

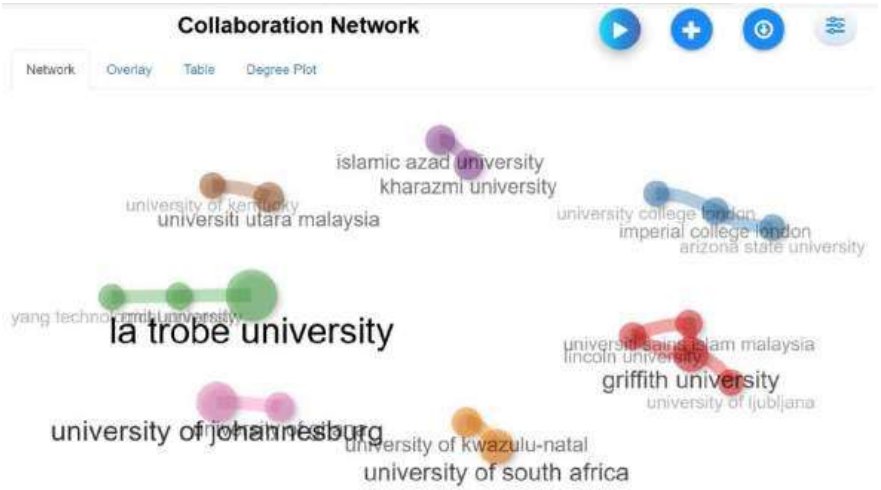


Figure 7. Collaboration network

Compared to the results of similar bibliometric studies, the results of research in the field of sustainability have improved significantly. More countries, affiliates, and authors are involved in sustainability research results, and sustainability topics have more and more connections to several new disciplines and fields. 671 papers have been produced due to research examining the energy associated with public engagement. Sustainability, sustainable energy, energy efficiency, and a sustainable environment are the main topics of the publication.

Cluster Analysis Discussion

This study presents content analysis, cluster analysis, and future research issues. The cluster analysis aims to assess the important journals and articles we mentioned about sustainability strategies and actionable

risk management. We look for key journals on risk management and sustainability performance to create a flow of information from Scopus. Next, we reference well-known authors who worked in the journal context, noting the journal's year of publication. Sustainable development, supply chain management, environmental management, disaster risk management, green economy, business competition and risk management, decision management, and sustainable entrepreneurship are just some of the keywords we collected in our sample to group the streams containing these keywords. We created eight topic-related streams from the lead keywords. We formulated the key questions for eight selected streams by plotting two quotes from leading authors from each cluster.

Table 7. Cluster Analysis

Cluster	Keyword
Cluster 1 consists of 125 items (red)	
Cluster 2 consists of 21 items (green)	
Cluster 3 consists of 19 items (Blue color)	banking, business risk, corporate governance, CSR, corporate strategy, corporate sustainability, decision making, environmental risk, ESG, financial performance, financial risk, governance, performance assessment, stakeholder engagement, supply chain, sustainability, sustainability reporting, sustainability risk, sustainability finance
	commerce, customer satisfaction, digital storage, food supply, Information management, marketing, performance, product design, risk mitigation, sales, supply chain collaboration, supply chain management, supply chain risk management, sustainability practices, sustainability development, sustainable supply chain management
	adaptive management, carbon, carbon emissions, carbon footprint, circular economy, climate change, emission control, environment, environmental economics, environmental management, environmental protection, environmental sustainability, risk perception, waste management
Cluster 4 consists of 15 items (yellow) Cluster 5 consists of 13 items (Purple color) Cluster 6 consists of 13 items (light blue) Cluster 7 consists of 10 items (light brown color) Cluster 8 consists of 10 items (dark	disaster management, knowledge management, life cycle management, optimization, risk assessment, risk management, stakeholder, strategic planning, sustainability risk management Credit risk management, economics, efficiency, environmental regulation, green economy, investment, resource management, supply chain resilience
	business, competition, competitive advantage, ERM, machine learning, planning, resilience, risk management, sustainable development, uncertainty
	artificial intelligence, budget control, cost-benefit analysis, decision making, decision support system, financial market, human resources management, purchasing,
	covid 19, entrepreneurship, health risk, innovation, insurance, public policy, technology, tourism,

tourism management
brown color)

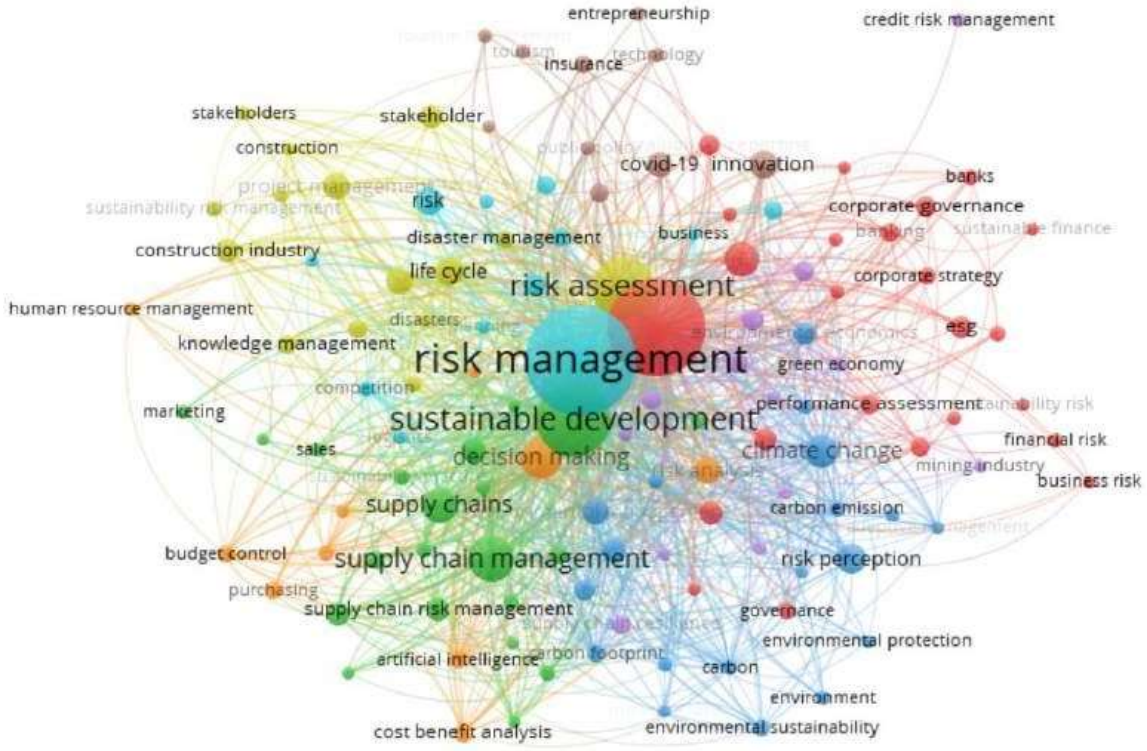


Figure 8. Co occurrence

We mainly collected eight important streams from Scopus on subjects related to risk assessment and sustainability. Stream is mainly used to identify important papers in related literature. One of the important paths we chose is cluster one, which is sustainable development. The author (Sadollah et al., 2020) emphasizes the importance of sustainability methods, viewing employee involvement in community development as an ethical obligation. The main result is that, in addition to companies
having to take exclusive responsibility for sustainability, it also teaches us to provide individual help. The second cluster, "supply and sustainability," chain management," from the authors (Chen et al., 2016), discusses how meta-analysis tools can impact sustainable practices in the supply chain sector. The third stream, "environmental management," which relates to sustainability measures, is another important phrase that we chose Scopus. Environmental management is related to actions that all community members can take to save already available resources, such as not wasting water or damaging the environment. The author promotes eco-friendly initiatives while highlighting the importance of eco-friendly habitats. Disaster risk management is the fourth path. We chose this related topic because it is more closely related to disaster risk mitigation to implement safety precautions that can reduce the risk of unforeseen circumstances. The fifth cluster is credit risk management and the green economy. The sixth cluster is business competition and risk management. The seventh cluster deals with sustainable decision management. We chose the seventh cluster, "blockchain technology that minimizes risk," because this stream highlights how important the development of cutting-edge technologies such as blockchain can be in lowering errors, offering security, and avoiding significant losses. The eighth cluster is sustainable entrepreneurship.

Table 8. Upcoming research agenda

Cluster	Research question
Cluster 1	1. How does the Company's sustainability strategy affect its long-term financial performance?
	2. Does employee involvement in sustainability initiatives positively impact employee loyalty and productivity?
Cluster 2	1. What are sustainability practices in supply chain management?
	2. Does collaboration in the supply chain significantly impact operational sustainability and risk reduction?
Cluster 3	1. How can implementing a circular economy reduce the Company's carbon footprint?
	2. Are eco-friendly initiatives in waste management effective in reducing environmental impact?
Cluster 4	1. How can the Company mitigate disasters by implementing effective risk management strategies?
	2. Can implementing disaster risk management increase the Company's operational resilience to unexpected events?
Cluster 5	1. How can credit risk management support the development of a green economy?
	2. Is there a relationship between environmental regulatory policies and the Company's credit risk reduction?
Cluster 6	1. How can companies use competitive analysis to identify and manage business risks?
	2. Can risk management provide a competitive advantage in a dynamic market?
Cluster 7	1. How can blockchain technology reduce the risk of errors in business decision- making?
	2. Can cutting-edge technology such as blockchain improve data security and operational efficiency?
Cluster 8	1. How can sustainable entrepreneurship strategies contribute to local economic growth?
	2. Can innovation in sustainable entrepreneurship reduce risk and improve business sustainability?

Suggestions for Future Studies

Using bibliometric software from thorough research studies, we found a way to identify keywords with content analysis. We teach you to export data from Scopus to Excel and workbooks using the amazing Biblioshiny and VOSviewer programs. Using a variety of functions, including merging, co-authoring, and bibliographic co-citations, we learned how to create bibliometric statistics based on authors, most cited journals, and citations from leading publications. We started by looking at the most cited risk and sustainability journals with many citations. In the second step, we collected the top ten influential publications, entered keywords, and analyzed citations, country of origin, journal and document citations, affiliations, and sources from leading universities. During the third phase, we only collected samples from journals related to the study. Fourth, we develop a cluster analysis environment to examine authors, streams, publication objectives, and important discoveries related to stream topics. The research agenda was changed to a research question (table 8). Since we found that research on sustainability and economic harm is cited with little analysis, we propose that future researchers be asked to investigate the topic of sustainable practices. To help management understand the importance of sustainability and risk assessment in the economy, we advise academics to develop a better version of the research agenda. One of the problems that can arise is unsustainable practices.

CONCLUSION

From a global perspective, sustainability is an issue that continues to be a difficult challenge, whether

from a corporate, business, or personal point of view. However, risk is always present in the economy, no matter the situation. It is our duty to address welfare issues more sensibly and impartially. Our goal is to secure waste management, stop pollution, stop the depletion of natural resources, and work by national compliance. If we consider implementing more sensible measures to keep the economy from being degraded, the flow of economic progress will automatically increase. We have created concrete and achievable steps to demonstrate how sustainability contributes to our proposals. This bibliometric report aims to provide an overview of the literature collected on risk management and sustainability performance in general. Nations, Organizations, journals, and sources are evaluated. Tables and images are used to display the results. The nodes and lines of analysis are depicted on each image. Nodes represent journals, publications, authors, and countries. Collaborative relationships between nodes are depicted with lines. In addition, we established a co-cite reference network in risk management and sustainability performance, which resulted in eight clusters: Sustainable Development, Supply Chain Management, Environmental Management, Disaster Risk Management, Green Economy, Business Competition and Risk Management, Decision Management, Sustainable Entrepreneurship, The gap in concept where leading authors do not cite all the most important quotes is a limitation of our bibliometric research. This suggests that important quotes from the paper's lead authors were omitted. Furthermore, we obtained several papers and publications from the Scopus database, which we then assessed using bibliometrics. Several important papers we did not collect from the Scopus database but could access from other databases were ignored. We advise prominent authors who publish journal articles in the future to include the most famous and important citations from prestigious publications in their most cited works. We advise future scholars to consider alternative databases to ensure that.

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