

A Comparative Analysis on Risk Communication between International and Chinese Literature from the Perspective of Knowledge Domains Visualization

Huiling Dong

Weifang Medical University

Qunhong Wu (✉ 15965787355@163.com)

Harbin Medical University

Yue Pang

Weifang Medical University

Bingyi Wu

Weifang Medical University

Research Article

Keywords: Risk Communication, Risk Perception, Research Frontier, Trust, Knowledge Domains.

Posted Date: April 8th, 2021

DOI: <https://doi.org/10.21203/rs.3.rs-378880/v1>

License:  This work is licensed under a Creative Commons Attribution 4.0 International License.

[Read Full License](#)

Abstract

Background At the end of 2019, the outbreak of coronavirus disease (COVID-19) severely damaged and endangered people's lives. Risk communication plays an important role in the response to COVID-19 successfully. Therefore, a comprehensive analysis of risk communication research is necessary, which can understand current research hotspots and reveal new trends.

Methods In this study, international articles come from Web of science database (3983), Chinese articles come from the China National Knowledge Infrastructure database (1134), Bibliometric and mapping knowledge domain analysis were used for cooperation network, co-word co-occurrence network and burst detection analysis.

Results The first article in this field was published by western scholars earlier, while the first Chinese article in 2002. Research institutions mainly come from universities. The United States play a key role in this field. Chinese scholars had a closer cooperation network, but there was less cooperation among domestic institutions. Risk perception, public trust, risk management, and risk information dissemination had always been the research hot-spots in this academic direction. Trust, sentiment research, and public risk events were essential directions for future. There are 25 burst words for international articles, while 11 burst words for Chinese articles from 2000–2020.

Conclusions In summary, both domestic and international researchers are concerned about risk communication, risk perception, trust, and risk information. International scholars begin to take cares with ecological and technological risks research, radiating many areas of social risk. Compared with international research on risk communication more systematic and comprehensive, Chinese scholars takes SARS as the research background and reviewing foreign knowledge as the research starting point. With purpose of practical and applied research based on a public emergency, the risk-communication research lacks continuity in Chinese academy in the past years.

Background

Since December 2019, the novel corona-virus (COVID-19) has broken out and spread in China, Thailand, Japan, the United States, Singapore, South Korea, and other countries, and has gradually evolved into a global pandemic[1]. As a major crisis in human society, COVID-19 has brought huge challenges to individuals, and over the world[2–3]. On January 31, 2020, the WHO announced that COVID-19 was listed as a “public health emergency of international concern” and made eight recommendations to China. The first one is to “implement a comprehensive risk communication strategy and inform the public about the evolution of the epidemic, preventive measures regularly”. For major public health emergencies, in addition to emergency response, effective risk communication is an indispensable part [4].

Risk-communication is an interactive process of exchanging information and views among individuals, groups, and institutions. It involves multidimensional risk properties and related information which not only directly conveys risk-related information, but also expresses the concerns, opinions and

corresponding responses to the risk events, or national regulations and measures in risk management[5]. The international risk communication research is relatively mature, radiating many areas of social risk. The frontiers of risk communication research mainly come from the United States. In the mid-1980s, the United States established several basic research and application centers for risk communication. Taking 1986 as boundary, “risk communication” began to become a compelling research focus[6]. From the new century on, the research field of risk communication has continuously expanded to social risk topics such as terrorist attacks, public transportation safety and judicial systems, in addition to the traditional ecological and technological risks[7–8].

The research on risk communication in China started late, and is still in the stage of exploration and introduction from abroad. At present, most of the influencing factors were analyzed from the perspective of psychology, combined with several important risk events in recent years, such as SARS, tainted milk powder, extremely large mudslides, H1N1 and influenza pandemics, etc. These above researches provide the foundation for the establishment of the psychological emergency system of risk events[9–12], by which the understanding of risk communication has deepened gradually.

Throughout the study of risk communication at international and domestic academy, the focus by scholars can be summarized into the following categories: First, the study of risk communication based on media responsibility and communication strategy[13–14]. Based on clarifying the sociological theory of risk communication, including Baker's risk society theory, the transformation of research paradigm, and the positive and negative effects of mass media have become research hotspots. Second, research on risk communication is from the perspective of government emergency management[15–16]. In response to the difficulty of administrative accountability, some scholars suggest to learn from the evaluation methods of government public crisis management, and consider the accountability objectives, subjects, procedures, and results. In the context of a risk society, the construction of emergency mechanisms has attracted widespread attention, and research on risk communication strategies has gradually increased. Third, research on risk communication is based on public perception and media literacy[17–18], in which public's risk awareness is an important factors for effective communication.

In recent years, with the frequent occurrence of public emergencies, domestic and foreign scholars have done a lot of research on risk communication. Yet, there are still some problems need to be solved. What is the current research status, what are the research forces, what are main research hotspots and trends of risk communication, and whether there are similarities and differences in risk communication research between international and Chinese academy? Therefore, sorting out the development characteristics, research hotspots and domain of risk communication is an important topic. Under the background, we used the method of knowledge map to reveal the research characteristics, frontiers, and trends by reviewing articles on risk communication published in international and Chinese journals in the past 20 years. Use CiteSpace software to sort out many articles related to risk communication, which is more objective, accurate, and scientific, and provides a reference for scholars and the government to understand the status and trends of risk communication.

Methods

Data Sources and Retrieval

The data in this study included international data and Chinese data. The international data was downloaded from the Web of Science Core Collection (WoS). A lot of literature showed that WoS was the largest comprehensive academic information resource[18–20]. In our research, WoS was divided into Social Sciences Citation Index (SSCI), Arts & Humanities Citation Index (A&HCI), and Science Citation Index Expanded (SCI-E) databases. China National Knowledge Infrastructure (CNKI) was the main source of Chinese database, which has the largest full text of Chinese journals [21]. Based on the above points, we chose “risk communication” as keywords. The international data retrieval strategies were set as: (TS= (“risk communication”) AND LANGUAGE: (English) AND DOCUMENT TYPES: (Article) Timespan = 2000.1.1-2020.12.31. When retrieving Chinese data, we choose “risk communication” as the theme-word, Timespan= “2000–2020”. A total of 4030 international articles and 1220 Chinese articles were retained.

To ensure the accuracy of sufficient data, members of our research team screened the articles. The exclusion criteria are: (1) health care, disease treatment or medical record management; (2) guidelines on the action, book chapter, interviews, summaries of conferences. The article finally used 3983 international articles and 1134 Chinese articles for the analysis after data filtering and duplicates were removed.

Data Analysis Tools

Data analysis mainly used CiteSpace 5.5. R2 and Microsoft Excel 2010. Citespace is a document visualization analysis software, which has been widely used in scientific meteorological analysis in various scientific fields [22–24]. This research mainly used 5.5.R2 software for biometric analysis. It has different parameter settings and options, resulting in differences in the result [25–26].The parameters of this research were set as follows: time slicing (2000–2020), years per slice (1), term source (Title, Abstract, Descriptors, identifiers), node type (Author, institution, country, keyword), selection criteria (top 50), and visualization (cluster view-static, show merged network). Besides, the time distribution and forecast of the number of articles used Microsoft Excel 2010.

Data analysis strategies

This study mainly used cooperation network analysis with authors, institutions, and countries, keyword co-occurrence network and burst detection analysis. The main purpose of cooperative network analysis is to analyze the contributions of different authors, institutions, and countries in a specific field[27–29]. Keyword co-occurrence network analysis can effectively map the strength of the relationship between items in the same text, and explore hot topics in this field. Keywords burst detection analysis can clearly grasp the areas that the academic community pays special attention to in a certain period [30]. The principles of the above analysis methods are mainly compared based on the index of betweenness centrality and burst weight. Betweenness centrality is an indicator that measures the effect of each node in the graph on the network [31]. The burst weight refers to the frequency of a word in a specific time. The higher the weight, the more representative the research trend in that period[32].

Results

Sample distribution Analysis

Figure 1 illustrated the distribution and trend of articles of international and Chinese scholars. The international research on risk communication started earlier, with less than 100 articles publications before 2006. After that, the number of articles entered a period of rapid rise, reached its peak (353) till 2019, then declined in 2020. The first Chinese article in this domain was published in 2002. The number of articles were less than 10 before 2006, and increased to 105 in 2012, reached the peak period that followed in 2016 (146), then declined after 2016, with 77 in 2020.

After descriptive analysis of the data, we forecasted the number of articles in the following three years. The chronological distribution trend of international articles can be expressed as follows:

$$y = 0.0213x^3 - 0.1925x^2 + 12.431X + 31.13, R^2 = 0.9744, \text{while Chinese database}$$

was: $y = -0.1204x^3 + 3.7067x^2 - 22.431X + 30.069, R^2 = 0.9618$, among which Y

indicates the article number, X the year, and R^2 the degree of fit, $R^2 > 0.9$

indicates a good degree of fit. The results show that international publications increase year by year. In the next three years, the number of documents published will increase annually in the world. While Chinese articles will continue to be reduced to the next three years. Besides, the gap between Chinese and the international publications will gradually widen.

Cooperation Network Analysis

Co-Author

Figures 2 and 3 showed the analysis of international and Chinese authors cooperation networks, indicating that many authors have conducted research on risk communication, and some scholars were collaborators. Internationally, ROCIO GARCIARETAMERO had the highest number of articles with 31, next was MICHAEL SIEGRIST with 28, followed by BRIAN J. ZIKMUND FISHER (18) and ANGELA FAGERLIN (14), which showed that these authors had published more articles. In China, Fanxu Zeng had the highest number of articles (9), followed by Zhengwei Zhu and Xiaoping Guo, both with 7 articles. The collaborator network diagram showed that many research teams had studied risk communication research, but domestic and international cooperation research was not close enough. Relatively speaking, the cooperation network of domestic scholars was closer, and foreign researchers were more independent.

Co-Institution

Table 1 showed the volume and centrality of domestic and international risk communication institutions. Just like co-author, many institutions have researched on risk communication. Internationally, eight of the top 10 research institutions were universities, indicating that universities had published the greatest

number of articles. The highest number of international universities published was Kings College London with 73, followed by Cornell University, Harvard University, and University of Michigan and Washington University with more than 48. The highest centrality ranking was Cardiff University (0.20), followed by Harvard University (0.17), University of Michigan (0.16) and Washington University (0.16), which indicates institutions had higher publication quality.

In China, the organization with the largest number of publications was the Chinese Health Education Center (14), indicating that the organization had published the largest number of articles, which was a bit difference from international ones. Followed by the Xian Jiaotong University, Tsinghua University, Zhongnan University of Economics and Law with more than 8 articles published. The centrality of all institutions in China were 0, which meant that the quality of articles published by Chinese institutions had not reached the leading level. The network diagram of the publications number showed that the network of cooperation among international institutions was closer than that of Chinese institutions.

Table 1
The volume and centrality of domestic and international risk communication institutions

International institutions	Count	Centrality	Chinese institutions	Count	Centrality
Kings College London	73	0.11	Chinese Health Education Center	14	0.00
Cornell University	68	0.06	School of Public Policy and Management, Xian Jiaotong University	11	0.00
Harvard University	57	0.17	School of Journalism and Communication, Tsinghua University	10	0.00
University of Michigan	48	0.16	School of Law, Zhongnan University of Economics and Law	8	0.00
Washington University	48	0.16	School of Journalism and Communication, Huazhong University of Science and Technology	6	0.00
University of Pennsylvania	44	0.06	School of Public Administration, Tsinghua University	6	0.00
Max Planck Institute for Human Development	43	0.01	School of Communication, East China Normal University	5	0.00
Ctr Dis Control Prevent	42	0.02	National School of Administration	4	0.00
Cardiff University	41	0.20	Chinese Center for Disease Control and Prevention	4	0.00
The University of Sydney	41	0.04	School of Political Science and Public Administration, Shandong University	4	0.00

Co-Country

Table 2 listed the top 10 countries in terms of volume and centrality in risk communication research. We can see that the United States had the largest number of articles published, far ahead of other countries, which centrality was also the largest (0.25). It showed the United States not only had conducted the highest publication quantity, but also more advanced than others. Although China ranked seventh on this list, its central position was almost 0, which showed Chinese scholars had not published articles appreciated internationally. Although the number of articles in New Zealand (269) and Switzerland (122) was much lower than that in the United States (1791), the centrality of the articles exceeded 0.10, which indicated that the quality of articles in these two countries were still high.

Table 2
Top 10 countries in the volume and centrality of international database.

Country	Count	Centrality
USA	1791	0.25
England	513	0.15
Canada	286	0.11
Germany	284	0.11
New Zealand	269	0.21
Australia	218	0.00
People's Republic of China	152	0.00
Italy	137	0.08
Japan	132	0.00
Switzerland	122	0.17

Co-word Network Analysis

Keywords Co-occurrence Network Analysis

The research hotspots can be explored by analyzing the keywords in the literature. In WoS, the top 10 important keywords were extracted after merging keywords with the same expression content, which were risk communication (2333), risk perception (1496), information (517), health (296), trust (293), knowledge (266), decision making (256), behavior (243), management (242) and impact (240). Among all keywords, the top three betweenness centrality were trust (0.37), risk communication (0.19) and risk perception (0.18), which means that they have greater influence than other keywords, as shown in Fig. 3. It can be seen that "trust" had the largest intermediary centrality, indicating that trust was a key issue in risk communication. The citation frequency of risk communication had a prominent position, far higher than other keywords. The research of risk communication based on risk perception had always been the focus of the public and decision-makers. In general, foreign researchers pay more attention to the understanding and promotion of public risk perception, and focus on the trust analysis, behavior analysis, practical application of communication behavior decision and macro-management of risk events on health issues.

Burst detection analysis

The strongest citation burst in international and Chinese databases are shown in Fig. 5 and Fig. 6. A total of 25 burst words appeared in the international field, while the Chinese data detected burst words with 11. It can be seen from Fig. 5 that in international countries can be divided into four stages. The first stage

was 2000–2007, in which the mutation weights of risk management and risk assessment were higher, indicating that more attention was paid to these two studies in this time period. The mutation weights of breast cancer and biotechnology ranked third and fourth. The second stage was 2008–2011. At this time, the frequency and form of risk communication received special attention, and public participation and women had become hot topics. The third stage was 2012–2017. The weight of burst in decision-making and public awareness was higher, which had become a new trend in this time. The fourth stage was 2018–2020. Risk communication emotion research and strategy research had entered the view of researchers. The weight of burst was higher, which had become a new research hot spot.

Chinese risk communication research was also divided into three phases. The first phase was from 2006 to 2011. During this period, research on risk communication, risk management and risk communication were fundamental research. The second stage was 2012–2017. Trust and various public emergencies (public health emergencies, food safety, emergencies, environmental risks) had become the research hot-spot during this period. The third stage was 2018–2020. Nurse-patient communication, NIMBY incidents and nurse-patient communication had become the focus topics for researchers.

Discussion

International research on risk communication is earlier than in China. International scholars pay more and more attention to risk communication, which has been growing over time. From the perspective of article number, international risk communication research has been increasing with time since 2000, reaching a peak in 2018, and will continue to grow. In the ten years from 2009 to 2019 in China, the overall trend in the number of researches fluctuated. This may be related to the number of major public events that occur each year[33]. The number of articles in 2014 reached a small climax, which was closely related to the human infection with H7N9 and the vaccine incident that year. The peak number of articles reached in 2016, which may be related to the frequent occurrence of vaccine events in Shandong Province.

The research scholars and institutions of domestic and international need to strengthen cooperation each other. The results of this study show that some scholars and research institutions have already cooperated, but the degree of closeness is not enough. There is little cooperation between institutions and universities in China. Previous research believed that cooperation between different research institutions was very effective in promoting high-level and effective research, helped to develop more mature research areas[34]. Therefore, it is very necessary to strengthen the close cooperation between different institutions. In addition, although China ranks seventh in the number of articles published, it lags many countries such. The number of articles published by each institution is small and scattered, which may lead to superficial research and lower recognition in China. After consulting these documents, it is found that domestic research focuses on reviewing the concept, development, purpose, and function of risk communication from abroad, the research results are scattered and fail to form an empirical research model or a convincing theoretical explanation.

Risk cognition is a research hotspot in both domestic and international research, and it is also the foundation to further research on risk communication. Through the keyword analysis, risk perception is cited at high frequency in domestic and international, and the centrality is relatively larger. Some studies have shown that Individuals' perception of risk plays a leading role in the process of risk communication. The ultimate purpose of risk communication is to formulate policies through dialogue between decision-makers and the public[35]. Therefore, how the public perceives risks and how to choose risks becomes an important part of risk communication. However, risk perception is affected by many factors. The randomness and subjectivity generated by personal factors and social factors make the perception of risk difficult to measure[36–37]. Some research has concluded that there were 15 main factors directly related to risk perception, such as the uncertainty and reversibility of risks, and the sources of risks[38–39]. But if it is specific to a certain field, such as a public health emergency or public safety incident, is these factors applied to? What variables will affect the public risk perception? What kind of attitudes and measures should the public adopt due to risk perception? These issues need to be studied further by relevant scholars.

"Trust" is a key factor affecting the effectiveness of risk communication. Through the keyword analysis, "trust" ranks among the best in risk communication, and its centrality is relatively high, especially among international researchers (0.74). Besides, "trust" has become an important direction of international researchers from 2003 to 2007 in citation bursts analysis. Domestic researchers in this field paid attention to the influencing factors of "trust" mainly in 2013–2015. In fact, "trust" has always been a core concept in the social science research on risk. The literature research found that the current research can be divided into three aspects: First, the research on the "lack of trust" between the public, experts, and policy makers[40–41]. The second is the study of factors affecting trust, which openness, authenticity, competence, and common values are all important factors [42]. The third is the research on the asymmetry of trust construction. Research literature shows that risk communication is based on trust[43]. But trust is often formed gradually in a long-term process, and individual trust judgments are easily affected by external factors. If the barriers to trust cannot be overcome, the desired goal of risk communication will be difficult to achieve.

In summary, the current Chinese and Western research institutes focus on the same topics, focusing on risk communication, risk perception, risk assessment, risk information. However, due to differences in specific national conditions and risk communication development, domestic and international scholars have different levels of attention to specific issues. Through this research, it is found that domestic research pays more attention to the understanding and improvement of public risk awareness based on health issues, focusing on the trust analysis of audiences and information disseminators. The previous research on risk communication is more systematic and comprehensive. In contrast, public safety events such as H1N1, influenza pandemic, nurse-patient communication, and NIMBY conflict events have a higher burst weight in domestic research, indicating that risk communication is mainly based on specific emergency occurrence, which may expose the lack of persistence in China.

The conclusions drawn in this study should be based only on the findings of two large literature databases above-mentioned, which is necessary to meet literature demand for the study. Since the current version of Citespace cannot achieve a better combination of synonymous keywords, it is necessary to merge keywords manually, which can easily affect the objectivity of the results. In addition, this article aims to analyze the development of risk communication research and find its characteristics and hotspots in the academic field. Therefore, we couldn't deeply analyze some specific links of risk communication, such as risk communication mechanisms, risk monitoring, risk assessment, and other issues.

Conclusions

In the next three years, the number of international articles will continue to increase, while China will decrease. The degree of cooperation between Chinese scholars is closer, yet there is less cooperation among different organizations. At present, researchers both at domestic and international are concerned about risk communication, risk perception, trust, and risk information. Due to differences in specific national conditions and risk communication development, scholars tended to have different levels of attention to specific issues. International scholars radiate many areas of social risk. The international research on risk communication is more systematic and comprehensive. Chinese researchers take SARS as the research starting point, foreign knowledge review as research background, which purpose is to propose a practical and applied counter-measures about one kind of public health event. Therefore, risk communication research in China inevitably lacks continuity in this domain.

List Of Abbreviations

NIMBY: Not In My Backyard"; COVID-19: Coronavirus disease 2019; WoS: Web of Science; SCI-E: Science Citation Index Expanded; SSCI: Social Sciences Citation Index; A&HCI: Arts & Humanities Citation Index; CNKI: China National Knowledge Infrastructure; SARS: severe acute respiratory syndrome.

Declarations

Ethics approval and consent to participate

Ethics approval was not required for this research.

Consent for publication

Not applicable.

Availability of data and materials

All data generated or analyzed during this study are included in this published article and its supplementary information files.

Competing interests

The authors have declared that no competing interests exist.

Funding

The study was supported by National Social Science Foundation of China (Project approval No:18BRK013) and Shandong Education Science Plan (Project approval No:2020YB050)

Authors' contributions

Conceived and designed the study: BY Wu; wrote the main manuscript: HL Dong; Gathered and Analyzed the data: HL Dong; Contributed materials/analysis tools: BY Wu; Prepared figures 2-5: Y Pang; Reviewed/edited/approved: QH Wu and BY Wu. All authors read and approved the final manuscript.

Acknowledgements

Thanks to the three experts for their valuable suggestions on literature retrieval and article writing. Members of the expert group are Qunhong Wu (Department of Management, Harbin Medical University, Harbin); Yue Pang (Department of Management, Weifang Medical University, Weifang); Bingyi Wu (Department of Management, Weifang Medical University, Weifang).

References

1. Society for Risk Analysis(2020). Available online:
<https://onlinelibrary.wiley.com/doi/toc/10.1002/1539-6924.risk-analysis-and-coronaviruses>
(accessed on 10 February 2020).
2. Chen Wang, Peter W Horby , Frederick G Hayden, et al(2020). A novel coronavirus outbreak of global health concern. *The Lancet*.395,470-473.
3. World Health Organization. Novel Coronavirus (2019-nCoV) situation reports. Available from:
<https://www.who.int/emergencies/diseases/novel-coronavirus-2019/situation-reports>.
4. Rui Guo,Hang Su(2020).COVID-19 risk communication response based on mutual direction model-trust dilemma and trust recons. *Medical education management*.6,107-112.
5. Visschers V H M , Meertens R M , Passchier W W F, et al(2010). Probability Information in Risk Communication: A Review of the Research Literature. *Risk Analysis*.29,267-287.
6. Jessica S. Ancker, Yalini Senathirajah, Rita Kukafka, et al(2006). Design Features of Graphs in Health Risk Communication: A Systematic Review. *Journal of the American Medical Informatics Association*. 13,608-618.
7. J Saxon B , Bass S B , Wright T , et al(2019). Ebola and the rhetoric of US newspapers: assessing quality risk communication in public health emergencies. *Journal of risk research*.9,1309-1322.

8. Richard G. Peters, Vincent T. Covello, David B. McCallum(1997). The Determinants of Trust and Credibility in Environmental Risk Communication: An Empirical Study. *Risk Analysis*.17,43-54.
9. Vincent T. Covello, Richard G. Peters, Joseph G. Wojtecki, et al(2001). Risk communication, the West Nile virus epidemic, and bioterrorism: responding to the communication challenges posed by the intentional or unintentional release of a pathogen in an urban setting. *Journal of Urban Health: Bulletin of the New York Academy of Medicine*.78,382-391.
10. Xiaofei Xie, Rui Zheng(2003). Risk Communication and Public Rationality. *Advances in Psychological Science*.11,375-381.
11. Kai Pang, Zongjun Zhang. The role and value of risk communication in public crisis management—enlightenment from typical cases(2013). *Gansu Social Sciences*.6,237-240.
12. Fangfang Zhu, Jinxia Yang(2011). Application of risk communication in influenza epidemic prevention and control. *Health Economics Research*.4,40-43.
13. Jean Pierre Guy Gashami, Christian Fernando Libaque Saenz(2019). Social-media-based risk communication for data co-security on the cloud. *Industrial Management & Data Systems*. 120,442-463.
14. Ting Wang(2020). Research on Communication Strategy based on Mobile Information Technology. *Journal of Physics: Conference Series*.1533,022119(6pp).
15. Liwei Zhang, Huijie Li, Kelin Chen(2020). Effective Risk Communication for Public Health Emergency: Reflection on the COVID-19 (2019-nCoV) Outbreak in Wuhan. China. 8,1-13.
16. Wuqi Qiu(2018). Thinking of risk communication in public health emergency management. *Chinese public health management*.34,59-61.
17. Liu T, Zhang H, Zhang H(2020). The Impact of Social Media on Risk Communication of Disasters—A Comparative Study Based on Sina Weibo Blogs Related to Tianjin Explosion and Typhoon Pigeon. *International Journal of Environmental Research and Public Health*.17,1-17.
18. Yuexia Zhang, Yixuan Feng, Ruiqi Yang(2019). Network public opinion propagation model based on the influence of media and interpersonal communication. *International Journal of Modern Physics B*.33,1-25.
19. Serhat Burmaoglu, Ozcan Saritas, Levent Bekir Kidak, et al(2017). Evolution of connected health: a network perspective. *Scientometrics*. 112,1419-1438.
20. Chen S , Bie R , Lai Y , et al(2019). Trends and Development in Enteral Nutrition Application for Ventilator Associated Pneumonia: A Scientometric Research (1996–2018). *Frontiers in Pharmacology*.10, 1-12.
21. Knowledge Infrastructure Project in China(2019). <http://www.cnki.net/gycnki/gycnki.htm>. Accessed on 1st January.
22. Luo Na, Li Meihui, Dai Jingqi(2020). Research Hotspots and Trends of Natural Gas Vehicles: A Visual Analysis Using CiteSpace. *Journal of Physics Conference Series* 1549,042136.

23. Daniel Fonseca Costa, Francisval de Melo Carvalho, et al(2017). Bibliometric analysis on the association between behavioral finance and decision making with cognitive biases such as overconfidence, anchoring effect, and confirmation bias. *Scientometrics*.111,1775-1799.32.
24. Sun Meng, Deping Xiong(2018). Review and Exploration of China Subtropical Climate Change Research Based on Scientometric Analysis. *Trop Conserv Sci*. 11,1-13.
25. Wang L , Xue X , Zhang Y , et al(2018).Exploring the Emerging Evolution Trends of Urban Resilience Research by Scientometric Analysis. *International Journal of Environmental Research and Public Health*.15,1-29.
26. Feng F, Zhang L, Du Y, et al(2015). Visualization and quantitative study in bibliographic databases: A case in the field of university–industry cooperation. *Journal of Informetrics*.1,118-134.
27. Chaomei Chen(2006). CiteSpace II: Detecting and visualizing emerging trends and transient patterns in scientific literature. *Journal of the American Society for Information Science & Technology*.57:359-377.
28. Chaomei Chen, Zhigang Hu, Shengbo Liu, et al(2012). Emerging trends in regenerative medicine: a scientometric analysis in CiteSpace. *Expert Opinion on Biological Therapy*. 12,593–608.
29. Synnestvedt Marie B, Chen Chaomei, Holmes John H(2005). CiteSpace II: visualization and knowledge discovery in bibliographic databases. *Amia Symposium. AMIA Annu Symp Proc*.2005,724-728.
30. Cailin Wang, Jidong Wu, Xin He, et al(2019). Emerging Trends and New Developments in Disaster Research after the 2008 Wenchuan Earthquake. *Int J Env Res Pub He*.16,1-19.
31. Linzeng Han, Bin Li, Kunling Zhang(2016). Knowledge Structure of China's Marine Economy Research: An Analysis Based on CiteSpace Map. *Geographic science*. 5,643-652.
32. Kamila Widziewicz-Rzońca, Malwina Tytła(2020). First systematic review on PMbound water: exploring the existing knowledge domain using the CiteSpace software. 5,1-64.
33. Jia Q, Shi S, Yuan G, Jing S, Shuai S, Yuan H(2020). Analysis of knowledge bases and research hotspots of coronavirus from the perspective of mapping knowledge domain. 99,1-14.
34. Du HS, Ke X, Chu SKW, Chan LT(2017). A bibliometric analysis of emergency management using information systems (2000–2016). *Online Inform Rev*. 41,454–470.
35. Wade E. Martin, Ingrid M. Martin, Brian Kent(2010). The role of risk perceptions in the risk mitigation process: The case of wildfire in high-risk communities. *Journal of Environmental Management*.91, 489-498.
36. JianLi Wang, Rachel Smail-Crevier, Molly Nannarone, et al(2020). The accuracy of depression risk perception in high-risk Canadians. *Journal of Affective Disorders*.265,410-415.
37. Wilson Robyn S, Zwickle Adam, Walpole Hugh. Developing a Broadly Applicable Measure of Risk Perception. *Risk Analysis*, 2019,39:777-791. DOI:1111/risa.13207.
38. Bostrom Ann, Anselin Luc, Farris Jeremy(2008). Visualizing Seismic Risk and Uncertainty A Review of Related Research. *Annals of the New York Academy of Sciences*, 1128,29-40.

39. Rouillon Steeve, El Ouazzani Houria, Rabouan Sylvie, et al(2018). Determinants of Risk Perception Related to Exposure to Endocrine Disruptors during Pregnancy: A Qualitative and Quantitative Study on French Women. *International Journal of Environmental Research & Public Health*.15,1-19.
40. Khan Sobia, Moore Julia E, Gomes Tara, et al(2014). The Ontario Drug Policy Research Network: Bridging the gap between Research and Drug Policy. *Health Policy*.117,392-398.
41. Adam Capon, James Gillespie, Margaret Rolfe, et al(2015). Perceptions of risk from nanotechnologies and trust in stakeholders: a cross sectional study of public, academic, government and business attitudes. *BMC Public Health*.15,1-13.
42. Bart W. Terwel, Fieke Harinck, Naomi Ellemers, et al(2009). How organizational motives and communications affect public trust in organizations: The case of carbon dioxide capture and storage. *Journal of Environmental Psychology*.29,290-299.
43. Dima Faour-Klingbeil, Tareq M. Osaili, Anas A. Al-Nabulsi, et al(2021). The public perception of food and non-food related risks of infection and trust in the risk communication during COVID-19 crisis: A study on selected countries from the Arab region. *Food Control*. 121,1-12.

Figures

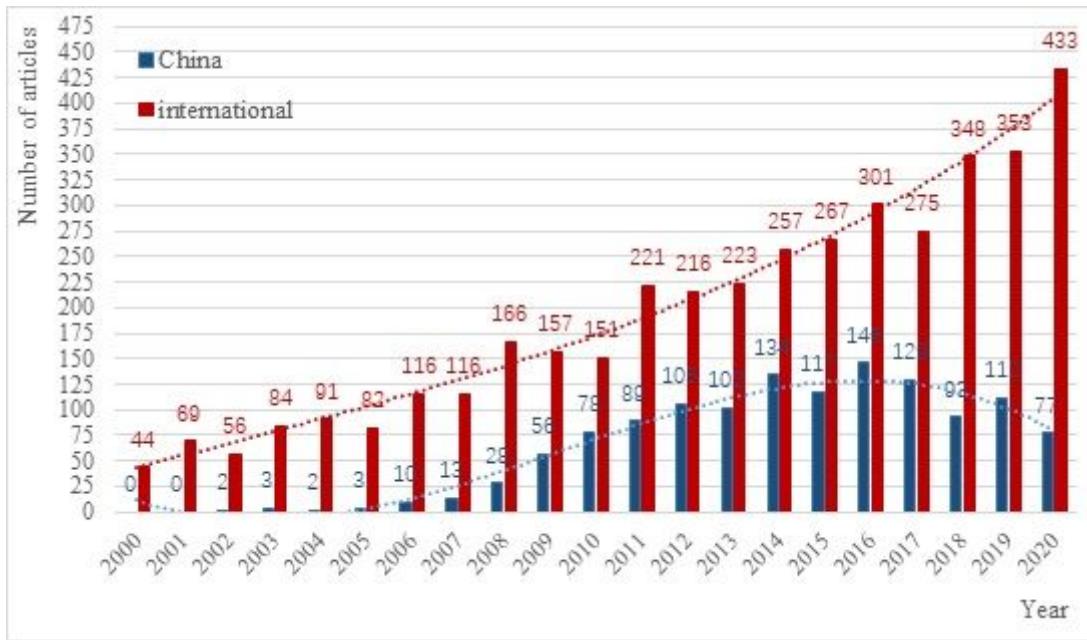


Figure 1

Temporal distribution of international and Chinese risk communication research.



Figure 2

Co-author network of international database



Figure 3

Co-author network of Chinese database

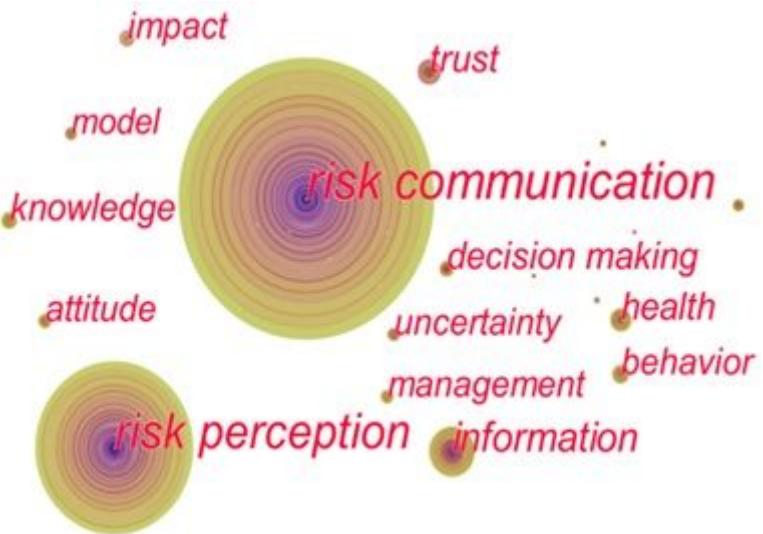


Figure 4

Keyword co-occurrence network of international database



Figure 5

Keyword co-occurrence network of Chinese database

Top 25 Keywords with the Strongest Citation Bursts

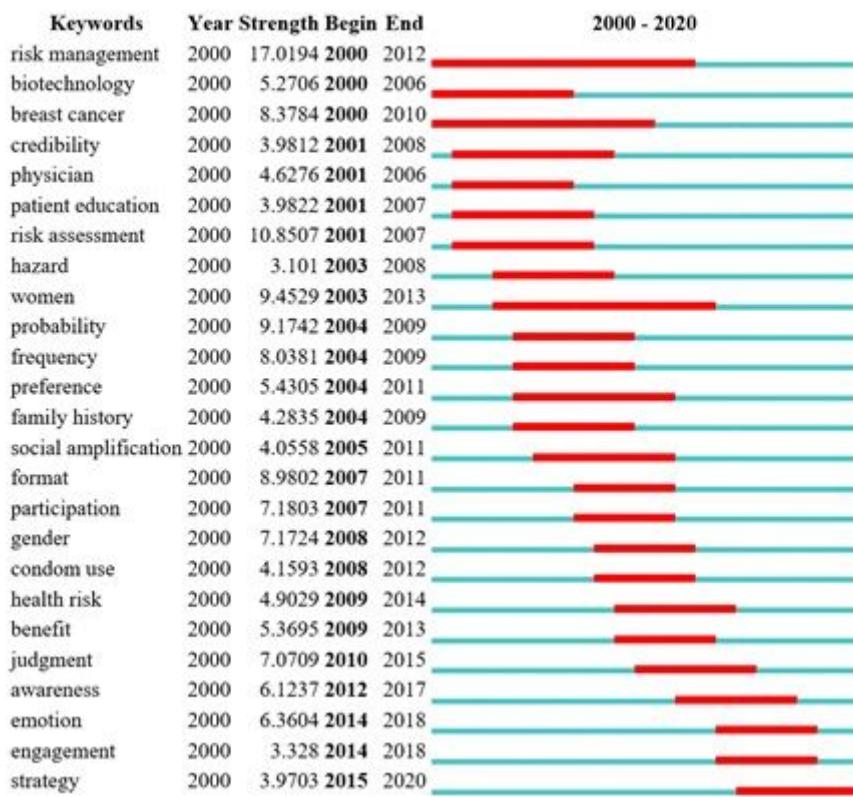


Figure 6

Keywords with the strongest citation bursts of international database

Top 11 Keywords with the Strongest Citation Bursts

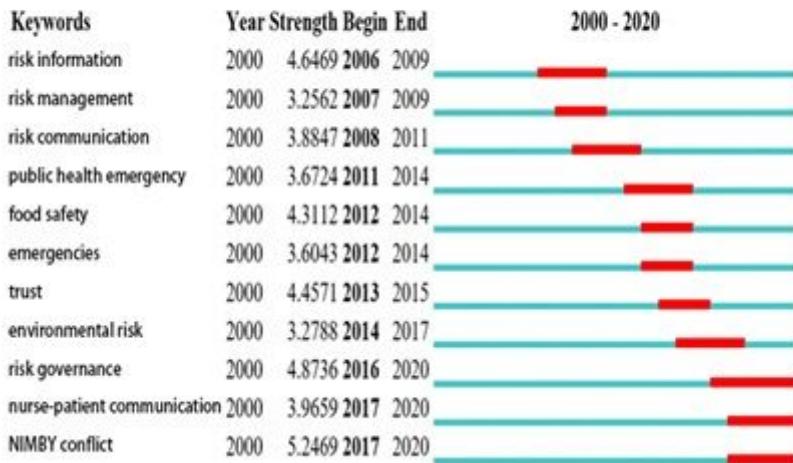


Figure 7

Keywords with the strongest citation bursts of Chinese database

Supplementary Files

This is a list of supplementary files associated with this preprint. Click to download.

- [supplementarymaterials.docx](#)