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Twenty-five years of the Journal of Risk Research: a bibliometric overview

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ABSTRACT

The Journal of Risk Research is a leading international journal in risk research connected to multidisciplinary areas. It was launched in 1998 and founded by Ragnar E. Löfstedt. Motivated by its 25th anniversary in 2023, this paper presents a general bibliometric overview of the leading trends occurring in the journal between 1998 and 2023. The study aims to identify the journal's impact, the most productive and influential authors, institutions, countries/territories, leading topics, and to analyse their evolution through time. The work mainly uses the Scopus database to analyse the bibliometric data. But in some particular cases, the Web of Science Core Collection database is also used to supplement bibliographic information. Moreover, we develop a graphical mapping of the bibliographic material by applying the Visualisation of Similarities (VOS) viewer software to provide deeper analyses. The graphical visualisation uses co-citation, bibliographic coupling, and co-occurrence of author keywords. The results emphasise the significant growth and impact of the journal throughout its entire lifetime. It is expected that the journal will continue growing its international diversity and disseminating knowledge in risk research all over the world.

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1. Introduction

The Journal of Risk Research (JRR) is the official journal for the European and Japanese sections of the Society for Risk Analysis (SRA). The journal was founded in 1998 by the Editor-in-Chief, Ragnar E. Löfstedt, Professor of Risk Management at King's College London and the previous SRA Council President (in 2022). Jamie K. Wardman, Associate Professor of Risk at the University of Leicester, has been Editor for the past year following his role as Managing Editor since 2010. The main aims of the JRR are to explore the inter-relationships between risk, decision-making, and society, to promote better risk management practices, and to contribute to the development of risk management methodologies in multidisciplinary areas. The journal accordingly focuses on theoretical, empirical, and applied research on the communication, regulation, and management of risk in the areas of social, physical, and health sciences, engineering, public policy and administration, and media and communication studies.

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In turn, this broad risk scope and international outlook attracts a wide variety of submissions every year.

During the first years from 1998 to 2002, JRR was a quarterly journal with the British publisher Routledge owned by Taylor & Francis Group. Since then, JRR grown substantially, now publishing on a monthly basis, and has become recognised as a leading international journal within the risk field. According to the 2022 Journal Citation Reports (JCR) published by Clarivate, the journal achieved an impact factor (IF) of 5.1, being in the 7th position out of 110 journals in the Web of Science (WoS) Core Collection database under the category of Social Sciences, Interdisciplinary (SSI).

Notably, 2023 also marked 25 years of the JRR. Motivated by this event, the objective of this paper is to present a general bibliometric overview of the most significant trends and developments that have occurred in the journal during its 25-year journey.

Journals often celebrate their remarkable anniversaries and milestones by organising special activities, such as editorials (Barley 2016), reviews (Renn 1998; Van Fleet et al. 2006), and special issues (Kozlowski, Chen, and Salas 2017), with many journals now also presenting bibliometric analyses to celebrate their journey, contributions, and presence. The main advantages of this approach are that it enables an objective study of the research published in a specific journal and provides a retrospective evaluation to identify the leading trends in that journal from a broad perspective (Merigó et al. 2015; Schwert 1993). However, no work has yet provided a general bibliometric overview of JRR.

This study accordingly identifies and analyses a wide range of bibliometric issues, including the publication and citation structure of the JRR, the most cited papers, the most cited documents in the journal publications, the leading authors, institutions and countries/territories, the citing articles, the author keyword analysis, the leading topics and topic clusters, and temporal evolutions. The data are compiled by mainly using the Scopus database, while only in particular cases the WoS Core Collection database is used. Moreover, this work applies the Visualisation of Similarities (VOS) viewer software (Van Eck and Waltman 2010) to graphically analyse the bibliographic material published in JRR. For the mapping analysis, we employ several bibliometric indicators, including bibliographic coupling (Kessler 1963), co-citation (Small 1973), and co-occurrence of author keywords (Merigó et al. 2018, 2019).

The rest of the paper is organized as follows. Section 2 briefly reviews the bibliometric methodology used in this paper. Section 3 presents the results including the publication and citation structure, the most cited papers, the most cited documents in the journal publications, the leading authors, institutions, and countries/territories publishing in the journal, and the citing articles. Section 4 develops a graphical visualisation of the bibliographic data of JRR with the VOS viewer software. Section 5 summarises the main findings and concludes the paper.

2. Bibliometric methods

Bibliometrics is a research area of library and information sciences that quantitatively analyses bibliographic data (e.g. units of publication and citation) based on statistical methods (Broadus 1987; Pritchard 1969), which can classify and provide a representative overview of a set of bibliographic documents. Bibliometric analysis is very useful for unveiling emerging trends in article and journal performance, research constituents (e.g. authors, countries/territories, institutions, topics), collaboration patterns, or scientific developments and exploring the intellectual structure of a well-established field in the existing literature by making sense of large volumes of unstructured data in rigorous ways (Donthu et al. 2021; Merigó et al. 2018). Bibliometric studies are getting more and more attention from the scientific community. In the literature, they are used to analyse a wide range of issues, such as topics (Blanco-Mesa, Merigó, and Gil-Lafuente 2017; Hao, Li, and Wu 2023; Yang et al. 2019), journals (Ferreira et al. 2014; Hall

2011; Thongpapanl 2012), institutions (Linton 2004), and countries/territories (Umeokafor, Umar, and Evangelinos 2022; Zhang, Ling, et al. 2023).

Many journals have also presented self-regarding bibliometric overviews. For example, Heck and Bremser (1986) studied the evolution of the first six decades of the Accounting Review, and Schwert (1993) the first 18 years of the Journal of Financial Economics. García-Merino, Pereira-do-Carmo, and Santos-Álvarez (2006) characterised Technovation between 1981 and 2004 to celebrate its 25th anniversary. Biemans, Griffin, and Moenaert (2007) presented a historical overview of the first 20 years of the Journal of Product Innovation Management, Weiss and Qiu (2008) of the first 75 years of the Journal of Risk and Insurance, and Cobo et al. (2015) of the first 25 years of Knowledge-Based Systems. Later, Merigó et al. (2019) analysed the first 40 years of Safety Science, and Milfont et al. (2019) of Environment and Behavior during the 1969–2018 period. More recently, Wang et al. (2020) analysed the publications in Omega-The International Journal of Management Science over the past 40 years from 1979 to 2018, Goerlandt and Li (2022) in Risk Analysis for the first 40 years, and Kumar, Chavan, and Pandey (2023) in the Journal of International Management between 1998 and 2020. Additionally, some other authors have also developed a bibliometric analysis of other journals including the International Journal of Information Technology and Decision Making (López-Herrera et al. 2012), Computers and Industrial Engineering (Cancino et al. 2017), Journal of Cleaner Production (Zou et al. 2017), European Journal of Marketing (Martínez-López et al. 2018), IEEE Transactions on Fuzzy Systems (Yu et al. 2018), and Journal of Knowledge Management (Gaviria-Marin, Merigo, and Popa 2018).

The field of risk research is a multi-dimensional and cross-disciplinary research domain, which has also attracted a variety of bibliometric studies in key areas besides those mentioned above. These include in management (Otitolaiye and Abd Aziz 2024; Zhao 2024), civil engineering (De Iuliis, Cardoni, and Cimellaro 2024), materials (Wang et al. 2014), supply chain (Fahimnia et al. 2015), health (Acharya et al. 2024), natural disasters (Rana 2020), economics (Bota-Avram 2024), marketing (Almeida and Vieira 2023), communication (Agyepong and Liang 2023), maritime transportation (Fu, Goerlandt, and Xi 2021; Gil et al. 2020), and aviation (Okine, Zarei, and Roggow 2024).

Based on bibliometric and network analysis tools, Fahimnia et al. (2015) conducted a systematic review of the quantitative and analytical models for supply chain risk management and examined the general trends of this research area. Van Nunen et al. (2018) studied the safety culture research to identify fundamental influences and obtain a structured overview of the main characteristics and developments in this research domain, looking into the two distinguished areas regarding organisation safety culture and healthcare and patient safety culture. Nobanee et al. (2021) performed a bibliometric analysis of objective and subjective risk for obtaining insights into narrative clusters, research developments, trends, and leading authors, journals, documents, institutions, and countries in the research domain. Zhang, Ling, et al. (2023) studied the risk management research in East Asia from 1998 to 2021 and identified research trends, hotspots, and directions for future research. Zhang, Ling, et al. (2023) developed a macroscopic overview of acceptable risk research in engineering and operations research and management science (OR-MS), with the information involving publication outputs, countries/territories, institutions, authors, journals, citations, and keywords.

JRR has likewise previously published several bibliometric studies on risk research issues. Agyepong and Liang (2023) studied the knowledge patterns and leading trends of public risk communication in disaster management. Hao, Li, and Wu (2023) analysed the developments and trends in risk science from 1996 to 2021 through bibliometric methods, providing insights into the critical contributors and hot topics to facilitate future developments. Cao, Yang, and Zhou (2023) presented an overview of the status of health risk perception and communication research worldwide and highlighted its global emerging trends. Later, Acharya et al. (2024) developed a bibliometric analysis of the research on vaccine hesitancy from a behavioural perspective.

This study focuses on using bibliometric methods to conduct a specific analysis of JRR publications (Hicks et al. 2015). This type of methodology facilitates a retrospective evaluation

of the journal by analysing various issues in terms of the publication and citation structure, authors, institutions, countries/territories, keywords, and temporal evolutions, among others (Laengle et al. 2017; Martínez-López et al. 2018; Merigó et al. 2019). The work uses many different bibliometric indicators (Ding, Rousseau, and Wolfram 2014; Garfield 1955) to represent the respective information from the bibliographic data, including the total number of publications, the total number of citations, the citations per paper, and the *h*-index (Alonso et al. 2009; Hirsch 2005). Generally, productivity and influence are the two main perspectives to evaluate research (Merigó and Yang 2017; Podsakoff et al. 2008). Productivity is often measured by the number of publications, while influence is measured by the number of citations. Note that the citations per paper and the *h*-index are the indicators combining measures of productivity and influence. The *h*-index measures the *X* number of documents that have received *X* citations or more.

Furthermore, the study includes IF and CiteScore (CS), connecting the number of publications with the number of citations, to measure the quality of a journal when comparing journals in risk research (Okagbue and Teixeira da Silva 2020). Note that the IF is calculated from data indexed in the WoS Core Collection database, while the CS is obtained based on the Scopus database. The IF evaluates the performance of a journal through dividing the number of citations in year *n* by the publications in year *n*-1 and *n*-2 by the total number of publications in year *n*-1 and *n*-2. The CS in year *n* measures the yearly average number of citations to the publications of a journal in the preceding four years (from year *n*-3 to *n*). Some other bibliometric indicators are included as well for evaluating the journal's performance, such as the 5-year impact factor, journal impact factor percentile, journal impact factor quartile, article influence score, and immediacy index.

The work also considers several other bibliometric indicators to provide a better representation of the documents under study, such as the citations per year, citation thresholds, citing articles, and temporal evolutions. Moreover, for the institution analysis, the university rankings in the Academic Ranking of World Universities (ARWU) and the Quacquarelli and Symonds (QS) University Ranking are presented. For the country analysis, the indicators regarding the publications and citations per million inhabitants are used to define the material more clearly.

In this study, the rankings presented can be different depending on the specific indicator considered. Nonetheless, the objective is to provide readers with a general informative overview of the elements and influences most associated with JRR. Additionally, readers can interpret the results according to their own specific interests and priorities (Laengle et al. 2017; Merigó et al. 2018; Podsakoff et al. 2008).

The work mainly uses the Scopus database in the search process for information to prepare the bibliometric analysis of the first 25 years' performance of JRR. The key reason is that all the publications of JRR between 1998 and 2023 are directly available in the Scopus database. However, in three particular cases of analysing the most cited documents in JRR publications (as shown in Table 5), co-citation of documents in JRR (as shown in Figure 8), and bibliographic coupling of institutions publishing in JRR (as shown in Figure 11), we use the data retrieved from the WoS Core Collection database because more practical resources are provided by the WoS. Note that the publications of JRR are only directly available starting from 2003 in the WoS Core Collection database.

The search process in the Scopus database first uses the keyword 'Journal of Risk Research' under the 'title' of the 'sources' option to obtain all the documents. Further, the publications of 2024 are excluded, and we only consider the 'articles', 'reviews', and 'notes' in the 'final' publication stage. The initial search resulted in 1584 documents published in JRR based on the Scopus database. After double-checking the webpage of the journal, four editorials have been removed from the initial results, and three new documents have been added, leading to a total of 1583 documents under study.

For the search process undertaken in the WoS Core Collection database, the keyword 'Journal of Risk Research' is introduced under the 'publication titles' option to retrieve all the available documents, and then, 'articles' and 'review articles' are selected while excluding the publications of 2024. The search process results in 1477 documents of JRR retrieved from the WoS Core Collection database between 2003 and 2023.

All the search processes have taken place in April 2024. Note that for the author analysis (as shown in Table 6), the total number of publications and citations for each author is directly obtained from the 'author profile' generated by the Scopus database. In addition, due to the difficulty in manually identifying the information related to the citing articles of JRR in terms of the 1583 documents, the initial search results of the 1584 documents directly retrieved from the Scopus database are used to analyse the citing articles of JRR (as presented in Table 13) and for most of the following graphical analyses.

To obtain a more general view of the results, this study graphically maps the bibliographic material using the VOS viewer software (Van Eck and Waltman 2010). This software collects large volumes of bibliographic data and visualises the results in a more pragmatic way (Donthu et al. 2021) through co-citation, bibliographic coupling, and co-occurrence of author keywords (Martínez-López et al. 2018; Merigó et al. 2018). Recall that bibliographic coupling occurs when two documents cite the same third document (Kessler 1963). In other words, the similarity between two documents depends on the number of shared references, with a greater number of common references indicating higher similarity (Kumar, Chavan, and Pandey 2023). In the study, this approach is applied for analysing the relationships between documents, authors, institutions, and countries/territories with time information. On the other hand, co-citation appears when two documents receive a citation from the same third document (Bar-Ilan 2008; Small 1973). The more the two documents are cited together, the more the similarities between them can be assumed (Van Nunen et al. 2018). The work implements the co-citation analysis for journals, authors, and documents. Co-occurrence of author keywords identifies the most common and frequent keywords used in the documents (Laengle et al. 2017; Wang et al. 2020). Observe that the keyword list of a document is usually provided on the first page of the paper. The keywords that frequently appear together tend to have a thematic relationship with one another (Donthu et al. 2021). Thus, the co-occurrence analysis of author keywords can be used to reveal the thematic trends and forecast the future research in JRR.

The graphical mapping using VOS viewer is carried out through network representations, in which the size of a circle and the network connections, respectively denote an item's relevance and link strength (Laengle et al. 2017; Merigó et al. 2019). Moreover, the VOS viewer clustering method (Van Eck and Waltman 2010) is applied to cluster items into different groups, where each cluster is marked with a different colour. Note that in the literature lots of software tools can be used for mapping bibliographic data (Cobo et al. 2011; Donthu et al. 2021; Wang et al. 2020).

3. Results

This section presents the results of the analysis. Between 1998 and 31 December 2023, JRR has published 1583 documents, only considering articles, reviews, and notes available in Scopus database. As of April 2024, the journal has received 35,961 citations, with an average of 22.72 citations per paper. The *h*-index is 78, indicating that of the 1583 documents, 78 have received 78 citations or more. This work analyses the publication and citation structure of JRR, the influential papers in JRR, and the leading authors, institutions, and countries/territories of the journal.

3.1. Publication and citation structure of JRR

JRR started publishing articles in 1998. The journal has published many papers over the past 25 years. This can be explained by the increasingly widespread attention of risk issues and the strong development of advanced knowledge and technologies during the last decades that have stimulated a significant growth of risk research. Figure 1 presents the annual number of papers published in the journal. During the initial years, the journal was publishing 20–30 papers per year. Since 2004, the number has grown very quickly and in the second decade of the

millennium, to one hundred. In 2020, the journal reached a top of 112 documents. During the last three years, the number of papers published has decreased and in 2023, the number was 80. Note that currently, the journal has an acceptance rate around 15%. It is expected that the annual publications will continue to grow due to the increasing number of submissions to the journal from all over the world.

To explore the annual results more deeply, this work further analyses the annual citation structure of JRR considering several specific citation thresholds, including equal or more than one, five, ten, twenty, fifty, one hundred, and two hundred citations. The number of publications in a certain year that have achieved those citation thresholds are identified, as shown in Table 1. It can be seen from the results that the number of citations is growing through time in general and many papers have been highly cited, indicating the journal has been able to maintain a good quality over its entire lifecycle. The papers published in 2011 and 2020 have received the most citations, with 3131 and 3536 citations, respectively. Additionally, the number of total citations received by the papers published in each year during the 2012–2019 period remains relatively stable within the range between 1200 and 1500 citations. However, the contributions from the last few years still need some time to catch up. Note that three papers published in 1998 (the starting year of JRR) have received more than two hundred citations, and five papers more than one hundred citations. During the period from 2002 to 2011, most of the highly cited papers have been published, which means the journal's quality has improved over time. Furthermore, note that 52 papers have obtained one hundred or more citations and that around one-third of them have received more than two hundred citations. 10.23% of the total papers have received fifty or more citations, 28.74% twenty or more citations, and around 51% equal or more than ten citations. 94.57% of the papers have received at least one citation from the documents indexed in Scopus. In the next sub-section, we examine the most cited papers published in the journal.

Next, let us look into more specifically the distribution of the citations of annual publications that have received and compare different sets of annual data. Figure 2 illustrates the annual box-whisker plot (Tukey 1977) structure of the citations of all JRR publications. Note that the average, median, first quartile, third quartile, interquartile range (IQR), minimum value, maximum value, and outliers for each citation data set of annual publications are all presented in the figure. The outliers that have more than 250 citations are represented by red dots. It is clear that the citation distribution of the publications in 1998 is the most dispersed, owing to the largest IQR and the widest spread shown by the extreme values. On

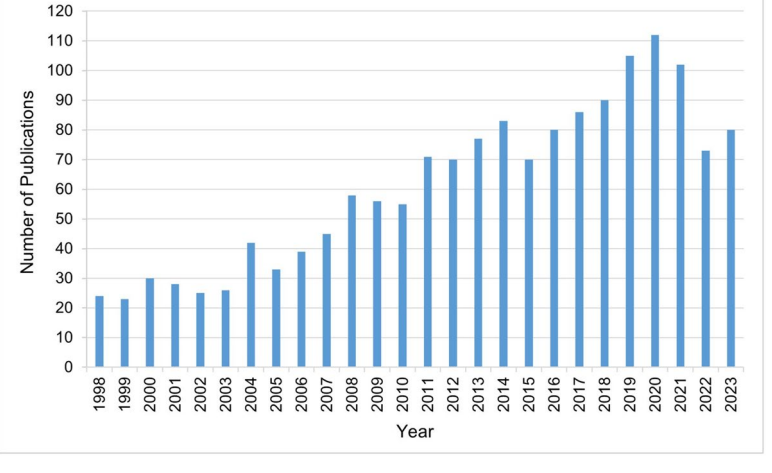

Figure 1. Annual number of papers published in JRR.

Table 1. Annual citation structure of JRR.

Year	TP	TC	≥200	≥100	≥50	≥20	≥10	≥5	≥1
1998	24	1668	3	5	7	9	12	16	23
1999	23	725	0	3	4	12	13	15	22
2000	30	940	1	2	4	13	19	21	25
2001	28	845	0	0	5	15	20	23	27
2002	25	1111	1	3	6	13	17	19	22
2003	26	599	0	2	4	6	12	15	24
2004	42	1144	0	0	10	19	31	38	42
2005	33	1878	2	2	9	17	23	29	33
2006	39	1426	0	2	11	22	29	34	39
2007	45	855	0	1	2	14	33	38	45
2008	58	2144	1	4	10	30	45	52	58
2009	56	2274	1	5	14	27	40	47	55
2010	55	1147	0	2	4	16	32	50	55
2011	71	3131	2	6	13	25	41	53	69
2012	70	1368	0	1	6	24	40	59	70
2013	77	1279	0	1	5	19	43	63	76
2014	83	1425	0	0	7	24	42	60	82
2015	70	1204	0	1	4	21	39	53	67
2016	80	1305	0	2	7	17	37	55	79
2017	86	1480	0	1	4	23	53	69	86
2018	90	1363	0	1	6	20	44	62	87
2019	105	1495	1	1	6	20	46	71	100
2020	112	3536	2	6	11	30	48	73	109
2021	102	1170	0	1	3	17	36	61	97
2022	73	376	0	0	0	2	13	30	68
2023	80	73	0	0	0	0	0	2	37
Total	1583	35961	14	52	162	455	808	1108	1497
%	100%	–	0.88%	3.28%	10.23%	28.74%	51.04%	69.99%	94.57%

TP and TC: total publications and citations; ≥200, ≥100, ≥50, ≥20, ≥10, ≥5, ≥1 = Number of papers with equal or more than 200, 100, 50, 20, 10, 5 and 1 citations.

the contrary, the citation distributions of the publications in 2022 and 2023 are the most concentrated ones, and these recent publications have relatively lower citations. The papers published in 1998 have also obtained the highest average citations. The highest median occurs in 2001, indicating that half of the publications in 2001 have received equal to or more than around 25 citations. Note that the citation distributions of the publications between 2012 and 2019 are very similar. In addition, we can see that the top 2 most cited papers are from 2020 and 2011, respectively.

Further, we analyse the evolution of JRR's performance from 2005 to 2023 based on the JCR in the WoS (Clarivate 2024). Table 2 shows the results. The evolution of the number of citable publications and tendency of citations are in accordance with the results of Table 1 obtained from the Scopus database. For this journal, the evolution of IF, journal impact factor percentile, and ranking in the WoS category of SSI have been very positive, ranking it in the top positions of the SSI category in the last years, i.e. in the quartile Q1. The 5-year impact factor and article influence score of JRR have been growing in this period, with both achieving the highest scores recently. The value of the journal's immediacy index has become higher since 2018, indicating that JRR has been attracting citations very rapidly in recent years.

In addition, we analyse the publication and citation performances of JRR compared with other major academic journals in the risk field. Table 3 presents 50 journals leading in risk research, including the most relevant journals in the Master Journal List of WoS strictly devoted to the risk field, the highly cited journals by the publications in JRR, and the top journals in the field of OR-MS that regularly publish papers related to risk research. Table 3 ranks the journals by the *h*-index in the past ten years, and in case of a tie, the ratio of citations per paper between 2014 and 2023 is also considered. All the measures serve to evaluate the quality and impact of the journals.

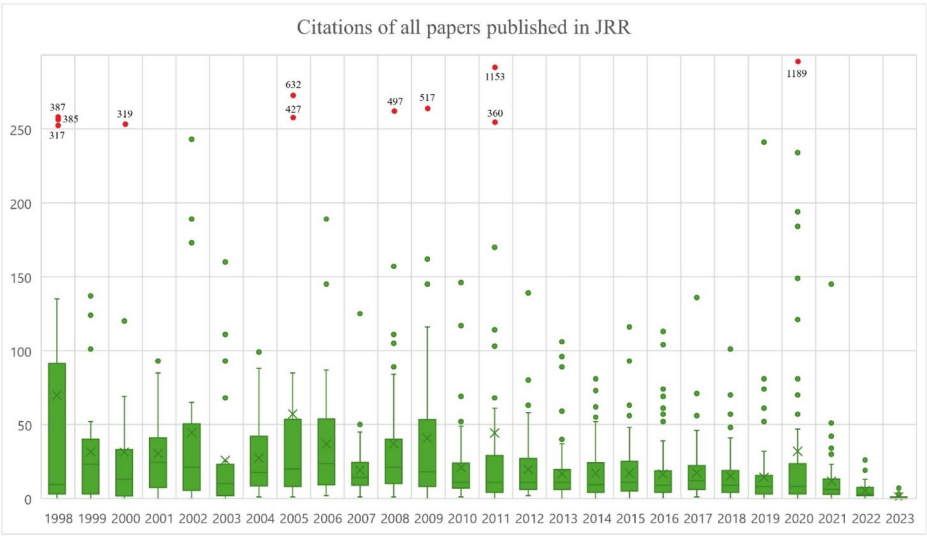

Figure 2. Annual box-whisker plot structure of the citations of all papers published in JRR.

Table 2. Analysis of JRR in the JCR of the WoS.

Year	TC	IF	5YIF	Imln	CI	AIS	PSSI	RSSI	Q
2005	144	0.47	–	0.11	38	–	51.69	29/59	Q2
2006	248	0.85	–	0.25	40	–	75.00	15/58	Q2
2007	304	0.94	–	0.06	54	–	81.58	11/57	Q1
2008	402	1.04	1.08	0.16	55	0.35	77.87	14/61	Q1
2009	447	0.57	0.99	0.13	16	0.36	40.44	41/68	Q3
2010	492	0.95	1.12	0.22	60	0.35	69.64	26/84	Q2
2011	610	0.88	1.17	0.25	65	0.35	63.48	33/89	Q2
2012	723	1.24	1.16	0.22	76	0.37	82.07	17/92	Q1
2013	794	1.27	1.28	0.09	77	0.46	83.33	16/93	Q1
2014	1023	0.94	1.36	0.30	73	0.51	67.89	31/95	Q2
2015	1084	1.03	1.39	0.25	77	0.47	63.68	35/95	Q2
2016	1339	1.34	1.58	0.32	72	0.45	70.31	29/96	Q2
2017	1527	1.38	1.35	0.31	84	0.38	63.78	36/98	Q2
2018	1896	1.70	1.62	1.03	89	0.40	65.87	36/104	Q2
2019	2124	1.93	1.83	0.88	103	0.43	73.61	29/108	Q2
2020	3277	2.58	2.67	1.78	166	0.67	68.35	35/109	Q2
2021	4332	5.35	4.27	1.37	97	1.07	93.30	8/112	Q1
2022	3961	5.10	3.80	0.50	51	0.96	94.10	7/110	Q1
2023	3266	2.40	3.20	0.20	70	0.86	86.50	36/263	Q1

TC: total citations; IF: impact factor; 5YIF: 5-year impact factor; Imln: immediacy index; CI: citable items; AIS: article influence score; PSSI: journal impact factor percentile in the WoS category of Social Sciences, Interdisciplinary (SSI); RSSI: ranking in the WoS category of SSI; Q: Quartile in SSI.

Considering the papers published in the past ten years between 2014 and 2023, Expert Systems with Applications is the top leading journal in the field, followed by European Journal of Operational Research, and JRR is ranked in the 20th position. It is found that the top 2 journals have the highest number of publications and number of citations, far greater than the other journals. However, according to the citations per paper ratio calculated between 2014 and 2023, the top 2 journals lose their leading positions while Psychological Bulletin occupies the first position.

Considering all the papers published up to 31 December 2023, European Journal of Operational Research is the most productive journal with the highest total number of publications, followed by Expert Systems with Applications and Journal of Personality and Social Psychology. Note that the Journal of Personality and Social Psychology and Psychological Bulletin are ranked as

Table 3. Publication record of leading journals in risk research.

R	J	H10	C/P10	P10	C10	TP	TC	C/P	H	≥500	≥100	≥10	IF	CS	Y	YS
1	Expert Syst Appl	197	32.04	10,533	337,453	18,713	779,393	41.65	280	81	1766	13,150	8.5	12.6	1990	1990
2	Eur J Oper Res	162	32.02	6589	210,964	18,891	952,098	50.40	323	147	2084	13,698	6.4	11.2	1977	1977
3	Psychological Bulletin	140	157.41	400	62,962	5894	1,209,082	205.14	535	566	1787	3562	22.4	31.4	1904	1904
4	Manag Science	123	30.79	2858	87,985	6638	583,856	87.96	331	180	1392	5018	5.4	7.9	1954	1969
5	Reliability Eng Syst Saf	119	30.85	4008	123,639	7101	279,002	39.29	183	27	557	5253	8.1	12.6	1980	1983[a]
6	Safety Science	114	28.39	3229	91,675	4992	180,315	36.12	157	6	371	3586	6.1	12.4	1976	1991
7	J Pers Social Psych	112	48.61	1138	55,316	10,356	1,826,611	176.38	586	717	3936	9140	7.6	11.7	1965	1965
8	Accident Anal Prev	105	28.67	3396	97,358	7561	328,718	43.48	199	16	759	5888	5.9	11.3	1969	1969
9	Omega	103	41.10	1305	53,635	3916	179,633	45.87	178	36	415	2403	6.9	13.8	1973	1973
10	Decis Support Syst	101	43.07	1169	50,348	3471	199,993	57.62	186	32	462	2760	7.5	12.5	1985	1985
11	Natural Hazards	95	18.37	5192	95,395	7581	195,963	25.85	146	13	303	4556	3.7	5.5	1988	1988
12	IJ Disaster Risk Reduction	87	16.83	3756	63,200	3810	72,278	18.97	90	0	72	1996	5.0	7.4	2012	2012
13	J Loss Prev Process Ind	73	18.81	2255	42,413	3980	96,125	24.15	104	1	120	2497	3.5	6.7	1988	1988
14	Risk Anal	71	19.70	1616	31,839	4568	186,553	40.84	173	31	386	2939	3.8	7.8	1981	1981
15	Operations Res	65	19.81	1118	22,147	4323	244,581	56.58	206	34	619	3140	2.7	4.8	1952	1969
16	Stoch Env Res Risk Assess	63	16.10	1770	28,497	2665	56,532	21.21	86	0	68	1482	4.2	6.5	1987	1999
17	Human Ecol Risk Assess	62	18.36	1170	21,481	2509	49,732	19.82	87	3	66	1244	4.3	11.2	1995	1995
18	Thera Clin Risk Manag	53	13.93	1561	21,751	2094	33,382	15.94	71	1	36	1080	2.8	4.8	2005	2006
19	Climate Risk Manag	52	23.27	525	12,218	525	12,218	23.27	52	1	15	287	4.4	6.7	2014	2014
20	J Risk Res	48	15.24	881	13,427	1583	35,961	22.72	78	4	52	808	5.1	9.7	1998	1998
21	IJ Disaster Risk Science	47	18.87	506	9550	576	11,953	20.75	50	0	16	315	4.0	7.1	2010	2010
22	Vasc Health Risk Manag	47	16.34	628	10,261	1451	39,583	27.28	83	2	60	898	2.9	5.8	2005	2005
23	J Flood Risk Manag	46	17.43	596	10,387	744	14,920	20.05	55	0	12	422	4.1	7.7	2008	2009
24	Risk Manag Healthc Policy	45	9.50	1368	13,000	1412	14,563	10.31	48	1	16	347	3.5	4.5	2008	2010
25	J Behavioral Decis Mak	40	14.29	504	7204	1139	49,933	43.84	103	11	107	721	2.0	4.5	1988	1988
26	Risks	33	6.01	1233	7409	1244	7475	6.01	33	0	3	196	2.2	3.1	2013	2013
27	J Risk Uncertainty	32	14.46	226	3269	886	56,173	63.40	97	8	95	647	4.7	4.8	1988	1988
28	Proc Inst Mech Eng O-J Risk Reliab	32	9.93	633	6283	893	10,130	11.34	37	0	1	375	2.1	4.1	2006	2006
29	J Risk Insurance	29	11.72	361	4232	947	25,303	26.72	71	1	50	559	1.9	3.1	1933	1978[b]
30	ASCE-ASME J Risk Uncertain A	29	10.16	468	4754	468	4754	10.16	29	0	3	156	2.5	3.8	2015	2015
31	Health Risk Society	26	12.06	243	2930	660	17,013	25.78	57	1	22	435	2.1	3.0	1999	1999
32	J Risk Finance	25	10.24	301	3083	726	9079	12.51	47	0	16	216	3.0	3.5	1999	1999
33	Eur J Risk Regul	23	5.77	592	3418	889	5133	5.77	28	0	2	127	2.9	4.4	2010	2010
34	Risk Hazards Crisis Pub Policy	22	11.32	178	2015	274	3190	11.64	27	0	2	96	3.5	6.0	2010	2010
35	Microb Risk Anal	22	10.75	172	1849	172	1849	10.75	22	0	1	64	2.8	4.3	2016	2016
36	ASCE-ASME J Risk Uncertain B	21	7.27	354	2574	354	2574	7.27	21	0	1	89	2.2	3.9	2015	2015
37	Geneva Pap Risk Insur-Issu Prac	20	8.35	305	2546	925	9624	10.40	41	0	9	287	1.6	3.1	1990	1999
38	IJ Risk Saf Medicine	20	5.67	230	1305	823	4782	5.81	29	0	2	150	1.7	1.8	1990	1990
39	Risk Management	18	8.47	148	1253	215	2349	10.93	24	0	2	76	2.1	5.0	1999	2006[c]

(*Continued*)

Table 3. Continued.

R	J	H10	C/P10	P10	C10	TP	TC	C/P	H	≥500	≥100	≥10	IF	CS	Y	YS
40	Law Probability Risk	16	6.66	143	952	193	1389	7.20	20	0	0	47	0.7	1.6	2002	2011
41	Risk Manag Insur Review	15	5.02	171	858	289	2253	7.80	20	0	5	58	1.2	1.8	1997	2006
42	J Risk	13	3.49	243	848	293	1225	4.18	15	0	1	27	0.7	1.3	1998	2011
43	J Patient Saf Risk Manag	13	3.15	201	634	201	634	3.15	13	0	0	17	1.5	1.9	1995	2018
44	Geneva Risk Insur Review	12	5.52	84	464	396	3708	9.36	28	0	2	112	1.5	2.8	1976	1976[d]
45	Probab Uncertain Quant Risk	12	5.07	108	548	108	548	5.07	12	0	0	16	1.5	1.9	2016	2016
46	Statistics Risk Modeling	11	7.73	67	518	601	3531	5.88	24	0	2	112	1.5	1.1	1982	1982[e]
47	J Credit Risk	10	3.00	147	441	193	769	3.98	13	0	0	21	0.3	0.6	2005	2011
48	J Operational Risk	9	2.93	158	463	207	924	4.46	15	0	0	26	0.5	1.2	2006	2011
49	J Risk Model Validat	9	2.20	153	336	185	492	2.66	9	0	0	9	0.7	0.6	2007	2012
50	Transplant Res Risk Manag	7	3.76	54	203	71	291	4.10	8	0	0	6	0.9	1.5	2009	2011

R: rank; J: journal; P10, C10, C/P10, and H10: publications, citations, citations per paper, and *h*-index between 2014 and 2023; TP, TC, C/P, and H: total publications, citations, citations per paper, and *h*-index available in Scopus; ≥500, ≥100, and ≥10: number of papers with equal or more than 500, 100, and 10 citations; IF: Impact Factor 2022 (Web of Science); CS: CiteScore 2022 (Scopus); Y: year of origin; YS: the first year available in Scopus. The numbers provided in the table only consider "articles", "reviews", and "notes" up to 31 December 2023.

[a]The Scopus covers the publications of Reliability Engineering and System Safety in 1983 and from 1988 to present.

[b]The Scopus covers the publications of Journal of Risk and Insurance in 1978, 1979, and from 1996 to present.

[c]The Scopus covers the publications of Risk Management in 2006 and from 2009 to present.

[d]The Geneva Risk and Insurance Review is formerly the Geneva Papers on Risk and Insurance-Theory. The Scopus covers the journal publications from 1976 to 1979 and from 1990 to present.

[e]The Scopus covers the publications of Statistics and Risk Modelling from 1982 to 2002 and from 2011 to present.

the top 2 journals in terms of the total number of citations, the citations per paper ratio, the *h*-index, and the number of papers that received 500 or more citations. Psychological Bulletin is the oldest journal in this list and has the highest IF and CS. It is worth noting that JRR is ranked in the 11th position with respect to both IF and CS. From an overall perspective, JRR has been performing well during the recent ten years and grew to a well-established journal among the top 20 in risk research, especially strictly dedicated to the risk field.

3.2. Influential papers in JRR

JRR has published many significant papers in the field of risk research. Table 4 presents the 50 most cited papers of all time in the journal. The influential papers are determined based on the total citations. That is, if a paper receives more citations, it will be more influential (Merigó et al. 2019).

The most cited paper of JRR was published by Sarah Dryhurst, Claudia R. Schneider, and John Kerr et al. in 2020 and has received 1179 citations with an average of 294.75 citations per year. Their research focuses on the assessment of public risk perceptions of COVID-19 around the world. The second most cited paper is from 2011 by Dan M. Kahan, Hank Jenkins-Smith, and Donald Braman about the cultural cognition of scientific consensus on climate change and other issues of risk, which has also received over one thousand citations. Note that Lennart Sjöberg, Lynn J. Frewer, Marjolein B. A. van Asselt, Ortwin Renn, and Sander van der Linden have three papers each in the list. The years 2011 and 2020 lead the table each with six publications, followed by the starting year 1998 and the year 2009 each with five publications. It is worth noting that the papers published in 2020 and 2021 are all related to the topic of COVID-19 pandemic. Among the top 50 influential papers, 14 papers receive more than 20 citations per year, including the seven papers published in either 2020 or 2021.

Another interesting issue is to analyse the most cited documents by the papers published in JRR. To this end, our study uses a co-citation analysis of the documents by means of the VOS viewer software. Table 5 presents the top 40 results based on the JRR publications between 2003 and 2023 in the WoS Core Collection database.

In the last two decades, the document most cited in publications of the journal is the seminal paper of Paul Slovic titled 'Perception of Risk', which was published in *Science* in 1987. This paper has been cited in 181 publications of JRR with 4.89 citations per year. Note that Paul Slovic has a total of five documents in the top 40 list as the first author, and Michael Siegrist and Ortwin Renn have four and three documents, respectively. Among the 40 most cited documents in the journal publications, there are 11 books, 13 articles published in Risk Analysis, 6 articles published in JRR, and 10 articles published in other journals.

3.3. Leading authors, institutions, and countries/territories

This section analyses the journal's leading authors, institutions, and countries/territories based on their total number of publications according to the Scopus database. First, let us investigate the 50 most productive authors in JRR; Table 6 describes the results. Note that in case of a tie regarding the number of publications in JRR, the authors' ranking is according to the number of citations in JRR.

Ragnar E. Löfstedt is the most productive author in the journal, followed by Ortwin Renn and Michael Siegrist. Note that the three authors are also ranked in the top 10 most cited authors, and the citations of their papers published in JRR are all over 400 times. However, although Sander van der Linden only has five papers in the journal, three of the papers that he co-authored are listed in the top 50 most cited papers, so he leads the 'citations per paper' category with 323.4 citations per paper in JRR. 12 authors have ten or more JRR publications,

Table 4. The 50 most cited papers in JRR.

R	TC	Title	Author/s	Year	C/Y
1	1179	Risk perceptions of COVID-19 around the world	Dryhurst, S.; Schneider, C.R.; Kerr, J.; Freeman, A.L.J.; Recchia, G.; Van der Bles, A.M.; Spiegelhalter, D.; Van der Linden, S.	2020	294.75
2	1148	Cultural cognition of scientific consensus	Kahan, D.M.; Jenkins-Smith, H.; Braman, D.	2011	88.31
3	629	Personality and domain-specific risk taking	Nicholson, N.; Soane, E.; Fenton-O'Creevy, M.; Willman, P.	2005	33.11
4	516	On risk defined as an event where the outcome is uncertain	Aven, T.; Renn, O.	2009	34.40
5	495	Are flood victims more concerned about climate change than other people? The role of direct experience in risk perception and behavioural response	Whitmarsh, L.	2008	30.94
6	425	Perception of risk: The influence of general trust, and general confidence	Siegrist, M.; Gutscher, H.; Earle, T.C.	2005	22.37
7	385	Metatheoretical foundations for post-normal risk	Rosa, E.A.	1998	14.81
8	384	Three decades of risk research: Accomplishments and new challenges	Renn, O.	1998	14.77
9	356	Risk governance	Van Asselt, M.B.A.; Renn, O.	2011	27.38
10	318	Risk perception and the media	Af Wahlberg, A.; Sjöberg, L.	2000	13.25
11	316	Comparative studies of risk perception: A review of twenty years of research	Boholm, Å.	1998	12.15
12	242	Comparing precaution in the United States and Europe	Wiener, J.B.; Rogers, M.D.	2002	11.00
13	240	The fake news game: actively inoculating against the risk of misinformation	Roozenbeek, J.; Van der Linden, S.	2019	48.00
14	232	Fact-checking as risk communication: the multi-layered risk of misinformation in times of COVID-19	Krause, N.M.; Freiling, I.; Beets, B.; Brossard, D.	2020	58.00
15	193	The paradox of trust: perceived risk and public compliance during the COVID-19 pandemic in Singapore	Wong, C.M.L.; Jensen, O.	2020	48.25
16	189	Cross-national comparisons of image associations with "global warming" and "climate change" among laypeople in the United States of America and Great Britain	Lorenzoni, I.; Leiserowitz, A.; De Franca Doria, M.; Poortinga, W.; Pidgeon, N.F.	2006	10.50
17	189	Five charges against the precautionary principle	Sandin, P.; Peterson, M.; Hansson, S.O.; Rudén, C.; Juthe, A.	2002	8.59
18	181	Resilience in the face of uncertainty: early lessons from the COVID-19 pandemic	Bryce, C.; Ring, P.; Ashby, S.; Wardman, J.K.	2020	45.25
19	173	Risk assessment of highway bridges under multiple hazards	Decò, A.; Frangopol, D.M.	2011	13.31
20	173	Cultural theory and risk perception: A proposal for a better measurement	Rippl, S.	2002	7.86
21	168	A relational theory of risk	Boholm, Å.; Corvellec, H.	2011	12.92
22	161	The influence of perceived risk on Internet shopping behavior: A multidimensional perspective	Crespo, A.H.; Del Bosque, I.R.; De los Salmones Sanchez, M.M.G.	2009	10.73
23	160	The views of scientific experts on how the public conceptualize uncertainty	Frewer, L.J.; Hunt, S.; Brennan, M.; Kuznesof, S.; Ness, M.; Ritson, C.	2003	7.62
24	156	Information needs and risk perception as predictors of risk information seeking	Huurne, E.T.; Gutteling, J.	2008	9.75
25	149	COVID-19: Reflections on trust, tradeoffs, and preparedness	Balog-Way, D.H.P.; McComas, K.A.	2020	37.25
26	146	Functional-dynamic public participation in technological decision-making: Site selection processes of nuclear waste repositories	Krütli, P.; Stauffacher, M.; Flüeler, T.; Scholz, R.W.	2010	10.43

(*Continued*)

Table 4. Continued.

R	TC	Title	Author/s	Year	C/Y
27	145	Climate change in the British press: The role of the visual	Smith, N.W.; Joffe, H.	2009	9.67
28	144	COVID-19 risk perception: a longitudinal analysis of its predictors and associations with health protective behaviours in the United Kingdom	Schneider, C.R.; Dryhurst, S.; Kerr, J.; Freeman, A.L.J.; Recchia, G.; Spiegelhalter, D.; Van der Linden, S.	2021	48.00
29	144	The precautionary principle and the uncertainty paradox	Van Asselt, M.B.A.; Vos, E.	2006	8.00
30	137	Consequences of perceived risk: Demand for mitigation	Sjöberg, L.	1999	5.48
31	136	GIS-based DRASTIC method for groundwater vulnerability assessment: A review	Shirazi, S.M.; Imran, H.M.; Akib, S.	2012	11.33
32	135	The two faces of social capital in private flood mitigation: opposing effects on risk perception, self-efficacy and coping capacity	Babcicky, P.; Seebauer, S.	2017	19.29
33	135	Understanding public attitudes to technology	Frewer, L.J.; Howard, C.; Shepherd, R.	1998	5.19
34	128	Risk at a turning point?	Stirling, A.	1998	4.92
35	124	Climate change: Perceptions and discourses of risk	Etkin, D.; Ho, E.	2007	7.29
36	124	Exploring dimensionality in the origins of hazard-related trust	Johnson, B.B.	1999	4.96
37	120	Perceived risk and tampering with nature	Sjöberg, L.	2000	5.00
38	119	Managing the COVID-19 pandemic through individual responsibility: the consequences of a world risk society and enhanced ethopolitics	Giritli Nygren, K.; Olofsson, A.	2020	29.75
39	117	Risk: Objective or subjective, facts or values	Hansson, S.O.	2010	8.36
40	115	Application of Social Vulnerability Index (SoVI) and delineation of natural risk zones in Greater Lisbon, Portugal	Guillard-Goncalves, C.; Cutter, S.L.; Emrich, C.T.; Zezere, J.L.	2015	12.78
41	115	A methodological approach for the definition of multi-risk maps at regional level: First application	Carpignano, A.; Golia, E.; Di Mauro, C.; Bouchon, S.; Nordvik, J.P.	2009	7.67
42	114	Understanding householder responses to natural hazards: Flooding and sea-level rise comparisons	Harvatt, J.; Petts, J.; Chilvers, J.	2011	8.77
43	113	Determinants of risk behaviour: Effects of perceived risks and risk attitude on farmers adoption of risk management strategies	Van Winsen, F.; De Mey, Y.; Lauwers, L.; Van Passel, S.; Vancauteren, M.; Wauters, E.	2016	14.13
44	111	Scientised citizens and democratised science. Re-assessing the expert-lay divide	Lidskog, R.	2008	6.94
45	111	Public perception of scientific uncertainty in relation to food hazards	Miles, S.; Frewer, L.J.	2003	5.29
46	107	Social vulnerability indexes as planning tools: Beyond the preparedness paradigm	De Oliveira Mendes, J.M.	2009	7.13
47	106	Bringing ideology in: the conservative white male effect on worry about environmental problems in the USA	Mccright, A.M.; Dunlap, R.E.	2013	9.64
48	104	Wrestling with uncertain risks: EU regulation of GMOs and the uncertainty paradox	Van Asselt, M.B.A.; Vos, E.	2008	6.50
49	103	Swine flu and hype: A systematic review of media dramatization of the H1N1 influenza pandemic	Klemm, C.; Das, E.; Hartmann, T.	2016	12.88
50	103	A cross-cultural comparison of road traffic risk perceptions, attitudes towards traffic safety and driver behaviour	Nordfjaern, T.; Jrgensen, S.; Rundmo, T.	2011	7.92

Abbreviations are available in the previous tables except: C/Y: citations per year.

Table 5. Top 40 most cited documents in JRR publications.

R	Year	First author	Cited reference	Volume	Page	Type	TC	C/Y
1	1987	Slovic, P.	Science	v236	p280	A	181	4.89
2	1988	Kasperson, R.E.	Risk Anal	v8	p177	A	112	3.11
3	1992	Beck, U.	Risk Society: New Modernity	–	–	B	100	3.13
4	2004	Slovic, P.	Risk Anal	v24	p311	A	96	4.80
5	1978	Fischhoff, B.	Policy Sciences	v9	p127	A	85	1.85
6	2001	Loewenstein, G.F.	Psychological Bulletin	v127	p267	A	79	3.43
7	2000	Finucane, M.L.	J Behavioral Decis Making	v13	p1	A	70	2.92
8	1979	Kahneman, D.	Econometrica	v47	p263	A	60	1.33
9	1995	Fischhoff, B.	Risk Anal	v15	p137	A	58	2.00
10	1999	Slovic, P.	Risk Anal	v19	p689	A	57	2.28
11	1993	Slovic, P.	Risk Anal	v13	p675	A	53	1.71
12	2000	Sjöberg, L.	Risk Anal	v20	p1	A	49	2.04
13	2008	Renn, O.	Risk Governance: Uncertainty	–	–	B	47	2.94
14	1982	Douglas, M.	Risk Culture: Tech Env Dangers	–	–	B	47	1.12
15	1994	Flynn, J.	Risk Anal	v14	p1101	A	46	1.53
16	2003	Pidgeon, N.	Social Amplification	–	–	B	45	2.14
17	1974	Tversky, A.	Science	v185	p1124	A	45	0.90
18	2000	Slovic, P.	Risk Perception	–	–	B	44	1.83
19	2002	Weber, E.U.	J Behavioral Decis Making	v15	p263	A	38	1.73
20	1998	Renn, O.	J Risk Res	v1	p49	A	38	1.46
21	2009	Aven, T.	J Risk Res	v12	p1	A	36	2.40
22	2005	Löfstedt, R.E.	Risk Management Post	–	–	B	36	1.89
23	1999	Beck, U.	World Risk Society	–	–	B	36	1.44
24	1991	Giddens, A.	Consequences Modernity	–	–	B	36	1.09
25	1999	Griffin, R.J.	Env Res	v80	p230	A	35	1.40
26	1998	Rosa, E.A.	J Risk Res	v1	p15	A	35	1.35
27	1998	Boholm, Å.	J Risk Res	v1	p135	A	35	1.35
28	1990	Renn, O.	Community Risks Pub: Int Persp	–	–	B	35	1.03
29	2000	Siegrist, M.	Risk Anal	v20	p713	A	34	1.42
30	1996	Wynne, B.	Risk Env Modernity: New Ecology	–	–	B	34	1.21
31	1995	Earle, T.	Social Trust: Cosmopolitan Society	–	–	B	34	1.17
32	2011	Van Asselt, M.B.A.	J Risk Res	v14	p431	A	33	2.54
33	2000	Finucane, M.L.	Health Risk Society	v2	p159	A	33	1.38
34	2000	Siegrist, M.	Risk Anal	v20	p195	A	33	1.38
35	2012	Lindell, M.K.	Risk Anal	v32	p616	A	32	2.67
36	2005	Siegrist, M.	J Risk Res	v8	p145	A	32	1.68
37	2002	Klinke, A.	Risk Anal	v22	p1071	A	32	1.45
38	2013	Wachinger, G.	Risk Anal	v33	p1049	A	31	2.82
39	2001	Lerner, J.S.	J Pers Social Psych	v81	p146	A	31	1.35
40	2000	Siegrist, M.	Risk Anal	v20	p353	A	30	1.07

Abbreviations are available in the previous tables except: A: article; B: book.

and six authors have more than five hundred citations. Considering the full profile and influence of the authors according to the Scopus database, the top 50 list includes 12 authors who have published more than 200 documents and nine authors who have received more than 10,000 citations. Moreover, observe that British and American authors lead the ranking, with 16 and 11 working at the UK and the USA institutions, respectively, although an important number of researchers work in other countries including Netherlands, Norway, and Sweden. It is worth mentioning that several of the top 50 leading authors currently hold important editorial positions in JRR, including Ragnar E. Löfstedt (Editor-in-Chief), Jamie K. Wardman (Editor), Frédéric E. Bouder (Book Review Editor), and the Associate Editors Ortwin Renn, Åsa Boholm, Peter M. Wiedemann, and Ann Bostrom.

To investigate how the most productive authors have changed through time, a temporal analysis is conducted in two ten-year periods (i.e. from 1998 to 2007, and from 2008 to 2017) and one six-year period (i.e. from 2018 to 2023). Table 7 presents the results of the temporal evolution of the most productive authors.

The temporal analysis reveals that in each period there are different leaders. Lennart Sjöberg led in the first ten years (1998–2007) of the journal with 13 publications and 874 citations.

Table 6. Top 50 leading authors in JRR.[a]

R	Author name	Institution	Country	TP	TC	H	C/P	≥100	≥50	≥20	TP-Scopus	TC-Scopus
1	Löfstedt, R.E.	King's College London	UK	28	407	13	14.54	0	1	8	146	2685
2	Renn, O.	RIFS	Germany	20	1766	14	88.30	3	7	12	225	13,748
3	Siegrist, M.	ETH Zurich	Switzerland	20	817	12	40.85	1	2	10	380	26,115
4	Aven, T.	U Stavanger	Norway	18	779	10	43.28	1	2	5	383	12,648
5	Sjöberg, L.	Stockholm Sch Econ	Sweden	13	874	9	67.23	3	5	7	211	7251
6	Yang, J.Z.	U Buffalo SUNY	USA	13	335	7	25.77	1	3	5	93	2502
7	Johnson, B.B.	Decision Research Inst	USA	13	329	7	25.31	1	2	4	105	2452
8	Bouder, F.E.	U Stavanger	Norway	13	236	7	18.15	0	2	3	40	476
9	Rundmo, T.	Norwegian U Sci Tech	Norway	12	485	10	40.42	1	3	10	94	5069
10	Graham, J.D.	Indiana U Bloomington	USA	12	142	6	11.83	0	0	2	159	5746
11	Burger, J.	Rutgers U, NB	USA	12	112	6	9.33	0	0	2	647	21,259
12	Osman, M.	U Cambridge	UK	10	94	5	9.40	0	0	1	105	2033
13	Hansson, S.O.	KTH Royal Inst Tech	Sweden	9	379	6	42.11	2	2	3	437	6054
14	Wardman, J.K.	U Leicester	UK	8	342	7	42.75	1	1	5	24	772
15	Gutteling, J.M.	U Twente	Netherlands	8	210	6	26.25	0	2	5	50	2398
16	Timmermans, D.R.M.	Amsterdam UMC	Netherlands	8	71	5	8.88	0	0	0	208	5837
17	Bennett, S.A.	U Leicester	UK	8	45	4	5.63	0	0	0	41	159
18	Boholm, Å.	U Gothenburg	Sweden	7	639	7	91.29	2	3	4	35	1419
19	Nordfjaern, T.	Norwegian U Sci Tech	Norway	7	224	6	32.00	1	1	4	120	2699
20	McComas, K.A.	Cornell U	USA	7	214	6	30.57	1	1	1	93	3168
21	Olofsson, A.	Mid Sweden U	Sweden	7	213	4	30.43	1	1	4	33	827
22	Li, S.	Chinese Academy Sci	China	7	91	6	13.00	0	0	2	142	1928
23	Claassen, L.	RIVM	Netherlands	7	53	4	7.57	0	0	0	45	812
24	Busby, J.S.	Lancaster U	UK	7	51	4	7.29	0	0	1	94	1966
25	Wilkinson, A.	World Energy Council	UK	7	27	3	3.86	0	0	0	24	751
26	Lidskog, R.	Orebro U	Sweden	6	240	5	40.00	1	2	4	120	3393
27	Pidgeon, N.	Cardiff U	UK	6	147	5	24.50	0	1	3	227	18,867
28	Wei, J.	U Sci Tech China	China	6	137	6	22.83	0	0	3	108	2027
29	Lambert, J.H.	U Virginia	USA	6	113	5	18.83	0	1	2	261	4621
30	Luxhoj, J.T.	Rutgers U, NB	USA	6	83	5	13.83	0	0	1	102	877
31	Hayes, J.	RMIT U	Australia	6	66	4	11.00	0	0	1	60	359
32	Fischhoff, B.	Carnegie Mellon U	USA	6	58	5	9.67	0	0	0	455	28,765
33	Van der Linden, S.	U Cambridge	UK	5	1617	4	323.40	3	4	4	174	14,276
34	Frewer, L.J.	Newcastle U	UK	5	474	5	94.80	3	3	5	268	19,498
35	Wong, C.M.L.	U Amsterdam	Netherlands	5	215	3	43.00	1	1	1	15	332
36	Flin, R.	Robert Gordon U	UK	5	194	4	38.80	0	2	3	259	15,550
37	Horlick-Jones, T.	Cardiff U	UK	5	170	5	34.00	0	2	2	50	1924
38	Wiedemann, P.M.	Monash U	Australia	5	145	5	29.00	0	2	2	79	1236
39	Barnett, J.	U Bath	UK	5	145	5	29.00	0	1	3	186	7051
40	Wilson, R.S.	Ohio State U	USA	5	123	4	24.60	0	1	2	94	2675
41	Bostrom, A.	U Washington	USA	5	105	5	21.00	0	0	1	104	5730
42	Bronfman, N.C.	U Andres Bello	Chile	5	103	4	20.60	0	0	2	25	957
43	Keller, C.	ETH Zurich	Switzerland	5	96	5	19.20	0	0	3	63	3946
44	Böhm, G.	U Bergen	Norway	5	94	5	18.80	0	0	3	70	2543
45	Lemyre, L.	U Ottawa	Canada	5	84	4	16.80	0	0	2	84	2125

(*Continued*)

Table 6. Continued.

R	Author name	Institution	Country	TP	TC	H	C/P	≥100	≥50	≥20	TP-Scopus	TC-Scopus
46	Besley, J.C.	Michigan State U	USA	5	60	5	12.00	0	0	0	105	3297
47	Rothstein, H.	King's College London	UK	5	59	3	11.80	0	0	2	34	1140
48	Way, D.	King's College London	UK	5	50	4	10.00	0	0	1	6	114
49	Burgess, A.	U Kent	UK	5	46	4	9.20	0	0	1	38	762
50	Eidinow, E.	U Bristol	UK	5	22	3	4.40	0	0	0	48	497

Abbreviations are available in the previous tables except: TP-Scopus and TC-Scopus: total publications and citations from the author profile generated by Scopus; Amsterdam UMC: Amsterdam University Medical Center; RIFS: Research Institute for Sustainability–Helmholtz Centre Potsdam; RIVM: National Institute for Public Health and the Environment (Rijksinstituut voor Volksgezondheid en Milieu).

[a]The ranking is determined by the total publications in JRR. In the case of a tie, the total citations are considered.

Michael Siegrist and Ragnar E. Löfstedt, having 13 publications each, jointly led in the period between 2008 and 2017. From 2018 to 2023, Löfstedt is still the most productive author who published 15 publications in total, while Siegrist is ranked in the 10th position. Observe that Torbjørn Rundmo attains the 2nd position in the first ten years, while he is ranked the 14th position during the period of 2008–2017 with four publications. Terje Aven and Janet Z. Yang are in the 6th and 26th position, respectively, for the period of 2008–2017; however, they have become more productive in the past six years (2018–2023), ranked in the 2nd and 3rd positions, respectively. Note that Ortwin Renn performs most regularly, and he attains the 6th, 3rd, and 7th positions in the list for the periods of 1998–2007, 2008–2017, and 2018–2023, respectively. In addition, Dan M. Kahan and Ortwin Renn have received more than one thousand citations during the period of 2008–2017, and Sander van der Linden is the most cited author (1617 citations) between 2018 and 2023. By further examining Table 4, some of their publications are identified in the top 50 most cited papers in JRR.

Next, let us analyse the most productive and influential institutions. Note that the institutions here represent the affiliations of the authors when they published their papers in JRR. The authors who have changed affiliations may have publications with different institutions. Table 8 shows the 50 most productive institutions in JRR. Similar to the author analysis, the institutions are ranked according to the number of publications, while in case of a tie, the total number of citations is considered.

King's College London is the most productive institution, thanks in part to the work of Löfstedt et al., which is followed by the University of Stavanger and ETH Zurich. The University of Cambridge has received the most citations and shows the best performance in the 'citations per paper' category, although it obtains only the 17th position in the ranking of the most productive institutions. Note that the Stockholm School of Economics has four publications that have received one hundred or more citations, and Maastricht University, the University of Cambridge, and the University of East Anglia have three publications each. It is worth mentioning that the latest position of Ortwin Renn, the second most productive author (see Table 6), is at the Research Institute for Sustainability–Helmholtz Centre Potsdam (RIFS); however, he worked at the University of Stuttgart until his retirement. The institutions from the UK and the USA hold almost half of the positions in the top 50 list, with 13 and 11, respectively. It is noticeable that the institutions from different parts of Europe mostly dominate this journal, mainly including the UK, Sweden, Netherlands, and Norway. Generally, there are 11 universities of the top 50 institutions that appear in the top 100 of the world university rankings, among which ETH Zurich, University of Cambridge, Harvard University, Cornell University, University of Melbourne, and University of New South Wales are the top 20 world universities. Only four universities are usually not in the top 500 of the world university rankings. In this regard, JRR is having significant influences among the world's leading universities. Additionally, note that

Table 7. Temporal evolution of the most productive authors.

R	Author	TP	TC
	1998–2007		
1	Sjöberg, L.	13	874
2	Rundmo, T.	8	299
3	Wilkinson, A.	7	27
4	Eidinow, E.	5	22
5	Elahi, S.	5	21
6	Renn, O.	4	498
7	Frewer, L.J.	4	437
8	Hansson, S.O.	4	250
9	Rosa, E.A.	3	410
10	Af Wahlberg, A.	3	363
11	Rogers, M.D.	3	276
12	Poortinga, W.	3	276
13	Peterson, M.	3	223
14	Slovic, P.	3	160
15	Horlick-Jones, T.	3	150
	2008–2017		
1	Siegrist, M.	13	275
2	Löfstedt, R.E.	13	215
3	Renn, O.	10	1053
4	Burger, J.	9	81
5	Nordfjaern, T.	7	224
6	Aven, T.	6	583
7	Keller, C.	5	96
8	Li, S.	5	66
9	McComas, K.A.	5	59
10	Way, D.	5	50
11	Busby, J.S.	5	41
12	Boholm, Å.	4	294
13	Corvellec, H.	4	259
14	Rundmo, T.	4	186
15	Gutteling, J.M.	4	137
16	Bouder, F.E.	4	100
17	Lambert, J.H.	4	97
18	Cousin, M.E.	4	70
19	Luxhoj, J.T.	4	60
20	Abrahamsen, E.B.	4	26
21	Graham, J.D.	4	23
22	Kahan, D.M.	3	1260
23	Van Asselt, M.B.A.	3	471
24	Stauffacher, M.	3	180
25	Scholz, R.W.	3	180
26	Yang, J.Z.	3	112
27	Zhang, L.	3	111
28	Mol, A.P.J.	3	111
29	Bergmans, A.	3	103
30	Salzano, E.	3	101
	2018–2023		
1	Löfstedt, R.E.	15	192
2	Aven, T.	12	196
3	Yang, J.Z.	10	223
4	Osman, M.	10	94
5	Johnson, B.B.	9	82
6	Bouder, F.E.	8	131
7	Renn, O.	6	215
8	Van der Linden, S.	5	1617
9	Wardman, J.K.	5	265
10	Siegrist, M.	5	49
11	Graham, J.D.	5	23
12	Brossard, D.	4	240
13	Wong, C.M.L.	4	208
14	Zinn, J.O.	4	110
15	Warren, G.W.	4	107
16	Wei, J.	4	87
17	Burgess, A.	4	23
18	Bennett, S.A.	4	21
19	Hayes, J.	4	18
20	Timmermans, D.R.M.	4	11
21	Claassen, L.	4	11

Abbreviations are available in the previous tables.

half of the top 20 most productive institutions have several researchers who are currently in the editorial board of JRR, making substantial influences in the journal.

To further investigate the evolution of the results throughout time, we analyse the 20 most productive institutions in the three periods of 1998–2007, 2008–2017, and 2018–2023, respectively. Table 9 shows the results.

In the first ten years of JRR between 1998 and 2007, the Stockholm School of Economics was the most productive and influential institution, having the highest number of publications and citations. King's College London is ranked in the second position with 13 publications. For the period of 2008–2017, the University of Stavanger, ETH Zurich, and King's College London were tied for the most productive institutions, with 19 publications each. The University of Stuttgart has received the highest number of citations in this period with more than one thousand times, thanks largely to the contributions of Renn et al. In the last six years between 2018 and 2023, King's College London is the most productive institution, followed by the University of Stavanger and ETH Zurich. The University of Cambridge stands out in terms of the total number of citations (i.e. 1665) during this period. It is worth noting that King's College London has been leading in JRR for all the three periods, and that the University of Gothenburg regularly performs in these periods. Moreover, the Norwegian University of Science and Technology occupied the third top position in the first ten years; however, it reduced to the 16th for the period of 2008–2017. Conversely, the University of Nottingham has become more productive in JRR during the last six years, rising from the 20th position between 2008 and 2017 to the fourth. From a general perspective, the European institutions have remarkable influence on the journal.

Next, we look into the publications at the country/territory level to obtain a more general picture of the results. Note that the country/territory represents the affiliation of the institutions where the authors are working when they publish their research in the journal. Table 10 presents the 40 most productive and influential countries/territories in JRR.

The UK leads the journal with 366 publications and is closely followed by the USA with 345 publications. Sweden, Netherlands, and Norway also perform remarkably well especially considering their population size, which obtain the third, fourth, and fifth positions, respectively. Note that Norway presents the best performance in terms of the 'publications per million inhabitants' and 'citations per million inhabitants' categories. Although Malaysia and Tunisia are in the top positions regarding citations per paper, their results are less significant because of the lower number of publications. The publication results regarding citation thresholds show that the UK and the USA have published most of the journal's leading papers. There are 14 European countries appear in the top 20, while only three Asian countries: China, Japan, and South Korea. Furthermore, although developing countries/territories take a majority of positions in the rear half of the top 40 list, they do not publish many in the journal, indicating that most developing countries/territories are still far away from the leading positions. The results in Table 10 show that JRR is very diverse, with countries/territories from all over the world disseminating the knowledge in risk research, although European institutions obtain the most remarkable results.

Further, to see the evolution of countries/territories' publications through time, Table 11 presents the number of papers published in JRR annually by the top 30 countries/territories. Note that the table mainly focuses on the last 20 years for annual analysis, while for the years between 1998 and 2003, the papers are grouped into three-year periods because the numbers are otherwise too small to make sense.

The UK and the USA have always been the main leaders of the journal. During the first six years, the UK published nearly one-third of all publications in JRR. It is worth noting that the USA has become more productive during the last five years, and that the USA published 13 more papers than the UK in 2020, three more in 2021, and six more in 2023. Therefore, the USA tends to play a more prominent role in leading the journal in the future. In 2011, China and Australia started to publish more regularly in the journal. Overall, most of the countries/

Table 8. The most productive and influential institutions in JRR.

R	Institution	Country	TP	TC	H	C/P	≥100	≥50	≥10	QS	ARWU
1	King's College London	UK	51	1103	22	21.63	0	7	31	40	59
2	U Stavanger	Norway	36	988	14	27.44	1	2	18	801–850	–
3	ETH Zurich	Switzerland	36	833	17	23.14	1	4	22	7	20
4	U Nottingham	UK	27	741	13	27.44	1	4	16	108	101–150
5	Decision Research Inst	USA	23	723	13	31.43	1	5	16	–	–
6	Rutgers U, NB	USA	23	256	10	11.13	0	0	10	328	101–150
7	U Gothenburg	Sweden	22	885	12	40.23	2	4	15	194	101–150
8	Norwegian U Sci Tech	Norway	22	609	11	27.68	1	4	12	264	101–150
9	Michigan State U	USA	20	342	11	17.10	1	2	12	152	151–200
10	Stockholm Sch Econ	Sweden	18	1254	11	69.67	4	6	12	–	501–600
11	Maastricht U	Netherlands	18	835	11	46.39	3	4	12	230	201–300
12	Mid Sweden U	Sweden	18	350	8	19.44	1	2	8	–	–
13	Carnegie Mellon U	USA	18	237	10	13.17	0	1	10	58	101–150
14	KTH Royal Inst Tech	Sweden	17	526	10	30.94	2	3	10	74	201–300
15	CNRS	France	17	249	10	14.65	0	1	10	–	–
16	Lund U	Sweden	17	203	9	11.94	0	1	7	75	151–200
17	U Cambridge	UK	16	1819	10	113.69	3	5	10	5	4
18	U Buffalo SUNY	USA	16	356	8	22.25	1	3	8	466	301–400
19	Chinese Academy Sci	China	16	300	9	18.75	0	2	9	–	–
20	Delft U Tech	Netherlands	16	282	10	17.63	0	1	10	49	151–200
21	Wageningen U Research	Netherlands	15	439	11	29.27	1	2	12	155	151–200
22	U Stuttgart	Germany	14	1176	9	84.00	2	4	9	314	301–400
23	Ohio State U	USA	14	278	9	19.86	0	1	9	208	101–150
24	U Twente	Netherlands	13	409	10	31.46	1	3	10	233	401–500
25	U Surrey	UK	13	351	9	27.00	0	3	9	285	301–400
26	London Sch Econ Polit Sci	UK	13	332	9	25.54	0	3	8	50	151–200
27	U East Anglia	UK	12	1035	9	86.25	3	6	9	332	201–300
28	Cardiff U	UK	12	453	9	37.75	1	3	9	186	151–200
29	Harvard U	USA	12	315	8	26.25	0	1	8	4	1
30	U Oslo	Norway	12	284	9	23.67	0	2	8	119	73
31	Queen Mary U London	UK	12	106	5	8.83	0	0	5	120	201–300
32	Orebro U	Sweden	11	320	9	29.09	1	2	8	–	701–800
33	U British Columbia	Canada	11	296	6	26.91	0	3	6	38	44
34	Cornell U	USA	11	264	6	24.00	1	1	5	16	12
35	U Antwerp	Belgium	11	264	7	24.00	1	2	6	267	201–300
36	U Kent	UK	11	180	7	16.36	0	1	5	380	401–500
37	Lancaster U	UK	11	120	6	10.91	0	0	3	141	301–400
38	Uppsala U	Sweden	11	114	8	10.36	0	0	6	103	82
39	U Chinese Academy Sci	China	11	87	6	7.91	0	0	5	–	–
40	Washington State U	USA	10	533	6	53.30	1	1	6	466	401–500
41	U Washington	USA	10	280	9	28.00	0	2	9	76	18
42	U Melbourne	Australia	10	257	8	25.70	0	1	8	13	35
43	U Sussex	UK	10	254	7	25.40	1	1	6	246	201–300
44	U Bergen	Norway	10	197	8	19.70	0	0	8	291	301–400
45	U Central Florida	USA	10	114	6	11.40	0	0	6	741–750	301–400
46	RIVM	Netherlands	10	68	6	6.80	0	0	2	–	–
47	Glasgow Caledonian U	UK	9	251	5	27.89	1	1	5	1001–1200	–
48	U Southampton	UK	9	192	5	21.33	1	1	3	80	151–200
49	U New South Wales	Australia	9	188	7	20.89	0	1	6	19	72
50	U Ottawa	Canada	9	147	7	16.33	0	0	5	189	201–300

Abbreviations are available in the previous tables except: CNRS: The French National Centre for Scientific Research (Centre National de la Recherche Scientifique); ARWU: Academic Ranking of World Universities 2023; QS: Quacquarelli & Symonds World University Rankings 2025.

territories are increasing their annual number of publications with the development of the journal. It is expected that JRR will continue growing, and many countries/territories will participate in more regularly.

Table 9. Temporal evolution of the most productive institutions.

R	Institution	TP	TC
	1998–2007		
1	Stockholm Sch Econ	17	1248
2	King's College London	13	429
3	Norwegian U Sci Tech	12	404
4	Harvard U	10	294
5	U East Anglia	8	345
6	KTH Royal Inst Tech	8	333
7	U Nottingham	8	215
8	Decision Research Inst	7	482
9	U British Columbia	7	209
10	CNRS	7	130
11	Shell International Ltd	7	27
12	U Gothenburg	6	427
13	European Commission	6	313
14	U Tsukuba	6	201
15	U Surrey	6	156
16	Carnegie Mellon U	5	114
17	Inserm	5	21
18	Cardiff U	4	339
19	U Sussex	4	199
20	Orebro U	4	104
	2008–2017		
1	U Stavanger	19	756
2	ETH Zurich	19	554
3	King's College London	19	477
4	Rutgers U, NB	15	158
5	Maastricht U	11	633
6	U Stuttgart	10	1058
7	Chinese Academy Sci	10	260
8	Lund U	10	148
9	U Gothenburg	9	384
10	London Sch Econ Polit Sci	9	297
11	Delft U Tech	9	198
12	Carnegie Mellon U	9	93
13	U Twente	8	321
14	Wageningen U Research	8	198
15	Cornell U	8	102
16	Norwegian U Sci Tech	7	202
17	U Surrey	7	195
18	U Southampton	7	191
19	U New South Wales	7	142
20	U Nottingham	7	115
	2018–2023		
1	King's College London	19	197
2	U Stavanger	17	232
3	ETH Zurich	13	273
4	U Nottingham	12	411
5	U Buffalo SUNY	12	228
6	Queen Mary U London	12	106
7	Michigan State U	12	70
8	Decision Research Inst	11	101
9	U Cambridge	10	1665
10	Mid Sweden U	10	223
11	U Melbourne	8	184
12	U Central Florida	8	92
13	U Chinese Academy Sci	8	50
14	RIFS	7	257
15	U College London	7	136
16	U Gothenburg	7	74
17	Ohio State U	6	92
18	U Kent	6	60
19	Lund U	6	42
20	Chinese Academy Sci	6	40

Abbreviations are available in the previous tables.

Table 10. The most productive and influential countries/territories in JRR.

R	Country/ Territory	TP	TC	H	C/P	≥100	≥50	≥10	Population	P/Po	C/Po
1	UK	366	10,165	50	27.77	13	50	189	68.12	5.37	149.22
2	USA	345	8643	44	25.05	13	39	178	335.14	1.03	25.79
3	Sweden	133	3422	28	25.73	9	15	70	10.55	12.61	324.36
4	Netherlands	116	3751	25	32.34	7	13	62	17.81	6.51	210.61
5	Norway	99	2421	27	24.45	2	11	51	5.53	17.90	437.79
6	Germany	96	3417	27	35.59	5	16	52	84.54	1.14	40.42
7	China	81	1142	19	14.10	0	5	40	1418.22	0.06	0.81
8	Australia	67	1120	17	16.72	0	4	41	26.62	2.52	42.07
9	France	67	939	18	14.01	0	3	36	65.91	1.02	14.25
10	Canada	63	1096	18	17.40	1	6	33	39.97	1.58	27.42
11	Italy	54	1256	22	23.26	1	9	32	58.85	0.92	21.34
12	Switzerland	53	1569	18	29.60	2	8	32	8.82	6.01	177.89
13	Japan	45	595	13	13.22	0	2	15	124.62	0.36	4.77
14	Spain	42	606	13	14.43	1	2	18	47.81	0.88	12.68
15	Belgium	34	681	15	20.03	2	3	18	11.74	2.90	58.01
16	Denmark	24	374	10	15.58	0	2	13	5.93	4.05	63.07
17	South Korea	23	258	9	11.22	0	0	9	51.6	0.45	5.00
18	Ireland	21	341	10	16.24	0	2	10	5.23	4.02	65.20
19	Finland	21	234	10	11.14	0	0	10	5.56	3.78	42.09
20	Austria	16	506	12	31.63	1	3	13	9.11	1.76	55.54
21	Portugal	15	504	11	33.60	2	3	11	10.31	1.45	48.88
22	Singapore	12	357	6	29.75	1	2	6	5.92	2.03	60.30
23	Greece	12	172	7	14.33	0	1	7	10.45	1.15	16.46
24	Turkey	12	148	6	12.33	0	0	3	86.27	0.14	1.72
25	Brazil	11	142	6	12.91	0	0	5	204.25	0.05	0.70
26	Taiwan	10	238	7	23.80	0	2	5	23.32	0.43	10.21
27	Israel	10	100	5	10.00	0	0	4	9.76	1.02	10.25
28	India	10	54	4	5.40	0	0	1	1430	0.01	0.04
29	South Africa	9	60	4	6.67	0	0	2	61.53	0.15	0.98
30	Chile	7	115	4	16.43	0	0	4	19.96	0.35	5.76
31	Poland	7	70	6	10.00	0	0	3	36.75	0.19	1.90
32	Hungary	7	66	5	9.43	0	0	4	9.6	0.73	6.88
33	Serbia	6	151	4	25.17	0	1	3	6.64	0.90	22.74
34	Czech Republic	6	51	5	8.50	0	0	2	10.85	0.55	4.70
35	Tunisia	4	166	4	41.50	0	1	4	12.24	0.33	13.56
36	Ethiopia	4	88	4	22.00	0	0	3	105.71	0.04	0.83
37	Estonia	4	44	3	11.00	0	0	1	1.37	2.92	32.12
38	Russia	4	16	2	4.00	0	0	1	146.33	0.03	0.11
39	Malaysia	3	156	3	52.00	1	1	2	33.06	0.09	4.72
40	Mexico	3	81	3	27.00	0	0	2	131.14	0.02	0.62

Abbreviations are available in the previous tables except: P/Po and C/Po: publications and citations per million inhabitants. Note that the total population (millions of inhabitants) of a country/territory in 2023 is obtained from the International Monetary Fund.

Additionally, we summarise all the publications of JRR from a supranational perspective, and Table 12 illustrates the results.

Europe (especially Western Europe) is currently the most productive region, distantly followed by North America and Asia. Note that Western Europe performs the best in the categories of 'publications per million inhabitants' and 'citations per million inhabitants'. The significant results obtained by Western Europe indicate that the journal is strongly impacting the countries within this region. East Asia takes a critical part in the journal's publications among the Asian regions. Oceania also performs well considering its small population size. Latin America and Southeast Asia are tied for the productivity, but Southeast Asia is more influential with nearly twice the number of citations than that of Latin America. From a globalised perspective, the journal has publications from all over the world. Africa and Middle East have published more significantly than Central Asia and South Asia, although their numbers are still very low compared with the leading regions.

Table 11. Annual number of papers classified by countries/territories.

R	Country/ Territory	23	22	21	20	19	18	17	16	15	14	13	12	11	10	09	08	07	06	05	04	D1	D2	Total
1	UK	12	22	26	18	30	19	9	22	14	12	15	11	15	11	13	14	17	13	12	12	27	22	366
2	USA	18	18	29	31	30	19	20	14	15	18	12	9	13	15	6	14	9	5	5	7	17	21	345
3	Sweden	1	3	11	8	12	8	7	3	6	6	3	4	5	4	4	9	2	7	5	7	10	8	133
4	Netherlands	6	3	5	10	3	8	10	11	6	8	7	4	8	5	3	4	1	3	5	3	2	1	116
5	Norway	11	4	12	8	4	2	5	4	3	4	3	6	2	2	12	0	2	3	2	4	4	2	99
6	Germany	6	7	4	9	6	4	6	4	3	3	16	3	3	4	4	0	0	4	2	0	5	3	96
7	China	13	5	8	2	9	7	10	2	3	4	5	2	5	2	1	1	0	0	0	0	1	1	81
8	Australia	3	3	5	7	7	13	1	6	6	1	0	3	3	1	2	1	1	0	0	3	0	1	67
9	France	4	4	3	2	2	3	4	2	3	3	5	7	2	1	1	0	5	3	3	1	7	2	67
10	Canada	3	1	5	5	5	3	2	1	1	2	4	3	6	2	5	1	3	4	1	4	1	1	63
11	Italy	6	3	3	3	1	4	1	6	3	3	6	6	3	1	1	1	0	1	0	0	0	2	54
12	Switzerland	2	3	3	3	4	3	4	1	2	2	3	5	3	3	0	2	1	1	1	1	4	2	53
13	Japan	1	1	1	2	0	2	1	2	3	2	3	1	5	0	1	5	3	0	1	3	3	5	45
14	Spain	2	6	2	3	2	3	4	4	1	2	2	2	1	0	2	2	0	1	1	0	1	1	42
15	Belgium	3	3	1	1	0	1	3	4	6	2	0	0	4	1	0	1	1	0	0	1	1	1	34
16	Denmark	1	1	1	1	0	4	1	0	1	1	1	0	3	1	1	4	1	0	0	0	1	1	24
17	South Korea	3	0	2	5	4	0	1	0	4	2	0	1	0	0	0	0	0	0	0	0	0	1	23
18	Ireland	1	0	2	0	0	1	2	4	0	2	0	1	1	3	0	2	0	0	0	0	1	1	21
19	Finland	1	2	3	1	1	1	2	1	0	2	4	1	1	0	1	0	0	0	0	0	0	0	21
20	Austria	1	0	1	3	1	1	2	0	0	0	2	0	0	1	0	0	0	1	0	0	2	1	16
21	Portugal	1	0	0	2	0	0	0	5	1	1	0	0	1	0	2	0	0	0	1	0	1	0	15
22	Singapore	4	0	0	3	0	1	0	0	0	0	1	1	1	0	0	0	0	0	1	0	0	0	12
23	Greece	0	2	0	0	0	0	1	2	0	2	1	0	0	2	1	0	0	0	0	0	0	1	12
24	Turkey	0	0	1	0	0	1	1	2	1	1	1	2	1	0	0	0	0	1	0	0	0	0	12
25	Brazil	3	0	0	0	4	0	0	0	1	1	1	0	0	0	0	0	0	0	1	0	0	0	11
26	Taiwan	0	0	0	0	1	0	1	1	0	1	0	1	0	0	1	1	1	0	0	0	0	2	10
27	Israel	1	0	1	0	0	2	1	1	0	0	1	1	1	0	1	0	0	0	0	0	0	0	10
28	India	0	0	0	0	0	1	0	0	2	6	0	0	0	0	1	0	0	0	0	0	0	0	10
29	South Africa	2	1	3	0	0	0	1	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	9
30	Chile	0	0	0	0	0	1	1	0	0	0	0	1	0	0	0	2	1	1	0	0	0	0	7

Abbreviations are available in the previous tables except: D1 and D2 represent the number of publications in the periods of 2001–2003 and 1998–2000, respectively. The rest of years (04–23) indicate the number of publications in that year.

Table 12. Publication structure classified by supranational regions.

R	Region	TP	TC	H	C/P	Population	P/Pop	C/Pop
1	Europe	1023	25,270	70	24.70	735.93	1.39	34.34
	Western Europe	1001	25,029	70	25.00	428.91	2.33	58.35
	Eastern Europe	38	507	12	13.34	307.02	0.12	1.65
2	North America	401	9590	46	23.92	375.11	1.07	25.57
3	Asia	195	3002	29	15.39	2653.95	0.07	1.13
	East Asia	151	2175	27	14.40	1620	0.09	1.34
	Southeast Asia	23	614	12	26.70	680.37	0.03	0.90
	Central Asia	13	163	6	12.54	182.5	0.07	0.89
	South Asia	11	62	5	5.64	1890	0.01	0.03
4	Oceania	69	1129	17	16.36	46.56	1.48	24.25
5	Latin America	23	332	11	14.43	638.66	0.04	0.52
6	Africa	21	399	11	19.00	1400	0.02	0.29
7	Middle East	18	156	6	8.67	254.18	0.07	0.61

Abbreviations are available in the previous tables. Note that the total population (millions of inhabitants) of a supranational region in 2023 is obtained from the International Monetary Fund.

Finally, let us analyse the citing articles of the journal in order to identify the origin of the citations of JRR. To this end, Table 13 presents, according to the Scopus database, the 30 authors, institutions, countries/territories, and journals that have the highest number of articles citing JRR. Note that only the 'articles' and 'reviews' are considered in the citation report generated by Scopus.

Michael Siegrist and Terje Aven are the two authors who cite the journal most frequently, with 90 and 88 papers, respectively. It is worth noting that the results depend a lot on the

productivity of the author (Merigó et al. 2018), and previous results have shown that the two authors are extremely productive. By further examining Table 6, 18 authors within the citing list are also the top 50 leading authors in JRR. At the institution level, ETH Zurich and Wageningen University & Research are the top 2 leading institutions that have more than two hundred papers citing JRR, followed by Cardiff University and the University of Stavanger. One-third of the top 30 institutions are from the UK, while only four from the USA. From the country/territory perspective, the USA leads the ranking, followed by the UK and China. The results indicate that the USA is growing significantly in risk research and today becomes more productive than the UK. Australia also cites the journal very frequently and is ranked in the fourth position. However, some unexpected countries/territories enter the top 30, including Malaysia in the 19th and Iran in 24th.

From the journal perspective, JRR is the most significant one because of self-citations. Note that the self-citation phenomenon is quite common for most of the journals because the material appearing in a journal tend to influence the future research in the same journal (Merigó et al. 2015). Risk Analysis, Sustainability, International Journal of Environmental Research and Public Health, and International Journal of Disaster Risk Reduction are other four journals that cite JRR more frequently, with 528, 427, 378, and 356 articles, respectively. Most of the journals in the list are connected closely with social sciences, environmental science, public health, and communication studies. However, several general OR-MS and engineering journals have also considerable citing numbers, including Safety Science, PLOS One, and Reliability Engineering and System Safety.

4. Mapping JRR with VOS viewer software

To provide a deeper understanding of the bibliographic material published in JRR, this section develops a graphical mapping of the data using the VOS viewer software (Van Eck and Waltman 2010). First, let us examine the co-citation of journals cited in JRR. Recall that the co-citation (Small 1973) of journals occurs when two documents published in different journals receive a citation from the same third document of another journal. Figure 3 presents an overall visualisation between 1998 and 2023 with a minimum threshold of 30 citations and the 100 most representative co-citation connections. Note that the width of the links represents the strength of the connection.

Risk Analysis is the most cited journal in JRR publications and has the strongest connection with JRR. Observe that the self-citations of JRR account for a substantial part of its citations, a feature common in most journals. It is worth noting that JRR cites the journals in social sciences, psychology, environmental science, OR-MS, and engineering more frequently. Furthermore, Figure 3 confirms JRR's multidisciplinary profile, citing also journals from fields, such as communication studies, economics, business, and ergonomics. To examine how the citations evolve through time, Figures 4–6 visualise the co-citation of journals in the periods of 1998–2007, 2008–2017, and 2018–2023, respectively. Note that the minimum citation thresholds for these figures are 10, 20, and 20, respectively. Figures 4 and 5 consider the 50 most representative co-citation links, while Figure 6 has 100 links.

Risk Analysis has been the most influential journal in JRR throughout its entire lifetime. Between 1998 and 2007, JRR did not have many self-citations because there were not many previous publications to be cited. However, over time, the self-citations of JRR have been becoming more and more relevant and today have already exceeded the number of citations of Risk Analysis. Note that at the beginning the graphical map of Figure 3 is much less dense than the other ones, which is mainly because there were not as many journals as today and the papers published in JRR were less than today. Moreover, it is worth noting that journals from the fields of engineering, OR-MS, and communication studies are becoming more influential

Table 13. Citing articles of JRR: authors, institutions, countries/territories, and journals.

R	Author	TP	TC	Institution	TP	TC	Country/Territory	TP	TC	J	TP	TC
1	Siegrist, M.	90	8268	ETH Zurich	260	12,922	USA	4988	179,485	J Risk Res	895	20,921
2	Aven, T.	88	6018	Wageningen U Research	219	12,126	UK	3288	142,243	Risk Anal	528	30,090
3	Pidgeon, N.	68	7539	Cardiff U	183	12,597	China	2135	36,976	Sustainability	427	5594
4	Frewer, L.J.	63	8031	U Stavanger	178	7908	Australia	1554	54,959	IJ Env Res Public Health	378	5788
5	Renn, O.	62	6187	Norwegian U Sci Tech	176	6319	Germany	1315	43,355	IJ Disaster Risk Reduction	356	7087
6	Johnson, B.B.	43	631	U College London	171	11,416	Netherlands	1109	49,453	Safety Science	293	11,060
7	Frangopol, D.M.	42	2622	U Cambridge	159	13,865	Canada	1072	26,868	PLOS One	229	6849
8	Barnett, J.	41	1789	Delft U Tech	158	5114	Italy	1026	28,446	Frontiers in Psych	206	4395
9	Lidskog, R.	37	1201	King's College London	152	8798	Sweden	859	30,131	Public Underst Science	137	5496
10	Rundmo, T.	36	2366	U Melbourne	150	6144	Norway	798	26,002	Natural Hazards	135	5661
11	Van der Linden, S.	34	4899	Michigan State U	148	5815	Spain	700	14,239	Health Risk Society	126	2790
12	Stauffacher, M.	33	2936	U Oxford	147	9804	France	671	16,011	Reliability Eng Syst Saf	117	6364
13	Nordfjaern, T.	33	1065	Chinese Academy Sci	144	3359	Switzerland	574	27,537	Climatic Change	109	6518
14	Lambert, J.H.	32	742	U Queensland	136	6939	India	484	9120	Energy Policy	101	8226
15	Burger, J.	32	697	U Gothenburg	130	4367	South Korea	441	8772	Global Env Change	97	14,441
16	Brossard, D.	31	1322	Texas A&M U	129	3568	Japan	385	7697	Frontiers in Public Health	96	1086
17	Sjöberg, L.	30	2333	U Michigan, Ann Arbor	126	4375	Belgium	345	10,185	Energy Res Social Science	94	2426
18	Scheufele, D.A.	29	1482	U Nottingham	125	5750	Denmark	330	13,266	BMC Public Health	93	2189
19	Leiserowitz, A.	28	3601	London Sch Econ Polit Sci	124	4644	Malaysia	327	4746	J Cleaner Produ	92	3083
20	Yang, J.Z.	28	409	CNRS	124	2593	Brazil	301	5401	Science Total Env	89	3675
21	Hamilton, L.C.	26	1062	Lund U	123	2887	Portugal	297	7058	J Env Psych	82	6409
22	Scolobig, A.	26	727	Vrije U Amsterdam	122	4385	Austria	296	9924	Science Commun	78	3268
23	Arvai, J.	26	700	Utrecht U	111	3593	Finland	294	7207	Transport Res F-Traf	78	2015
24	Li, S.	26	505	U Leeds	109	7480	Iran	268	5149	Env Science Policy	75	2828
25	Poortinga, W.	25	4428	U New South Wales	107	4106	Turkey	251	4594	Accident Anal Prev	72	2513
26	Klein, W.M.P.	25	1731	U Amsterdam	106	5251	New Zealand	241	6290	J Env Manag	69	1835
27	Besley, J.C.	24	940	U Manchester	106	3506	Taiwan	241	6164	Env Commun	68	1730
28	Lemyre, L.	24	418	U Edinburgh	106	3236	South Africa	229	5221	Human Ecol Risk Assess	63	893
29	Perko, T.	24	241	U Wisconsin, Madison	104	4761	Poland	219	4122	Water	61	1092
30	Lewandowsky, S.	23	3418	Tsinghua U	104	2921	Israel	200	3485	J Health Commun	60	1941

Abbreviations are available in the previous tables.

in JRR through time, although social, psychological, and environmental sciences-related journals have been highly relevant of all time. From this perspective, JRR has made remarkable contributions to address the risk issues in areas of social sciences and engineering, which aligns with one of the founding visions of the journal (Löfstedt 1998) and makes it stand out from other mainstream risk journals.

To summarise the results of co-citation analysis of journals and supplement detailed co-citation data, Table 14 presents the 40 most cited journals in JRR considering the overall results and three different periods: 1998–2007, 2008–2017, and 2018–2023.

The results regarding global and temporal analysis further confirm the strong influence of Risk Analysis and JRR itself over the entire lifetime of JRR. In addition, Science, Safety Science, and Journal of Personality and Social Psychology have been also highly cited by JRR through time. Note that Reliability Engineering and System Safety and Global Environmental Change have been getting more and more influential in JRR over time, which are ranked in the 6th and 7th positions, respectively, for the period of 2018–2023. Moreover, from the global perspective, 11 journals have a >200 citation link strength with JRR. It is worth noting that only three journals have the citation link strength >100 with JRR in the 1998–2007 period, while the number has increased to 14 journals during the last six years. These results indicate that the relevance of JRR is growing rapidly.

Next, let us analyse the co-citation of authors most cited in JRR. Figure 7 illustrates the co-citation of authors with a minimum threshold of 50 citations and the 100 most representative co-citation connections among authors.

Some of the leading scholars in risk research appear in Figure 7 as the most influential authors on JRR, including Paul Slovic, Ortwin Renn, Baruch Fischhoff, Lennart Sjöberg, and Michael Siegrist. Note that Paul Slovic is the most cited author in the journal's publications and together with Ortwin Renn, they have become the core authors whose studies impact JRR very

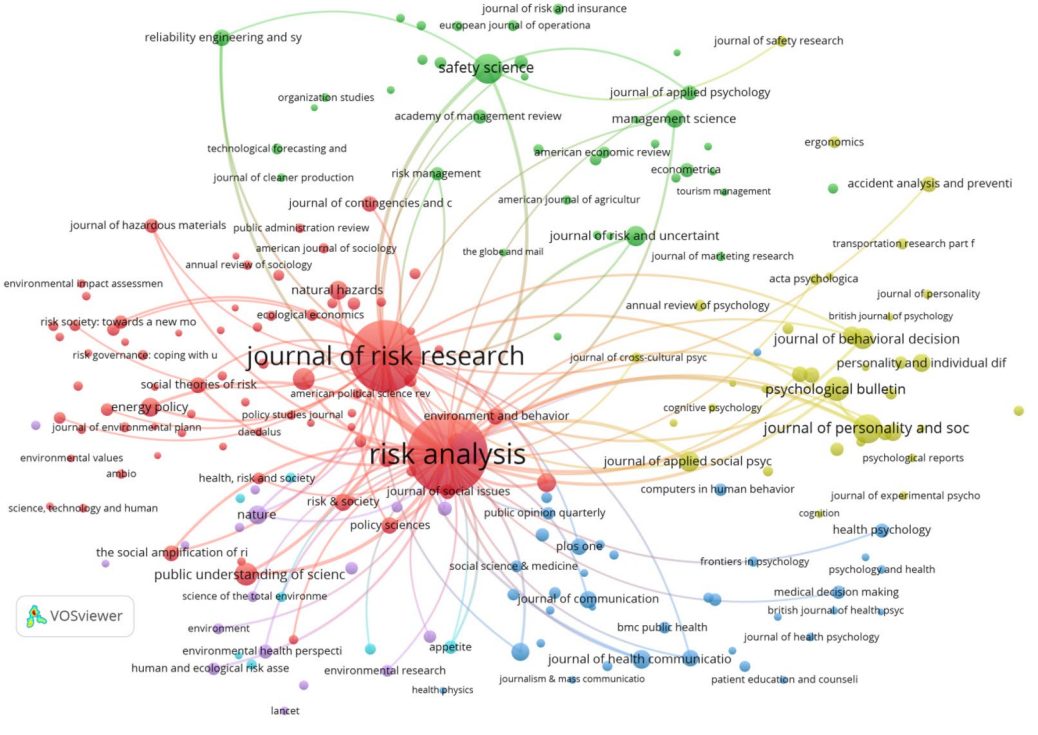

Figure 3. Co-citation of journals in JRR: minimum citation threshold of 30 and 100 links.

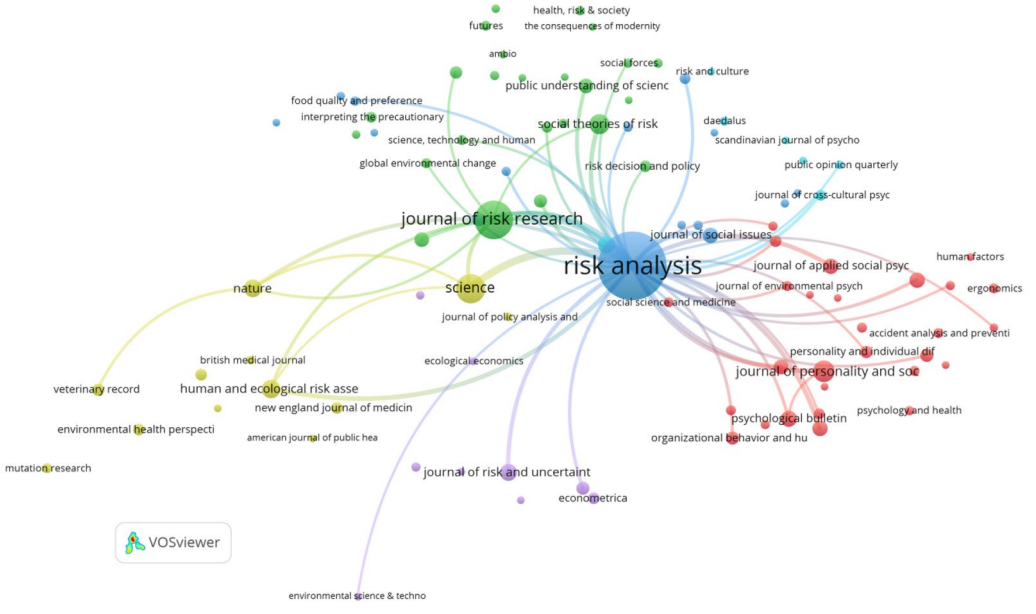

Figure 4. Co-citation of journals in JRR: 1998–2007 (minimum citation threshold of 10 and 50 links).

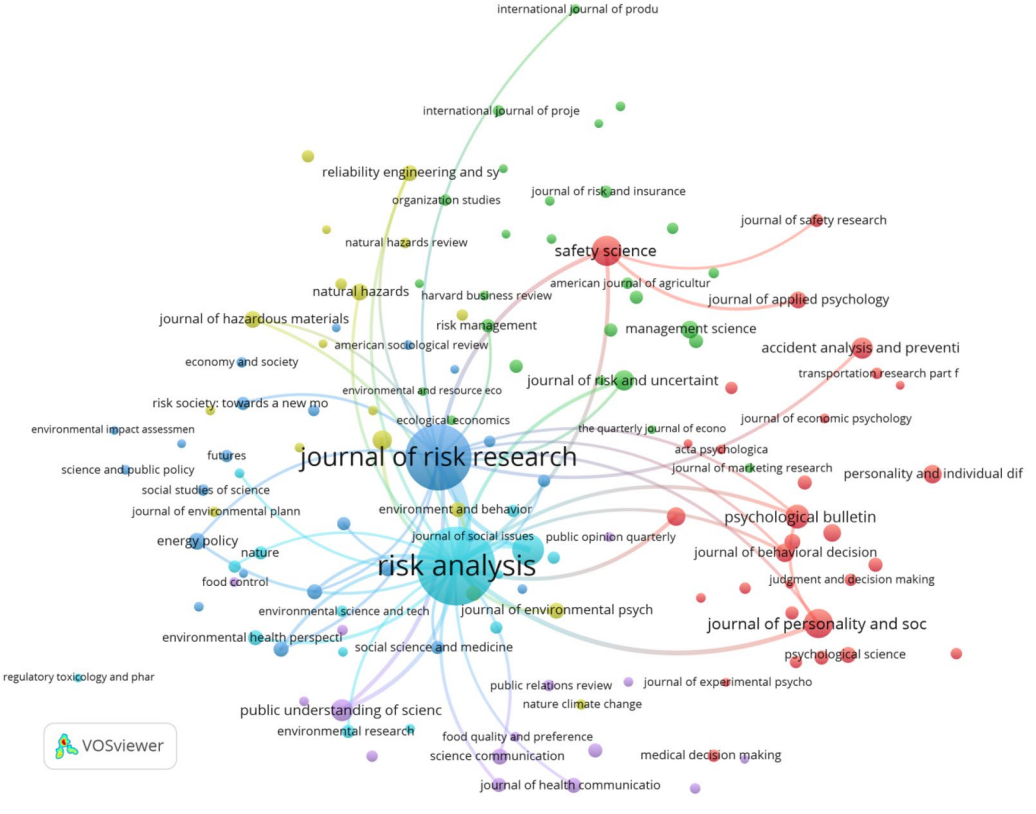

Figure 5. Co-citation of journals in JRR: 2008–2017 (minimum citation threshold of 20 and 50 links).

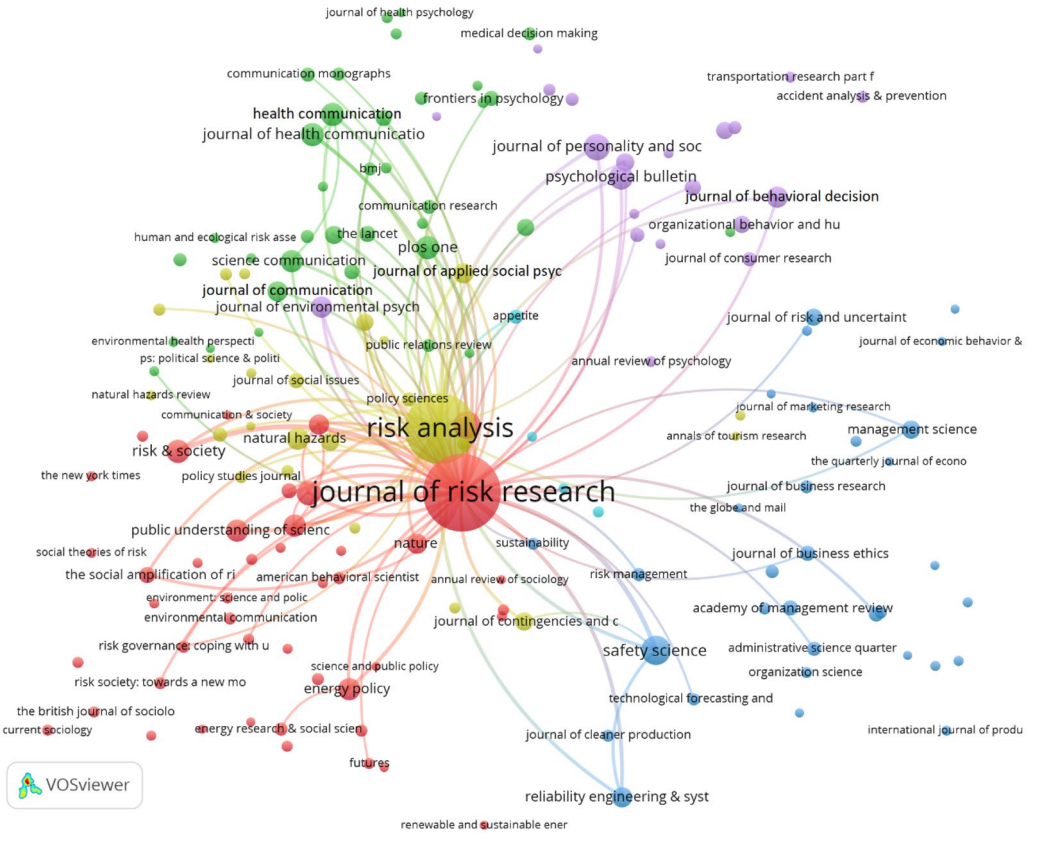

Figure 6. Co-citation of journals in JRR: 2018–2023 (minimum citation threshold of 20 and 100 links).

significantly. The results shown in Figure 7 are closely relevant to the top 40 most cited documents in JRR publications presented in Table 5, although these results focus on the most cited authors.

To deeply analyse the co-citation of the most influential documents cited by JRR, Figure 8 presents the co-citation of documents with a minimum threshold of 20 citations and the 100 most representative co-citation connections among documents. Note that the results of this figure are extracted from WoS Core Collection considering documents published in the journal between 2003 and 2023.

The results shown in Figure 8 are consistent with those presented in Table 5. The main advantage of this figure is the visualisation of the most cited documents in order to see their relevance. It is worth noting that the seminal paper of Paul Slovic published in Science in 1987 has a strong co-citation connection with the fundamental work on social amplification of risk by Roger E. Kasperson published in Risk Analysis in 1988, and the two papers are the most influential documents in JRR publications. The book by Ulrich Beck titled 'Risk Society: Towards a New Modernity' (published in 1992) is also highly cited by JRR and has relatively strong connections with several other co-cited documents.

Another interesting issue to consider is the graphical visualisation of the most cited JRR publications and the most productive authors, institutions, and countries/territories publishing in JRR to observe how they are connected to each other. First, let us analyse the bibliographic coupling of JRR publications with time information. Recall that bibliographic coupling (Kessler 1963) of documents occurs when two documents cite the same third one. Figure 9 presents the data with a minimum threshold of 50 citations and the 100 strongest bibliographic coupling

Table 14. Co-citation of journals in JRR: global and temporal analysis.

	Global			1998–2007			2008–2017			2018–2023		
R	Journal	Cit	CLS	Journal	Cit	CLS	Journal	Cit	CLS	Journal	Cit	CLS
1	Risk Anal	3410	2495.98	Risk Anal	738	499.70	Risk Anal	1573	1086.83	J Risk Res	1334	1036.92
2	J Risk Res	2682	2116.14	J Risk Res	237	192.16	J Risk Res	1111	846.94	Risk Anal	1099	846.66
3	Science	564	528.11	Science	135	124.22	Science	258	240.52	Safety Science	198	138.47
4	Safety Science	467	340.61	J Pers Social Psych	78	71.25	Safety Science	229	165.29	Science	171	161.28
5	J Pers Social Psych	455	415.76	Social Theories Risk	63	53.68	J Pers Social Psych	220	195.25	J Pers Social Psych	157	144.30
6	Psychological Bulletin	317	305.87	Human Ecol Risk Assess	57	44.90	Psychological Bulletin	145	137.78	Reliability Eng Syst Saf	145	128.04
7	Public Underst Sci	276	257.72	Nature	53	46.09	Public Underst Sci	130	116.80	Global Env Change	133	122.46
8	Reliability Eng Syst Saf	267	202.18	J Risk Uncertainty	49	40.32	Accident Anal Prev	115	77.35	Psychological Bulletin	130	126.86
9	Global Env Change	250	230.14	Policy Sciences	48	46.39	J Risk Uncertainty	105	93.18	J Health Commun	123	115.96
10	J Behavioral Decis Mak	236	226.64	Psychological Bulletin	42	39.78	Global Env Change	100	89.16	Risk & Society	121	100.04
11	J Applied Social Psych	220	215.44	J Applied Social Psych	40	39.33	J Behavioral Decis Mak	94	91.68	PLOS One	120	116.43
12	J Risk Uncertainty	219	194.02	J Social Issues	40	39.08	Reliability Eng Syst Saf	93	84.31	Health Commun	119	110.07
13	Energy Policy	192	163.86	Safety Science	40	28.26	J Applied Social Psych	91	87.84	Public Underst Sci	112	105.61
14	J Health Commun	190	179.95	J Behavioral Decis Mak	39	37.50	Pers Indiv Dif	89	72.24	Science Commun	111	102.35
15	Nature	190	170.89	Environment	35	34.06	Org Beh Hum Decis Proc	84	78.04	Energy Policy	110	97.61
16	J Env Psych	186	173.10	American Psychologist	35	33.58	Manag Science	80	72.71	Nature Climate Change	109	99.51
17	Natural Hazards	186	167.99	Public Underst Sci	34	33.01	Natural Hazards	76	67.70	Natural Hazards	109	98.01
18	Org Beh Hum Decis Proc	182	171.43	Org Beh Hum Decis Proc	30	28.44	Energy Policy	73	57.28	J Behavioral Decis Mak	103	96.42
19	Manag Science	181	166.98	Reliability Eng Syst Saf	29	25.27	J Applied Psych	72	64.10	J Env Psych	99	94.25
20	Pers Indiv Dif	181	155.40	Health Psych	28	25.44	J Hazardous Materials	71	62.04	Climatic Change	92	86.09
21	Science Commun	178	166.97	The Perception Risk	28	22.83	J Env Psych	70	60.23	J Commun	90	85.89
22	Climatic Change	160	149.69	Manag Science	27	22.46	Psychological Review	67	63.94	Nature	90	83.95
23	Risk & Society	157	135.20	Science Public Policy	25	20.07	Psychological Science	64	61.65	J Applied Social Psych	89	87.19
24	Psychological Science	154	148.75	Pers Indiv Dif	24	22.06	Science Commun	64	60.72	IJ Env Res Public Health	78	72.98
25	J Commun	154	146.99	Veterinary Record	24	12.73	J Health Commun	63	59.03	IJ Disaster Risk Reduction	78	71.08
26	Policy Sciences	151	148.42	Environment Behavior	23	21.83	Health Risk Society	61	56.84	J Conting Crisis Manag	77	69.79
27	Health Commun	151	141.49	Lancet	23	20.97	Env Health Perspectives	61	53.10	Manag Science	74	70.76
28	Environment Behavior	150	145.41	Risk Dec Policy	22	20.31	Environment Behavior	59	56.80	Psychological Science	73	70.82
29	PLOS One	146	142.38	Econometrica	22	20.24	Climatic Change	59	54.36	Computers Human Behavior	71	61.77
30	Psychological Review	139	135.22	New Engl J Medicine	21	18.82	Social Amplif Risk	57	55.00	Environment Behavior	68	66.72
31	Nature Climate Change	138	127.10	Env Health Perspectives	21	18.24	Econometrica	56	52.42	Org Beh Hum Decis Proc	68	63.88
32	Accident Anal Prev	137	99.38	Acta Psychologica	20	19.54	American Psychologist	55	53.96	Pers Indiv Dif	68	57.59
33	American Psychologist	136	132.91	J Hazardous Materials	20	18.84	Health Psych	55	49.91	J Risk Uncertainty	65	57.30
34	J Conting Crisis Manag	135	121.70	J Cross-Cultural Psych	19	17.74	Policy Sciences	54	53.35	Social Amplif Risk	61	59.19

(*Continued*)

Table 14. Continued.

	Global			1998–2007			2008–2017			2018–2023		
R	Journal	Cit	CLS	Journal	Cit	CLS	Journal	Cit	CLS	Journal	Cit	CLS
35	Social Amplif Risk	132	127.22	Social Trust Manag Risk	19	17.38	Pers Social Psych Bulletin	54	51.65	Lancet	59	53.87
36	Social Theories Risk	132	121.45	Interpr Precaut Princ	19	16.90	J Commun	50	47.70	Psychological Review	58	56.71
37	J Social Issues	125	123.45	Futures	18	15.65	Appetite	50	45.97	BMC Public Health	58	54.75
38	J Applied Psych	123	113.59	J Env Psych	17	16.70	Env Research	49	38.43	Frontiers in Psych	56	53.40
39	Health Psych	112	106.09	Global Env Change	17	16.31	Risk Manag	48	46.78	Academy Manag Review	53	50.46
40	Env Health Perspect	108	95.36	Ergonomics	17	13.88	J Safety Research	47	41.87	Academy Manag Journal	52	48.67

Cit: citations; CLS: citation link strength.

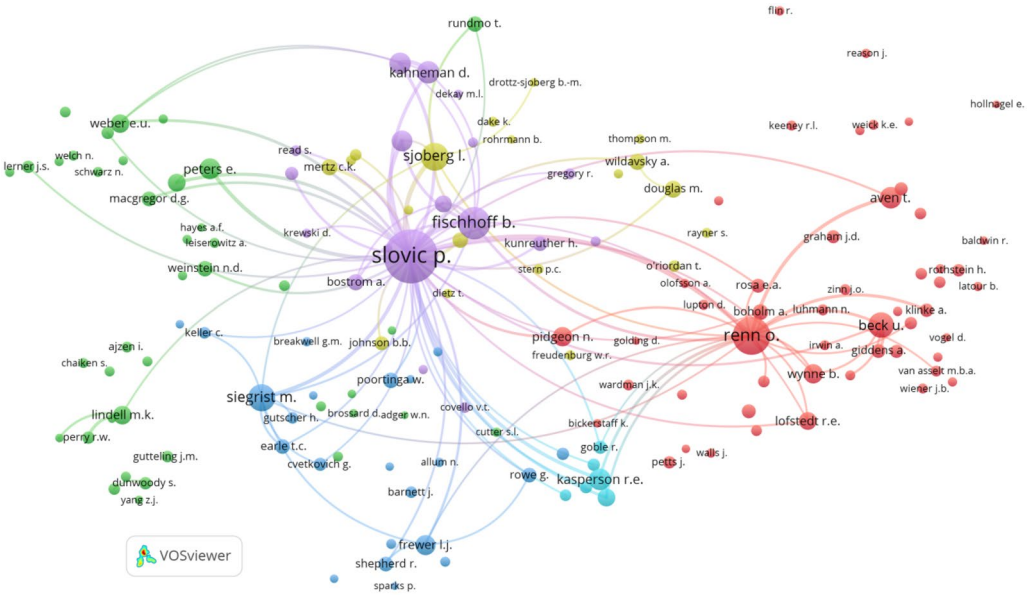

Figure 7. Co-citation of authors in JRR: minimum citation threshold of 50 and 100 links.

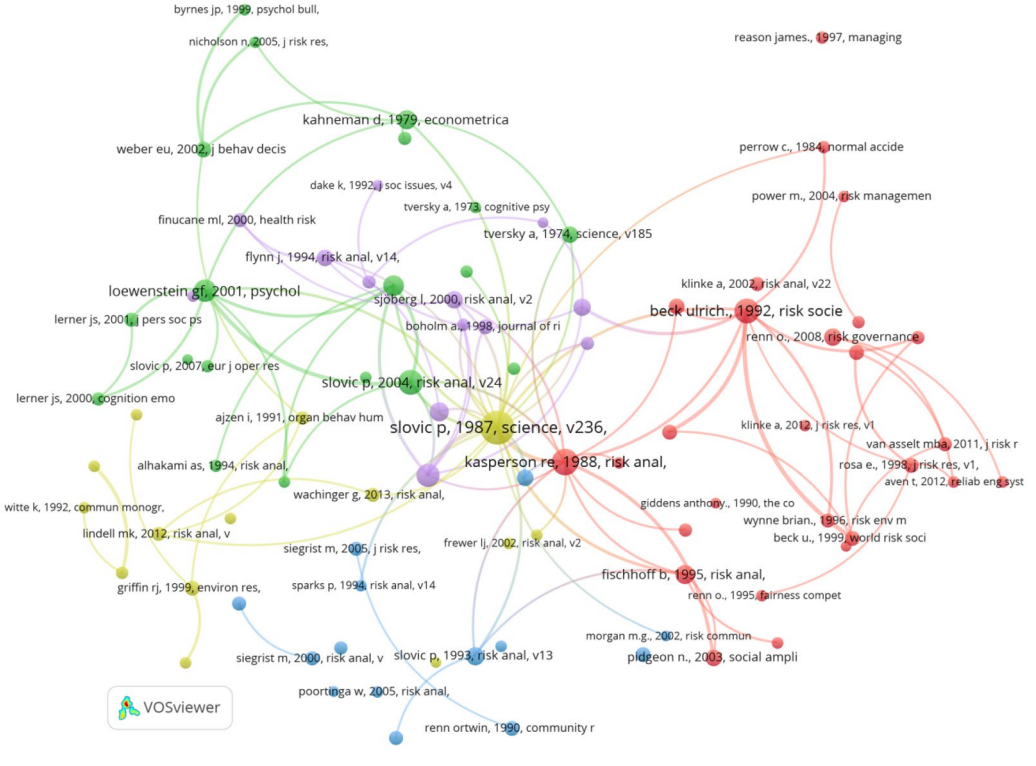

Figure 8. Co-citation of documents in JRR: minimum citation threshold of 20 and 100 links.

connections between documents. Note that the colour of a document indicates the document's publication year.

The results are consistent with Table 4, where the two papers of Dryhurst et al. (2020) and Kahan, Jenkins-Smith, and Braman (2011) have received the highest citations among the JRR publications, followed by the papers of Nicholson (2005), Aven and Renn (2009), and Whitmarsh (2008). From an overall perspective, most JRR publications that are highly cited were published in the period around 2000–2010. The results are quite logical because previous studies are literally getting more citations. This figure is beneficial to visualising the documents those with closer profiles, that is, those that cite same bibliographic material. For example, there is a strong connection between the paper of Sarah Dryhurst et al. (2020) and the work of Claudia R. Schneider (2021), both focusing on the analysis of COVID-19 risk perceptions. Note that although the paper of Dan M. Kahan, Hank Jenkins-Smith, and Donald Braman (2011) is leading in the journal with many citations, it has few strong bibliographic coupling connections with other JRR publications.

Next, let us examine the bibliographic coupling of authors who have published in JRR. Recall that the bibliographic coupling of authors occurs when the authors of two documents cite the same third document from another author. Figure 10 visualises the most productive authors with a minimum publication threshold of three documents and the 100 strongest bibliographic coupling connections between authors. Note that the colour of an author represents the average publication year of the author's documents published in JRR. The average publication year of an author is obtained by taking the average of the publication years of all the author's JRR publications.

The results obtained are in line with Tables 6 and 7. The advantage of this figure is that the authors that cite similar bibliographic material are graphically visualised through bibliographic coupling links. The authors strongly connected with each other tend to have similar research profiles. It is noticeable that the majority of most productive authors have more publications in the last decade, including Ragnar E. Löfstedt, Terje Aven, Magda Osman, and Frédéric E. Bouder, and there are many strong connections in this period. However, Ortwin Renn, Michael Siegrist, and Joanna Burger were the most productive authors in JRR between 2010 and 2015, while Lennart Sjöberg was the leading author around 2005.

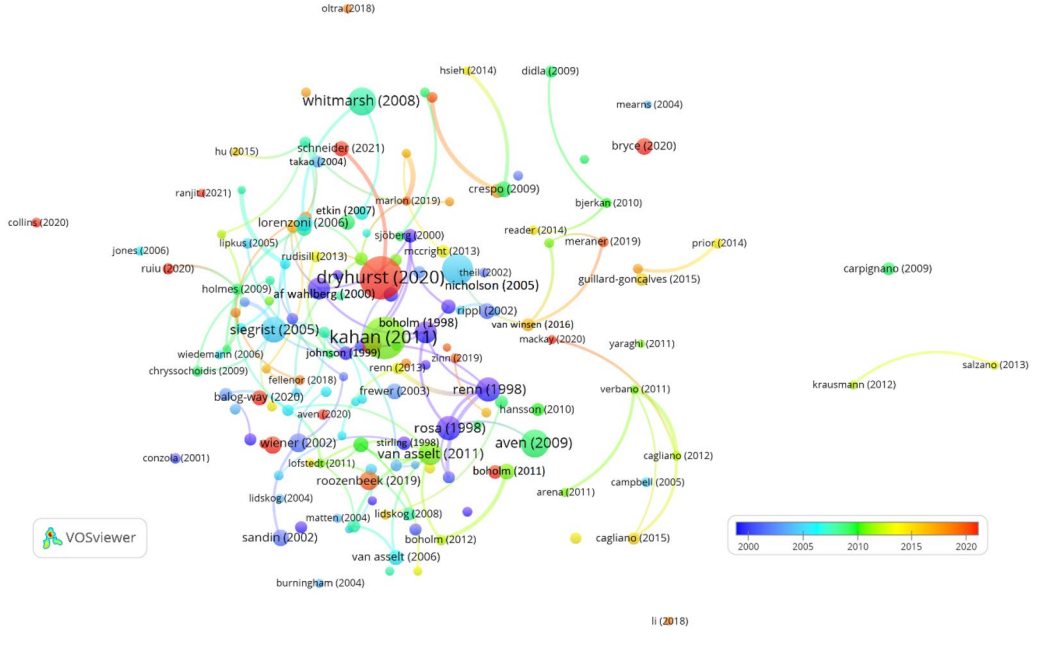

Figure 9. Bibliographic coupling of documents published in JRR: minimum threshold of 50 citations and 100 links.

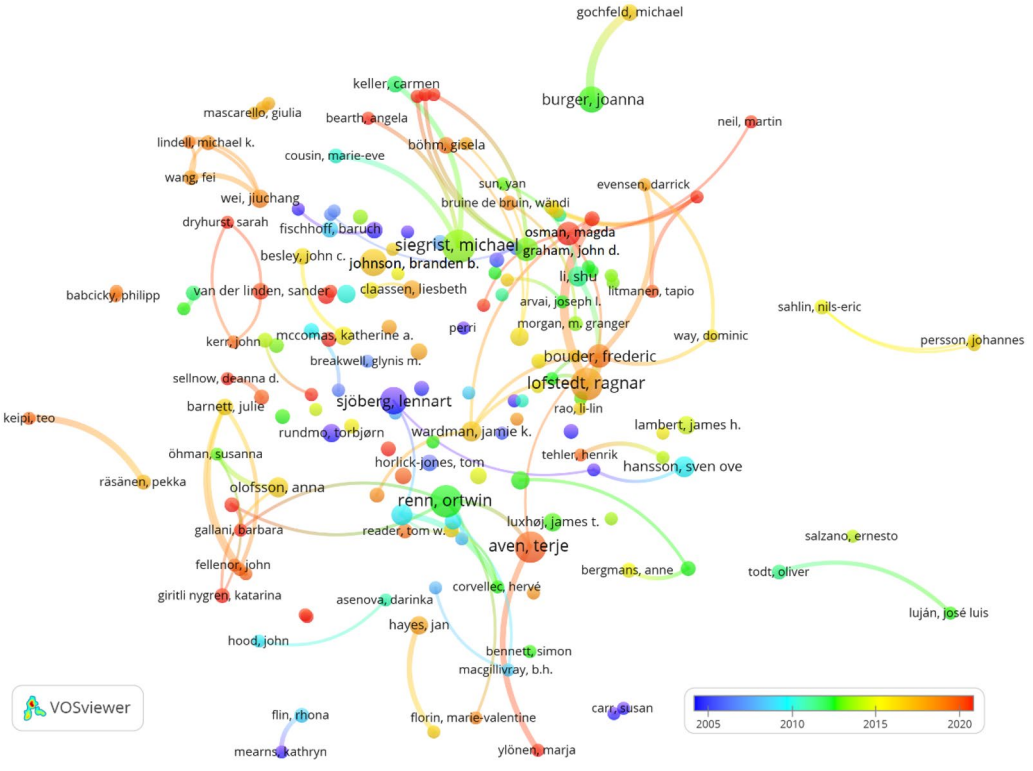

Figure 10. Bibliographic coupling of authors publishing in JRR: minimum publication threshold of 3 documents and 100 links.

Further, we analyse the bibliographic coupling of institutions that publish in JRR. This type of bibliographic coupling occurs when two documents from different institutions cite the same third document from another institution. Note that here the graph shows the institutional affiliation of the authors regarding the JRR publications between 2003 and 2023 retrieved from the WoS. Figure 11 presents the data with a minimum publication threshold of five documents and the 100 most representative bibliographic coupling links. Additionally, the colour of an institution indicates the average publication year of all the JRR publications affiliated with this institution.

The leading institutions shown in this figure are similar to those of Tables 8 and 9, where King's College London and the University of Stavanger are generally the top 2 most productive institutions, and they published more frequently in JRR in the period around 2014–2018. Based on Figure 11, we can have a better understanding of how each of the leading institutions is connected to the other ones. Note that the institutions from the same countries/territories tend to be strongly connected with each other by citing same bibliographic material. That is, these institutions have similar research profiles. Such trend is very common and also occurs in other journals (Merigó and Yang 2017; Merigó et al. 2018). Moreover, it is found that most of the representative connections link the institutions that have the similar average publication year.

To summarise the results at the country/territory level, Figure 12 presents the bibliographic coupling of countries/territories that publish frequently in JRR with a minimum publication threshold of three documents and the 50 most representative bibliographic coupling connections. Note that the colour of a country/territory indicates the average publication year of all the JRR publications affiliated with this country/territory.

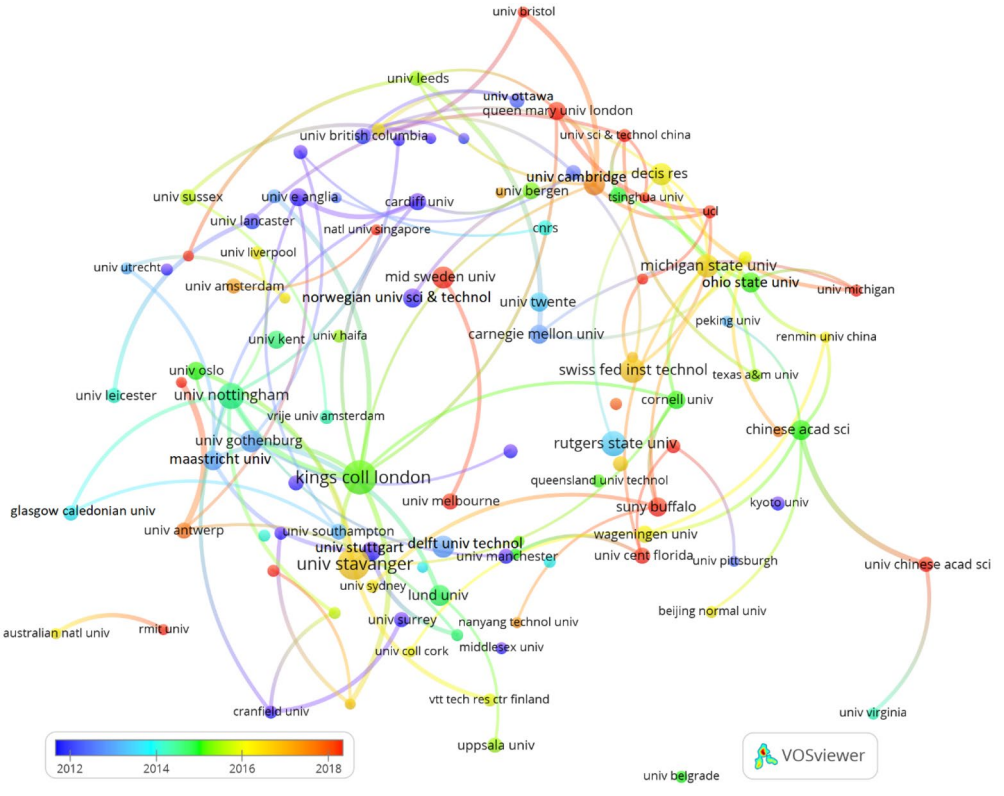

Figure 11. Bibliographic coupling of institutions publishing in JRR: minimum publication threshold of 5 documents and 100 links.

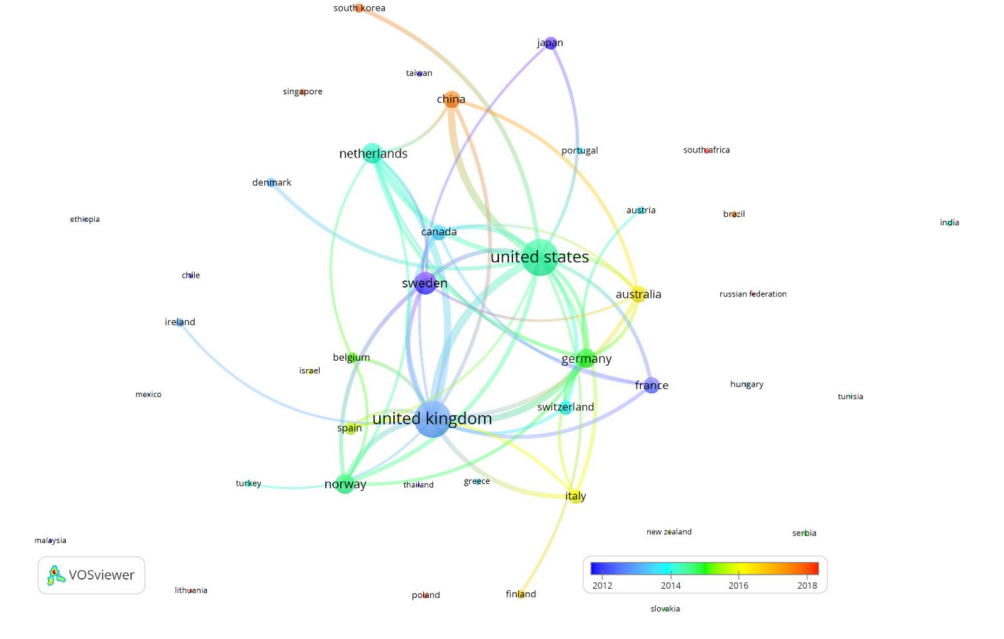

Figure 12. Bibliographic coupling of countries/territories publishing in JRR: minimum publication threshold of 3 documents and 50 links.

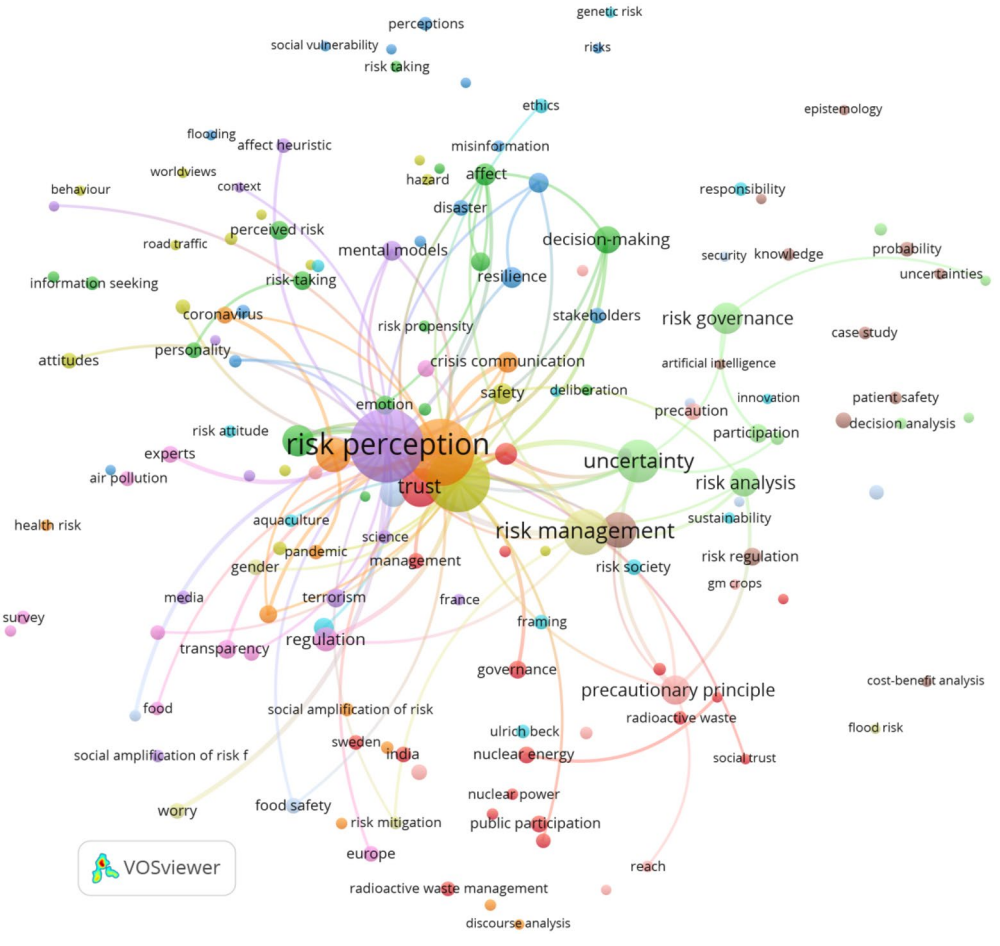

Figure 13. Co-occurrence of author keywords in JRR: minimum occurrence threshold of 5 and 100 links.

The UK and the USA are the most productive countries/territories and take the most significant positions in the journal, followed by Sweden, Netherlands, and Norway. Most of leading countries/territories are from Europe. The results are in accordance with those of Tables 10 and 11. The main advantage of Figure 12 is the visualisation of countries/territories to identify those with closer research profiles. For example, the UK is strongly connected with the USA and Netherlands. That is, these countries/territories have more collaborative research work in JRR. Looking at the time periods, it is worth noting that the USA has published more papers in the journal than the UK in the last decade. In addition, China presents a trend of publishing more papers in JRR in recent years and is strongly connected with the USA. Australia and Italy have also seen a recent increase in their JRR publications. From a general perspective, many strong bibliographic coupling connections appear between the countries/territories that have the average publication year in the period around 2012–2016.

Finally, let us analyse the most frequent author keywords of JRR so as to identify the leading topics published in the journal. To this end, the study develops a graphical visualisation regarding the co-occurrence of author keywords in JRR publications. Note that author keywords refer to those keywords that often appear below the abstract and are used to characterise the topic of a paper. Figure 13 presents the results considering a minimum threshold of five occurrences and the 100 most significant co-occurrence connections.

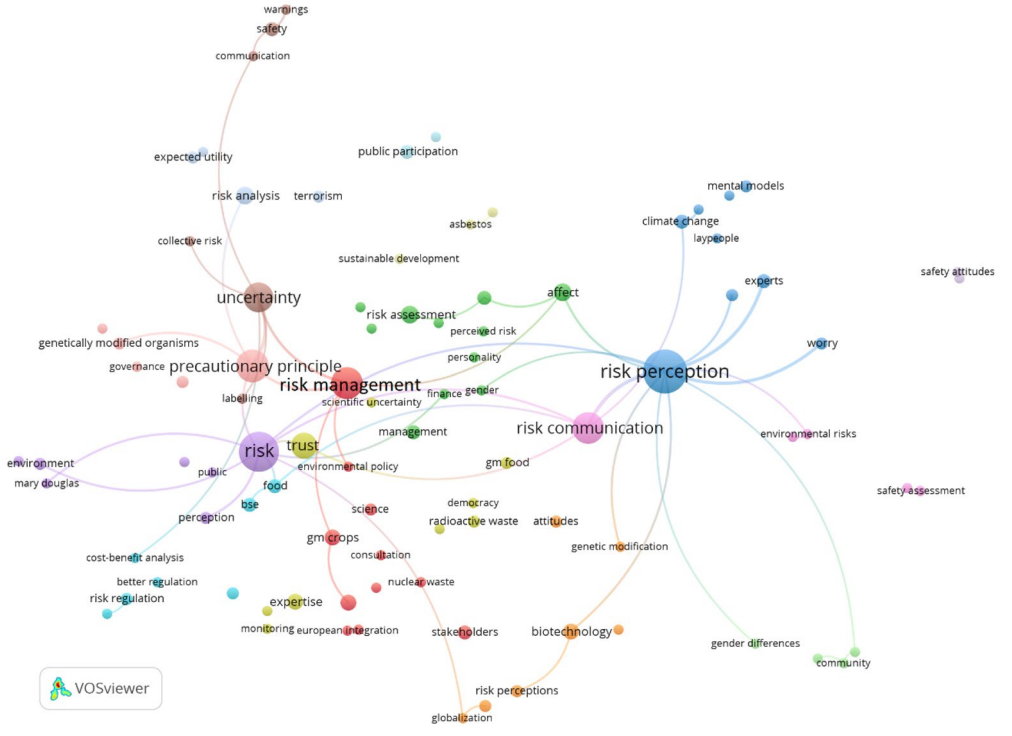

Figure 14. Co-occurrence of author keywords in JRR: 1998–2007 (minimum occurrence threshold of 2 and 50 links).

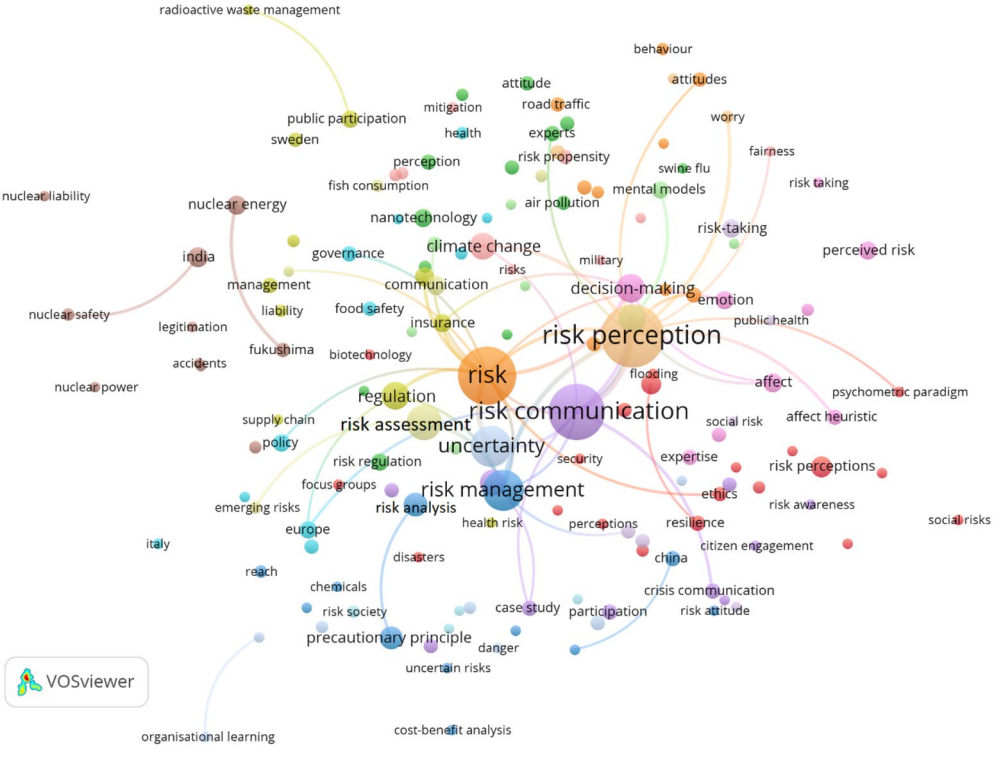

Figure 15. Co-occurrence of author keywords in JRR: 2008–2017 (minimum occurrence threshold of 3 and 50 links).

Risk perception is the most frequent author keyword used in the journal publications and has the largest network connecting with many other author keywords in the map. From a general perspective, the keywords that include the word 'risk' are the most common ones of JRR. As illustrated in Figure 13, the journal uses a great variety of keywords, indicating a clear multidisciplinary orientation of JRR that covers the risk research in areas, such as social sciences, psychology, engineering, management, environmental and health studies. To observe more specifically how the leading author keywords of JRR evolve through time, Figures 14–16 compare the results among three periods: 1998–2007, 2008–2017, and 2018–2023. Note that the minimum occurrence thresholds for these figures are 2, 3, and 3, respectively, and that Figures 14 and 15 present the 50 most representative co-occurrence links, while Figure 16 shows 100 links.

From the beginning of JRR and throughout its journey, risk perception has been leading the author keywords of the journal. The graph of the co-occurrence of author keywords in JRR is getting denser with more keywords and co-occurrence connections appearing along with time, although Figure 16 only considers the data of the last six years. The results of temporal evolution indicate that the research topics of JRR are growing significantly and becoming more diverse within the risk field. Observe that the frequency and relevance of the risk communication keyword increases very quickly, and today it becomes one of the main leading keywords in the journal strongly connected with risk perception and trust. In addition, it is worth noting that COVID-19 appears as one of the most frequent keywords in recent JRR publications.

However, although Figures 13–16 represent graphically how the author keywords connect with each other, these figures may omit the names of some keywords. To identify more clearly the detailed leading keywords, Table 15 presents the 40 most frequent author keywords of JRR (columns of 'Global'). The table also considers the top 40 occurrences of the

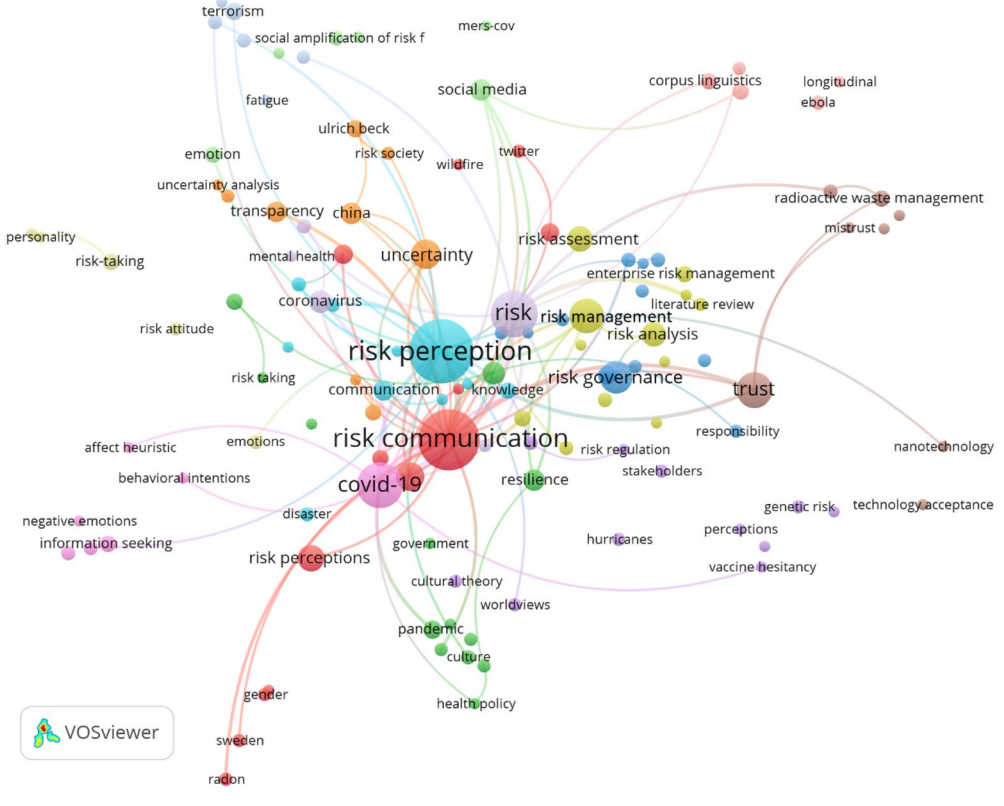

Figure 16. Co-occurrence of author keywords in JRR: 2018–2023 (minimum occurrence threshold of 3 and 100 links).

Table 15. Co-occurrence of author keywords in JRR: global and temporal analysis.

	Global			1998–2007			2008–2017			2018–2023		
R	Keyword	Occ	Co-oc	Keyword	Occ	Co-oc	Keyword	Occ	Co-oc	Keyword	Occ	Co-oc
1	Risk perception	225	177	Risk perception	37	33	Risk perception	96	76	Risk perception	92	75
2	Risk communication	181	137	Risk	31	28	Risk	81	71	Risk communication	86	70
3	Risk	163	132	Precautionary principle	21	19	Risk communication	75	52	Risk	51	43
4	Risk management	88	75	Risk communication	20	17	Risk management	41	38	COVID-19	48	38
5	Uncertainty	77	64	Risk management	20	16	Uncertainty	40	36	Trust	29	26
6	Trust	61	52	Uncertainty	17	16	Risk assessment	30	23	Risk management	27	20
7	Risk assessment	51	36	Trust	13	10	Decision-making	20	19	Risk governance	24	16
8	COVID-19	48	38	Affect	6	6	Regulation	19	18	Uncertainty	20	18
9	Risk governance	41	30	Risk analysis	6	6	Trust	19	18	Climate change	19	16
10	Climate change	40	33	Risk assessment	6	4	Climate change	17	13	Risk perceptions	16	9
11	Precautionary principle	35	29	Biotechnology	5	5	Risk governance	16	15	Risk assessment	15	10
12	Risk analysis	34	24	GM crops	5	5	Risk analysis	14	9	Risk analysis	14	11
13	Decision-making	31	28	Expertise	5	4	Precautionary principle	13	11	Coronavirus	12	12
14	Risk perceptions	30	15	Precaution	5	4	Risk perceptions	11	3	Crisis communication	12	12
15	Regulation	25	24	BSE	4	4	India	10	8	Social media	11	11
16	Communication	21	19	Climate change	4	4	Vulnerability	10	7	Resilience	11	9
17	Affect	20	19	Experts	4	4	Affect	9	9	China	11	8
18	Crisis communication	18	17	Food	4	4	Communication	9	9	Transparency	10	9
19	Safety	18	17	Safety	4	4	Nuclear energy	9	8	Communication	10	8
20	Resilience	18	16	Stakeholders	4	4	Safety	9	8	Decision-making	9	8
21	China	17	12	Decision making	4	3	Nanotechnology	8	8	Framing	8	8
22	Mental models	16	14	Management	4	3	Emotion	8	7	Pandemic	8	8
23	Expertise	16	13	Public participation	4	3	Insurance	8	7	Participation	8	7
24	Vulnerability	16	13	Attitudes	3	3	Risk-taking	8	4	Terrorism	7	5
25	Decision making	15	14	Genetically modified organisms	3	3	Perceived risk	8	3	Ulrich Beck	7	4
26	Participation	15	13	Environment	3	3	Europe	7	7	Decision making	6	6
27	Emotion	15	12	European Union	3	3	Mental models	7	7	Information seeking	6	5
28	Terrorism	15	10	GM food	3	3	Policy	7	7	Knowledge	6	5
29	Transparency	15	10	Millennium bug	3	3	Public participation	7	6	Radioactive waste management	6	5
30	Perceived risk	15	9	Perception	3	3	Risk regulation	7	4	Social amplification of risk	6	5
31	Risk-taking	15	8	Risk perceptions	3	3	Experience	6	6	Social capital	6	5
32	Governance	13	13	Risk regulation	3	3	Governance	6	6	Corpus linguistics	6	4
33	Social media	13	12	Risk society	3	3	China	6	5	Emotion	6	4
34	Risk regulation	13	10	Science	3	3	Crisis communication	6	5	Mental models	6	4
35	Coronavirus	12	12	Worry	3	3	Expertise	6	5	Misinformation	6	4
36	Experts	12	11	Decision analysis	3	2	Experts	6	5	Risk-taking	6	4
37	Nuclear energy	12	11	Expected utility	3	2	Management	6	5	Enterprise risk management	6	3
38	Public participation	12	10	Mental models	3	2	Affect heuristic	6	4	Affect	5	5
39	Insurance	12	9	Terrorism	3	2	Case study	6	4	Artificial intelligence	5	5
40	Precaution	12	9	Radioactive waste	3	1	Participation	6	4	Culture	5	5

Occ: occurrences; Co-oc: co-occurrence link strength.

Table 16. Leading topics in JRR between 2013 and 2022 (Scopus).

R	Topic	TP	FWCI	PP
1	Risk Perception; Decision Making; Regression Analysis	99	1.00	94.564
2	Risk Society; Decision Making; COVID-19	39	1.27	81.046
3	Climate Change; Risk Perception; Environmental Policy	20	1.74	99.188
4	Risk Management; Decision Making; Uncertainty Analysis	16	1.32	80.528
5	Radioactive Waste; Nuclear Fuel; Justice	16	1.05	71.192
6	Risk Management; Decision Making; COVID-19	15	1.38	75.086
7	Risk Perception; Public Health; COVID-19	14	13.20	99.731
8	Crisis Management; Case Study; Social Media	14	1.77	97.689
9	Risk Perception; Air Pollution; Social Media	14	1.44	69.591
10	High Reliability; Mindfulness; Risk Management	13	0.96	83.589
11	Accident Prevention; Construction Industry; Safety Management	11	1.25	98.657
12	Right to Information; Disclosure; Local Government	11	1.83	88.404
13	Decision Making; Risk Management; Asbestos	11	0.83	69.697
14	Risk Management; Climate Change; Flood	10	2.29	94.380
15	Risk Perception; Health Information; COVID-19	9	1.11	90.433
16	Risk Attitude; Risk-Taking; Decision Making	9	1.88	85.128
17	Food Safety; Risk Perception; Social Media	9	1.46	78.214
18	Climate Change; Case Study; Adaptive Management	8	1.98	98.170
19	Driving Behaviour; Transport Safety; Traffic Accident	8	0.81	96.676
20	Risk Management; Company; Corporate Governance	8	1.07	92.148
21	Traffic Control; Decision Making; Transport	7	0.76	94.652
22	Risk-Taking; Adolescents; Sensation Seeking	7	0.76	62.012
23	Nanomaterial; Benefits; Risk Perception	7	1.28	61.302
24	Nuclear Safety; Radioactive Waste; Nuclear Power Plant	7	0.55	43.762
25	Supply Chain; Risk Management; COVID-19	6	2.69	99.882
26	Crisis Management; Case Study; COVID-19	6	0.51	94.986
27	Numeracy; Decision Making; Risk Communication	6	0.38	87.001
28	Decision-Making; Risk Management; Discrimination	6	0.85	69.290
29	Misinformation; Social Media; COVID-19	5	9.48	99.793
30	Carbon Dioxide; Climate Change; Risk Perception	5	1.76	90.601

R: rank; TP: total publications; FWCI: field-weighted citation impact (data from Scopus); PP: worldwide prominence percentile (according to Scopus and FWCI).

author keywords divided into the three periods concerning 1998–2007, 2008–2017, and 2018–2023.

The results are consistent with the general representation of leading keywords provided by Figures 13–16. From the global perspective, risk perception (unified with risk perceptions), risk communication, risk, risk management, uncertainty, trust, risk assessment, COVID-19, decision making (unified with decision-making), and risk governance are the top 10 author keywords most frequently used in JRR, among which risk perception, risk communication, and risk are in the dominated positions and have the highest co-occurrence link strength. Note that many of the keywords appearing over the entire lifetime of the journal, including risk perception, risk communication, risk, risk management, uncertainty, trust, affect, risk analysis, risk assessment, climate change, decision making, and mental models are still highly active research topics in JRR. Note that precautionary principle was ranked in the 3rd position for the 1998–2007 period but has lost its dominant role in the author keywords of the journal since around 2008. Risk has been overtaken by risk communication in recent years, although it remains highly relevant. Decision making and crisis communication climbed in the ranking very significantly. Trust, risk governance, climate change, and risk analysis are also growing in importance. It is worth noting that recent publications have seen the prominent developments in the research topics concerning COVID-19, coronavirus, social media, resilience, and transparency, with the first one even taking the 4th top spot during the 2018–2023 period.

To have a deeper understanding of the leading topics and topic clusters in JRR, we further analyse the JRR publications through the SciVal platform in Scopus (SciVal 2024). From the analysis, we obtained 374 topics and 207 topic clusters that the journal has contributed to

Table 17. Leading topic clusters in JRR between 2013 and 2022 (Scopus).

R	Topic cluster	TP	FWCI	PP
1	Risk Perception; Energy Transition; Climate Change	233	1.15	35.906
2	Climate Change; Disaster Management; Social Media	43	1.44	91.236
3	Occupational Health; Safety Management; Engineering	41	1.04	70.765
4	Engineering; Risk Analysis; Nuclear Power Plant	27	1.10	29.235
5	Decision Making; Behavioural Economics; Prospect Theory	25	1.06	53.761
6	Pro-Environmental Behaviour; Climate Change; Environmental Policy	24	1.64	93.591
7	COVID-19; Severe Acute Respiratory Syndrome Coronavirus 2; Public Health	22	9.29	100.000
8	Social Media; Health Literacy; COVID-19	21	3.11	89.209
9	Social Media; Journalism; Content Analysis	18	1.69	82.995
10	Artificial Intelligence; Decision Making; Tree Search	15	0.65	25.049
11	Maize; Bacterial Protein; Biological Control	12	0.84	27.077
12	Personality Trait; Cognitive Function; Psychometrics	11	0.74	63.636
13	e-Government; Open Data; Social Media	11	1.83	45.716
14	Supply Chain Management; Industry; Airline	10	4.29	98.038
15	Institutional Theory; Public Sector; Management Accounting	10	0.96	56.115
16	Earth Surface Sediment Transport; Coastal Erosion; Sea Level	9	0.96	50.360
17	Social Media; COVID-19; Democracy	9	1.62	29.104
18	Social Media; Adoption; e-Commerce	7	0.66	98.365
19	Traffic Accident; Emergency Medical Service; Computed Tomography	7	0.38	40.026
20	Computational Fluid Dynamics; Large Eddy Simulation; Boundary Layer	7	0.55	37.083
21	Volatility; Investors; Commerce	6	1.66	96.861
22	Sustainable Development Goals; Energy Transition; Climate Change	6	0.82	90.190
23	Justice; Criminology; Crime Prevention	6	0.16	70.896
24	Artificial Intelligence; Bayesian Network; Machine Learning	6	1.60	16.024
25	Weather Forecasting; Climate Change; Tropical Cyclone	5	0.66	93.198
26	Network Security; Cybersecurity; Machine Learning	5	1.20	85.808
27	Public-Private Partnership; Construction Industry; Project Scheduling	5	2.06	79.398
28	Public Administration; Local Government; Democracy	5	0.74	62.459
29	Natural Resource; Land Use Change; Contingent Valuation	4	0.90	95.618
30	Job Satisfaction; Organizational Citizenship Behaviour; Justice	4	0.32	92.086

Abbreviations are available in Table 16.

between 2013 and 2022. According to the total number of publications, Tables 16 and 17 present the top 30 leading topics and topic clusters in JRR, respectively. In the case of a tie, the worldwide prominence percentile is considered (Klavans and Boyack 2017). Note that a publication can only belong to one topic and one topic cluster.

The 'Risk Perception; Decision Making; Regression Analysis' topic leads in the journal with 99 papers published, distantly followed by the topics of 'Risk Society; Decision Making; COVID-19' and 'Climate Change; Risk Perception; Environmental Policy', with 39 and 20 publications, respectively. The 'Risk Perception; Public Health; COVID-19' topic has gained the highest field-weighted citation impact (FWCI) (i.e. 13.20) far beyond the world average for similar publications (Purkayastha et al. 2019). Moreover, there are 21 topics in Table 16 that have been cited equal to or more than the world average for similar publications, while nine are less than the world average. Among the top 30 leading topics in JRR, four are the top 1% of worldwide topics by prominence, eight are the top 5%, and a half the top 10%.

Looking at the leading topic clusters of JRR, 'Risk Perception; Energy Transition; Climate Change' is at the first position of Table 17 and is connected to 233 publications of the journal. The topic clusters in terms of 'Climate Change; Disaster Management; Social Media' and 'Occupational Health; Safety Management; Engineering' hold the 2nd and 3rd positions, respectively, both with over 40 publications. It is worth noting that the 'COVID-19; Severe Acute Respiratory Syndrome Coronavirus 2; Public Health' topic cluster obtains the highest FWCI (i.e. 9.29), which is considered as the most prominent one among the worldwide topic clusters. Over a half of the top 30 topic clusters in the journal have been cited more than the world average for similar publications. Additionally, according to the worldwide prominence percentile, five of the top 30 leading topic clusters in JRR are in the top 5% worldwide topic clusters, one-third in the top 10%, and 14 in the top 25%.

5. Conclusions

The Journal of Risk Research is 25 years old. To celebrate this anniversary, this paper presents a bibliometric overview of the leading trends and the most significant results that have occurred in the journal during the period from 1998 to 2023. The study mainly uses the Scopus database to analyse the journal's bibliographic data and identify the leading trends in terms of impacts, authors, institutions, countries/territories, and topics. For several cases, to retrieve more practical bibliographic data and supplement more detailed analysis, the WoS Core Collection database is also used. The results show the strong growth and impact the journal has through time being today one of the leading journals in the risk field. In addition, this work aims to bridge a current gap in the journal which has yet to involve bibliometric studies analysing its own publications.

The study identifies a significant growth of the journal in the last decade (between 2014 and 2023) with more than a half of its total publications. Around 51% of the total papers of the journal have received equal or more than ten citations. The most cited paper of the journal titled 'Risk perceptions of COVID-19 around the world' is the work of Sarah Dryhurst, Claudia R. Schneider, and John Kerr et al. published in 2020. Ragnar E. Löfstedt is the most productive author, followed by Ortwin Renn and Michael Siegrist. It is worth noting that these three authors are also among the top 10 most cited authors in the journal. King's College London is the most productive institution thanks in part to the work of Löfstedt et al., and the University of Cambridge becomes the most influential institution. By looking into the results of leading authors and institutions, it is clear that those authors and institutions holding editorial positions in the journal tend to be among the most productive ones.

From a globalised perspective, the journal is very diverse with countries/territories from all over the world disseminating knowledge in risk research. The UK is the most productive and influential country in the journal, closely followed by the USA. Almost half of the 50 most productive institutions are from the UK and the USA. Norway shows the best performance when normalising the results per million inhabitants and is followed by Sweden and Netherlands. It is noteworthy that the USA has become more productive during the last five years and is expected to play a more important role in leading the journal in the future. Additionally, China and Australia are publishing more regularly in the journal. However, developing economies are still far away from the leading positions with a very low number of publications. Europe (especially Western Europe) is currently the most productive region, with 14 countries appearing in the top 20 leading countries/territories and seven of the top 10 most productive institutions. Oceania also performs remarkably well considering its smaller population size. Africa and Middle East also publish in the journal although their numbers are very low compared with the leading regions'.

To deepen the bibliometric results, the work also develops a graphical analysis of the bibliographical material by using the VOS viewer software. The analysis considers co-citation, bibliographic coupling, and co-occurrence of author keywords to investigate the publication structure of authors, institutions, and countries/territories. The results obtained are consistent with the results of the tables. The main advantage of the graphical analysis is the representation of the most significant connections between the key variables to identify similar research profiles inside the JRR publications. Risk Analysis is the most cited journal in the publications of JRR, and many other journals within the scientific domain of JRR tend to appear very close to the journal, including journals in the areas of social sciences, psychology, environmental science, OR-MS, engineering, and health studies. In addition, these results also confirm the multidisciplinary profile of the journal. Observe that the self-citations of JRR show a strong relevance, which is very common in most of the journals. It is also worth noting that the institutions from the same countries/territories tend to be strongly connected to each other and have similar research profiles. The graphical analysis ends with a mapping of the most frequent author keywords and the most representative co-occurrences between them. The top 10 most frequent keywords in the journal are risk perception, risk communication, risk, risk management,

uncertainty, trust, risk assessment, COVID-19, decision making, and risk governance. Furthermore, the leading topics and topic clusters in the journal between 2013 and 2022 are analysed specifically through the SciVal platform in Scopus. The 'Risk Perception; Decision Making; Regression Analysis' topic and the 'Risk Perception; Energy Transition; Climate Change' topic cluster lead in the journal. More importantly, many of the leading topics and topic clusters in the journal are in the top 10% worldwide by prominence, specifically one-half of the top 30 leading topics and one-third of the leading topic clusters, respectively.

This work provides a broad outline of the publication and citation structures of the journal by using a wide range of bibliometric indicators and techniques with the objective of identifying the leading trends. The results mainly depend on the bibliometric data collected from the Scopus and WoS Core Collection databases. However, there are two main limitations of these databases, although they are widely used for classifying research. One major limitation is that these databases use full counting for any co-authoring participant. Thus, the documents with several co-authors tend to obtain more significance in the analysis than the single-author documents. Additionally, the analysis considers the affiliation of authors, including institutions, countries/territories, and supranational regions, at the time of publication, which may not accurately represent where authors currently work. Furthermore, it is worth noting that the bibliometric data is dynamic in nature with time. Therefore, the results presented in this paper represent the current picture and may change and evolve differently as other contributing variables gain more importance in the journal. For now, the findings provide key insights into current publication trends and serve to underscore the significant growth and impact of JRR throughout its lifetime. In the future, we project that the journal will continue growing its international diversity and will continue to be an important platform for facilitating the exchange and dissemination of risk knowledge across the world.

Disclosure statement

No potential conflict of interest was reported by the author(s).

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