

**Enterprise risk management: A bibliometric analysis of research Trends****Titik Aryati<sup>a\*</sup>, K Khomsiyah<sup>a</sup> and Cicely D. Harahap<sup>a</sup>**<sup>a</sup>*Universitas Trisakti, Jakarta, Indonesia***CHRONICLE***Article history:*

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*Keywords:**Bibliometric**Enterprise Risk Management**ERM**Web of Science***ABSTRACT**

A bibliometric study of 510 enterprise risk management (ERM) papers from the Web of Science Core Collection (WOS-CC) database from 2004 to 2023 is presented in this article. The study's main goal was to give a bibliometric overview of ERM research, focusing on annual publications, references, journals, authors, author affiliations, and nations. Each article's author, document type, publication year, source, volume, edition, pages, number of citations, and references were obtained from WOS in BibTex format. To help the research, Biblioshiny evaluated this data. The survey indicated that ERM research has increased fast over the previous two decades, with a consistent upward trend and increasing pace in the past five years. "What's wrong with risk matrices?" by Cox, LA (2008) was the most cited publication in this topic, and the Journal of Risk and Financial Management was the most influential journal. David L. Olson of the University of Nebraska Lincoln was the most prolific author, and UNL was the premier research institution in this area, according to the survey. ERM research was heavily influenced by the US and several other countries. To further ERM research, the paper recommends international collaboration. More research can refine the identification of ERM research hotspots and emerging trends, according to the report.

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**1. Introduction**

Enterprise risk management (ERM) is a comprehensive process that organizations use to identify, evaluate, and manage potential risks that may impact their ability to achieve their strategic goals and objectives. The process of ERM is crucial for companies that operate in dynamic and complex environments, where risks are constantly evolving, and traditional risk management practices may no longer be effective. The ERM process is designed to be all-encompassing, covering every aspect of an organization's operations, including its people, processes, and systems. This holistic approach to risk management allows companies to gain a deep understanding of their vulnerabilities, assess the likelihood and impact of potential risks, and develop effective strategies to mitigate those risks (Berry-Stölzle & Xu, 2018; Gadzali, 2023). ERM is an ongoing process that begins with identifying potential organizational risks and threats. These risks can arise from various sources, including internal factors such as employee misconduct, process failures, or system failures and external factors such as economic conditions, natural disasters, or regulatory changes (Anton & Nucu, 2020; Gadzali, 2023).

Once risks are identified, they are evaluated to determine their likelihood and potential impact on the organization's operations, financial performance, and reputation. Based on this assessment, organizations can prioritize risks and develop strategies to mitigate or manage them (Zio, 2018). ERM encompasses a range of activities, including risk assessment, risk measurement and reporting, risk monitoring and control, and risk mitigation and response planning (Aven, 2016). This includes establishing a risk management framework that includes policies and procedures for risk management throughout the organization (Hegde & Rokseth, 2020; Suherlan, 2023).

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In today's business environment, enterprise risk management (ERM) is becoming increasingly important for companies. With increasing global competition, technological advances, and evolving regulatory requirements, companies face various risks that can impact their operations, reputation, and bottom line. ERM helps companies proactively and strategically identify, assess, and manage these risks. One of the critical benefits of ERM is that it gives organizations a holistic view of their risks (Ballou et al., 2009). Rather than managing risk in silos, ERM considers risk across the organization, including its people, processes, and systems. This approach helps organizations identify risks that fragmented risk management might overlook. Organizations can take a more integrated and coordinated approach to managing these risks by identifying them (Gorzeń-Mitka, 2013).

Enterprise risk management (ERM) is an essential field of study that has received significant attention recently due to the increasing complexity of organizations' risks. As a result, research related to ERM is becoming increasingly important to help organizations understand and effectively manage these risks. ERM research can help organizations identify emerging threats, understand the interactions between risks, develop effective risk management strategies, and demonstrate the value of risk management. By investing in ERM research, organizations can better understand and manage the risks they face and improve their overall performance and resilience.

Scholarly study on ERM is growing. This article does a bibliometric evaluation of ERM research to assess its current state. This topic's research landscape is our objective. We'll use bibliometrics to examine ERM research's decade-long trends. This study will reveal the most influential ERM researchers, journals, and publications. This study will help researchers, practitioners, and policymakers comprehend ERM research and its implications for business risk management.

## 2. Method

This study used the Web of Science Core Collection (WOS-CC) database to analyze corporate risk management research bibliometrically (ERM) (Thelwall, 2018). A February 2023 keyword search for "Business Risk Management" yielded 557 publications. To properly examine the data, the author employed literature and time filters. The filters kept 510 items (Singh et al., 2021). After that, the author manually screened the articles to remove duplicates and non-relevant items, leaving 510 entries in the dataset. After that, WOS data were downloaded in BibTex format, providing complete article records. These records comprised author, document type, publication year, source, volume, edition, pages, and citations. Biblioshiny also collected article references to corroborate its conclusions.

The use of the WOS-CC database ensured that the data was comprehensive and representative of the field of ERM research, providing the author with a large sample size of articles to analyze (Ali et al., 2021). The utilization of filters and manual screening helped to ensure that the data was relevant and accurate, providing a reliable basis for the subsequent bibliometric analysis. The use of complete records and reference information provided a detailed picture of each article's characteristics, enabling the author to conduct a comprehensive and detailed analysis using Biblioshiny.

Biblioshiny is a secondary development program that is built upon the Bibliometrics language pack within the R environment. It is specifically designed to facilitate quantitative research in scientific metrology by providing a user-friendly and efficient method for analyzing research data. The program aims to provide researchers with a comprehensive and clear presentation of research fields, helping them to identify hot topics, important literature, and current research trends. Biblioshiny offers significant improvements over the traditional Bibliometrics script execution mode. It provides an intuitive and user-friendly interface that is easy to navigate and use, thereby lowering the user's access threshold to information technology. With its enhanced functionalities, Biblioshiny offers researchers the ability to analyze web page data more effectively and efficiently (Aria & Cuccurullo, 2017).

Biblioshiny is a powerful and well-designed tool for conducting bibliometric analyses, providing researchers with numerous options for visualizing their analyses. Once literature is imported into the software, Biblioshiny can generate a wide range of visual maps to explore various aspects of academic research production, such as document sources, documents cited, authorship, publication affiliation, and author country (Batubara et al., 2021; Watrionthos et al., 2022, 2023).

Biblioshiny, part of the R programming environment, lets researchers import and analyze data from Web of Science and Scopus. This functionality allows researchers to categorize and evaluate historical data from research conducted during specific time periods to extract relevant metadata from databases, enabling in-depth assessments of academic literature. Biblioshiny is flexible and strong for bibliometric analyses of scholarly books. Its cutting-edge features and user-friendly design make it a critical tool for researchers in a wide range of fields, allowing them to explore and understand research production and dissemination in unprecedented depth.

Biblioshiny's capabilities extend beyond simple visualizations of bibliometric data. It also offers advanced features for data mining and analysis, allowing researchers to extract relevant metadata and conduct more detailed analyses of research fields. For example, the software can extract keywords and conduct co-citation and bibliographic coupling analyses to identify

important research topics and authors. Fig. 1 shows that this enterprise risk management research summary has seven steps. The current state of research and its trends and limitations are discussed to paint a complete picture of research in this area.

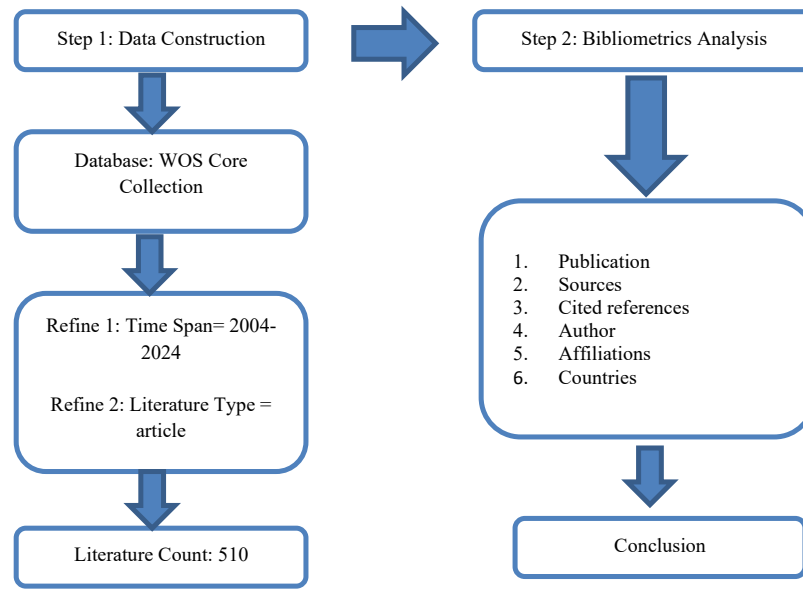


Fig. 1. Research Step

### 3. Results and Discussion

#### 3.1 Publishing Trend in Enterprise Risk Management Research

It is possible to gain a lot of helpful information about the overall development trend of this study topic by analyzing the annual production of research on business risk management. Fig. 2 of the study on enterprise risk management shows how new academic literature has changed over time. As the picture shows, international research on enterprise risk management has been going up steadily and has made a lot of progress in the last five years. This trend indicates that more academics are interested in enterprise risk management. ERM research has an 8.84% CAGR, according to the dataset study. Enterprise risk management (ERM) research has developed steadily with an annual growth rate (AGR) of 8.84%. To put this in perspective, ERM research is expanding by 8.84% annually. The 8.84% yearly growth rate shows that ERM is getting more popular, and organizations must stay up to date on the latest research to improve their risk management and stay ahead of the competition. The importance of enterprise risk management (ERM) is expanding as companies and researchers become more aware of the need for improved risk management in the complex business environment of today. The expansion of ERM research can be attributed to the desire of regulators, stakeholders, and individuals to see improvements in organizational performance and resilience. The three stages of publishing in this field are illustrated in Fig. 2. The first phase lasted from 2004 to 2010. At this point in time, research on enterprise risk management was in its infancy. Between 2010 and 2016, there was a consistent increase of releases. The number of publications saw a considerable uptick between 2016 and 2022. Research on the management of company risks is starting to pick up again.

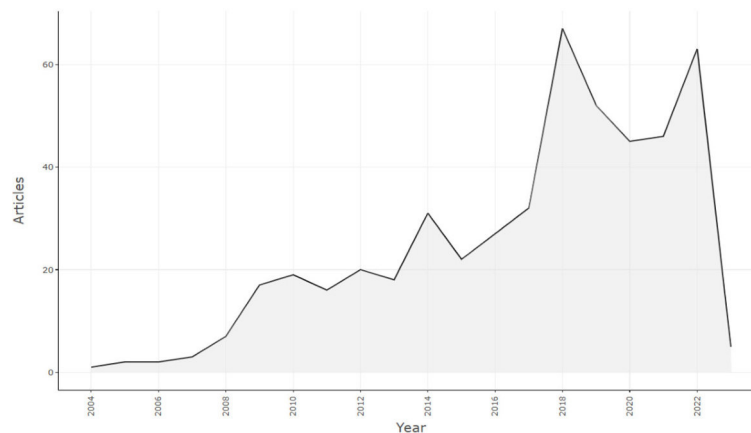


Fig. 2. Annual Scientific Production in Enterprise Risk Management Research

Enterprise Risk Management (ERM) research is growing because people are becoming more aware of how important it is to manage risks; the business environment is getting more complicated, there is more data available, and the chances are constantly changing. As organizations try to find better ways to manage risks, researchers are doing more complex studies to get more in-depth results that can help improve ERM practices. The ongoing growth of ERM research is essential to helping organizations stay up-to-date with the latest risks and develop effective risk management strategies to mitigate them. Tatiana Varcholova, from the University of Economics in Bratislava, Slovakia, states in her study on the position of risk management that, until the late 1970s, risk management in companies was limited to insurance against the possibility of risk. The study also talks about two new developments in risk management: using information technology more to do quantitative and qualitative risk assessments and putting risk management into strategic management. Finally, it is pointed out that, for active risk management, it is essential to build a corporate culture that places responsibility on the risk managers. This is the first article in this dataset, published in *Politicka Ekonomie*, Volume 52, 2004 (Varcholová, 2004).

### 3.2 Source of Enterprise Risk Management Research

The objective of conducting a literature analysis is to identify high-quality sources of research in a given field and provide researchers with the necessary information to publish their own work. Fig. 3, presented herein, displays the ten most significant sources of research pertaining to enterprise risk management. A key metric utilized in assessing the influence of academic journals is the h-index, denoting the number of publications with a high citation rate. A higher h-index signifies a greater contribution to the field, increasing the influence and impact of the journal. The h-index is an important tool for evaluating the quality and significance of academic research, and can serve as an effective metric for assessing the influence of a particular journal. Journals with a high h-index are widely recognized as leaders in their respective fields, and are often considered to be the most influential and impactful publications in their area of study. By analyzing the h-index of different journals within the field of enterprise risk management, researchers can gain valuable insights into the most important and influential sources of research, allowing them to focus their efforts on publishing in the most relevant and impactful journals. In Table 1, The five most important sources' h-index and citations are displayed. The Journal of Risk and Financial Management (12 documents), Journal of Risk and Insurance (11), Journal of Risk Research (11), Risk Management: An International Journal (11), and International Journal of Production Research (10) are the top five sources for teacher critical thinking research.

**Table 1**

Top 10 most relevant sources in Enterprise Risk Management Research From 2004 – 2023

No.	Sources	NP	TC	H-index	Publisher
1	Journal of Risk and Financial Management	12	58	3	MDPI
2	Journal of Risk and Insurance	11	742	9	Wiley Online Library
3	Journal of Risk Research	11	118	6	Taylor & Francis Online
4	Risk Management-An International Journal	11	64	6	Springer Nature Switzerland AG
5	International Journal of Production Research	10	346	6	Taylor & Francis Online
6	Geneva Papers on Risk and Insurance-Issues and Practice	7	69	4	Springer Nature Switzerland AG
7	Risk Analysis	7	476	5	Wiley Online Library
8	Sustainability	7	69	4	MDPI
9	Annals Of Operations Research	6	77	5	Springer Nature Switzerland AG
10	Accounting Organizations and Society	5	518	4	Elsevier

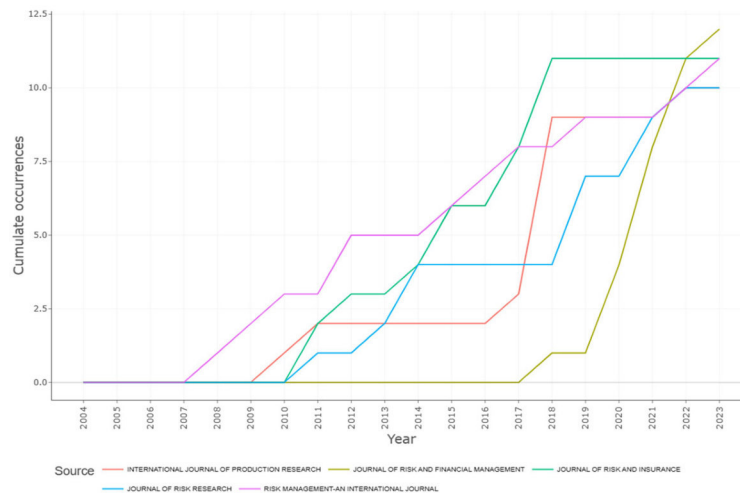
In the field of enterprise risk management research, the Journal of Risk Management and Finance, which is published by MDPI and is considered among the top 10 sources, will have 12 new issues published between the years 2004 and 2023. This publication's H-index is 3, and it has 58 citations in the WOS-CC database. The research that was conducted by Yang et al. (2018) is the study that has been cited in WOS-CC a total of 39 times, making it the study that has garnered the most attention from other researchers. According to the findings of this research, the manner in which businesses deal with potential threats has a significant bearing on both their level of success and their degree of market advantage (SMEs). In particular, the findings of the study revealed that a competitive advantage served as a partial mediator of the connection between enterprise risk management techniques and the performance of SMEs. A further finding from the research was that a high level of financial literacy has a significant bearing on the connection between organizational risk management techniques and competitive advantage (Songling et al., 2018).

These results emphasize the importance of effective risk management strategies for SMEs seeking to enhance their competitive positioning and overall performance. Moreover, the study contributes to the growing body of research exploring the complex interplay between risk management practices, firm performance, and various moderating and mediating factors. Further research is needed to fully elucidate the underlying mechanisms through which these relationships operate, as well as to explore potential avenues for optimizing risk management practices and financial literacy programs for SMEs.

The journal that contributes the most, with 742 citations in WOS-CC, is the Wiley Online Library's Journal of Risk and Insurance. This journal produced 11 publications with an h-index of 9. Hoyt et al. (2011)'s investigation of the value of enterprise risk management became the most cited article in the WOS-CC, with 287 citations. This article presents a study examining the impact of enterprise risk management (ERM) on enterprise value. The study looks at insurance companies

in the United States and finds that enterprise value and the implementation of an ERM program go together well. The study estimates the ERM premium to be around 20%, statistically and economically significant. The results show that ERM can give companies a competitive edge and help them improve in the insurance industry. This study shows how important it is to use formal ERM practices to reduce risk and enhance the value of a business. Companies in many industries should consider implementing ERM programs to gain a competitive edge in today's tumultuous market. This study was published in Volume 78, Issue 4, December 2011 (Hoyt & Liebenberg, 2011).

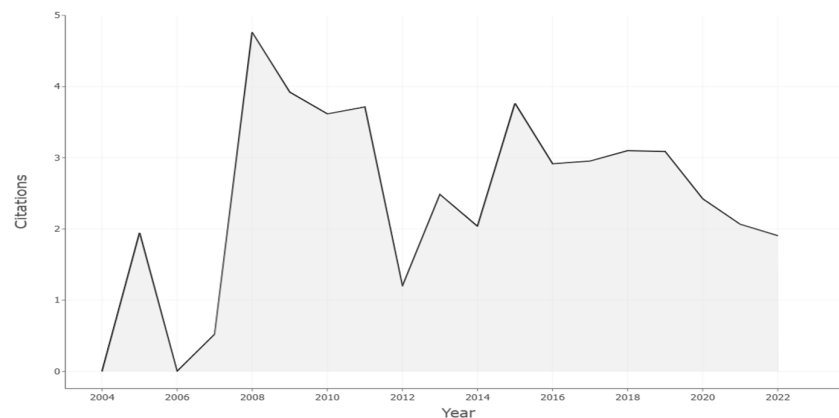
Fig. 3 depicts the source dynamics of the top 5 journals used in this study. The graph demonstrates the trends in publications for these journals from 2004 to 2023. The results indicate that the number of publications in most of the journals has been steadily increasing over the years. For instance, the Journal of Risk and Financial Management did not have any articles related to enterprise risk management research before 2017. However, in 2022, the number of articles published in this journal rose significantly, with 12 articles being published. This suggests a growing interest in research on enterprise risk management and highlights the importance of keeping abreast of the latest publications in this field.



**Fig. 3.** Source Dynamics in Enterprise Risk Management Research

### 3.3 Cited Documents in Enterprise Risk Management Research

Fig. 4 shows how the number of article citations changed each year from 2004 to 2022. From 2004 to 2022, there were both up and down trends in the number of article citations each year. In 2008, with an average of 4.76 per year, most citations were made on average each year. This year also saw the highest average citation per article (71.43) compared to other years in the study period. This was influenced by research by Louis Anthony TonyCox that discussed the problems with the risk matrix, which is often used in enterprise risk management (ERM) and other places. ERM finds, evaluates, and takes care of risks that could make it hard for an organization to reach its goals. Risk matrices are commonly used in ERM to assess and prioritize risks based on frequency and severity. But risk matrices have some problems that may make them less useful in ERM decision-making. These problems include poor resolution, mistakes in ranking, suboptimal resource allocation, and unclear inputs and outputs. This study was published in 2008 in Risk Analysis - An International Journal and has been cited 421 times in WOS-CC (Cox, 2008).



**Fig. 4.** Average Citation Per Year in Enterprise Risk Management Research

The analysis of the most cited documents represents the number of citations of downloaded articles in the Web of Science database, i.e., global citation scores (GCS). A very high GCS means that scientists worldwide have paid more attention to the article. Out of the world's top ten most cited documents, *What's Wrong with Risk Matrices?* was written by Louis A. Cox in 2008. Table 2 shows the ten most-read articles about enterprise risk management and what they found.

**Table 2**  
Top Ten Highest Cited Documents Related to Enterprise Risk Management Research from 2004 – 2023

Rank	Title	Authors	TC	Findings
1	"What's wrong with risk matrices?"	Cox, LA (2008)	421	The article talks about some of the problems with risk matrices that could hurt ERM, such as poor resolution, mistakes, suboptimal resource allocation, and unclear inputs and outputs. Because of these problems, using risk matrices in ERM should be done carefully, and the assessments built into the matrix should be thought about carefully (Anthony TonyCox, 2008).
2	"The Value of Enterprise Risk Management"	Hoyt et al. (2021)	287	The study found that ERM use is positively related to Tobin's Q, a standard proxy for enterprise value, and that there is an ERM premium of about 20 percent, which is statistically and economically significant. This suggests that implementing ERM programs can add value for companies, at least in the context of the US insurance industry (Hoyt & Liebenberg, 2011).
3	"The risk management of nothing"	Power, Michael (2009)	232	The key finding of this paper is that enterprise risk management (ERM) has significant limitations in its approach to risk management, particularly in its understanding of risk-taking, and that these limitations were a contributing factor to the financial crisis. The paper argues that ERM tends to rely on a narrow, metric-driven conception of risk-taking that fails to capture the complex organizational processes and values that shape risk-taking. As a result, ERM has often focused on maintaining boundaries and meeting audit trail requirements rather than addressing the interconnected and dynamic realities of risk (Power, 2009).
4	"Enterprise risk management and firm performance: A contingency perspective"	Gordon et al. (2009)	227	The article emphasizes the importance of taking a holistic approach to risk management and tailoring ERM to the specific context of each organization. In this way, companies can improve their performance and effectively manage their risks in a rapidly changing and complex business environment (Gordon et al., 2009).
5	"The value of non-financial information in small and medium-sized enterprise risk management"	Altman et al. (2010)	203	The article highlights the importance of including non-financial data in credit risk models for SMEs. This approach can help overcome the limitations of traditional accounting-based models and allow for a more comprehensive and accurate assessment of credit risk. Incorporating such data can be part of an ERM strategy to effectively manage credit risk and mitigate potential losses (Altman et al., 2010).
6	"Risk management and calculative cultures"	Mikes, Anette. (2009)	199	The most important thing to learn from this paper is that enterprise risk management (ERM) practices in the financial services industry are not all the same. The paper uses real-world examples from two large banks to show how the risk management mix in a given organization is made up of four ideal types of risk management. The study suggests that there are two types of ERM models: one that is driven by a strong shareholder value imperative (ERM by the numbers) and another that meets the requirements of the risk-based internal control imperative (holistic ERM) (Mikes, 2009).
7	"Imbalanced enterprise credit evaluation with DTE-SBD: Decision tree ensemble based on SMOTE and bagging with differentiated sampling rates"	Liu et al. (2022)	196	The study found that DTE-SBD outperformed other models and is effective for imbalanced enterprise credit evaluation. This relates to ERM as effective enterprise credit evaluation is an essential component of risk management in financial institutions. The use of advanced models, such as DTE-SBD, can help financial institutions better assess and manage their credit risk, which is an important part of ERM (Sun et al., 2018).
8	"The organizational dynamics of Enterprise Risk Management"	Arena et al. (2010)	179	The main point of this article is that enterprise risk management (ERM) practices vary from organization to organization. The study looks at how ERM has changed over time in organizations as it meets logics that were already there and is shaped by risk rationales, experts, and technologies. This shows that implementing ERM is not a one-size-fits-all solution and needs to be tailored to the organization's specific needs. (Arena et al., 2010).
9	"The Characteristics of Firms That Hire Chief Risk Officers"	Pagach et al. (2011)	156	Findings in this essay suggest that organizations are adopting enterprise risk management (ERM) for direct business benefit, and not just to meet regulatory pressures. The study identified specific characteristics of companies that are more likely to adopt ERM, including larger size, higher volatility and greater institutional ownership. It was also found that the company is more likely to hire a chief risk officer (CRO) with the implementation of ERM when the CEO has incentives to take risks (Pagach & Warr, 2011).
10	"Enterprise risk management: a DEA VaR approach in vendor selection"	Wu et al. (2010)	136	The paper talks about the importance of enterprise risk management (ERM) in today's complex global business environment and how it can be used in supply chain management. It talks about how ERM came to be and where it is now. It also talks about how important risk modeling is to ERM. The article's results suggest that risk modeling and quantitative decision tools like the DEA-VaR model can make ERM risk management in supply chain management more effective (Wu & Olson, 2010).

Based on an analysis of the ten most-cited articles, this study shows how important it is to have a customized, all-encompassing approach to ERM that includes non-financial data and advanced models for assessing credit risk. ERM can provide business value, improve performance, and effectively manage risk in a rapidly changing and complex business environment. The reviewed articles underscore the importance of a holistic approach to ERM. They suggest that organizations must look at risk comprehensively, considering financial and non-financial factors. This approach is about looking beyond traditional accounting-based models and incorporating data from various sources such as social media, customer feedback, and industry trends to enable a more accurate credit risk assessment.

The articles also suggest that advanced models such as the DEA-VaR and the DTE-SBD model can effectively manage and assess credit risk. These models provide a quantitative approach to decision-making and can help organizations better understand and manage their risks. Overall, the articles underscore the importance of a tailored, holistic, and data-driven approach to ERM and the potential value it can bring to organizations. Organizations can better manage their risks, improve performance, and remain competitive in an ever-changing business environment by adopting such an approach. The findings also emphasize the potential value that ERM can add to companies in terms of improving their performance and effectively managing risks in a rapidly changing and complex business environment. Several studies suggest that firms that adopt ERM tend to have higher enterprise value, indicating that implementing ERM programs can add value for companies, at least in the context of the US insurance industry.

### 3.4 Authors, Affiliations and Countries in Enterprise Risk Management Research

The bibliometric analysis conducted in this study identified 1101 authors who have contributed to the field of Enterprise Risk Management. Table 3 presents the top ten most influential authors based on their productivity and impact. Among these authors, Olson has the highest number of documents with a total of 16, followed by Wu with 12 documents and Low with 7 documents. Moreover, Olson has an h-index of 7, a g-index of 16, and a citation count of 342, making him the most influential author in this research domain. His publications are considered to be of high quality and have made significant contributions to the advancement of Enterprise Risk Management research. It is noteworthy that the research output of these authors has been steadily increasing, reflecting their sustained interest and engagement in this field.

**Table 3**

Top 10 Most Influential Authors in Enterprise Risk Management Research From 2004 – 2023

No.	Author	NP	TC	H-index	Affiliation	Country
1	David L Olson	16	342	7	University of Nebraska Lincoln	USA
2	Desheng Dash Wu	12	372	7	Stockholm Business School	Sweden
3	Ayse Kucuk Yilmaz	6	57	4	Eskisehir Technical University	Turkey
4	Sui Pheng Low	7	255	6	National University of Singapore	Singapore
5	Xianbo Zhao	7	290	7	Central Queensland University	Australia
6	Triant Flouris	5	48	3	Hellenic American University	USA
7	Robert Hoyt	6	412	5	Virginia Commonwealth University	USA
8	Bon Gang Hwang	6	249	6	National University of Singapore	Singapore
9	Don Pagach	6	202	3	North Carolina State University	USA
10	James H. Lambert	5	41	4	University of Virginia	USA

Table 3 shows that David L. Olson has written the most about enterprise risk management research during this period. This author has created 16 related articles with 342 citations in WOS-CC. Throughout his academic career, David L. Olson has contributed to research on enterprise risk management (ERM). His ERM research includes examining risk management practices in organizations, examining the role of IT in risk management, and developing models for ERM implementation. His most influential ERM-related research was on applying ERM to the small business scorecard (Wu & Olson, 2009). In this article, he talks about how the small business scorecard can be used to manage operations and the supply chain to implement enterprise-wide risk management. This article was published in *Production Planning & Control* Volume 20, 2009, and mentioned 54 times in WOS-CC. Fig. 5 shows the top 10 affiliations that are important to enterprise risk management research. The University of Nebraska holds the top three positions at Lincoln (31 articles), the University of Toronto (21), and the University of Rio Grande do Sul (16). The University of Nebraska Lincoln is a leading institution in this field of research, and this research and David L. Olson, who ranks first in the number of published articles on enterprise risk management, are also from this university.

The University of Nebraska Lincoln (UNL) has an active enterprise risk management (ERM) research program. ERM is a process that helps organizations find, evaluate, and manage risk in a way that considers the whole thing. ERM tries to make it easier for an organization to reach its goals while avoiding or reducing the risk of losses. At UNL, the ERM research program focuses on understanding risk management best practices, studying the impact of risk on different organizations, and developing tools and techniques to improve ERM processes. One example of the research conducted by UNL's ERM program is a study on the impact of ERM on financial performance. The study found that organizations that implemented ERM had better financial performance than those that did not. This research demonstrates the potential benefits of ERM for organizations and can help encourage more widespread adoption of ERM practices (Lin et al., 2017; Wu & Olson, 2010).

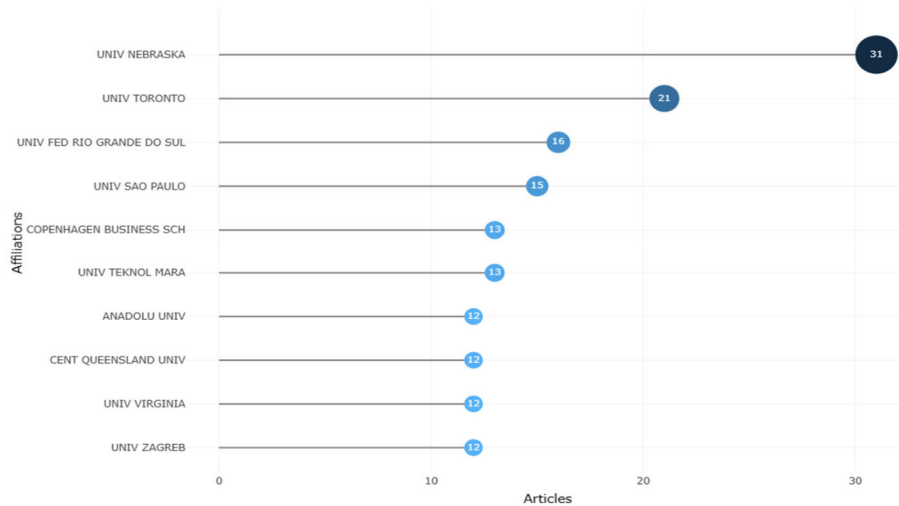


Fig. 5. Average Citation Per Year in Enterprise Risk Management Research

The MCP and SCP measures were used to look at how researchers from different countries or regions in the field of enterprise risk management wrote papers together. The MCP shows how many papers were written by researchers from different countries or regions. The SCP shows how many papers were written by researchers from the same country or region. As depicted in Figure 6, the SCP value is considerably greater than the MCP value in the top ten countries/regions, implying that researchers tend to collaborate within their own country/region rather than across countries/regions. The MCP rate, which indicates the proportion of international collaboration, was found to be relatively low in most countries/regions. Notably, American authors exhibit a high level of collaboration, albeit with an MCP ratio of only 0.317 (as shown in Table 4), indicating a preference for international cooperation. For instance, Robert E. Hoyt and Andre P. Liebenberg, both affiliated with universities in the United States, co-authored the second most cited article, titled “The Value of Company Risk Management” (2011).

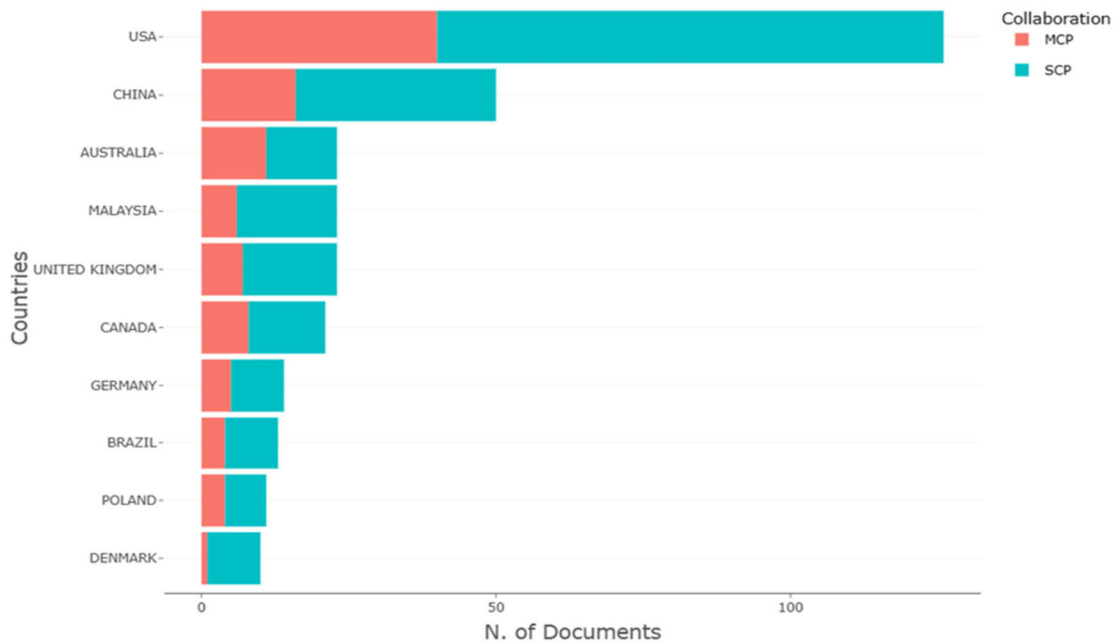


Fig. 6. MCP and SCP comparison in Top 10 Corresponding Author's Country in Enterprise Risk Management Research From 2004 – 2023

This suggests that there is significant room for international collaboration in enterprise risk management research. While collaboration within countries/regions is beneficial, international cooperation can lead to a greater exchange of ideas and knowledge, ultimately resulting in a more comprehensive understanding of enterprise risk management. Therefore, it is recommended that researchers from different countries/regions increase their efforts to collaborate with one another in this field.



**Table 4**

Top 10 Corresponding Author's Country in Enterprise Risk Management Research From 2004 – 2023

No.	Country	Articles	SCP	MCP	MCP Ratio
1	USA	126	86	40	0.317
2	China	50	34	16	0.320
3	Australia	23	12	11	0.478
4	Malaysia	23	17	6	0.261
5	United Kingdom	23	16	7	0.304
6	Canada	21	13	8	0.381
7	Germany	14	9	5	0.357
8	Brazil	13	9	4	0.308
9	Poland	11	7	4	0.364
10	Denmark	10	9	1	0.100

Table 4 shows that enterprise risk management (ERM) is a significant research area in the United States, with many universities, think tanks, and other organizations dedicating resources to studying ERM. The United States has a solid and diverse ERM research community, with many organizations working to advance the field and help organizations manage risk more effectively. In addition to academic institutions, several professional organizations in the US focus on ERM. The Risk Management Society (RIMS) is one such organization that provides educational resources and networking opportunities for ERM professionals. The Institute of Risk Management (IRM) also has a US chapter that includes training, certification, and other resources for risk management professionals.

#### 4. Conclusion

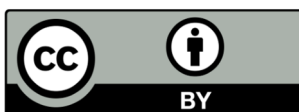
The present study provides a comprehensive bibliometric analysis of research on enterprise risk management, using data obtained from the Web of Science (WOS) Core Collection database. A total of 510 articles published between 2004 and 2023 were included in the analysis, which focused on various aspects of enterprise risk management research, such as annual publication trends, references, journals, authors, author affiliations, and countries. By analyzing these parameters, the study aims to provide a comprehensive understanding of the research landscape in the field of enterprise risk management. This approach allows researchers to identify important trends and themes that can guide future research in this area, and to gain insight into the most influential authors, journals, and institutions in this field. The findings indicate that enterprise risk management research has demonstrated rapid growth over the last 20 years, with a steady upward trend and rapidly increasing momentum in the last five years. The initial period from 2004 to 2013 was characterized by a nascent stage of enterprise risk management research, whereas after 2016, publications exhibited a steady growth trend, notwithstanding fluctuations. This surge in publications over the past five years reveals the revived vitality of enterprise risk management research. The Journal of Risk and Financial Management emerged as the most influential journal in this research domain, offering a diverse range of high-quality articles and providing authors with an opportunity to disseminate their work. Additionally, Cox's (2008) article titled "What's wrong with risk matrices?" emerged as the most cited work, making a significant contribution to enterprise risk management research with 421 citations in the WOS-CC. The study also provides a comprehensive list of the most influential authors, affiliations, and countries in the field of Enterprise Risk Management research. David L. Olson of the University of Nebraska Lincoln ranked first in both the number of articles published and the total number of citations in the WOS-CC. The University of Nebraska Lincoln (UNL) emerged as a premier research institution in the field, publishing 31 articles during the study period. The United States was found to be the leading contributor to enterprise risk management research, with a few key countries exerting significant influence in this area. Collaborations among American authors were frequent, although the MCP ratio was only 0.317. The study reveals that researchers within countries tend to collaborate more often than between countries, suggesting the need to strengthen cross-border collaboration in the future. The research findings suggest that future research should focus on analyzing emerging trends and research points related to enterprise risk management to refine the current understanding of this crucial research domain.

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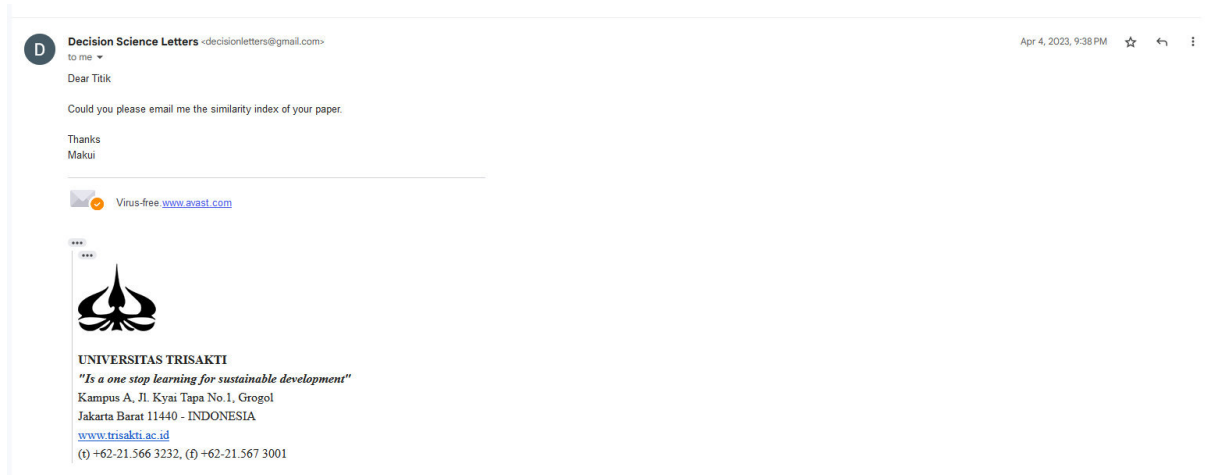
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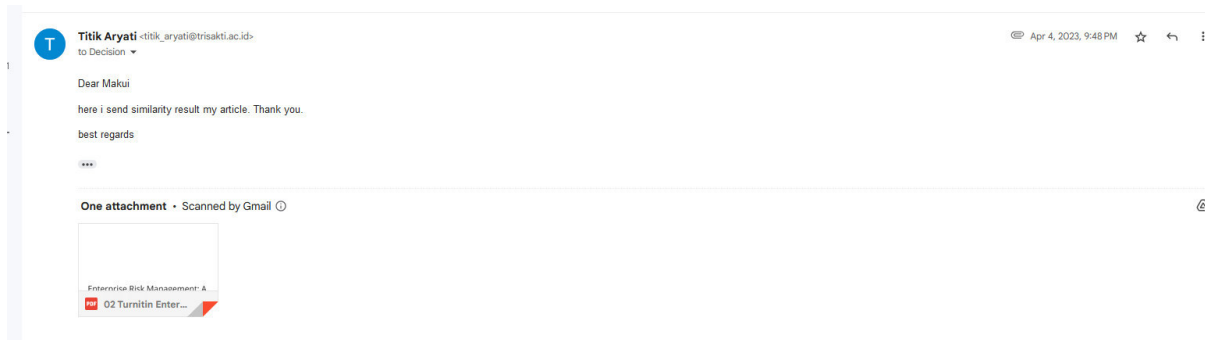
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# Enterprise Risk Management: A Bibliometric Study

*by* Titik Aryati

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# Enterprise Risk Management: A Bibliometric Study

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**Abstract.** This article reports on the results of a bibliometric analysis of 510 articles about enterprise risk management (ERM) obtained from the Web of Science Core Collection (WOS-CC) database, covering the period from 2004 to 2023. The main objective of the study was to provide a comprehensive bibliometric overview of ERM research, with a particular focus on annual publications, references, journals, authors, author affiliations, and countries. The data was collected from WOS in BibTex format and included detailed information about each article, such as the author, document type, publication year, source, volume, edition, pages, number of citations, and references. This data was analyzed using Biblioshiny to support the research findings. The study found that ERM research has grown rapidly over the past two decades, with a steady upward trend and increasing momentum in the past five years. The Journal of Risk and Financial Management was identified as the most influential journal in this field, and the article "What's wrong with risk matrices?" by Cox, LA (2008) was the most cited work. The study also identified David L. Olson of the University of Nebraska Lincoln as the most prolific author and UNL as the leading research institution in this area. The United States was found to be a major contributor to ERM research, with several key countries also influential in this area. The study suggests that international cooperation between researchers be strengthened to advance ERM research. The study concludes that further research can refine the analysis of research hotspots and emerging trends related to ERM.

**Keywords:** Bibliometric, Enterprise Risk Management, ERM, Web of Science

## INTRODUCTION

Enterprise risk management (ERM) is a comprehensive process that organizations use to identify, evaluate, and manage potential risks that may impact their ability to achieve their strategic goals and objectives. The process of ERM is crucial for companies that operate in dynamic and complex environments, where risks are constantly evolving, and traditional risk management practices may no longer be effective. The ERM process is designed to be all-encompassing, covering every aspect of an organization's operations, including its people, processes, and systems. This holistic approach to risk management allows companies to gain a deep understanding of their vulnerabilities, assess the likelihood and impact of potential risks, and develop effective strategies to mitigate those risks [1]. ERM is an ongoing process that begins with identifying potential organizational risks and threats. These risks can arise from various sources, including internal factors such as employee misconduct, process failures, or system failures and external factors such as economic conditions, natural disasters, or regulatory changes [2].

Once risks are identified, they are evaluated to determine their likelihood and potential impact on the organization's operations, financial performance, and reputation. Based on this assessment, organizations can prioritize risks and develop strategies to mitigate or manage them [3]. ERM encompasses a range of activities, including risk assessment, risk measurement and reporting, risk monitoring and control, and risk mitigation and response planning [4]. This includes establishing a risk management framework that includes policies and procedures for risk management throughout the organization [5].

In today's business environment, enterprise risk management (ERM) is becoming increasingly important for companies. With increasing global competition, technological advances, and evolving regulatory requirements, companies face various risks that can impact their operations, reputation, and bottom line. ERM helps companies proactively and strategically identify, assess, and manage these risks. One of the critical benefits of ERM is that it gives organizations a holistic view of their risks [6]. Rather than managing risk in silos, ERM considers risk across the organization, including its people, processes, and systems. This approach helps organizations identify risks that

fragmented risk management might overlook. Organizations can take a more integrated and coordinated approach to managing these risks by identifying them [7].

Enterprise risk management (ERM) is an essential field of study that has received significant attention recently due to the increasing complexity of organizations' risks. As a result, research related to ERM is becoming increasingly important to help organizations understand and effectively manage these risks. ERM research can help organizations identify emerging threats, understand the interactions between risks, develop effective risk management strategies, and demonstrate the value of risk management. By investing in ERM research, organizations can better understand and manage the risks they face and improve their overall performance and resilience.

The study of ERM has received significant attention in the academic literature, and there is a growing body of research on the subject. In this article, we conduct a bibliometric study of ERM research to provide a comprehensive overview of this field's research state. Specifically, we will analyze the trends in ERM research over the past decade using bibliometric techniques. This study will provide insights into the most influential authors, journals, and publications in ERM research. The results of this study will be valuable to researchers, practitioners, and policymakers who want to understand better the current state of ERM research and its implications for risk management practices in organizations.

## METHODS

The study utilized data extracted from the Web of Science Core Collection (WOS-CC) database to conduct a comprehensive bibliometric analysis of enterprise risk management (ERM) research [8]. The author conducted a keyword search using the term "Enterprise Risk Management" which resulted in a total of 557 publications as of February 2023. To ensure that the data was suitable for analysis, the author applied filters based on literature type and the time period, resulting in the retention of 510 articles [9]. Subsequently, the author manually screened the articles to eliminate any duplicates or irrelevant articles, resulting in a final dataset of 510 articles. The data was then downloaded from the WOS database in BibTex format, which provided complete records of each article, including information such as author name, document type, publication year, source, volume, edition, pages, and number of citations. Additionally, references for each article were also obtained to support the analysis in Biblioshiny.

The use of the WOS-CC database ensured that the data was comprehensive and representative of the field of ERM research, providing the author with a large sample size of articles to analyze [10]. The utilization of filters and manual screening helped to ensure that the data was relevant and accurate, providing a reliable basis for the subsequent bibliometric analysis. The use of complete records and reference information provided a detailed picture of each article's characteristics, enabling the author to conduct a comprehensive and detailed analysis using Biblioshiny.

Biblioshiny is a secondary development program that is built upon the Bibliometrix language pack within the R environment. It is specifically designed to facilitate quantitative research in scientific metrology by providing a user-friendly and efficient method for analyzing research data. The program aims to provide researchers with a comprehensive and clear presentation of research fields, helping them to identify hot topics, important literature, and current research trends. Biblioshiny offers significant improvements over the traditional Bibliometrix script execution mode. It provides an intuitive and user-friendly interface that is easy to navigate and use, thereby lowering the user's access threshold to information technology. With its enhanced functionalities, Biblioshiny offers researchers the ability to analyze web page data more effectively and efficiently [11].

Biblioshiny is a powerful and well-designed tool for conducting bibliometric analyses, providing researchers with numerous options for visualizing their analyses. Once literature is imported into the software, Biblioshiny can generate a wide range of visual maps to explore various aspects of academic research production, such as document sources, documents cited, authorship, publication affiliation, and author country [12]–[14].

The installation package for Biblioshiny within the R programming environment provides researchers with the ability to import and analyze data from prominent academic databases such as the Web of Science and Scopus. With this functionality, researchers can conduct in-depth analyses of academic literature, making it possible to sort and study historical data from research conducted during specific time periods to extract relevant metadata from databases. Biblioshiny is a versatile and powerful tool for conducting bibliometric analyses of academic literature. Its advanced features and intuitive interface make it an indispensable resource for researchers across various fields, providing them with the ability to explore and understand the production and dissemination of research in unprecedented detail.

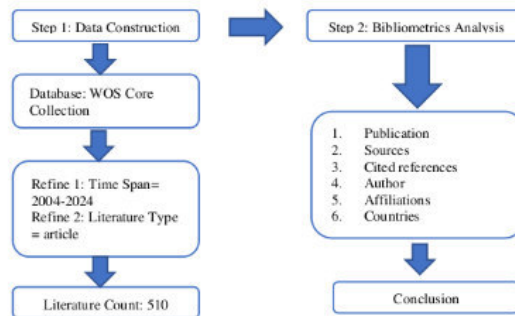


FIGURE 1. Research Step

Biblioshiny's capabilities extend beyond simple visualizations of bibliometric data. It also offers advanced features for data mining and analysis, allowing researchers to extract relevant metadata and conduct more detailed analyses of research fields. For example, the software can extract keywords and conduct co-citation and bibliographic coupling analyses to identify important research topics and authors. Figure 1 shows that this enterprise risk management research summary has seven steps. The current state of research and its trends and limitations are discussed to paint a complete picture of research in this area.

## RESULTS AND DISCUSSION

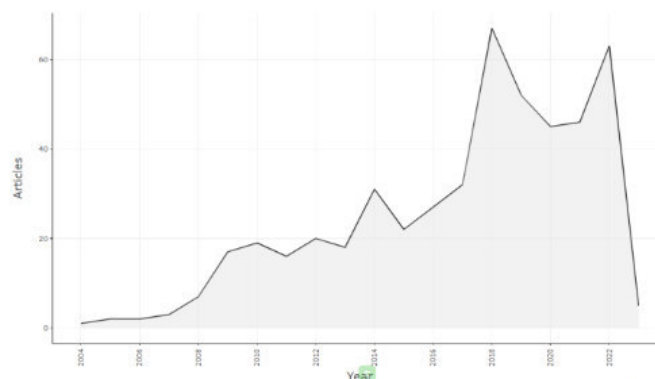
### Publishing Trend in Enterprise Risk Management Research

It is possible to gain a lot of helpful information about the overall development trend of this study topic by analyzing the annual production of research on business risk management. Figure 2 of the study on enterprise risk management shows how new academic literature has changed over time. As the picture shows, international research on enterprise risk management has been going up steadily and has made a lot of progress in the last five years. This trend indicates that more academics are interested in enterprise risk management.

The dataset analysis showed that research on enterprise risk management (ERM) has a CAGR of 8.84%. The annual growth rate (AGR) of 8.84% for research on enterprise risk management (ERM) shows that this area's research has steadily grown over time. In concrete terms, this means that the amount of ERM research published each year is rising by an average of 8.84 percent. The annual growth rate of 8.84% shows that ERM is becoming more popular and that companies need to keep up with the latest research to improve their risk management practices and stay ahead of the competition.

This trend shows that ERM is becoming increasingly important to organizations and researchers as they recognize the need for better risk management in today's complex business environment. ERM research can also grow because regulators want it, stakeholders wish to it, and people want to improve organizational performance and resilience. As shown in Figure 2, publications in this area can be roughly divided into three phases. The first phase was from 2004 to 2010. During this time, few publications about enterprise risk management showed that research on the topic was still young compared to other management research topics. The second phase lasted from 2010 to 2016, during which the number of releases showed steady growth, although there were ups and downs. In the third phase, from 2016 to 2022, the number of publications went up by a lot compared to the year before. This shows that research on risk management in companies is becoming more active again.





**FIGURE 2. Annual Scientific Production in Enterprise Risk Management Research**

Enterprise Risk Management (ERM) research is growing because people are becoming more aware of how important it is to manage risks; the business environment is getting more complicated, there is more data available, and the chances are constantly changing. As organizations try to find better ways to manage risks, researchers are doing more complex studies to get more in-depth results that can help improve ERM practices. The ongoing growth of ERM research is essential to helping organizations stay up-to-date with the latest risks and develop effective risk management strategies to mitigate them.

Tatiana Varcholova, from the University of Economics in Bratislava, Slovakia, states in her study on the position of risk management that, until the late 1970s, risk management in companies was limited to insurance against the possibility of risk. The study also talks about two new developments in risk management: using information technology more to do quantitative and qualitative risk assessments and putting risk management into strategic management. Finally, it is pointed out that, for active risk management, it is essential to build a corporate culture that places responsibility on the risk managers. This is the first article in this dataset, published in *Politická Ekonomika*, Volume 52, 2004 [15].

#### Source of Enterprise Risk Management Research

The objective of conducting a literature analysis is to identify high-quality sources of research in a given field and provide researchers with the necessary information to publish their own work. Figure 3, presented herein, displays the ten most significant sources of research pertaining to enterprise risk management. A key metric utilized in assessing the influence of academic journals is the h-index, denoting the number of publications with a high citation rate. A higher h-index signifies a greater contribution to the field, increasing the influence and impact of the journal.

The h-index is an important tool for evaluating the quality and significance of academic research, and can serve as an effective metric for assessing the influence of a particular journal. Journals with a high h-index are widely recognized as leaders in their respective fields, and are often considered to be the most influential and impactful publications in their area of study. By analyzing the h-index of different journals within the field of enterprise risk management, researchers can gain valuable insights into the most important and influential sources of research, allowing them to focus their efforts on publishing in the most relevant and impactful journals.

In Table 1, you can see the h-index and the total number of citations from the ten most essential sources. The top five sources for research into teacher critical thinking are the *Journal of Risk and Financial Management* (number of documents = 12), the *Journal of Risk and Insurance* (N = 11), the *Journal of Risk Research* (N = 11), *Risk Management: An International Journal* (N = 11), and the *International Journal of Production Research* (N = 10).

**TABLE 1.** Top 10 most relevant sources in Enterprise Risk Management Research From 2004 – 2023

No.	Sources	NP	TC	H-index	Publisher
1	Journal of Risk and Financial Management	12	58	3	MDPI
2	Journal of Risk and Insurance	11	742	9	Wiley Online Library
3	Journal of Risk Research	11	118	6	Taylor & Francis Online
4	Risk Management-An International Journal	11	64	6	Springer Nature Switzerland AG
5	International Journal of Production Research	10	346	6	Taylor & Francis Online
6	Geneva Papers on Risk and Insurance-Issues and Practice	7	69	4	Springer Nature Switzerland AG
7	Risk Analysis	7	476	5	Wiley Online Library
8	Sustainability	7	69	4	MDPI
9	Annals Of Operations Research	6	77	5	Springer Nature Switzerland AG
10	Accounting Organizations and Society	5	518	4	Elsevier

The Journal of Risk Management and Finance, published by MDPI, is ranked among the top 10 sources in enterprise risk management research, with 12 publications in 2004–2023. This journal has an h-index of 3 with 58 citations in WOS-CC. The research by Yang et al. (2018) is the study that has attracted the most attention from other researchers, with a total of 39 citations in WOS-CC [16]. The findings of this study suggest that the manner in which organizations manage risks has a notable impact on the competitive advantage and performance of small and medium-sized enterprises (SMEs). Specifically, the study identified a partial mediating effect of competitive advantage on the relationship between enterprise risk management practices and SME performance. Furthermore, the study highlighted the significant moderating influence of financial literacy on the relationship between enterprise risk management practices and competitive advantage.

These results emphasize the importance of effective risk management strategies for SMEs seeking to enhance their competitive positioning and overall performance. Moreover, the study contributes to the growing body of research exploring the complex interplay between risk management practices, firm performance, and various moderating and mediating factors. Further research is needed to fully elucidate the underlying mechanisms through which these relationships operate, as well as to explore potential avenues for optimizing risk management practices and financial literacy programs for SMEs.

The journal that contributes the most, with 742 citations in WOS-CC, is the Wiley Online Library's Journal of Risk and Insurance. This journal produced 11 publications with an h-index of 9. Hoyt et al. (2011)'s investigation of the value of enterprise risk management became the most cited article in the WOS-CC, with 287 citations. This article presents a study examining the impact of enterprise risk management (ERM) on enterprise value. The study looks at insurance companies in the United States and finds that enterprise value and the implementation of an ERM program go together well. The study estimates the ERM premium to be around 20%, statistically and economically significant. The results show that ERM can give companies a competitive edge and help them improve in the insurance industry. This study shows how important it is to use formal ERM practices to reduce risk and enhance the value of a business. Companies in many industries should consider implementing ERM programs to gain a competitive edge in today's tumultuous market. This study was published in Volume 78, Issue 4, December 2011 [17].

Figure 3 depicts the source dynamics of the top 5 journals used in this study. The graph demonstrates the trends in publications for these journals from 2004 to 2023. The results indicate that the number of publications in most of the journals has been steadily increasing over the years. For instance, the Journal of Risk and Financial Management did not have any articles related to enterprise risk management research before 2017. However, in 2022, the number of articles published in this journal rose significantly, with 12 articles being published. This suggests a growing interest in research on enterprise risk management and highlights the importance of keeping abreast of the latest publications in this field.

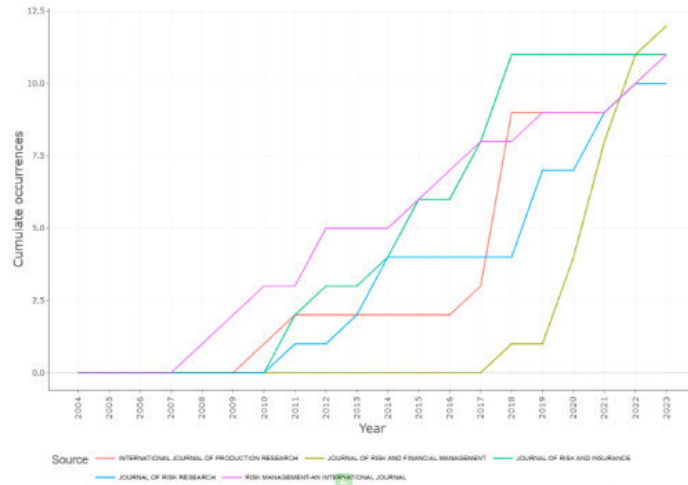


FIGURE 3. Source Dynamics in Enterprise Risk Management Research

**Cited Documents in Enterprise Risk Management Research**

Figure 4 shows how the number of article citations changed each year from 2004 to 2022. From 2004 to 2022, there were both up and down trends in the number of article citations each year. In 2008, with an average of 4.76 per year, most citations were made on average each year. This year also saw the highest average citation per article (71.43) compared to other years in the study period. This was influenced by research by Louis Anthony TonyCox that discussed the problems with the risk matrix, which is often used in enterprise risk management (ERM) and other places. ERM finds, evaluates, and takes care of risks that could make it hard for an organization to reach its goals. Risk matrices are commonly used in ERM to assess and prioritize risks based on frequency and severity. However, limitations of risk matrices, such as poor resolution, errors in ranking, suboptimal resource allocation, and ambiguous inputs and outputs, may limit their effectiveness in ERM decision-making. This research was published in Risk Analysis - An International Journal in 2008 and has received 421 citations in WOS-CC [18].

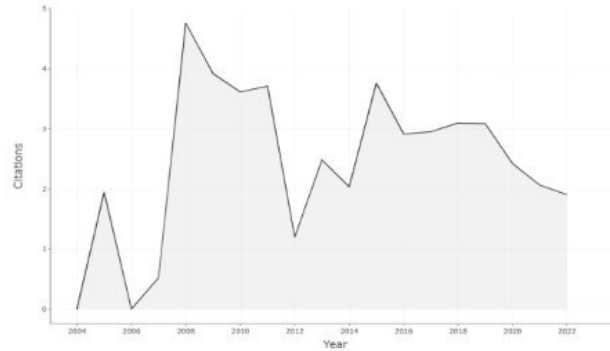


FIGURE 4. Average Citation Per Year in Enterprise Risk Management Research

The analysis of the most cited documents represents the number of citations of downloaded articles in the Web of Science database, i.e., global citation scores (GCS). A very high GCS means that scientists worldwide have paid more attention to the article. Out of the world's top ten most cited documents, *What's Wrong with Risk Matrices?* was written by Louis A. Cox in 2008 [19]. Table 2 shows the ten most-read articles about enterprise risk management and what they found.

**TABLE 2.** Top Ten Highest Cited Documents Related to Enterprise Risk Management Research from 2004 – 2023

Rank	Title	Authors	TC	Findings
1	"What's wrong with risk matrices?"	Cox, LA (2008)	421	The article identifies several limitations of risk matrices that could negatively impact ERM, including poor resolution, errors, suboptimal resource allocation, and ambiguous inputs and outputs. These limitations suggest that the use of risk matrices in ERM should be approached with caution and requires careful consideration of the assessments embedded in the matrix [19].
2	"The Value of Enterprise Risk Management"	Hoyt et al. (2021)	287	The study found that ERM use is positively related to Tobin's Q, a standard proxy for enterprise value, and that there is an ERM premium of about 20 percent, which is statistically and economically significant. This suggests that implementing ERM programs can add value for companies, at least in the context of the US insurance industry [20].
3	"The risk management of nothing"	Power, Michael (2009)	232	The key finding of this paper is that enterprise risk management (ERM) has significant limitations in its approach to risk management, particularly in its understanding of risk-taking, and that these limitations were a contributing factor to the financial crisis. The paper argues that ERM tends to rely on a narrow, metric-driven conception of risk-taking that fails to capture the complex organizational processes and values that shape risk-taking. As a result, ERM has often focused on maintaining boundaries and meeting audit trail requirements rather than addressing the interconnected and dynamic realities of risk [21].
4	"Enterprise risk management and firm performance: A contingency perspective"	Gordon et al. (2009)	227	The article emphasizes the importance of taking a holistic approach to risk management and tailoring ERM to the specific context of each organization. In this way, companies can improve their performance and effectively manage their risks in a rapidly changing and complex business environment [22].
5	"The value of non-financial information in small and medium-sized enterprise risk management"	Altman et al. (2010)	203	The article highlights the importance of including non-financial data in credit risk models for SMEs. This approach can help overcome the limitations of traditional accounting-based models and allow for a more comprehensive and accurate assessment of credit risk. Incorporating such data can be part of an ERM strategy to effectively manage credit risk and mitigate potential losses [23].
6	"Risk management and calculative cultures"	Mikes, Anette. (2009)	199	The key takeaway from this paper is that there are systematic differences in enterprise risk management (ERM) practices across the financial services industry. The paper presents real-world evidence from two major banking organizations that illustrate four risk management ideal types that make up the risk management mix in a given organization. The study posits two types of ERM models: one driven by a strong shareholder value imperative (ERM by the numbers) and the other that conforms to the requirements of the risk-based internal control imperative (holistic ERM) [24].
7	"Imbalanced enterprise credit evaluation with DTE-SBD: Decision tree ensemble based on SMOTE and bagging with	Liu et al. (2022)	196	The study found that DTE-SBD outperformed other models and is effective for imbalanced enterprise credit evaluation. This relates to ERM as effective enterprise credit evaluation is an essential component of risk management in financial institutions. The use of advanced models, such as DTE-SBD,

	differentiated sampling rates"			can help financial institutions better assess and manage their credit risk, which is an important part of ERM [25].
8	"The organizational dynamics of Enterprise Risk Management"	Arena et al. (2010)	179	The finding of this article is that there are organizational differences in enterprise risk management (ERM) practice within organizations. The study examines the evolution of ERM in organizations as it encounters pre-existing logics and is shaped by risk rationales, experts and technologies. This suggests that ERM implementation is not a one-size-fits-all approach and needs to be tailored to the specific organizational context [26].
9	"The Characteristics of Firms That Hire Chief Risk Officers"	Pagach et al. (2011)	156	Findings in this essay suggest that organizations are adopting enterprise risk management (ERM) for direct business benefit, and not just to meet regulatory pressures. The study identified specific characteristics of companies that are more likely to adopt ERM, including larger size, higher volatility and greater institutional ownership. It was also found that the company is more likely to hire a chief risk officer (CRO) with the implementation of ERM when the CEO has incentives to take risks [27].
10	"Enterprise risk management: a DEA VaR approach in vendor selection"	Wu et al. (2010)	136	The paper discusses the relevance of ERM in today's complex global business environment and how it can be applied to supply chain management. It presents the development and current status of ERM and emphasizes the importance of risk modeling in ERM. The results of the article suggest that risk modeling and quantitative decision tools such as the DEA-VaR model can improve the effectiveness of ERM in risk management in supply chain management [28].

Based on an analysis of the ten most-cited articles, this study shows how important it is to have a customized, all-encompassing approach to ERM that includes non-financial data and advanced models for assessing credit risk. ERM can provide business value, improve performance, and effectively manage risk in a rapidly changing and complex business environment. The reviewed articles underscore the importance of a holistic approach to ERM. They suggest that organizations must look at risk comprehensively, considering financial and non-financial factors. This approach is about looking beyond traditional accounting-based models and incorporating data from various sources such as social media, customer feedback, and industry trends to enable a more accurate credit risk assessment.

The articles also suggest that advanced models such as the DEA-VaR and the DTE-SBD model can effectively manage and assess credit risk. These models provide a quantitative approach to decision-making and can help organizations better understand and manage their risks. Overall, the articles underscore the importance of a tailored, holistic, and data-driven approach to ERM and the potential value it can bring to organizations. Organizations can better manage their risks, improve performance, and remain competitive in an ever-changing business environment by adopting such an approach. The findings also emphasize the potential value that ERM can add to companies in terms of improving their performance and effectively managing risks in a rapidly changing and complex business environment. Several studies suggest that firms that adopt ERM tend to have higher enterprise value, indicating that implementing ERM programs can add value for companies, at least in the context of the US insurance industry.

#### Authors, Affiliations and Countries in Enterprise Risk Management Research

The bibliometric analysis conducted in this study identified 1101 authors who have contributed to the field of Enterprise Risk Management. Table 3 presents the top ten most influential authors based on their productivity and impact. Among these authors, Olson has the highest number of documents with a total of 16, followed by Wu with 12 documents and Low with 7 documents. Moreover, Olson has an h-index of 7, a g-index of 16, and a citation count of 342, making him the most influential author in this research domain. His publications are considered to be of high quality and have made significant contributions to the advancement of Enterprise Risk Management research. It is noteworthy that the research output of these authors has been steadily increasing, reflecting their sustained interest and engagement in this field.

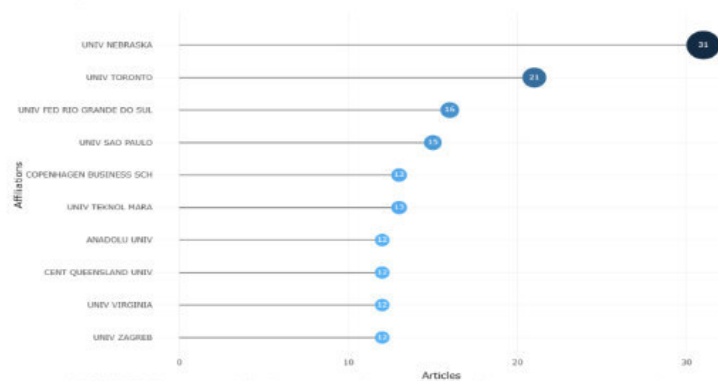
**TABLE 3.** Top 10 Most Influential Authors in Enterprise Risk Management Research From 2004 – 2023

No.	Author	NP	TC	H-index	Affiliation	Country
1	David L. Olson	16	342	7	University of Nebraska Lincoln	USA
2	Desheng Dash Wu	12	372	7	Stockholm Business School	Sweden
3	Ayşe Kucuk Yilmaz	6	57	4	Eskisehir Technical University	Turkey
4	Sui Pheng Low	7	255	6	National University of Singapore	Singapore
5	Xianbo Zhao	7	290	7	Central Queensland University	Australia
6	Triant Flouris	5	48	3	Hellenic American University	USA
7	Robert Hoyt	6	412	5	Virginia Commonwealth University	USA
8	Bon Gang Hwang	6	249	6	National University of Singapore	Singapore
9	Don Pagach	6	202	3	North Carolina State University	USA
10	James H. Lambert	5	41	4	University of Virginia	USA

Table 3 shows that David L. Olson has written the most about enterprise risk management research during this period. This author has created 16 related articles with 342 citations in WOS-CC. Throughout his academic career, David L. Olson has contributed to research on enterprise risk management (ERM). His ERM research includes examining risk management practices in organizations, examining the role of IT in risk management, and developing models for ERM implementation. His most influential ERM-related research was on applying ERM to the small business scorecard [29]. In this article, he talks about how the small business scorecard can be used to manage operations and the supply chain to implement enterprise-wide risk management. This article was published in Production Planning & Control Volume 20, 2009, and mentioned 54 times in WOS-CC.

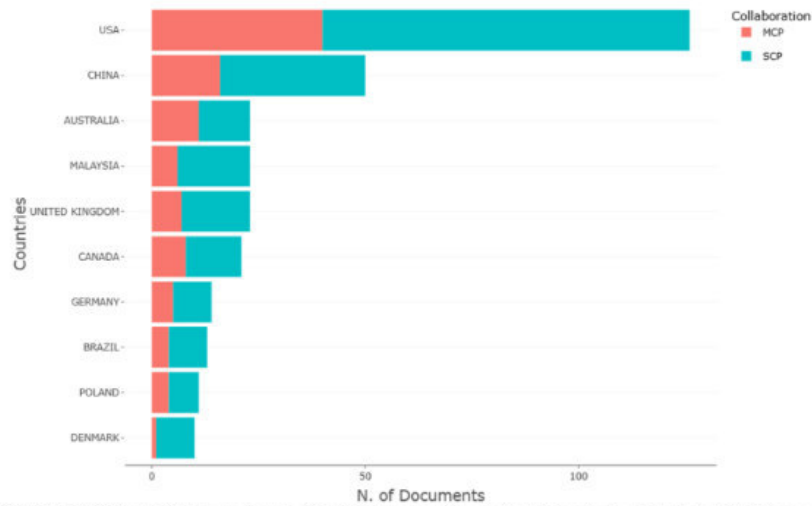
Figure 5 shows the top 10 affiliations that are important to enterprise risk management research. The University of Nebraska holds the top three positions at Lincoln (31 articles), the University of Toronto (21), and the University of Rio Grande do Sul (16). The University of Nebraska Lincoln is a leading institution in this field of research, and this research and David L. Olson, who ranks first in the number of published articles on enterprise risk management, are also from this university.

The University of Nebraska Lincoln (UNL) has an active enterprise risk management (ERM) research program. ERM is a process that helps organizations find, evaluate, and manage risk in a way that considers the whole thing. ERM tries to make it easier for an organization to reach its goals while avoiding or reducing the risk of losses. At UNL, the ERM research program focuses on understanding risk management best practices, studying the impact of risk on different organizations, and developing tools and techniques to improve ERM processes. One example of the research conducted by UNL's ERM program is a study on the impact of ERM on financial performance. The study found that organizations that implemented ERM had better financial performance than those that did not. This research demonstrates the potential benefits of ERM for organizations and can help encourage more widespread adoption of ERM practices [30], [31].



**FIGURE 5.** Average Citation Per Year in Enterprise Risk Management Research

The co-authorship patterns of researchers from different countries/regions in the enterprise risk management field were examined using the MCP and SCP measures. The MCP reflects the number of documents co-authored by researchers from different countries/regions, while the SCP indicates the number of papers co-authored by researchers from the same country/region. As depicted in Figure 6, the SCP value is considerably greater than the MCP value in the top ten countries/regions, implying that researchers tend to collaborate within their own country/region rather than across countries/regions. The MCP rate, which indicates the proportion of international collaboration, was found to be relatively low in most countries/regions. Notably, American authors exhibit a high level of collaboration, albeit with an MCP ratio of only 0.317 (as shown in Table 4), indicating a preference for intra-national cooperation. For instance, Robert E. Hoyt and Andre P. Liebenberg, both affiliated with universities in the United States, co-authored the second most cited article, titled "The Value of Company Risk Management" (2011).



**FIGURE 6.** MCP and SCP comparison in Top 10 Corresponding Author's Country in Enterprise Risk Management Research From 2004 – 2023

This suggests that there is significant room for international collaboration in enterprise risk management research. While collaboration within countries/regions is beneficial, international cooperation can lead to a greater exchange of ideas and knowledge, ultimately resulting in a more comprehensive understanding of enterprise risk management. Therefore, it is recommended that researchers from different countries/regions increase their efforts to collaborate with one another in this field.

**TABLE 4.** Top 10 Corresponding Author's Country in Enterprise Risk Management Research From 2004 – 2023

No.	Country	Articles	SCP	MCP	MCP Ratio
1	USA	126	86	40	0.317
2	China	50	34	16	0.320
3	Australia	23	12	11	0.478
4	Malaysia	23	17	6	0.261
5	United Kingdom	23	16	7	0.304
6	Canada	21	13	8	0.381
7	Germany	14	9	5	0.357
8	Brazil	13	9	4	0.308

9	Poland	11	7	4	0.364
10	Denmark	10	9	1	0.100

Table 4 shows that enterprise risk management (ERM) is a significant research area in the United States, with many universities, think tanks, and other organizations dedicating resources to studying ERM. The United States has a solid and diverse ERM research community, with many organizations working to advance the field and help organizations manage risk more effectively. In addition to academic institutions, several professional organizations in the US focus on ERM. The Risk Management Society (RIMS) is one such organization that provides educational resources and networking opportunities for ERM professionals. The Institute of Risk Management (IRM) also has a US chapter that includes training, certification, and other resources for risk management professionals.

A related study was done by Jalilvand et al. (2022), who examined ERM maturity in multinational companies in the United States. The study found that the company's risk management system was previously ad hoc and uncoordinated. A post-implementation review of the ERM program showed improvements in the financial and operational positions resulting from risk diversification, increased profitability, and the use of natural hedges, and the improved companies demonstrated leadership. This study was published in the *Journal of Accounting, Auditing, and Finance* in 2022.

## CONCLUSIONS

The present study provides a comprehensive bibliometric analysis of research on enterprise risk management, using data obtained from the Web of Science (WOS) Core Collection database. A total of 510 articles published between 2004 and 2023 were included in the analysis, which focused on various aspects of enterprise risk management research, such as annual publication trends, references, journals, authors, author affiliations, and countries. By analyzing these parameters, the study aims to provide a comprehensive understanding of the research landscape in the field of enterprise risk management. This approach allows researchers to identify important trends and themes that can guide future research in this area, and to gain insight into the most influential authors, journals, and institutions in this field. The findings indicate that enterprise risk management research has demonstrated rapid growth over the last 20 years, with a steady upward trend and rapidly increasing momentum in the last five years. The initial period from 2004 to 2013 was characterized by a nascent stage of enterprise risk management research, whereas after 2016, publications exhibited a steady growth trend, notwithstanding fluctuations. This surge in publications over the past five years reveals the revived vitality of enterprise risk management research. The *Journal of Risk and Financial Management* emerged as the most influential journal in this research domain, offering a diverse range of high-quality articles and providing authors with an opportunity to disseminate their work. Additionally, Cox's (2008) article titled "What's wrong with risk matrices?" emerged as the most cited work, making a significant contribution to enterprise risk management research with 421 citations in the WOS-CC. The study also provides a comprehensive list of the most influential authors, affiliations, and countries in the field of Enterprise Risk Management research. David L. Olson of the University of Nebraska Lincoln ranked first in both the number of articles published and the total number of citations in the WOS-CC. The University of Nebraska Lincoln (UNL) emerged as a premier research institution in the field, publishing 31 articles during the study period. The United States was found to be the leading contributor to enterprise risk management research, with a few key countries exerting significant influence in this area. Collaborations among American authors were frequent, although the MCP ratio was only 0.317. The study reveals that researchers within countries tend to collaborate more often than between countries, suggesting the need to strengthen cross-border collaboration in the future. The research findings suggest that future research should focus on analyzing emerging trends and research points related to enterprise risk management to refine the current understanding of this crucial research domain.

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## Enterprise Risk Management: A Bibliometric Study

### ORIGINALITY REPORT



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### Tanggal 4 April 2023



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Apr 8, 2023, 9:55 PM

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here i send revision article and similarity result. Thank you

Best Regards

\*\*\*

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## Enterprise Risk Management: A Bibliometric Analysis of Research Trends

### ORIGINALITY REPORT



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\*\*\*

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Account Holder Last Name: Sadjadi  
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Transit Number: 07702  
Bank Account: 5263421  
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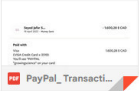
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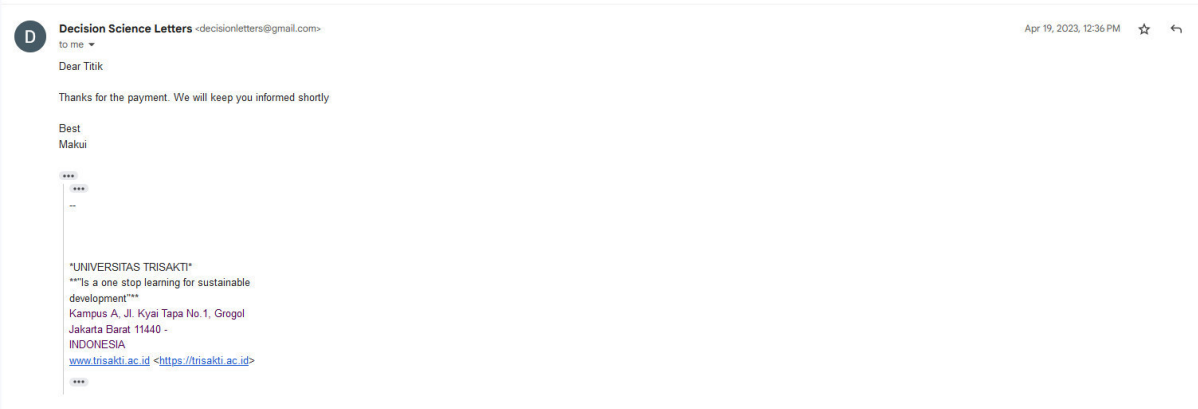
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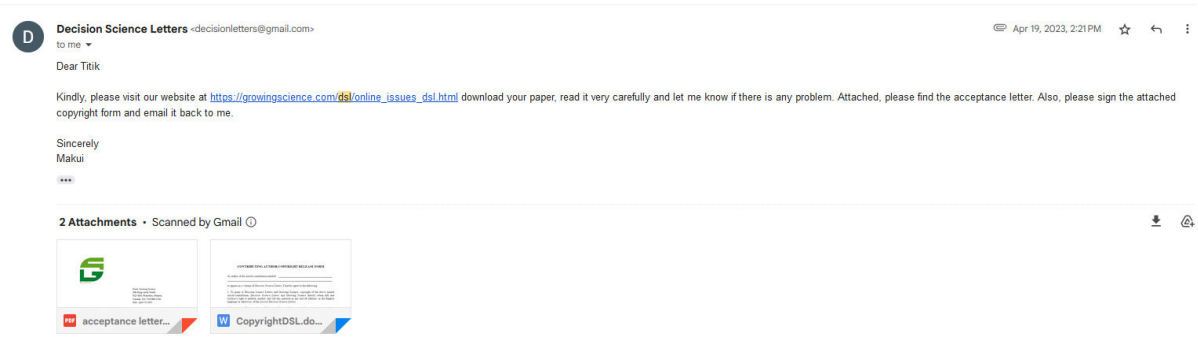
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Canada, Tel: 519-900-1541  
Date: April 19, 2023

Dear *Titik Aryati*

I would like to confirm that your paper entitled "[Enterprise risk management: A bibliometric analysis of research Trends](#)" with *K Khamsiyah and Cicely D. Harahap* has been accepted for publication on Decision Science Letters, An international journal.

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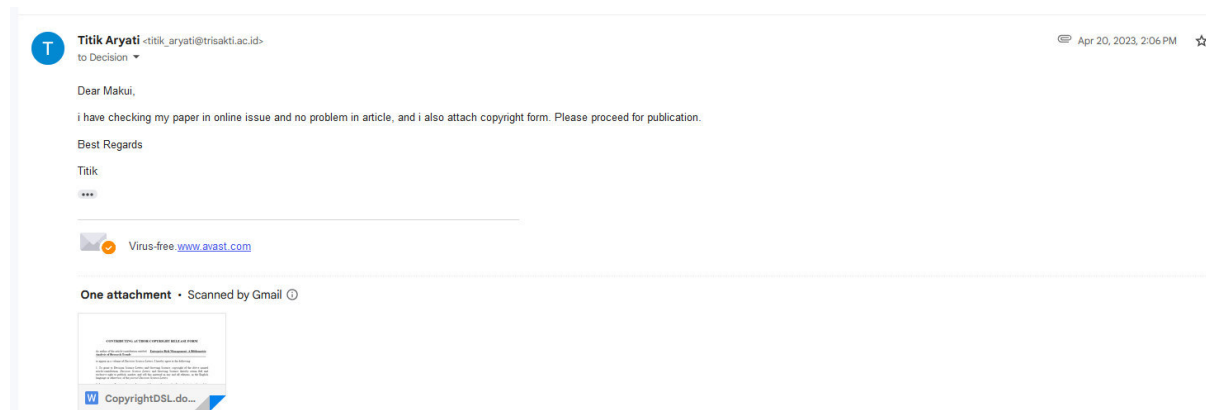
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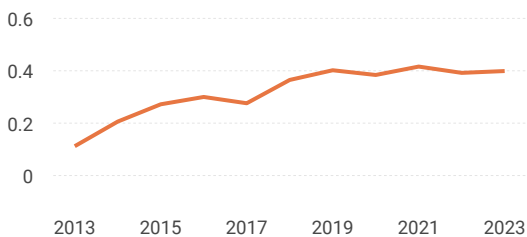
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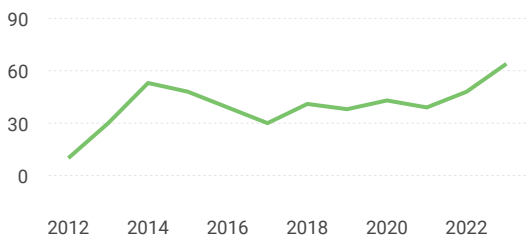
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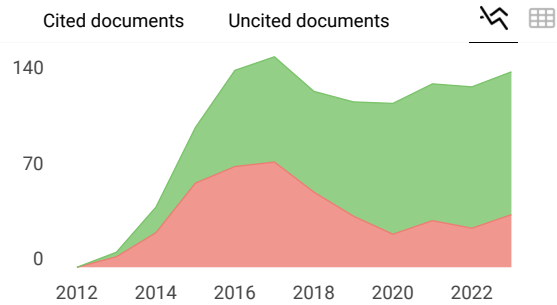
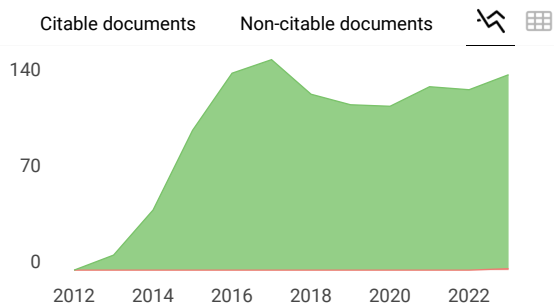
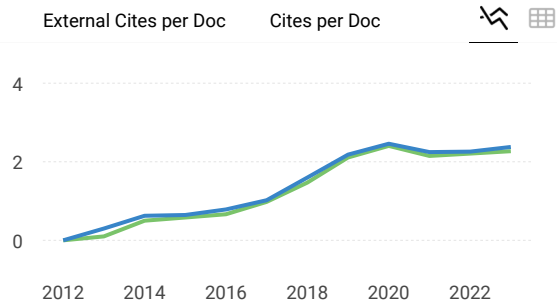
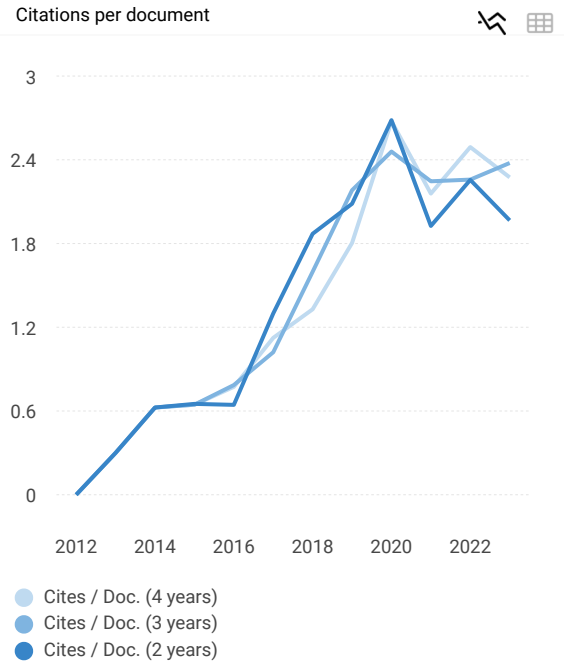
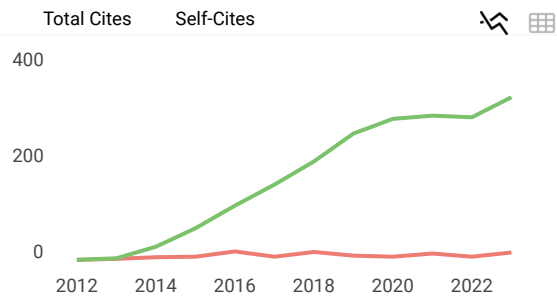
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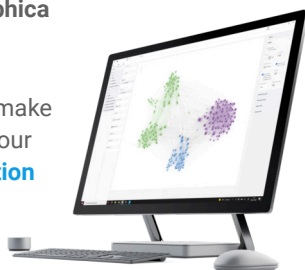
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### Enterprise risk management: A bibliometric analysis of research Trends *Pages 561-570* [Download PDF](#)

Authors: *Titik Aryati, K Khomsiyah, Cicely D. Harahap*

DOI: [10.5267/j.dsl.2023.4.007](https://doi.org/10.5267/j.dsl.2023.4.007)

Keywords: *Bibliometric, Enterprise Risk Management, ERM, Web of Science*

**Abstract:** A bibliometric study of 510 enterprise risk management (ERM) papers from the Web of Science Core Collection (WOS-CC) database from 2004 to 2023 is presented in this article. The study's main goal was to give a bibliometric overview of ERM research, focusing on annual publications, references, journals, authors, author affiliations, and nations. Each article's author, document type, publication year, source, volume, edition, pages, number of citations, and references were obtained from WOS in BibTex format. To help the research, Biblioshiny evaluated this data. The survey indicated that ERM research has increased fast over the previous two decades, with a consistent upward trend and increasing pace in the past five years. "What's wrong with risk matrices?" by Cox, LA (2008) was the most cited publication in this topic, and the Journal of Risk and Financial Management was the most influential journal. David L. Olson of the University of Nebraska Lincoln was the most prolific author, and UNL was the premier research institution in this area, according to the survey. ERM research was heavily influenced by the US and several other countries. To further ERM research, the paper recommends international collaboration. More research can refine the identification of ERM research hotspots and emerging trends, according to the report.

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