Edelweiss Applied Science and Technology
ISSN: 2576-8484
Vol. 9, No. 10, 1541-1551
2025
Publisher: Learning Gate
DOI: 10.55214/2576-8484.v9i10.10696

Cartographic analysis of enterprise risk management research: A bibliometric study using Scopus data (2014–2024)

Rini Armin[1*], Rahmat Setiawan[2], Windijarto[3]
[1,2,3]Department of Management, Business Economics Faculty, Airlangga University, Indonesia; rini.armin-2020@feb.unair.ac.id (R.A.) rahmatsetiawan@feb.unair.ac.id (R.S.) windijarto@feb.unair.ac.id (W.).

Abstract: Enterprise Risk Management (ERM) has evolved into an increasingly important strategic field as organizations enhance their capacity to systematically manage uncertainty. This study aims to map the intellectual and thematic development of ERM through cartographic and bibliometric analysis of 261 documents indexed in Scopus during the period 2014–2024. By integrating the VOSviewer and Biblioshiny tools, the methodological approach includes co-authorship analysis, co-emergence, co-citations, bibliographic coupling, and thematic trend identification. The results reveal the dominant contributions of authors such as Moloi T. and Fraser J., as well as the most prolific journals and countries, with Indonesia emerging as a major actor in the Southeast Asian region. Thematic mapping indicates a shift towards a more empirical approach, with a primary focus on risk assessment and the integration of ERM into organizational strategy. The study concludes that ERM is evolving in a more structured and collaborative direction, highlighting the need for cross-disciplinary and cross-country exploration. The practical implications of these findings provide data-driven guidance for researchers, institutions, and policymakers in aligning the ERM research and policy agenda with changing global dynamics.

Keywords: *Bibliometric analysis, Biblioshiny, Cartographic analysis, Enterprise risk management, VOSviewer.*

1. Introduction

Enterprise Risk Management (ERM) has increasingly gained traction in organizational and academic circles due to growing complexities and uncertainties in global business environments [1-3]. Enterprise Risk Management (ERM) posits that institutions should address their risks more holistically and systematically rather than managing them in isolation [4]. The need for a systematic and integrated risk approach has sparked a surge in ERM-related literature across various disciplines [4-6]. However, a structured and visual understanding of the intellectual and thematic landscape of ERM research remains limited [5, 7]

This work aims to provide insights into this underexplored area by conducting a comprehensive cartographic and statistical analysis of books, articles, and other publications to measure the impact and development of scientific research using two leading tools: VOSviewer and Biblioshiny. While VOSviewer enables mapping of co-authorship, co-occurrence, co-citation, and bibliographic coupling [8, 9], Biblioshiny complements it with analytical depth through annual publication trends, country-level production, source impact, and thematic evolution [10]. The triangulated methodology allows us to chart not only structural relationships among authors and topics but also thematic development over time and geographic distribution of ERM research [11].

This research intends to explore some questions:

1. Who are the most prolific and collaborative authors in ERM research?
2. What are the most influential themes, journals, and concepts in ERM literature?
3. Which countries are leading in ERM scientific production?

History: Received: 7 August 2025; Revised: 2 October 2025; Accepted: 6 October 2025; Published: 24 October 2025
* Correspondence: rini.armin-2020@feb.unair.ac.id

4. How are research documents structurally and thematically connected over time?

By answering these questions, this study contributes a comprehensive overview of ERM scholarship from 2014 to 2024 and provides a valuable resource for both academics and practitioners in identifying trends, gaps, and opportunities within the field.

2. Literature Review

The literature on corporate risk management (ERM) has been extensively analyzed through various bibliometric studies, providing a comprehensive understanding of developments, trends, and emerging themes in the field.

2.1. Key Findings

Geographic Distribution: The US, UK, and China are the foremost contributors to ERM research [12]. This trend is consistent across various studies, which show a strong focus on ERM in these regions.

Research Themes: Key themes in ERM research include scope, decision-making, derivatives, project management, reputational risk, fraud risk, and exchange risk [12]. These themes reflect the ever-evolving focus of the ERM literature to address specific market needs and risks.

Publication Trends: We've observed a substantial growth in ERM publications since the 1990s, with significant contributions from the academic and business sectors [10, 13]. However, in the past several years, there has been a decline in the quantity of scholarly articles, which may indicate a shift to more specialized and diverse topics within ERM [13].

Collaborative networks: Research collaborations were mostly observed between two authors, with the United States demonstrating a dynamic collaborative network. This highlights the importance of partnerships in advancing ERM research.

Methodological Approach: Bibliometric analysis often uses tools such as VOSviewer and Bibliometrix's R package to visualize data and identify trends [14]. These tools assist in mapping the intellectual structure and performance of ERM research.

Emerging trends: Recent studies emphasize bringing together advanced digital technologies, with machine learning being a prime example and AI in financial risk management, reflecting the shift from traditional methods to more sophisticated analytical techniques [14]. In addition, there is an increased interest in sustainability and environmental considerations within the framework of ERM [15].

2.2. Research Gap and Future Directions

Interdisciplinary research: More interdisciplinary research that integrates ERM with other areas such as corporate governance, sustainability, and technology is needed [16]. This can take a broader view of risk management.

Focus on Developing Countries: Although most ERM research is focused on developed countries, there is a significant amount of research that concentrates on developing countries. This shift highlights the global relevance of ERM and the necessity for context-specific studies.

Advanced Data Analysis: Future research should explore the use of advanced data analytics and AI to improve ERM practices. This includes developing predictive models and integrating environmental factors into risk assessments.

3. Methodology

To provide a systematic overview of the research landscape on Enterprise Risk Management (ERM), the current study employed a bibliometric analysis approach powered by data retrieved from the Scopus database. Bibliometric methods offer a quantitative means of evaluating the intellectual structure of a scientific field by analyzing patterns in authorship, citation, and terminology [17]. The procedure involved four key stages: data retrieval, data cleaning, network construction, and visualization.

Edelweiss Applied Science and Technology
ISSN: 2576-8484
Vol. 9, No. 10: 1541-1551, 2025
DOI: 10.55214/2576-8484.v9i10.10696

3.1. Data Collection

A comprehensive search was conducted on the Scopus database using the keyword phrase "enterprise risk management" in the title, abstract, and keywords fields. The inclusion criteria were as follows:

- Time frame: 2014–2024
- Type of publication: including various forms of scholarly literature
- Language: English
- Subject areas: All subject areas relevant to ERM

A total of 261 documents met the inclusion criteria and were exported in CSV and RIS formats, including full bibliographic details (authors, titles, sources, keywords, and references).

3.2. Data Processing and Cleaning

The data underwent a cleaning process that involved standardizing author names, merging synonymous keywords, and removing generic or irrelevant terms. This ensured consistency and improved the accuracy of the bibliometric mapping.

3.3. Tools and Techniques

This study employed a dual-tool bibliometric approach using both VOSviewer and Biblioshiny (part of the Bibliometric R package). The combination of these tools enabled both structural and thematic analyses.

- VOSviewer was used to visualize:
- Co-authorship networks
- Keyword co-occurrence
- Co-citation patterns
- Bibliographic coupling
- Biblioshiny provided complementary insights through:
- Annual scientific production trends
- Most relevant sources and authors
- Country-level scientific output
- Thematic maps and trend topic analysis

Each technique helped uncover specific dimensions of the ERM research landscape, enabling a more holistic and triangulated understanding.

- Co-authorship Analysis to identify collaboration networks among authors
- Co-occurring Keyword Analysis to uncover the primary research fronts' thematic concentrations
- Analysis of co-cited documents to reveal the scholarly linkages between cited references
- Bibliographic Coupling to reveal document-level relationships based on shared references

Data cleaning included unifying author name variants and removing irrelevant terms.

4. Results and Discussion

4.1. Co-Authorship Analysis

The co-authorship network shows a fragmented structure with several distinct clusters [18]. Fragmentation can affect knowledge dissemination and collaboration dynamics. For example, in rheumatology, despite increased collaboration, the network remains fragmented with many components disconnected, indicating a persistent pattern of local collaboration [19]. Figure 1 shows Moloi T. and Fraser J. emerging as central figures, often collaborating within limited networks. The results suggest limited cross-institutional collaboration, highlighting the opportunity for enhanced global cooperation in ERM research.

Edelweiss Applied Science and Technology
ISSN: 2576-8484
Vol. 9, No. 10: 1541-1551, 2025
DOI: 10.55214/2576-8484.v9i10.10696

Figure 1.
Co-Authorship Analysis.

4.2. Keyword Co-occurrence Analysis

The co-occurrence map in Figure 2 reveals three major thematic clusters: (1) Strategic risk and decision-making, (2) Financial performance and internal controls, and (3) Risk assessment and modeling tools such as Monte Carlo simulation. Emerging topics include supply chain risk and sector-specific ERM practices, suggesting growing diversification of the field. The integration of new technologies into SCRM is a significant trend. These technologies help identify, assess, and mitigate risks more effectively [20].

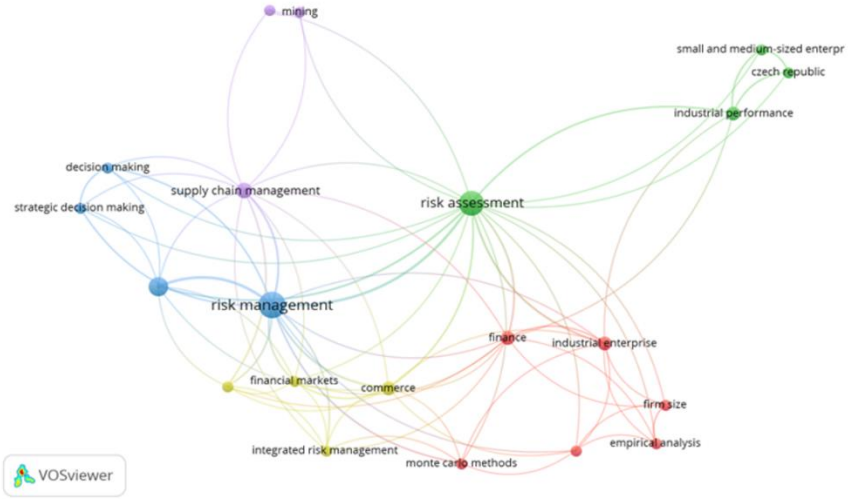

Figure 2.
Co-Occurrence Analysis by Keyword.

4.3. Co-citation Analysis

The co-citation network uncovers influential authors and seminal works that shape ERM theory. Figure 3 shows that notably cited are Fraser, Simkins, and Moloi, whose works lay the foundation for

Edelweiss Applied Science and Technology
ISSN: 2576-8484
Vol. 9, No. 10: 1541-1551, 2025
DOI: 10.55214/2576-8484.v9i10.10696

risk integration, corporate governance, and strategic risk management. The density of citation links reveals tight intellectual cohesion among core works.

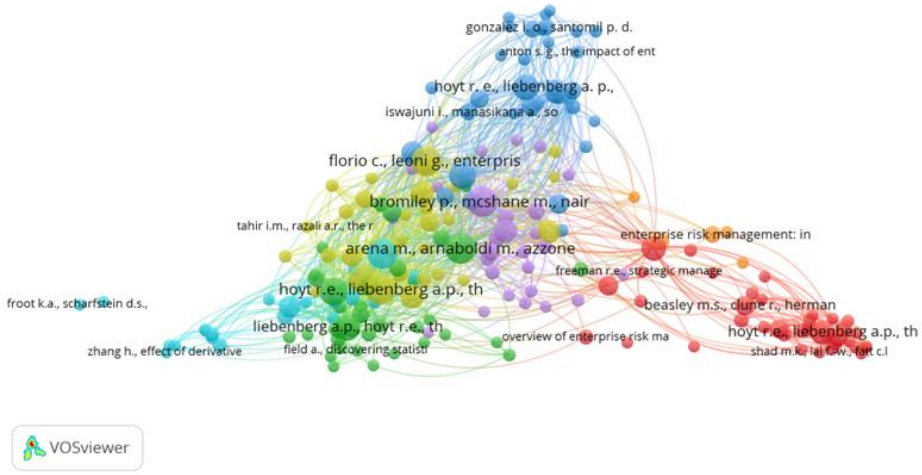

Figure 3.
Co-Citation Analysis.

4.4. Bibliographic Coupling

Bibliographic coupling in Figure 4 highlights relationships among documents that share similar reference profiles. This analysis reveals methodological convergence around ERM implementation frameworks, organizational decision support systems, and sectoral case studies. The results indicate a growing body of interlinked studies anchoring ERM in applied and empirical settings.

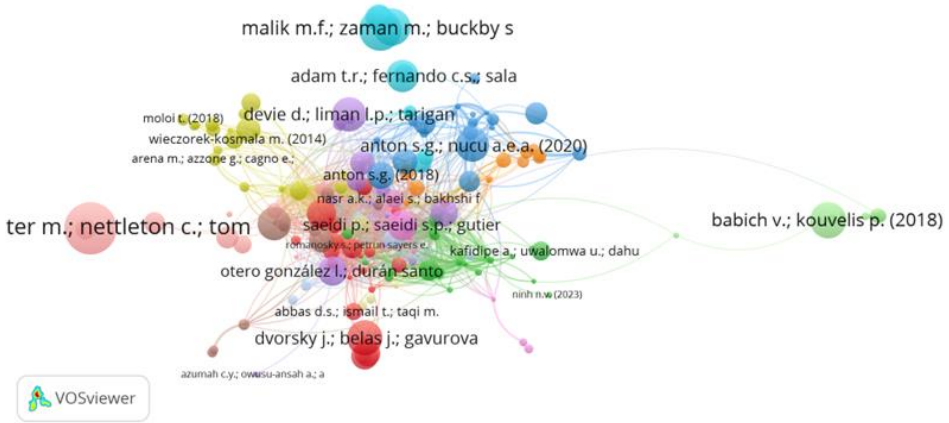

Figure 4.
Bibliographic Coupling.

4.5. Additional Insights from Biblioshiny Analysis

4.5.1. Annual Scientific Production

The annual scientific production on Enterprise Risk Management (ERM) from 2014 to 2024, as

Edelweiss Applied Science and Technology
ISSN: 2576-8484
Vol. 9, No. 10: 1541-1551, 2025
DOI: 10.55214/2576-8484.v9i10.10696

shown in Figure 5, indicates a clear upward trend, reflecting increasing scholarly interest in this field. In 2014, only 6 publications were recorded, but this number grew steadily, reaching a peak in recent years. Notably, there was a sharp increase in 2018, with 21 articles, followed by consistent growth in subsequent years. This pattern suggests that ERM has gained momentum as both an academic and practical priority, likely driven by global economic uncertainty, regulatory changes, and organizational demand for integrated risk frameworks.

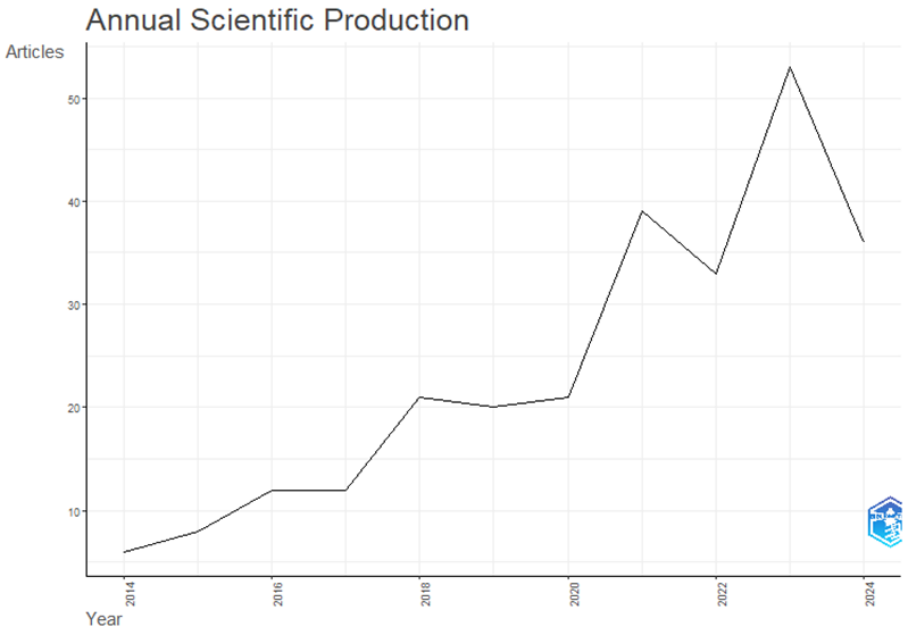

Figure 5.
Annual Scientific Production.

4.5.2. Most Relevant Sources

Figure 6 shows the most prolific journals publishing on ERM between 2014 and 2024, including:

- Journal of Risk and Financial Management (20 articles)
- Risks (11 articles)
- Cogent Business and Management (8 articles)
- Investment Management and Financial Innovations (7 articles)
- Cogent Economics and Finance (5 articles)

These journals highlight the strong interest in risk governance and financial integration, with open-access platforms playing a key role in disseminating ERM scholarship. Open scholarship reshapes research policy and behavior, offering significant opportunities for adaptation [21]

Edelweiss Applied Science and Technology
ISSN: 2576-8484
Vol. 9, No. 10: 1541-1551, 2025
DOI: 10.55214/2576-8484.v9i10.10696

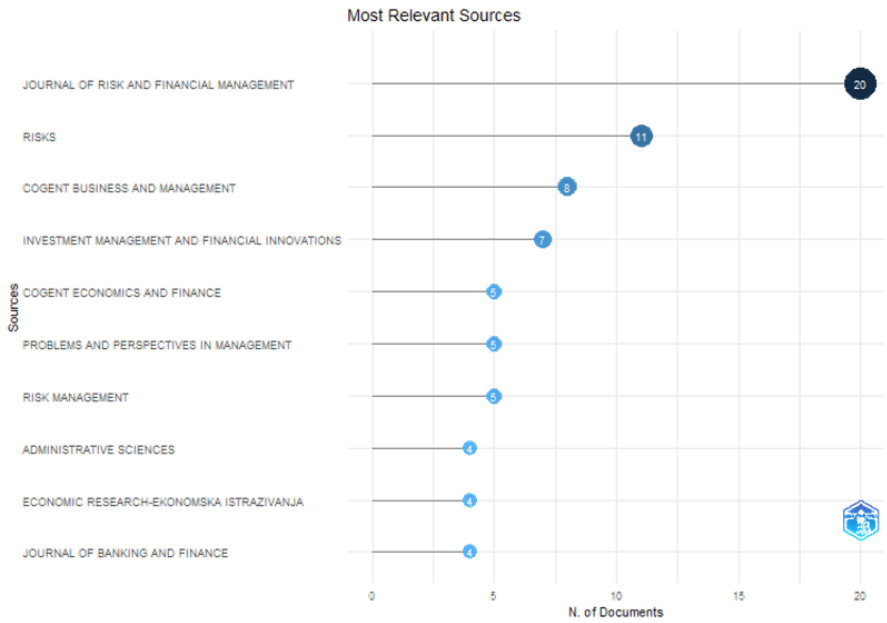

Figure 6.
Most Relevant Sources.

4.5.3. Scientific Output by Country

The country-level scientific production in Table 1 reveals Indonesia as the most active contributor to ERM research (102 articles), followed by the USA (57), Malaysia (48), the UK (48), and Ukraine (42). This highlights Southeast Asia's increasing visibility in ERM research, with Indonesia and Malaysia driving regional developments. The comparative study highlights that the determinants influencing the adoption of ERM in Southeast Asia are similar to those influencing the operationalization of ERM in developed countries such as the US and Europe. This shows that there is global alignment in ERM practices despite regional differences [22].

Table 1.
Top Ten of Scientific Output by Country.

Region	Freq
INDONESIA	102
USA	57
MALAYSIA	48
UK	48
UKRAINE	42
CANADA	34
CHINA	31
SPAIN	27
NIGERIA	26
SLOVAKIA	26

Edelweiss Applied Science and Technology
ISSN: 2576-8484
Vol. 9, No. 10: 1541-1551, 2025
DOI: 10.55214/2576-8484.v9i10.10696

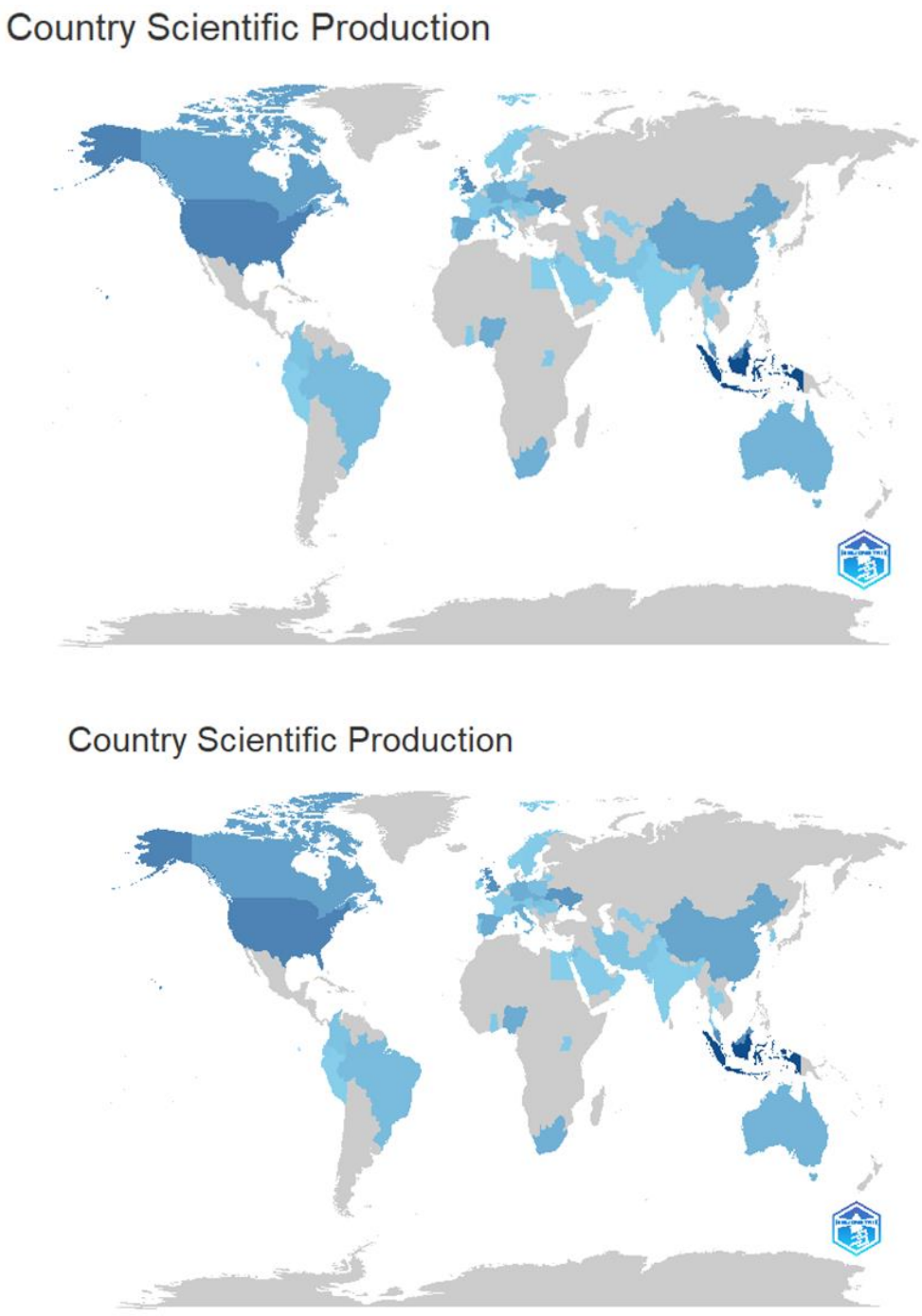

Figure 7.
Scientific Output by Country.

4.5.4. Thematic Evolution and Emerging Topics

Trend topic analysis reveals 'risk management' as a consistent theme, peaking around 2018–2021. 'Enterprise risk management' became prominent from 2018–2022, while 'risk assessment' gained attention between 2020–2023, indicating a shift towards more assessment-based and empirical studies in

Edelweiss Applied Science and Technology
ISSN: 2576-8484
Vol. 9, No. 10: 1541-1551, 2025
DOI: 10.55214/2576-8484.v9i10.10696

ERM.

Table 2.
Trend Topics.

Cluster	Call on Centrality	Call on Density	Rank Centrality	Rank Density	Cluster Frequency
Risk management	2.48535354	76.469697	6	5	45
Decision making	0	75	2	3	4
Industrial enterprise	0.86111111	50	5	1	5
Industrial performance	0	83.3333333	2	6	7
Empirical analysis	0.5	75	4	3	4
Mining	0	75	2	3	4

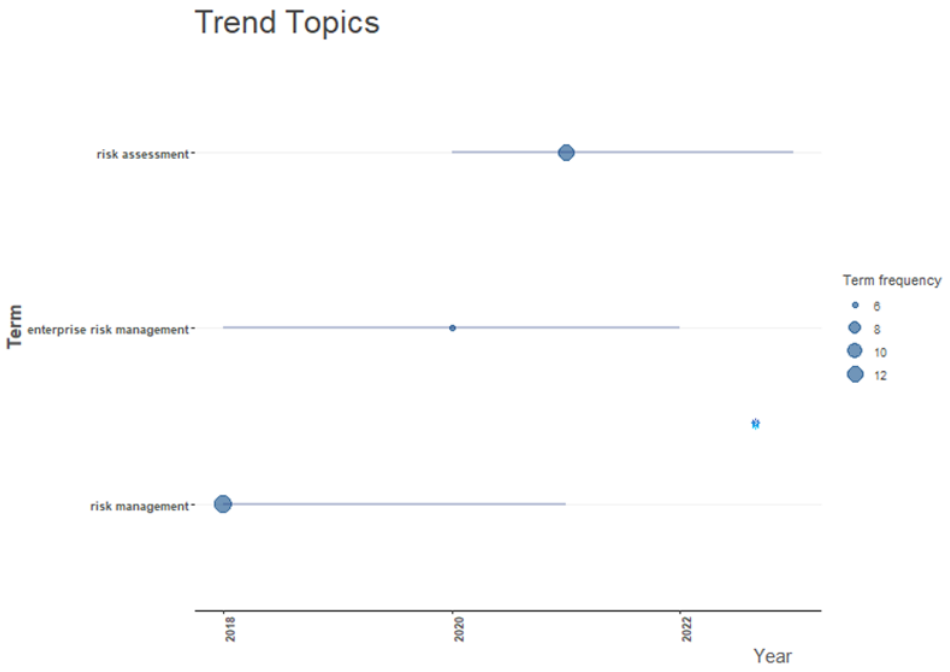

Figure 8.
Thematic Evolution and Emerging Topics.

5. Conclusion

This study conducted a comprehensive cartographic and bibliometric analysis of 261 documents on Enterprise Risk Management (ERM) published between 2014 and 2024 using Scopus data. Through the integration of VOSviewer and Biblioshiny tools, the research uncovers key authors, themes, journals, and country contributions that define the ERM knowledge structure. The findings indicate a field that is theoretically grounded, thematically expanding, and increasingly empirical. With Indonesia emerging as a leading contributor, and with evolving focus areas like risk assessment and strategic integration, this study offers both a roadmap for researchers and practical signals for institutions to align with global ERM trends. The triangulated methodology provides a solid base for future explorations across regions, sectors, and technologies.

The implications of this study include:

- Theoretical Contributions: Key publications form the foundation for developing integrated risk management models, enriched by thematic mapping from Biblioshiny, which confirms the structural coherence of the field.
- Research Agenda: Emerging topics such as digital risk, sectoral ERM practices, and the shift

toward empirical approaches (e.g., risk assessment) offer promising directions for future inquiries.

- Geographical Expansion: Country-level analysis reveals significant contributions from Indonesia and other Southeast Asian countries, highlighting regional leadership and the need for comparative cross-country studies.
- Collaboration Potential: Fragmented author networks, despite the presence of prolific authors, suggest opportunities to build stronger international and interdisciplinary research collaborations.
- Practical Relevance: ERM intersects with financial, operational, and regulatory strategies, making it essential for practitioners in diverse sectors to consider recent scholarly insights.

This study presents a comprehensive cartographic and bibliometric analysis of 261 publications on Enterprise Risk Management (ERM) over the past decade, which uncovers the theoretical foundations, thematic evolutions, and increasingly empirical trends in the development of this field. The findings show the emergence of Indonesia's leadership in ERM research and an increased focus on topics such as risk assessment and strategic integration.

Based on these results, several strategic directions can be recommended. First, future research needs to develop an integrated ERM model that takes into account local contexts and multi-theoretical approaches, particularly in developing countries. Potential topics include digital risks, sectoral ERM practices, and the integration of ERM with sustainability and ESG agendas. Second, the fragmentation of the authors' network indicates the need to strengthen international and cross-disciplinary research collaboration to increase scientific impact. Third, practitioners are advised to implement evidence-based ERM frameworks that align with organizational strategies and utilize data-driven risk monitoring tools. Finally, policymakers in the Southeast Asia region are expected to encourage standardization of ERM practices, cross-border comparative research, and capacity building through funding and professional certification.

Transparency:

The authors confirm that the manuscript is an honest, accurate, and transparent account of the study; that no vital features of the study have been omitted; and that any discrepancies from the study as planned have been explained. This study followed all ethical practices during writing.

Acknowledgments:

The author conveys his appreciation to the organization and collaborators who supported this study and to the Scopus database for providing comprehensive bibliographic data.

References

[1] E. Pecina, D. Miloš Sprčić, and I. Dvorski Lacković, "Qualitative analysis of enterprise risk management systems in the largest European electric power companies," *Energies*, vol. 15, no. 15, p. 5328, 2022. https://doi.org/10.3390/en15155328

[2] P. G. Aquino Jr, R. C. Jalagat Jr, M. Mubeen, W. Mehmood, and B. Zehra, "Enterprise risk management: An important process for feasible profit and growth," *Contaduría y administración*, vol. 67, no. 2, pp. 118–141, 2022. https://doi.org/10.22201/fca.24488410e.2022.3068

[3] V. K. Shrivastava, J. Balasubramanian, A. Katyal, A. Yadav, and S. Yogananthan, "Understanding the significance of risk management in enterprise management dynamics," *Multidisciplinary Reviews*, vol. 6, p. e2023ss093, 2023. https://10.31893/multirev.2023ss093

[4] P. Bromiley, M. McShane, A. Nair, and E. Rustambekov, "Enterprise risk management: Review, critique, and research directions," *Long Range Planning*, vol. 48, no. 4, pp. 265-276, 2015. https://doi.org/10.1016/j.lrp.2014.07.005

[5] H. E. Oydag and O. Senvar, *General overview to enterprise risk management with its key components and determinants from the management perspectives. In S. Grima, E. Boztepe, & P. Romanova (Eds.), Social, Economic, and Environmental Impacts Between Sustainable Financial Systems and Financial Markets*. Yeditepe University, Turkey: IGI Global, 2019.

[6] M. Altuntas, T. R. Berry-Stölzle, and R. E. Hoyt, "Implementation of enterprise risk management: Evidence from the German property-liability insurance industry," *The Geneva Papers on Risk and Insurance-Issues and Practice*, vol. 36, pp. 414-439, 2011. https://doi.org/10.1057/gpp.2011.11

[7] S. Kumar, P. Rao, and M. Barai, "Enterprise risk management in the insurance industry: Trends and future directions," *Journal of Risk Management in Financial Institutions*, vol. 17, no. 2, pp. 183–196, 2024.

[8] D. Chubin and E. Garfield, "Is citation analysis a legitimate evaluation tool?," *Scientometrics*, vol. 2, no. 1, pp. 91-94, 1980. https://doi.org/10.1007/bf02016602

[9] J. Kim and S. J. McMillan, "Evaluation of internet advertising research: A bibliometric analysis of citations from key sources," *Journal of Advertising*, vol. 37, no. 1, pp. 99-112, 2008. https://doi.org/10.2753/JOA0091-3367370108

[10] T. Ahmad Jaber and S. Mohammed Shah, "Enterprise risk management literature: Emerging themes and future directions," *Journal of Accounting & Organizational Change*, vol. 20, no. 1, pp. 84-111, 2023. https://doi.org/10.1108/jaoc-07-2022-0106

[11] B. Mukhtar, M. K. Shad, K. Ali, L. F. Woon, and A. Waqas, "Systematic literature review and retrospective bibliometric analysis on ESG research," *International Journal of Productivity and Performance Management*, vol. 74, no. 4, pp. 1365-1399, 2025. https://doi.org/10.1108/IJPPM-07-2023-0395

[12] J. H. Tabares, J. C. Jaramillo, M. B. Arias, and A. V. Arias, "Trends in enterprise risk management research: A bibliometric analysis," *Revista Venezolana de Gerencia*, vol. 22, no. 79, pp. 506-524, 2017.

[13] D. Erdem, E. Güvendi, M. Aslan, R. Acar, and S. Ülger, *Enterprise Risk Management: A Bibliometric Review. In A. B. İncekara (Ed.), Digital Transformation, Strategic Management, and Economic Growth*. Singapore: Springer, 2024.

[14] M. A. Chohan, T. Li, S. Ramakrishnan, and M. Sheraz, "Artificial intelligence in financial risk early warning systems: A bibliometric and thematic analysis of emerging trends and insights," *International Journal of Advanced Computer Science & Applications*, vol. 16, no. 1, 2025. https://doi.org/10.14569/ijacsa.2025.01601127

[15] S.-L. Patipan, "Modeling enterprise risk management ecosystems using text analytics," *Foundations of Management*, vol. 16, no. 1, pp. 391-406, 2024. https://doi.org/10.2478/fman-2024-0024

[16] N. M. Greapcă, *Corporate governance and risk management: A network analysis. In M. Nica & S. A. Zahra (Eds.), Contemporary Issues in Corporate Governance*. Cham: Springer, 2024.

[17] C. Martínez-Climent, A. Zorio-Grima, and D. Ribeiro-Soriano, "Financial return crowdfunding: Literature review and bibliometric analysis," *International Entrepreneurship and Management Journal*, vol. 14, pp. 527-553, 2018. https://doi.org/10.1007/s11365-018-0511-x

[18] T. Santonen and P. Ritala, "Social network analysis of the ISPIM innovation management community in 2009–2011," *International Journal of Innovation Management*, vol. 18, no. 01, p. 1450010, 2014. https://doi.org/10.1142/S1363919614500108

[19] N. Ogasawara, "Three decades of collaboration in rheumatology: a comprehensive co-authorship network analysis (1994–2023)," *Reumatologia*, vol. 63, no. 2, pp. 68-80, 2025. https://doi.org/10.5114/reum/200529

[20] A. Emrouznejad, S. Abbasi, and Ç. Sıcakyüz, "Supply chain risk management: A content analysis-based review of existing and emerging topics," *Supply Chain Analytics*, vol. 3, p. 100031, 2023. https://doi.org/10.1016/j.sca.2023.100031

[21] J. Rogers, "Open scholarship and research management," *Insights*, vol. 27, no. 3, pp. 239-243, 2014. https://doi.org/10.1629/2048-7754.170

[22] D. C. Pangestuti, A. Muktiyanto, and I. Geraldina, "Modified of ERM index for Southeast Asia," *Cogent Business & Management*, vol. 10, no. 2, p. 2199906, 2023. https://doi.org/10.1080/23311975.2023.2199906

Edelweiss Applied Science and Technology
ISSN: 2576-8484
Vol. 9, No. 10: 1541-1551, 2025
DOI: 10.55214/2576-8484.v9i10.10696