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THE ROLE OF COMMUNICATION IN ENTERPRISE RISK MANAGEMENT (ERM) – SYSTEMATIC LITERATURE REVIEW

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Purpose: The aim of this study is to identify the current state of research on the role of communication in integrated risk management, to highlight research gaps, and to suggest future research directions.
Design/methodology/approach: To achieve the research objective, the authors conducted a bibliometric review using the VOSviewer software (version 1.6.20). The study included only English-language, peer-reviewed scientific publications indexed in the Scopus database.
Findings: The study identified a research gap concerning the role of communication in enterprise risk management. It highlighted the lack of consideration of communication as an integrating mechanism within Enterprise Risk Management.
Research limitations/implications: The review of the state of knowledge on the role of communication in integrated risk management was limited to the Scopus database. Future research will aim to develop an Enterprise Risk Management model in which communication plays an integrating role within the structure of this process.
Originality/value: The study offers a new perspective, positioning communication as a key integrative mechanism in enterprise risk management.
Keywords: Risk management, enterprise risk management (ERM), risk communication, internal and external communication.
Category of the paper: Literature review.

1. Introduction

The evolution of risk management over recent decades is most evident in the shift away from viewing risk solely within the organisation towards integrating risk management with the organisation's broader strategic objectives. There has been a noticeable shift from siloed risk management to integrated risk management (ERM) (Gordon et al., 2009; Bromiley et al., 2014; Gleißner, Berger, 2024). The responsibility of directors and board members for the quality of risk management, and the growing claims by external stakeholders against them for

mismanagement of assets, have meant that risk assessment and risk communication have become crucial for managerial careers, corporate reputation and the evaluation of management performance (Alatassi, Pillai, 2024; Amiraslani et al., 2025). The role of risk communication in risk management has evolved. Not only have the quality and quantity of information changed, but so too have the parties involved in the communication. Senior management and the board have begun to communicate with shareholders to present and discuss risk management practices, whilst developing a common, organisation-wide language of risk has become a key challenge for organisations (Beretta, Bozzolan, 2004; Jiang et al., 2024; Xu et al., 2025).

Risk communication has proven to be an important tool in effective risk management (Nielson et al., 2005). Many organisations and research findings confirm the positive impact of communication on risk management within a company. COSO identifies 'Information, communication, and reporting' as one of the five components of effective Enterprise Risk Management (COSO framework) – the continuous flow of information and reporting improves risk oversight and decision-making (COSO, 2020). Authors of literature reviews indicate that risk communication supports social risk management as well as decision-making in the private sector (Goerlandt et al., 2020), and that better communication changes risk perceptions and decisions (Marynissen, Ladkin, 2012). The three-line model of risk management organisation proposed to enterprises also emphasises communication (The Institute of Internal Auditors [IIA], 2020; Łusiakowski, 2024). Companies often use digital tools for internal and external communication, which have a positive impact on the effectiveness of this process (Machnik-Słomka, Rzemek, 2025).

The quality of risk communication is also important in the area of preventing casualties resulting from disasters. Effectively communicating information about risks to the public and stakeholders is a fundamental element of disaster risk reduction. Effective risk communication, as part of early warning systems, enables effective disaster preparedness and response, mitigates their impacts, and prevents fatalities (Fakhruddin et al., 2020).

Risk communication is "the process of exchanging views on how best to assess and manage risks among academics, regulatory practitioners, interest groups, and the general public" (Powell, Leiss, 2004, p. 33). The evolution of risk communication over the years has proceeded in three phases. In phase 1, stakeholders focused on risk and its management at a high level of detail, whilst in phase 2 the emphasis was placed on the development of communication. In Phase 3, the final phase, these stakeholders recognised the importance of a responsible approach to both issues simultaneously, identifying the practice of sound risk communication as an element of good business practice (Leiss, 1996).

Powell and Leiss (Powell, Leiss, 2004) identified the existence of a 'risk information vacuum', i.e. a gap in the understanding of risk communication between its senders and its recipients (Powell, Leiss, 2004, p. IX). Effective risk communication can be used to fill this vacuum, translating the often complex language of experts into comprehensible content for an increasingly broad group of recipients – external stakeholders (Nielson et al., 2005).

According to M.N. Ndlela, risk communication will only be effective and credible if the person communicating the risk understands the stakeholders and the way in which they understand risk, whilst the stakeholders engage in communication at every stage of the risk management process, making it a two-way communication (Ndlela, 2018).

The aim of this article is to identify the current state of knowledge regarding the role of communication in integrated risk management, research gaps, and future research directions. The authors posed the following research questions:

- How has the trend in academic publications on the role of communication in risk management developed?
- Which authors, publications and journals have had the greatest influence on the development of research in this area?
- What are the main thematic trends (areas of research) that dominate the literature on communication in risk management?
- How has the role of communication evolved in risk management research?

What research gaps and future research directions can be identified in the area concerning the role of communication in risk management?

2. Methodology

Systematic literature reviews are part of a growing interest in rigorous reviews, which has been observed in many social science disciplines in recent decades (Bem, 1995). A similar trend can be observed in business disciplines, where leading journals encourage the conduct of systematic reviews and provide guidelines in this regard within their respective fields, for example in marketing (Hulland, Houston, 2020). To achieve their objective, the authors utilised a bibliometric review, which is a type of domain-based review, itself a variant of a systematic literature review (SLR) (Paul, Criado, 2020). Assuming that only peer-reviewed scientific publications would be included in the study, the authors selected the Scopus scientific database. In line with the suggestion by Zupic and Čater (2015), the authors searched titles, abstracts and keywords. Following the guidelines set out by Munim et al. (Munim et al., 2020), included only journal articles in the analysis, thereby excluding books, book chapters, reviews, conference proceedings, conference papers and short surveys. The search was conducted across the entire available timeframe, i.e. from 1988 to the date of the search (February 2026). The Boolean operators OR and AND were used during the search. The initial search identified 315 publications, and after narrowing the scope to articles in English, 187 publications remained. The query strings used in the database are presented in Table 1.

Table 1.
Steps and criteria for searching for publications in the Scopus database

Step	Keywords (query string)	Number of publications
1. Keyword search without limitations	(TITLE-ABS-KEY("enterprise risk management" OR "ERM" OR "corporate risk management" OR "integrated risk management")) AND (TITLE-ABS-KEY("communication" OR "risk communication" OR "information exchange" OR "organizational communication" OR "managerial communication" OR "stakeholder communication" OR "internal communication" OR "external communication"))	315
2. Limited to document type	(TITLE-ABS-KEY ("enterprise risk management" OR "ERM" OR "corporate risk management" OR "integrated risk management")) AND (TITLE-ABS-KEY ("communication" OR "risk communication" OR "information exchange" OR "organizational communication" OR "managerial communication" OR "stakeholder communication" OR "internal communication" OR "external communication")) AND (LIMIT-TO (DOCTYPE , "ar"))	193
3. Limited to document type and language	(TITLE-ABS-KEY ("enterprise risk management" OR "ERM" OR "corporate risk management" OR "integrated risk management")) AND (TITLE-ABS-KEY ("communication" OR "risk communication" OR "information exchange" OR "organizational communication" OR "managerial communication" OR "stakeholder communication" OR "internal communication" OR "external communication")) AND (LIMIT-TO (DOCTYPE , "ar")) AND (LIMIT-TO (LANGUAGE , "English"))	187

Source: own study based on Scopus.

In the next stage of the study, the authors carried out an abstract screening (Figure 1). At this stage, 114 publications unrelated to the study topic were excluded. A total of 73 publications were ultimately included in the main study. The authors included the acronym ERM in the query string to mitigate the risk of omitting pivotal documents. Literature shows that authors frequently use solely the acronym ERM in titles, keywords, and abstracts, rather than the full term Enterprise Risk Management. Excluding this acronym from the search string could result in the automatic rejection by the Scopus database of relevant, highly cited works where the full text was not explicitly stated. Since the acronym ERM is widely utilised across numerous academic disciplines, the initial search results in Scopus exhibited a high level of information noise. To ensure the theoretical purity of the sample and the precision of the results, publications where the abbreviation ERM referred to concepts other than Enterprise Risk Management were excluded from the analysis. These included medical and biological terms (e.g. Epiretinal Membrane, Epithelial Rests of Malassez, ERM proteins, Erythromycin Resistance Gene), mathematical and computer science models (e.g. Empirical Risk Minimization, Entity Relationship Model, Enterprise Rights Management), and engineering or environmental monitoring frameworks (e.g. Exploding Reflector Model, Environmental Radiation Monitoring). The rejected publications presented the results of studies focusing, amongst other things, on: The Effective Regions of Movement (ERM), The Efficient Residual Mixing (ERM) Block, The Electronic Records Management (ERM), The Emotion-in-Relationships Model (ERM), The Empirical Risk Minimization (ERM), The Employee Relationship Management (ERM), The Enhanced CT Radiomics Model (ERM), The Enterprise Rights Management (ERM), The Entity Relationship Model (ERM), The Entropic Risk

Measure (ERM), The Environment Reconstruction Methodology (ERM), The Environmental Radiation Monitoring (ERM), The Environmental Resources Management (ERM), The Epiretinal Membrane (ERM), The Epithelial rests of Malassez (ERM), The ERM proteins (Ezrin/Radixin/Moesin - ERM), The Erythromycin Resistance (ERM) Gene, The Exploding Reflector Model (ERM), The Exposure Reference Map (ERM), The Extreme Rain Multiplier (ERM), The Multiview Ensemble Learning (ERM-ME), The Recurrent Epiretinal Membranes (ERMs), The Relative Motion (ERM) Model, The Resource Management (ERM) Scheme, The Retinal Glial Cells ERM, The Slice Selection and Edge Resource Management (JSS-ERM), The Synapse Emergency Room Mobile (Synapse ERm).

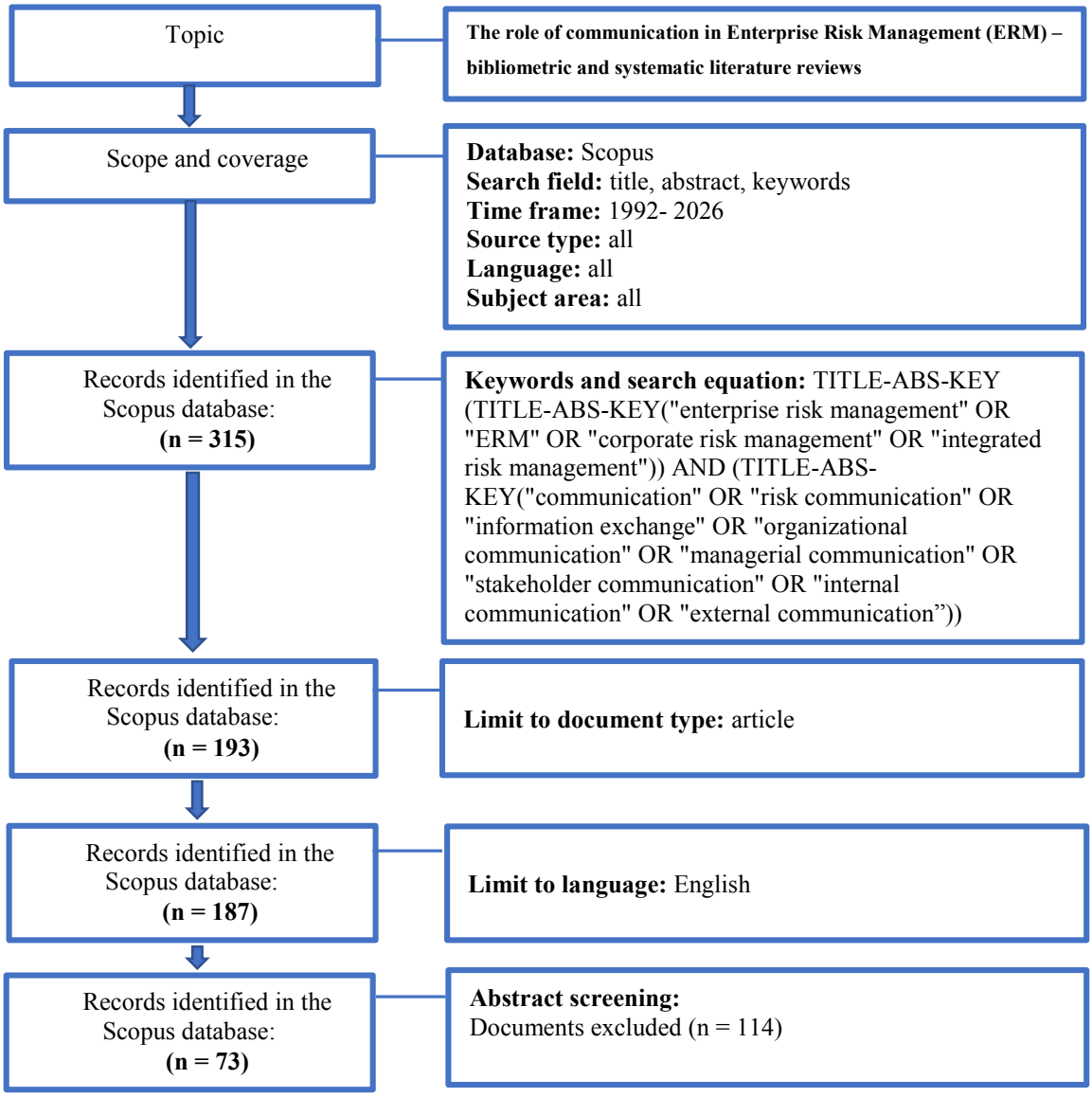

Figure 1. Steps and criteria for searching for publications in the Scopus database.

Source: own study based on Scopus.

In the next step, the authors carried out a bibliometric analysis using the VOSviewer software (version 1.6.20). Bibliographic data on the 73 articles under study were obtained from the Scopus database in CSV format. The authors applied the method of co-occurrence analysis of author keywords to identify thematic structures within the field. The authors applied a minimum occurrence threshold of 3, resulting in 33 keywords meeting the inclusion criteria. These words were grouped into 4 clusters, total link strength = 364 (Table 4). The full counting method was used. Network visualisation enabled the identification of thematic links indicating 4 thematic clusters reflecting the main research trends in the analysed area, whilst overlay visualisation allowed for the examination of temporal trends based on the average year of publication. To improve data quality, the authors used a thesaurus file to merge synonymous terms (humans, human) and remove non-substantive keywords (article, priority journal).

3. Results

First, the authors carried out a time-series analysis of the identified articles. The 73 articles included in the study were published between 1992 and 2026 (Figure 2).

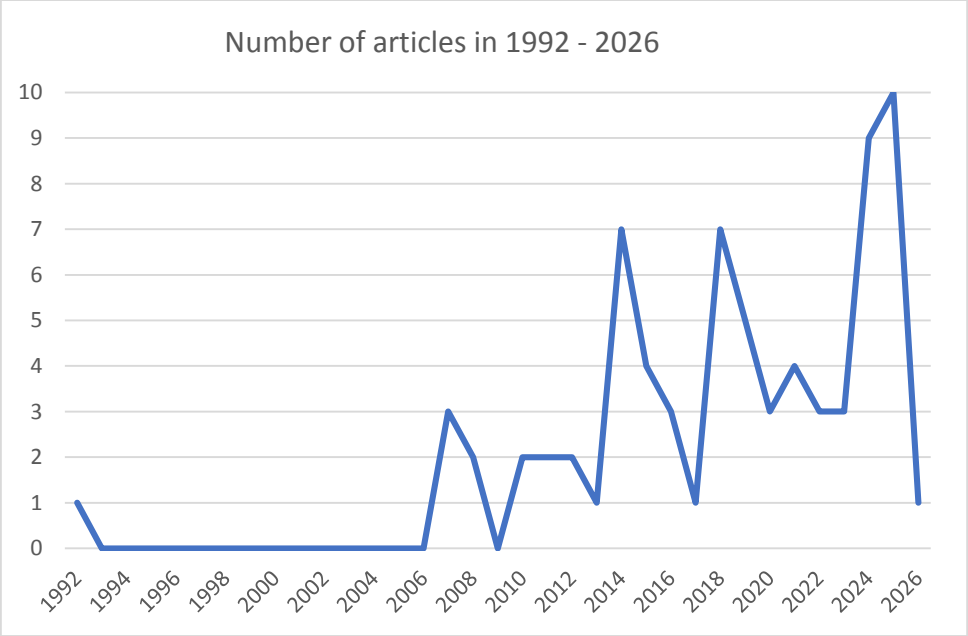

Figure 2. Number of articles in 1992-2026.

Source: own study based on Scopus.

The first article appeared in 1992 and was authored by Hawkins, H., Jayjock, M.A., and Lynch, J., entitled 'A rationale and framework for establishing the quality of human exposure assessments', published in the American Industrial Hygiene Association Journal (53(1), pp. 34-41). This article was included by the authors in the research procedure because the occupational exposure assessment presented therein provides input data for the evaluation

of potential human health risks. This stage forms an integral part of the comprehensive risk assessment, the results of which – as the authors of that paper emphasise – determine the decision-making processes of government agencies and corporations within the field of risk management (Hawkins, Jayjock, Lynch, 1992). However, over the following 14 years (1993-2006), not a single article was published. It was only in later years that the number of publications on this topic increased, reaching a peak of 10 articles in 2025.

Articles on the role of communication in risk management that are also indexed in Scopus have been published in a total of 64 academic journals. Table 2 presents a list of journals in the Scopus database containing the highest number of publications on the subject under study between 1992 and 2026.

Table 2.
List of scientific journals containing the highest number of publications on the subject under study in the SCOPUS database between 1992 and 2026

Title of journal	**Database: SCOPUS**		
	Number of publications on the subject under study in the database (a)	**Total number of articles published in the journal (b)**	**Proportion of publications (a) in the total number of articles (b)**
Reliability Engineering and System Safety	3	9 740	0,03%
Administrative Sciences	2	1 849	0,11%
Environmental Science and Policy	2	4 145	0,05%
Journal of Construction Engineering and Management	2	5 153	0,04%
Natural Hazards	2	9 538	0,02%

Source: own study based on Scopus.

The remaining 59 scientific journals each contained one article on the subject under study. An analysis of the Scopus database metadata also made it possible to identify the predominant research areas represented by the articles under study (Figure 3).

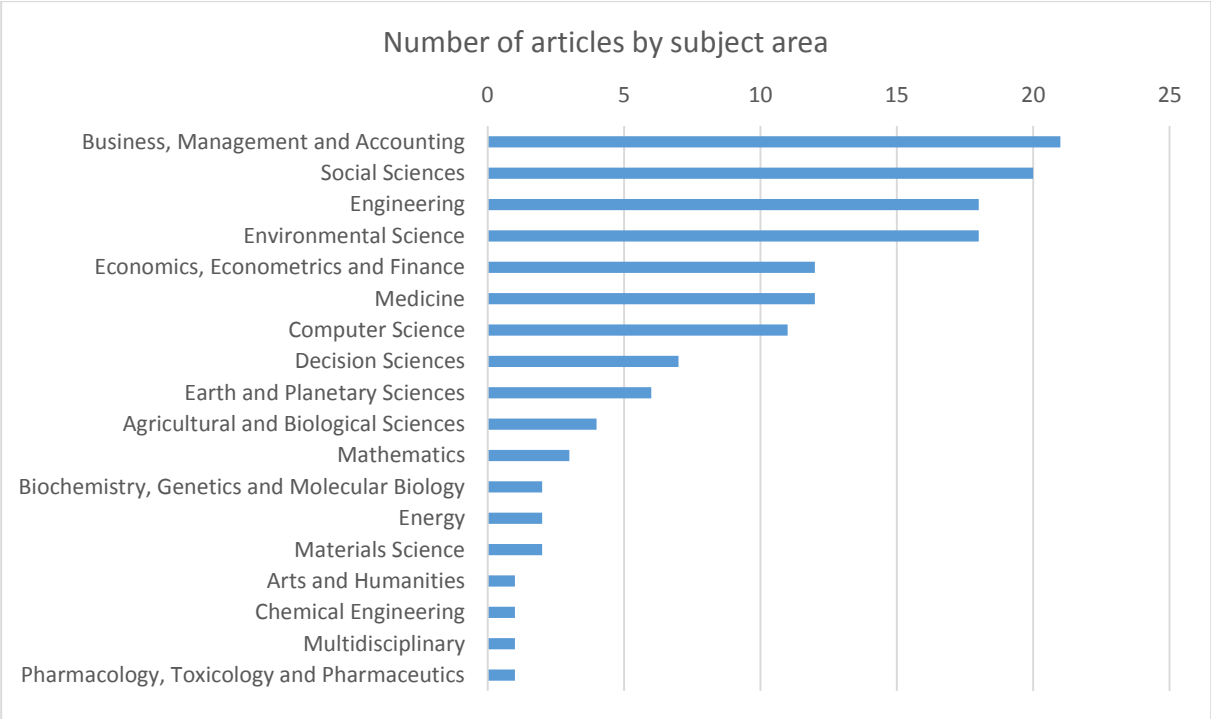

Figure 3. Number of articles by subject area.

Source: own study based on Scopus.

The largest number of articles (21) were assigned to the Business, Management and Accounting subject area. The next highest numbers were assigned to the following subject areas: Social Sciences (20), Engineering (18), Environmental Science (18), Economics, Econometrics and Finance (12), Medicine (12) and Computer Science (11).

In the next step, taking into account the mechanisms of aggregating bibliographic descriptions of articles, the authors carried out a geographical analysis of the publication output, identifying the most prolific authors (Figure 4), their countries of origin (Figure 5) and research centres (Figure 6).

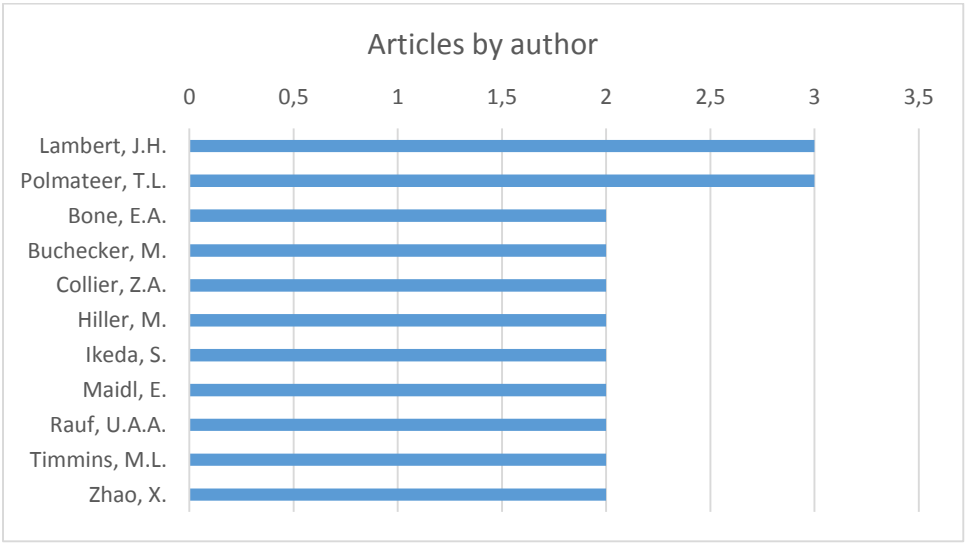

Figure 4. Articles by author.

Source: own study based on Scopus.

The articles on the subject under study (73) were written by a total of 161 authors. James H. Lambert of the University of Virginia, Charlottesville, United States, and Thomas L. Polmateer of Charlottesville, United States, were the most prolific authors, having co-authored three articles on the subject under study (Figure 4).

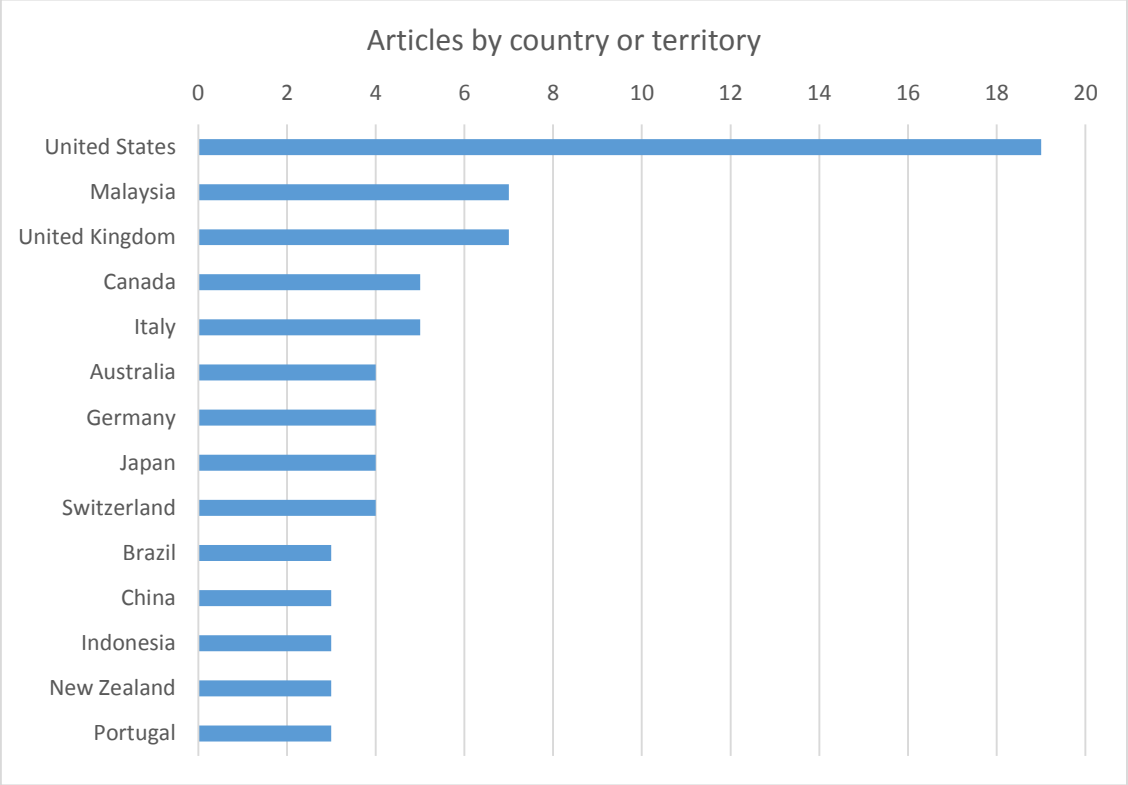

Figure 5. Articles by country or territory.

Source: own study based on Scopus.

The largest number of authors came from the United States (19), Malaysia (7), the United Kingdom (7), Canada (5) and Italy (5) (Figure 5). The remaining authors of the publications under review represented 21 countries.

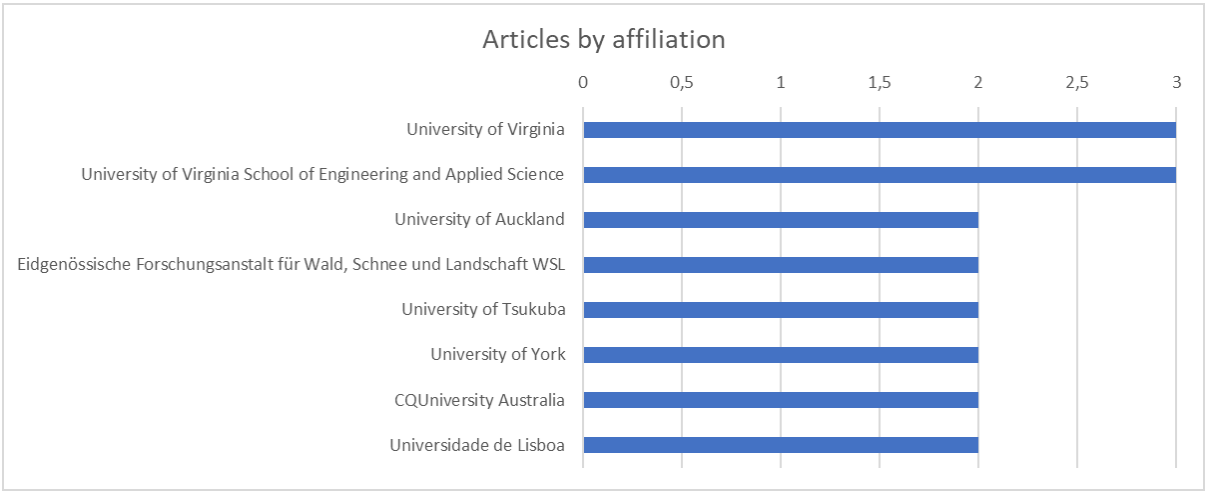

Figure 6. Articles by affiliation.

Source: own study based on Scopus.

The largest number of authors came from the University of Virginia (3), the University of Virginia School of Engineering and Applied Science (3), the University of Auckland (2), the Swiss Federal Institute for Forest, Snow and Landscape Research (WSL) (2), the University of Tsukuba (2), the University of York (2), CQUniversity Australia (2) and the University of Lisbon (2). The remaining authors represented 142 research institutions (Figure 6).

In the next stage of the research, the authors identified the most frequently cited publications on the subject under study (Table 3).

Table 3.
List of the five most frequently cited publications and their authors

Authors' names	Title of publication	Year	Name of the journal	Number of citations	H-index
Schelfaut K., Pannemans B., van der Craats I., Krywkow J., Mysiak J., Cools J.	Bringing flood resilience into practice: The FREEMAN project	2011	Environmental Science and Policy	145	160
Erdem, S., Rigby, D., Wossink, A.	Using best-worst scaling to explore perceptions of relative responsibility for ensuring food safety	2012	Food Policy	74	145
Arena, M., Arnaboldi, M., Palermo, T.	The dynamics of (dis)integrated risk management: A comparative field study	2017	Accounting Organizations and Society	70	164
Zhao, X., Hwang, B.-G., Low, S.P.	Investigating enterprise risk management maturity in construction firms	2014	Journal of Construction Engineering and Management	57	147
Zhao, X., Singhaputtangkul, N.	Effects of firm characteristics on enterprise risk management: Case study of Chinese construction firms operating in Singapore	2016	Journal of Management in Engineering	55	106

Source: own study based on Scopus.

The most frequently cited article (145 citations) is the paper by K. Schelfaut, B. Pannemans, I. van der Craats, J. Krywkow, J. Mysiak and J. Cools, entitled 'Bringing flood resilience into practice: The FREEMAN project', which was published in 2011 in the journal "Environmental Science and Policy", 14(7), pp. 825-833. Next in line are the frequently cited articles by S. Erdem, D. Rigby, A. Wossink, 'Using best-worst scaling to explore perceptions of relative responsibility for ensuring food safety' (2012) Food Policy, 37(6), pp. 661-670 (cited 74 times) and M. Arena, M. Arnaboldi, T. Palermo, The dynamics of (dis)integrated risk management: A comparative field study, (2017) Accounting, Organizations and Society, 62, pp. 65-81 (cited 70 times).

An analysis of the keyword co-occurrence map conducted using VOSviewer (Figure 7) identified four thematic clusters reflecting the main research trends in the analysed field (Table 4).

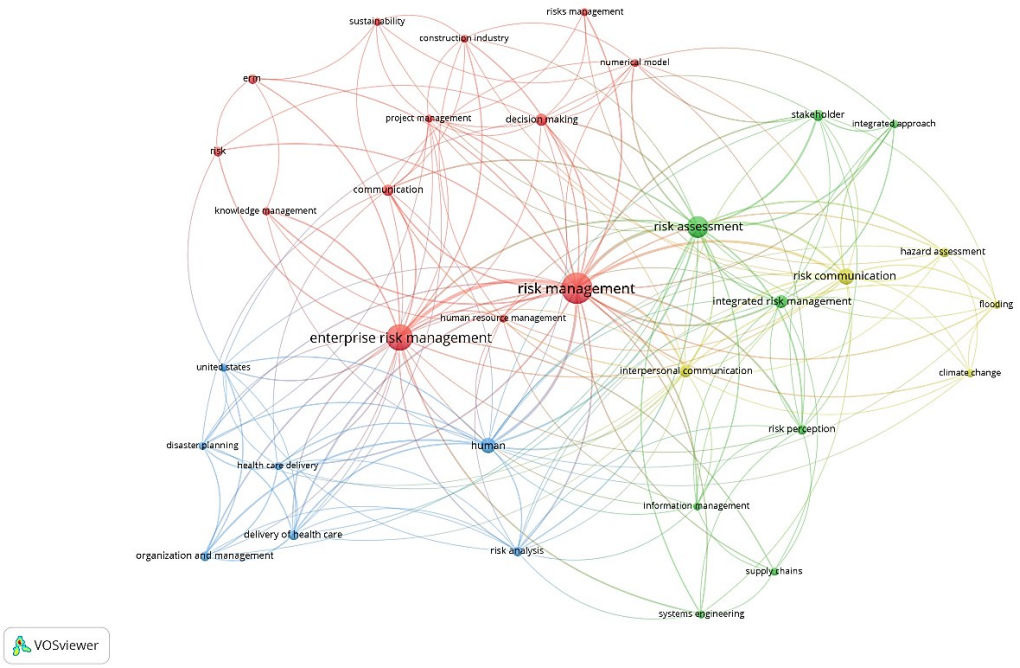

Figure 7. Co-occurrence - network visualization.

Source: own study.

In accordance with standard bibliometric interpretation practices, cluster labels were assigned on the basis of the dominant keywords in each group and their semantic relationships. The strong links between clusters suggest that research into risk management is interdisciplinary in nature.

Table 4.
Clusters and keywords

Cluster	Keywords
Cluster 1 (red) Internal communication in decision-making processes and ERM	communication construction industry decision making enterprise risk management (ERM) human resource management knowledge management numerical model project management risk risk management (risks management) sustainability
Cluster 2 (green) Information management and communication with stakeholders	information management integrated approach integrated risk management risk assessment risk perception stakeholder supply chains systems engineering

Cont. table 4.

Cluster 3 (blue) Communication in crisis management and healthcare	delivery of health care disaster planning health care delivery human organization and management risk analysis United States
Cluster 4 (yellow) Public communication on climate and environmental risks	climate change flooding hazard assessment interpersonal communication risk communication

Source: own study.

It should be emphasised that the interpretation of the identified clusters required the authors to exercise caution due to the presence of very broad concepts such as 'human', 'United States', 'construction industry' and 'sustainable development'.

Cluster 1 (red) *Internal organisational communication in decision-making processes and ERM* is the dominant cluster, forming the core thematic focus of the research. The dominant keywords are: risk management, enterprise risk management, decision-making, project management, communication and sustainable development. The cluster's subject matter relates to the dominant research trend focusing on the integration of risk management with organisational processes and with strategic decision-making under conditions of uncertainty. This cluster occupies a central position on the map and connects with all other clusters, meaning that it serves as the theoretical foundation and core of the research. Communication appears in this cluster as a supporting element rather than as the main subject of research into integrated risk management. The presence of concepts such as knowledge management and construction suggests that research in this cluster is also presented in a sectoral context.

Cluster 2 (green) *Information management and communication with stakeholder* encompasses research that adopts an interdisciplinary approach, combining technical aspects with process-based risk management. The dominant terms are risk assessment, integrated risk management, stakeholders, integrated approach, risk perception and information management. Research in this cluster focuses on practical risk assessment tools and methods, as well as on the role and involvement of stakeholders. The presence of terms such as 'supply chains' and 'systems engineering' indicates interdisciplinary research combining engineering and management perspectives. It can be noted that there is a lack of connection between risk assessment and the integrative tool that is communication.

Cluster 3 (blue) *Communication in crisis management and healthcare* encompasses research into healthcare systems and public administration, focusing on the application of risk management within social and institutional contexts, often in relation to specific geographical areas. The dominant keywords are: healthcare provision, risk analysis, crisis planning, organisation and management, and people. Research focuses on the impact of direct interactions on effectiveness in extreme situations (disasters). The occurrence of geographical terms, such

as the United States, suggests that empirical research is being conducted in various regions. Communication within this cluster is primarily examined in the context of environmental and social risks, rather than in the context of the internal integration of the Enterprise Risk Management system.

Cluster 4 (yellow) – *Public communication on climate and environmental risks* – is the smallest of the four clusters. The dominant keywords are risk communication, risk assessment, climate change, floods and interpersonal communication. Research in this cluster focuses on environmental risk and communication processes, i.e. on studies of hazard communication, including in the context of climate change and natural hazards. This indicates a growing focus of research on the social and environmental dimensions of risk management. Communication plays an informational and warning role here.

In the next step, the authors carried out a co-occurrence analysis – overlay visualisation (Figure 8).

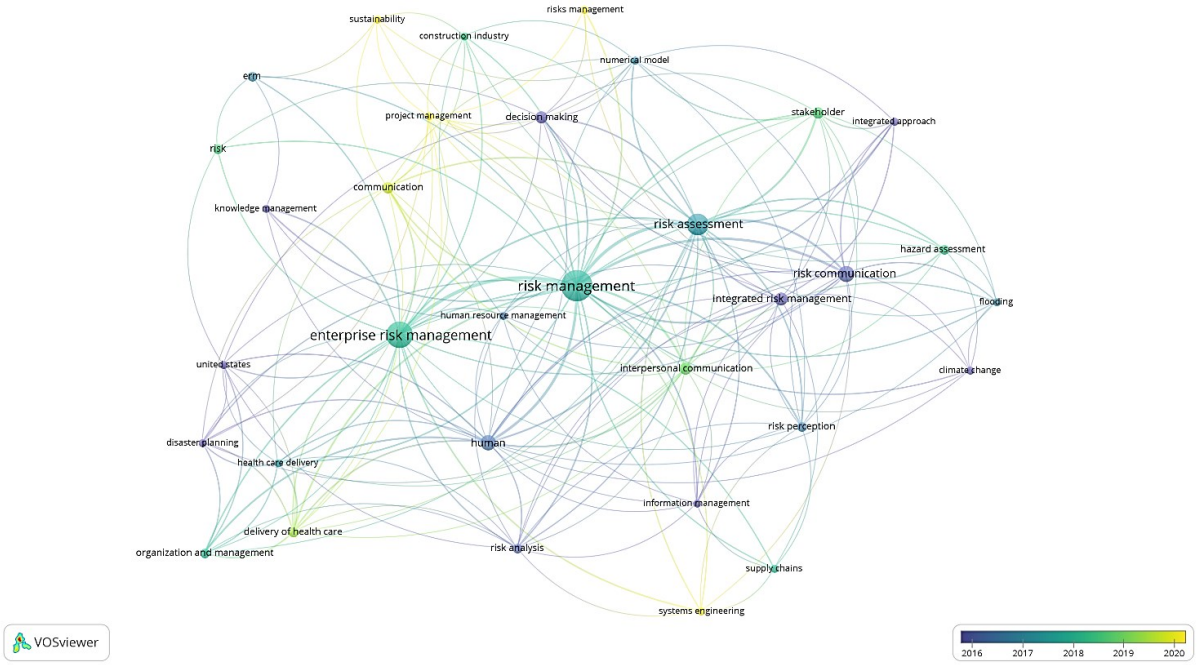

Figure 8. Co-occurrence - overlay visualization.

Source: own study.

Given that the time scale of the visualisation (2014-2020) reflects the average publication year for each concept, three publication periods can be identified: 1. Publications from 2014-2016 (blue), 2. Publications from 2016-2018 (green) and 3. Publications from 2018-2020 and later (yellow). The first period is dominated by the terms ‘risk perception’, ‘risk communication’, ‘climate change’, ‘flooding’ and ‘disaster planning’, indicating researchers’ interest in crises, environmental threats and public communication. Communication was not perceived as an organisational element. The second period is dominated by the terms ‘risk management’, ‘enterprise risk management’, ‘risk assessment’ and ‘stakeholder’. During this period, communication begins to be linked to risk management, ERM and stakeholders,

but does not constitute an element of ERM. In contrast, the third period is dominated by the terms communication, project management, sustainability, construction industry and systems engineering, suggesting that communication is considered in the context of projects, sustainable development and management systems. During this period, communication is examined as an element of management, but still not as the core of ERM.

4. Conclusions

The bibliometric analysis carried out suggests that researchers have shown little interest in the role of communication in Enterprise Risk Management. Research in this field is currently in its early stages. It is a young, rapidly developing field in which many research topics have yet to be explored. Almost all the articles were written between 2007 and 2026, which means that the issue of communication in the context of integrated risk management did not constitute a distinct research trend between 1992 and 2006. The field was very underdeveloped. It is only since 2007 that a growing interest in the subject matter and a focus on a systemic approach to risk can be observed. This can be explained by the growing importance of corporate governance, increased regulatory pressure, or the rise in the significance of the ERM concept following the 2008 financial crisis. However, the increase in the number of publications between 2017 and 2025 suggests that the importance of communication in risk management—and thus in organisational management—is growing, as is interest in organisational resilience and the importance of risk integration in conditions of uncertainty. The COVID-19 pandemic may have had an undeniable impact, particularly on the growth of research into the role of communication in crisis management. This leads to the conclusion that the field of research focusing on the role of communication in risk management is currently undergoing a phase of intensive development. At the time of the study – in February 2026 – only one article in the field under investigation had been published in 2026. Based on the analysis of the overlay visualisation, it can be concluded that research into communication in risk management has its origins in environmental and hazard-related contexts. It was only in subsequent years that researchers began to link communication with organisational management and risk management (and with ERM), treating it as a support for both of these processes. Research also began to take the stakeholders' perspective into account. Subsequent studies point to the growing importance of communication as an element of corporate risk management, including in the context of project management and sustainable development. However, communication is still not perceived as a key element of corporate risk management. Nor is it sufficiently embedded within the structure of this process, which points to the need to redefine it as a mechanism for integrating the risk management process within the organisation.

Furthermore, two main areas of research can be identified. The first area focuses on research into risk management in organisations from an organisational and strategic perspective, whilst the second focuses on the role of communication in the context of public organisations and environmental risks. The very limited links between these areas suggest that communication does not form the core of research in the context of risk management, nor has it been unequivocally recognised as an element or mechanism that integrates aspects of ERM, strengthens decision-making, or facilitates the building of relationships with the organisation's internal and external stakeholders.

Based on the analysis carried out, it can be concluded that the role of communication in risk management has evolved from a marginal, passive reporting function to a key element supporting the integration and coordination of this process. Initially, the role of communication was limited to reporting information, and only later was it expanded to include its use in decision-making and stakeholder engagement. Currently, communication is considered within the context of integrated and systemic approaches to risk management. However, the bibliometric analysis carried out indicates that, despite this evolution, communication remains scattered across various research streams and is not fully defined as an integrated structural element of corporate risk management systems. Four phases of the evolution of communication in the field of risk management can be identified:

- Phase I (up to around 2005) – risk management focused primarily on risk identification and quantitative analysis. The role of communication was marginal, and communication itself was used mainly for reporting purposes. Communication served merely as a supporting tool, rather than an integral part of risk management.
- Phase II (approx. 2005-2015) – during this period, the development of the ERM concept can be observed, leading to a holistic approach to risk and its integration with corporate governance and strategic decisions. Communication serves as a supporting element for processes within the organisation and is beginning to be recognised in the context of decision-making, knowledge management and governance. It is still not a mechanism for integrating ERM
- Phase III (approx. 2015-2020) – two sub-areas can be observed here. The concept of ERM continues to develop. The role of communication begins to be linked to stakeholders involved in the ERM process and to information management. However, communication is still not an element that integrates ERM (the core of ERM). It operates in parallel with risk analysis processes. There is also a noticeable development in research on climate change, disasters and communication during crises. Research focuses on the role of public communication, mainly external.
- Phase IV (post-2020) – as a result of the Covid-19 pandemic, the accelerating pace of digitalisation and growing global uncertainty, the role of communication is becoming increasingly important. Communication is regarded as a very important, indeed critical, element of ERM, but it still does not serve as a mechanism for integrating all elements of the ERM system.

In summary, it can be said that the role of communication in risk management has evolved from a passive reporting function to a key component supporting integration and coordination. However, despite this evolution, communication has not yet been fully defined as a structural element of corporate risk management systems.

This study highlights the need to intensify research in this area by, amongst other things, defining the role that communication plays in ERM, as well as the role it plays in decision-making and in relations with stakeholders. Research gaps can be identified within the identified clusters (Table 5).

Table 5.
Research gaps in the identified clusters

Cluster	Research gaps
Cluster 1	Lack of conceptualisation of communication as a central element of the ERM framework. Lack of a standardised framework integrating communication with the organisation's risk management systems. Lack of models for the flow of information (communication) between the operational and strategic levels of ERM.
Cluster 2	Lack of integration between communication and the risk assessment process.
Cluster 3	The lack of transfer of communication models from the public sector to risk management in private sector companies.
Cluster 4	Lack of integration between internal risk communication and external risk communication – a focus primarily on external risk communication.

Source: own study.

The first cluster includes the concept of communication, but it is not the central focus. The cluster concentrates on the organisational aspects of the Enterprise Risk Management structure, whilst not treating communication as a fundamental, central, integrating element of that structure. Furthermore, communication is not identified as a mechanism or model that facilitates the flow of information between the operational and strategic levels of the decision-making process. In the second cluster, the focus is primarily on risk assessment methodology, which is not considered in conjunction with the communication process. Communication is not a key element in this cluster either. The concept of a stakeholder appears, but it is not considered in the context of information flow. In the third cluster, communication is presented as an element of risk management in the public sector. However, there is a lack of literature presenting the adaptation of the communication model used in this sector to ERM risk management in the private sector. In the fourth cluster, risk communication is examined primarily in the context of climate change, flooding and hazard assessment. This cluster focuses on communicating risk to the public in crisis situations. However, there is a lack of connection between external risk communication and internal communication. There is a lack of focus on the integration of communication with ERM.

In summary, it can be observed that the topic of communication features in the literature on risk management; however, it is very rarely viewed as a mechanism for structural integration within corporate risk management systems. The research gaps identified have helped to pinpoint future research directions, which should focus on:

- Developing a communication model as a mechanism for integrating ERM components. This model should take into account the flow of information between the operational and strategic levels, as well as the integration of risk assessment with decision-making. The next step is to verify in practice the impact of these models on the effectiveness of ERM.
- Measuring the effectiveness of communication within ERM. It is necessary to develop indicators of risk communication effectiveness and measures of the impact of communication on risk reduction. Another important research area is the construction of models for assessing the communication maturity of ERM systems.
- The integration of internal and external communication. Another key research focus appears to be the assessment of the impact of stakeholder communication on a company's internal processes, including ERM.
- Identifying the impact of organisational culture (including risk culture) on risk communication within ERM. A key research focus is the identification of communication barriers in the implementation and operation of ERM.
- To highlight the potential for using digital tools in risk communication as part of risk management, and to identify the impact of using these tools on the effectiveness of the ERM process. The use of digital tools (including AI tools) in the integration and analysis of risk data, as well as in risk communication, has been little studied. There is a lack of research identifying the impact of their use on the effectiveness of the ERM process. Real-time risk communication is also an important research topic, as it facilitates rapid and informed decision-making, particularly in crisis situations (including during pandemics or natural disasters).
- Identifying any differences in the role of communication within ERM depending on the country, region, industry, regulatory differences or cultural differences. The research appears to focus solely on the role of communication in various sectors.
- Conducting a bibliometric analysis using other databases.

In drawing their final conclusions, the authors sought to exercise caution in generalising their findings, as the study presented is based solely on data from the Scopus database. The analysis does not cover resources from other relevant databases, such as Web of Science, EBSCO, Emerald, ScienceDirect or Google Scholar, and also excludes monographs, book chapters, conference proceedings and publications in languages other than English. Consequently, the search excluded so-called 'grey literature' and numerous practical and industry-specific publications, in which the topics of ERM and risk communication are very frequently and extensively discussed.

The authors are aware of the limitations of the study. These include, amongst others: the study being restricted to a single database (Scopus); the study being restricted to a single type of document (articles); the study being restricted to a single language (only English-

language texts were analysed); and the researcher's subjective selection of keywords and cut-off thresholds. Bibliometric mapping on a small sample (73 documents) may overemphasise dominant keywords, potentially narrowing the thematic diversity and the scope for analytical generalisations.

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