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Current Status and Trends in Rumor Governance: A Visual Analysis based on CiteSpace

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ABSTRACT

[Purpose/Significance] With the advent of the 5G era and the rapid development of the internet, the speed and modes of rumor dissemination have continuously evolved. This study employs bibliometric methods to conduct a systematic review and visual analysis of scholarly articles on rumor governance, aiming to clarify the research landscape, key features, hotspots, and future directions in this field. [Methods/Process] Utilizing data from the China National Knowledge Infrastructure (CNKI) and Web of Science (WoS) core databases, this study applies CiteSpace, a bibliometric analysis tool, to examine publication trends, highly cited authors, prolific researchers, keyword co-occurrence patterns, and thematic clusters from60 2012 to 2024. [Results/Conclusion] The findings indicate that foreign researchers exhibit high publication productivity and strong collaborative networks, whereas domestic researchers are relatively dispersed with weaker cooperative ties. Keyword co-occurrence and cluster analysis reveal that domestic research predominantly focuses on the practical implementation of governance strategies, emphasizing macro-level frameworks such as "collaborative governance," and primarily employing qualitative methodologies to propose policy recommendations and localized practices. In contrast, international studies prioritize the universality of communication models, utilizing quantitative methods and model construction to examine the micro-level mechanisms influencing individual behavior and collective emotions. Future research should integrate the contextual depth of case studies with the generalizability of quantitative models to explore user psychology, the long-term societal impacts of rumors, and the role of legal frameworks in rumor governance. Additionally, cross-cultural research should be expanded to analyze the mechanisms of rumor dissemination across different cultural contexts and governance models, addressing the challenges posed by the globalization of information dissemination.

KEYWORDS

CiteSpace; Online Rumors; Rumor Governance; Visual Analysis; Knowledge Mapping.

1. INTRODUCTION

Today, social networks are widely used as a fast and ubiquitous medium for sharing information. As unconfirmed information, rumors are also widely circulated on social networks.[1] It can quickly trigger social panic and public pressure, mislead the public about the facts, and damage the reputation of individuals, organizations, and society as a whole. This, in turn, undermines social trust, threatens public order, and poses major challenges to governance and the stability of the digital information ecosystem. Therefore, studying how rumors spread and how to control them is of great significance for reducing the social and psychological damage caused by rumors in social networks. Although rumors governance has been extensively studied at home and abroad, the effective application of these research results in real scenarios is still a pressing issue. In this context, this study systematically

reviews the current situation, research hotspots, and emerging trends of rumor governance literature from two perspectives at home and abroad, and determines the future research direction.

2. RESEARCH METHODS AND DATA SOURCES

2.1. Research Methods

This study employs bibliometric and knowledge-mapping techniques to visualize the characteristics of research publications and identify key contributors, structural relationships, and evolving trends in the field of rumor governance. CiteSpace, a widely used bibliometric analysis tool, was utilized to analyze author networks, keyword co-occurrence, and research gaps.

2.2. Data Sources and Processing

Data were retrieved from CNKI and the Web of Science core collection. The CNKI search was conducted using the keywords "rumor governance," "debunking," "rumor control," and "rumor regulation," with results limited to "CSSCI" and "Peking University Core Journals" from 2012 to 2024. After removing news reports, conference reviews, and duplicates, 403 valid documents were obtained. For Web of Science, the search query was formulated as:

TS= (("rumor") OR ("fake news") OR ("disinformation") OR ("fake information")) AND TS = (("control") OR ("management")), yielding,1432 articles. To ensure a comprehensive comparison, the collected documents were categorized into "domestic publications" (articles published in Chinese academic journals) and "international publications" (articles published in global academic journals).

3. RESULTS AND ANALYSIS

3.1. Publication Trends

The publication volume reflects the degree of scholarly attention to rumor governance over time. The analysis indicates that international publications consistently outnumber domestic ones. However, between 2019 and 2022, there was a significant surge in both domestic and international publications, which then stabilized. This surge can be attributed to two key factors:1) COVID-19 Pandemic**:** The outbreak in 2019 led to the rapid spread of misinformation regarding the virus's origins, preventive measures, and vaccines. This heightened the urgency of studying rumor control mechanisms.2) Rise of Social Media: The proliferation of platforms such as Weibo, Twitter, and Facebook accelerated information dissemination, increasing the complexity of rumor governance and fueling academic interest in the topic.

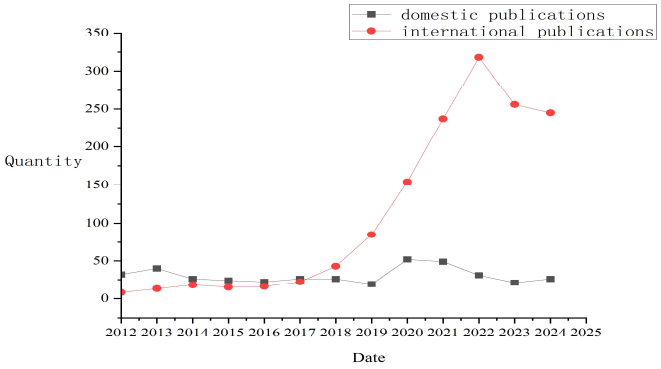


Figure 1. Number of literature on Rumor control at home and abroad from 2012 to 2024

3.2. High-Impact Authors and Collaborative Networks

Table 1. Highly cited authors of research on rumor control at home and abroadpresents the most highly cited studies in the field of rumor governance in China from 2012 to 2024, along with their respective authors. Among domestic scholars, the works of Li Biao, Chen Juan, and Chen Y S have had a significant impact, with citation counts exceeding 120 as of December 2024. A substantial portion of these highly cited papers adopts a qualitative research approach. For instance, Li Biao et al. [2]analyzed the rumor propagation structure on WeChat Moments and proposed countermeasures for scientific rumor debunking in the post-truth era. Similarly, Chen Juan[3], Ren Yiqi[4], and Tang Mengfei[5] examined the propagation mechanisms of rumor information on Weibo, identifying key diffusion nodes and group interaction patterns. Their findings contributed to developing targeted rumor-refutation strategies based on the identified diffusion patterns.

The COVID-19 pandemic in 2019 marked a turning point, leading to an exponential surge in rumor dissemination, which stimulated a wave of academic research. For example, Chen Y S[6]. conducted a textual analysis of pandemic-related rumors, employing qualitative methodologies to explore the identification and suppression of misinformation during public health crises. In addition to qualitative research, some studies have adopted quantitative approaches. Liu Z Y et al[7] applied semantic analysis to develop a Weibo-based rumor classification model. Their research proposed an automated rumor-refutation framework that integrates machine intelligence with collective intelligence, emphasizing the role of technological tools in rumor governance. Meanwhile, Lai Shengqiang et al[8]. focused on the relationship between rumor governance and user behavior, arguing that the key factor driving large-scale rumor propagation is audience engagement in secondary dissemination. His study highlighted the influence of user behavior on rumor diffusion and introduced behavioral modeling approaches to integrate user behavior patterns into rumor transmission models.

In summary, these studies explore rumor governance from multiple perspectives, including propagation mechanisms, societal impact, and user behavior, contributing to a more comprehensive understanding of misinformation control strategies.

Among international scholars, the works of Depoux A., Islam M.S., Ma L., and Yang L. have demonstrated significant influence in the field of rumor governance. As of December 2024, the first two authors' publications have been cited over 500 times, while the latter two have received more than 150 citations. As shown in Table 1, the two most highly cited papers primarily focus on COVID-19, reflecting a common trend where research published during the early stages of the pandemic tends to accumulate high citation counts due to the urgency and global impact of the crisis. International scholars predominantly adopt mathematical modeling approaches to develop rumor governance strategies. For example, Ma et al[9] proposed a gravity centrality index to identify influential spreaders within complex networks, thereby enhancing the efficiency of rumor debunking. Yang et al[10] introduced a competitive diffusion model, simulating the spread of two competing types of information within the same network. Their study explored methods to minimize rumor dissemination on social media and developed a novel heuristic algorithm based on diffusion dynamics to address the LT1DT problem. Shrivastava G[11] and Li J[12] applied dynamical systems modeling to analyze the stability and velocity of rumor propagation, aiming to mitigate the spread of misinformation through mathematical optimization. This suggests that highly cited international studies predominantly adopt a mathematical modeling approach to rumor governance, leveraging differential dynamical systems and complex network analysis to investigate the mechanisms of misinformation dissemination and control.

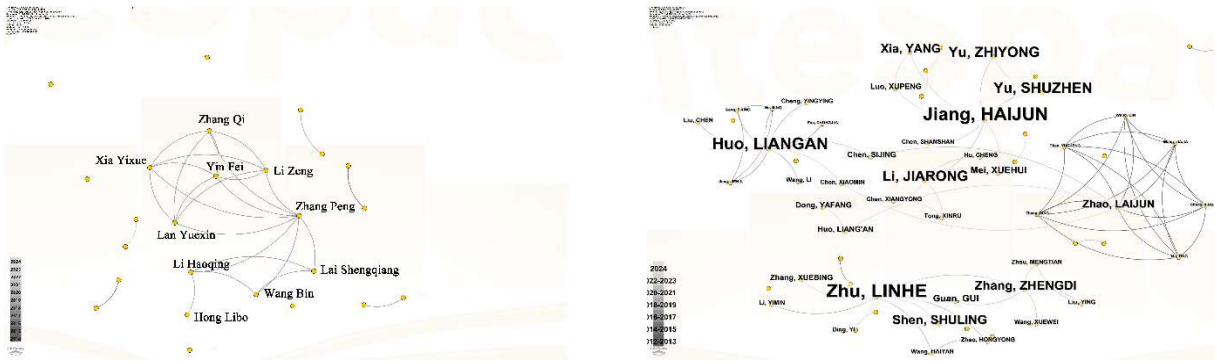
Table 1. Highly cited authors of research on rumor control at home and abroad

Serisal Number	Domestic Publications			International Publications		
	Author	Title	Citation Count	Author	Title	Citation Count
1	Li B[2]	Discourse space and propagation field of Internet rumors in the post-Truth era: An analysis based on 4160 rumors in wechat circle of Friends	261	Depoux, A[15]	The pandemic of social media panic travels faster than the COVID-19 outbreak	566
2	Chen J[3]	An analysis of factors influencing the dissemination effect of rumor-refuting information	128	Islam, MS[16]	COVID-19-Related Infodemic and Its Impact on Public Health: A Global Social Media Analysis	527
3	Chen Y S[13]	Research on the spread and control of online rumors in Public health Emergencies: Text analysis of online rumors based on the novel coronavirus epidemic	127	Ma L[9]	Identifying influential spreaders in complex networks based on the gravity formula	298
4	Liu Z Y[7]	Statistical and semantic analysis of rumors in Chinese social media	106	Yang,L[10]	Containment of rumor spread in complex social networks	180
5	Reng Y Q[4]	Research on the Evolution Mechanism of Micro-blog Rumors	92	Shrivastava, G[11]	Defensive Modeling of Fake News Through Online Social Networks	145
6	Mengfei T[5]	A Research on Rumorsrefuting Effects of Government Micro-blog in Emergency Based on The Case Study of Shanghai Bund Stampede Incident	99	Li, J[12]	Dynamical analysis of rumor spreading model in multi-lingual environment and heterogeneous complex networks	95
7	Shengqiang L[8]	Influencing mechanism of the Online Rumors on audiences' re-transmission behavior	80	Wu, Y[17]	A risk defense method based on microscopic state prediction with partial information observations in social networks	95
8	Li H Q[14]	Research on evolution law and countermeasure of the derived network public opinion based on information alienation theory-taking internet rumors governance for example	77	Liu, W[18]	Modeling cyber rumor spreading over mobile social networks: A compartment approach	94

3.3. Analysis of Prolific Authors' Collaboration Network

Figure 2. High Yield Author Relationship Map illustrates the collaboration network of prolific authors in rumor governance research at both domestic and international levels. As shown in Figure 2(a), the distribution of prolific authors in China exhibits a combination of large-scale clustering and localized dispersion. Domestically, the collaboration network is primarily centered around the top five most productive authors, yet the connections between these key nodes remain relatively loose, with limited inter-institutional cooperation. The top three most prolific authors in domestic rumorgovernance research are: Li H Q (5 publications, Chinese People's Police University) – Focuses on risk analysis of rumors and proposes preventive strategies. Shengqiang L (4 publications, Chongqing University of Technology) – Specializes in audience perception of rumors, particularly in public sentiment analysis within online environments. Zhang P (3 publications, Chinese People's Police University). Li H Q[13] rimarily focuses on analyzing rumor risks and proposing corresponding prevention strategies. Shengqiang L[18] specializes in studying audience perception of rumors, making significant contributions to research on public sentiment perception in online environments Tracking the research collaborations of prolific authors reveals that Li H Q frequently collaborates with Lan Yuexin and Xia Yixue, with their studies mainly addressing politically sensitive online rumors and the simulation of rumor dissemination in emergency events.

As shown in Figure 2. High Yield Author Relationship Map(b), the international authorship network in rumor governance research is centered around prolific scholars such as Zhu Linhe (31 publications), Jiang Haijun (27 publications), and Huo Liangan (21 publications). These researchers predominantly employ dynamical models to examine the characteristics of rumor propagation and develop effective rumor-mitigation strategies For instance: Zhu[20] constructed a delayed SIR-based differential dynamical model to analyze the effects of time delays on rumor dissemination. By employing computational simulations, he examined the propagation trends and characteristics under various conditions, uncovering the underlying mechanisms of rumor diffusion and providing theoretical support for rumor control and predictive modeling. Huo[21]and Jian[22] also adopted differential dynamical models to investigate the dynamic characteristics of rumor transmission, aiming to develop appropriate governance strategies. Furthermore, an analysis of author affiliations reveals that a significant number of internationally published papers on rumor governance are authored by Chinese scholars, highlighting China's substantial academic contributions to this research field.



(a) Domestic Authors' Collaboration Network (b) International Authors' Collaboration Network

Figure 2. High Yield Author Relationship Map

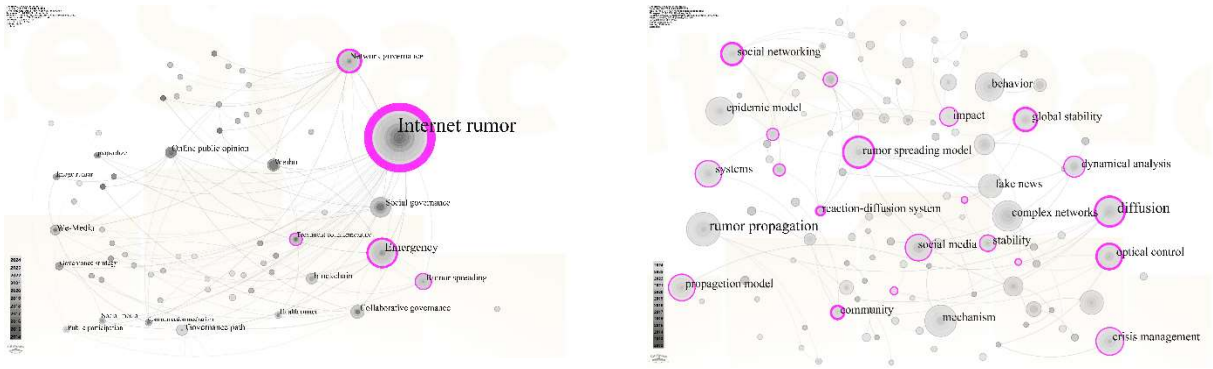
3.4. Keyword Co-occurrence and Clustering

By using CiteSpace software to extract keywords from relevant literature, we can generate keyword co-occurrence maps, which provide a more intuitive way to reveal the underlying connections

between themes in rumor governance. In these maps, the number and size of keyword nodes reflect the research intensity and attention given to each theme. **Figure 3** illustrates the co-occurrence map of keywords from domestic and international publications, and further application of the LLR algorithm enables the generation of keyword clustering maps, as shown in **Figure 4**.

From **Figure 3** (a), it is evident that the domestic keyword co-occurrence map contains 269 nodes and 596 links, highlighting a concentrated focus on research themes such as “emergencies,” “rumor propagation,” “governance strategies,” “social governance,” “Weibo,” “collaborative governance,” and “blockchain.” Additionally, from **Figure 4**, it can be observed that the clustering modularity value (Q) for domestic publications is 0.6908, and the average silhouette value (S) is 0.9398. These values indicate that the clustering structure of domestic rumor governance research is significant and the distribution is reasonable.

From **Figure 3**(b), the international keyword co-occurrence map consists of 243 nodes and 573 links, with high-frequency terms such as “rumor spreading model,” “systems,” “diffusion,” “optimal control,” and “global stability” representing the key hotspots in international rumor governance research. Moreover, as shown in **Figure 4**, the clustering network density for international publications is 0.0195; the Q value is 0.5548, which is greater than 0.3, confirming the significance of the clustering structure; and the S value is 0.8114, which is greater than 0.7, indicating a well-distributed clustering structure.

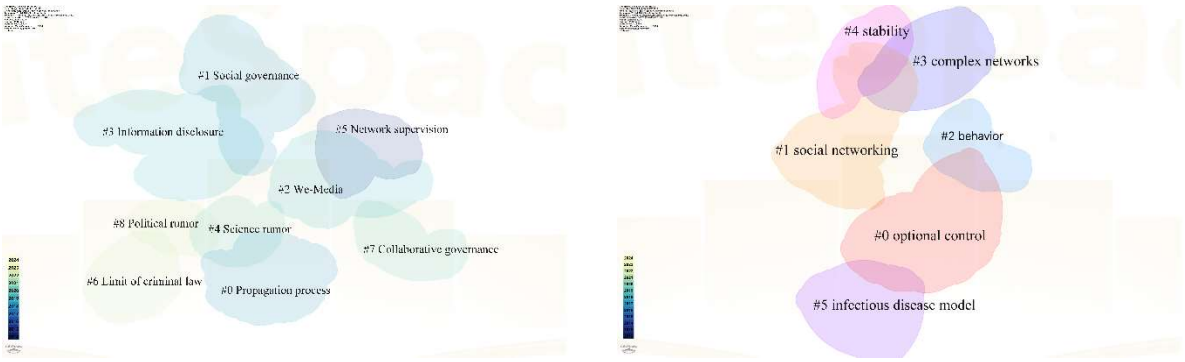


(a) Domestic publication keyword co-occurrence

(b) International publication keyword co-occurrence

Figure 3. Keyword Co-occurrence Map of Speech Management Research

Through a comparative analysis of keyword clustering in domestic and international publications, it is found that the keyword clusters in China exhibit a more compact linking structure, with the clustering structure being more prominent. In contrast, the clustering structure in international publications is more concentrated, and the research content shows a higher degree of focus. Specifically, the domestic keyword clusters can be divided into nine main areas, namely: "Communication Process", "Social governance", "We-media", "Information Disclosure", "Scientific rumors", "Network regulation", "Criminal Law limits", "Collaborative governance" and "political rumors". The international keyword clusters consist of six groups: "optimal control," "social networking," "behavior," "complex network," "stability," and "infectious disease model." These clustering results highlight the differences in research directions between domestic and international studies on rumor governance: domestic research tends to focus more on macro-level areas such as social governance and online regulation, while international research places greater emphasis on micro-level studies such as communication models, behavioral analysis, and complex networks.



(a) domestic keyword clustering (b) International keyword clustering

Figure 4. Keywords Co-occurrence Clustering Information Map

Through the analysis of keyword clustering in the literature, it is evident that the research hotspots in the domestic field of rumor governance are primarily focused on two aspects: first, exploring rumor governance from a micro perspective, such as studying information dissemination mechanisms and their patterns; and second, examining governance strategies and models from a macro perspective.

(1)Research on the mechanisms and patterns of information dissemination. This includes four clustering areas: "Communication Process", "We-media", "Information Disclosure", and"Scientific rumors". The focus is primarily on the perspective of information dissemination, with an emphasis on exploring the influencing factors of willingness to spread counter-rumor information, the construction of dissemination models, and the analysis of dissemination mechanisms and patterns. The following section will discuss these two aspects in detail:

①A large number of empirical studies have explored the influencing factors of counter-rumor information dissemination from various perspectives, such as the source of the counter-rumor, content, dissemination channels, and audience. For instance, Wang Guan et al[23] analyzed the dissemination structure of counter-rumor information across media platforms, identifying key factors that influence the effectiveness of counter-rumors, thus providing theoretical support and practical guidance for government optimization of rumor governance. Yang Y Y[24] examined the user profiles, content profiles, and environmental profiles of online counter-rumor information to investigate how different combinations of factors impact the governance mechanisms of online counter-rumors. Yang R B et al.[25]collected data on counter-rumor information related to Weibo and short videos and explored the differences in the combinations of factors that lead to high dissemination effectiveness in counter-rumor information across different scenarios, focusing on the dimensions of rumor types, counter-rumor sources, and dissemination channels.

②Regarding the study of rumor propagation models and patterns, scholars often use various models to analyze the dissemination mechanisms and effects of counter-rumor information. Common models include diffusion models, complex network models, machine learning models, and game theory models. For example, Qian Rong et al. [26]proposed a rumor propagation and counter-rumor model based on the classic SIR rumor propagation model, incorporating a censorship mechanism and establishing its mathematical equations from the perspective of competitive innovation diffusion. Li Zongmin et al.[27] applied natural language processing (NLP) methods to extract textual features of counter-rumor Weibo posts, analyzing the emotional tendencies of counter-rumor posts and popular comments, and offering decision-making suggestions on how to organize counter-rumor information to enhance effectiveness in different counter-rumor scenarios. These recommendations can also be applied to other social media platforms.

(2)Research on rumor governance strategies and models. This includes five clustering areas: "Scientific rumors", "Network regulation", "Criminal Law limits", "Collaborative governance" and"Social governance. Domestic counter-rumor strategies and models are primarily focused on a multi-level, multi-stakeholder collaborative macro-governance framework, encompassing various aspects such as government leadership, media guidance, social participation, and technical support. Many studies focus on the analysis of specific cases, particularly in the social and political fields. For example, Huang Weixing et al[29] analyzed the dissemination process of the "AIDS woman" incident, revealing the dynamic process of online rumors from release, belief, and amplification, to diffusion. They pointed out that the government and media should take responsibility for regulation and supervision, improving internet laws and regulations, and enhancing rumor management mechanisms. The rule-of-law governance of online rumors is crucial for the modernization of internet governance. Comprehensive laws, regulations, and public education are essential components of rumor governance. Therefore, in the current online environment, online violence, as a derivative issue of rumors, urgently requires the government to implement corresponding laws and regulations to curb its spread.

Through the clustering analysis of keywords in foreign literature, it can be observed that the research on rumor governance abroad primarily focuses on the micro-level, particularly discussing governance strategies from the perspectives of rumor propagation mechanisms and dissemination behaviors. In terms of research methods, the current hotspots are mainly concentrated on model construction, including: "complex network models," "game theory models," "dynamical systems models," and "machine learning models." The following section will elaborate on these research hotspots and methods:

(1)Research on Rumor Propagation Mechanisms and Behavior. This includes three clustering modules: "social networking," "optimal control," and "behavior." Relevant literature primarily focuses on the dissemination behaviors of individuals within social networks, integrating psychological theories to gain a deeper understanding of the response patterns of different groups, which in turn inform effective governance strategies. For instance, Pennycook et al. [30] proposed a strategy for countering rumors through a crowdsourcing mechanism, analyzing how interactions among social media users influence the spread and identification of false information, and exploring how to leverage the power of user groups for effective rumor debunking. Zeng R et al. [31] argued that the emotional contagion of netizens is a key factor in accelerating rumor propagation and is crucial for counter-rumor effectiveness. They studied the relationship between emotion, rumor propagation, and counter-rumor by simulating how individual emotions can be transformed into collective emotions during the counter-rumor process. Bakshy et al. [32] discussed how social media platforms, especially Facebook, affect users' exposure to and engagement with news and viewpoints of different ideologies, highlighting the role of social media in political information dissemination. They emphasized how algorithms influence the diversity of information and users' ideological exposure, offering a new perspective on rumor governance by focusing on users' thought processes.

(2)Research on Rumor Governance Mechanisms and Stability. This includes three clustering modules: "infectious disease model," "complex network," and "stability." The primary focus is on analyzing the network structure of counter-rumor information and its stability. In related studies on rumor governance, foreign scholars employ various models to analyze and address this issue. The main models include "complex network models," "game theory models," "dynamical systems models," and "machine learning models." First, the complex network model pays close attention to the structural characteristics of social networks, aiming to analyze the specific circumstances under which individuals are influenced by rumor propagation in different social network environments. For example, the ClusterRank algorithm proposed by Chen et al. [33] uses node centrality, including degree centrality, closeness centrality, and betweenness centrality, as well as diffusion processes, to uncover the inherent laws of rumor propagation in social networks. Next, the game theory model is used to analyze the decision-making behaviors of individuals in the face of incomplete information,

particularly in social networks, where individuals must choose between spreading rumors and revealing the truth. For instance, Choi et al. [34] combined the SKIR model with the dissemination of counter-rumor information and evolutionary game theory to quantify the driving forces behind user behavior. They studied the dynamic competitive process between rumors and counter-rumors, revealing how network structure impacts rumor propagation. Finally, the dynamical systems model focuses on analyzing the temporal evolution characteristics and dynamics of the rumor propagation process. Within this model, epidemic models, such as the widely used SIR and SI models, are often employed to study the dynamic processes of rumor dissemination. For example, Shah et al. [35] used the popular Susceptible-Infected (SI) model to model rumors spreading across networks. They further developed a rumor source estimator and, by simulating interactions between individuals, explored the specific mechanisms of rumor propagation within populations. Additionally, Xiao et al. [36] proposed a differential dynamical model for rumor propagation, integrating differential equations, evolutionary game theory, and counter-rumor information. This model offers solid theoretical support for the formulation of effective counter-rumor strategies by studying the dynamics of rumor propagation and counter-rumor information. Jiang et al. [37] developed a two-stage rumor model (SPNR), using opinion dynamics to analyze the propagation and reversal of rumors related to sudden events on Weibo, proposing corresponding counter-rumor strategies.

3.5. Keyword Centrality and Emergence Analysis

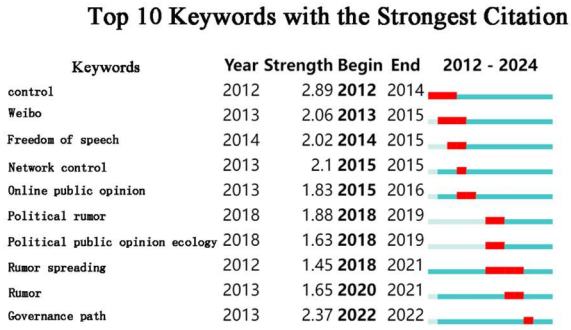
The betweenness centrality of a keyword reflects the frontier issues in the field of rumor governance at a particular point in time, and it serves as an important indicator for analyzing the significance of nodes in a co-occurrence network. When the centrality exceeds 0.1, the node is considered a key node. The higher the centrality, the greater the core influence of the keyword in the co-occurrence network. As shown in **Table 2**, the keyword with the highest frequency of occurrence in domestic publications is "online rumors," with a centrality of 1.2, indicating that "online rumors" play a prominent intermediary role in the network. This means it frequently appears in the shortest paths that connect other keyword pairs. Meanwhile, the keyword with the highest frequency in foreign publications is "dynamics," which has a centrality of 0.14. Additionally, keywords like "spreading model," "diffusion," and "complex networks" also show a high frequency of citation, highlighting the significant attention scholars have given to these areas.

Table 2. Frequency and centrality of keywords

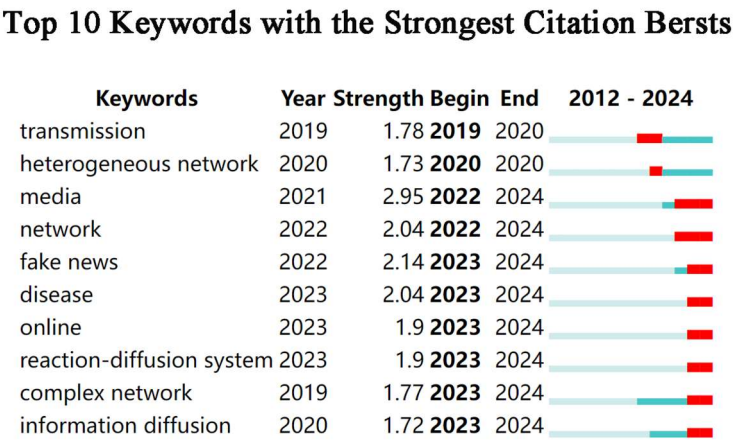
Serisal Number	Domestic author publication				International author publication			
	keywords	Frequency	Centrality	Years	keywords	Frequency	Centrality	Years
1	Internet rumor	98	1.2	2014	Spreading model	76	0.05	2019
2	Rumor propagation	10	0.14	2018	Rumor propagation	57	0.05	2019
3	Social media	8	0.07	2015	Dynamics	47	0.14	2019
4	Science rumor	7	0.08	2014	Diffusion	47	0.09	2019
5	Political rumor	6	0.07	2018	Optimal control	44	0.08	2019
6	Governance path	5	0.09	2017	Complex network	41	0.11	2019
7	Collaborative governance	5	0.09	2014	Epidemic model	40	0.05	2020

In addition to analyzing the centrality of high-frequency keywords, the emergence of keywords can also reflect their frequency changes over a short period, shedding light on the dynamic evolution of the field of rumor governance from multiple perspectives. This can provide predictions for future research directions. Figure 5 shows the emergence intensity and timing of keywords. In terms of intensity, the highest emergence intensity in domestic research is for the keyword "governance" (2.89). Since "governance" is the central theme of this study, it is not a meaningful reference. Excluding "governance," the second-highest emergence intensity is for "Weibo" (2.06), which reflects the significant role of social media in rumor governance research. Additionally, the higher emergence intensity suggests that, in the coming period, research on rumor governance on Weibo will continue to deepen, potentially exploring governance methods from different angles, such as user behavior, transmission mechanisms, and the influence of algorithms. In international research, the highest emergence intensity is for the keyword "transmission" (1.78), indicating a high focus on the rumor transmission process in foreign research on rumor governance. Since rumor transmission involves multiple disciplines, including communication studies, sociology, psychology, and information science, this trend reflects the interdisciplinary direction of the research. Thus, future studies are likely to further investigate the interactions between these fields in the rumor transmission process, fostering the multidimensional development of rumor governance.

By comparing the emergence of keywords in domestic and international research, it is evident that the construction of rumor transmission and governance strategies has become a common focus. However, with the continuous development of social media, the ways in which rumors spread are constantly evolving. Therefore, how to achieve efficient governance of rumors has gradually become a pressing research topic for governments and nations to address.



(a) Emergence of Domestic Keywords



(b) Emergence of international Keywords

Figure 5. The Occurrence of Keywords at Home and Abroad

4. CONCLUSION AND FUTURE PROSPECTS

4.1. Conclusion

(1)In terms of content, both domestic and foreign studies have gradually shifted focus from broad themes or general issues to specific subfields of interest. Although research on rumor governance started around the same time both domestically and internationally, there are clear differences in the areas of emphasis. Domestic scholars primarily explore the close relationship between rumor dissemination and various factors such as social and cultural contexts, media environments, etc., and tend to focus more on qualitative analysis of specific events, leading to the development of targeted governance strategies. In contrast, many foreign scholars prefer to build different rumor propagation models, including classic "diffusion models" (e.g., the Bass model, epidemic models) as well as social network-based propagation models. Additionally, psychologists abroad have conducted in-depth studies on cognitive biases when individuals receive or spread rumors, particularly how emotional and cognitive biases influence people's judgments and behaviors.

(2)In terms of research methods, most domestic researchers focus on specific case studies, thoroughly analyzing the causes, dissemination paths, and impacts of each rumor event. In contrast, foreign scholars tend to favor quantitative analysis and model construction, using mathematical tools and data mining techniques to explore the underlying patterns of rumor dissemination. Both methods have their advantages: case studies allow for precise capture of contextual details, providing an intuitive and detailed understanding of complex realities; quantitative analysis and model building, on the other hand, help reveal general patterns of rumor propagation, offering theoretical support for macro-level control. However, both approaches also have limitations: case studies are difficult to generalize into widely applicable theories, and quantitative analysis may overlook special contexts and individual differences due to oversimplification. Based on this, future research could organically combine the strengths of domestic case studies in capturing contextual details with the advantages of foreign quantitative analysis and model building in revealing general patterns.

(3)Overall, research in the field of rumor governance, both domestically and internationally, shows an upward trend in publication numbers, indicating that the academic community's attention to rumor governance is continuously increasing. Domestic research has made significant progress in policy recommendations and localized practices. For example, in response to public health emergencies like the COVID-19 pandemic, many scholars have proposed a series of targeted and localized rumor governance strategies. These studies not only provide a practical framework for addressing similar public health crises but also accumulate valuable experience for rumor management in future emergency situations. However, there are still some shortcomings in domestic research. First, although there have been certain achievements in policy formulation, there is a lack of in-depth discussion on the long-term social impact, such as the far-reaching effects of rumors on social trust, public sentiment, and politics. Secondly, the research tends to focus on response strategies for single events, lacking comparative and systematic analysis across different events.

International research has made significant progress in the mechanisms of rumor dissemination and user behavior analysis. Many scholars have explored the mechanisms of rumor spread and the impact of individual behaviors on group emotions by constructing models based on complex networks, game theory, and dynamical systems. These studies provide theoretical frameworks for rumor governance and have promoted interdisciplinary integration, particularly between fields like communication studies and sociology. However, there are some limitations in international research, mainly in terms of cross-cultural adaptability and practical applications. Although theoretical modeling and analysis have been conducted, there is still limited research on the differences in rumor propagation patterns across different cultural contexts. Moreover, research on the mechanisms of rumor dissemination and governance strategies, particularly in the context of specific social events, such as sudden public health emergencies, remains insufficient.

4.2. Future Prospects

Despite the substantial body of research on rumor governance, there are still many unexplored areas due to the rapid development of social media, continuous advancements in information technology, and the increasing complexity of information dissemination in the context of globalization. Future research can focus on the following areas:

(1) Exploring Governance Strategies by Integrating User Psychology and Public Emotions. Currently, while some studies have explored rumor governance from the perspective of user psychology, these studies typically focus on factors such as cognitive biases and emotional responses when individuals accept or spread rumors. Future research can delve deeper into how these psychological factors influence the spread of rumors, and, by integrating sentiment analysis techniques with behavioral theory, explore how understanding user psychology can lead to the development of more effective governance strategies.

(2) Research on the Social Impact Mechanisms of Rumors. Current research tends to focus more on the short-term effects of rumors, while studies examining the long-term impacts of rumors on society as a whole—such as social trust, political stability, and responses to public health crises—remain limited. Understanding how rumors influence social structures, national governance, and the overall stability of society is a critical area in need of further exploration. Future research could integrate relevant interdisciplinary theories to investigate the profound effects of rumors in different social contexts, particularly on aspects like social trust and political unrest, and provide a theoretical foundation for the development of effective governance strategies.

(3) Exploring Governance Strategies for Different Types of Emergencies. Particularly, it is worth further exploring governance strategies for rumors arising from natural disasters, such as pandemics, earthquakes, or floods. For instance, there are differences between the spread of rumors related to epidemics and those related to natural disasters in terms of the speed of information diffusion, influence, and verification of authenticity. Future research could focus on developing tailored strategies for responding to these differences.

(4) Evaluation of the Effectiveness of Existing Spread Models. Although many spreading models have been developed in existing research, the assessment of their effectiveness remains underexplored, which has hindered their widespread application in practical settings. Future research should focus on evaluating the validity and reliability of existing models, aiming to bridge the gap between theoretical model construction and practical implementation. This will ensure that these models can be applied effectively in real-world scenarios, offering more accurate predictions of rumor propagation and providing actionable insights for governance.

(5) Ongoing Development of Policy and Legal Frameworks. Both domestic and international strategies for rumor governance, as well as the construction of legal frameworks, are continuously evolving. The introduction and refinement of relevant laws and regulations have become a crucial area of research. For instance, balancing information security with the protection of freedom of speech and clarifying the responsibilities and regulatory roles of platforms remain unresolved issues. Future research will further advance the legalization and institutionalization of rumor governance, providing theoretical foundations and practical guidance for the enhancement of governance systems. The development of policies and regulations that ensure the responsible management of rumors while respecting individual freedoms will be vital in fostering a fair and transparent governance environment.

(6) Cross-Cultural and Cross-Regional Research on Rumor Propagation Mechanisms. With the development of globalization and information technology, the spread of rumors is no longer confined to a specific region or cultural context. For example, in the recent "TikTok refugee incident," many foreign users posted and interacted on Chinese platforms. Different cultural and social backgrounds cause people to interpret and respond to information in diverse ways, which leads to rumors

potentially spreading across regions or communities and exerting varying degrees of influence. This presents new challenges for both the propagation model and governance strategies. Research into the cross-cultural and cross-regional mechanisms of rumor spread is essential. Understanding how rumors emerge, spread, and are received in different cultural or national contexts will be key to designing adaptive governance strategies. Such research will provide valuable insights and contribute significantly to global rumor governance, ensuring strategies are tailored to specific regional and cultural needs.

CONFLICTS OF INTEREST

The authors declare that they have no conflicts of interest regarding the publication of this paper.

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