



# Analysis of the Propagation Paths and Governance Strategies of Online Rumors Based on an Example in Dalian

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**Abstract.** The American scholar “Father of Rumour Research” Alpert explains rumors as propositions related to events at the time that lack concrete information to formalize their exactness. As a widespread phenomenon of social opinion, rumors have combined with the Internet to form a new force, the Internet rumor mill. The topic takes typical online rumors and their management at different times and stages as the object of research, discusses the current situation, characteristics, and typical cases of online rumors at home and abroad, analyses the causes and hazards of online rumors, and conducts in-depth research on the dissemination path, mechanism, and identification of online rumors. The study also examines the paths, mechanisms, and identification of online rumors. It proposes new strategies for the management of online rumors in view of the shortcomings in the various aspects of online rumor management.

**Keywords:** Internet rumors · identification and control · dissemination paths · governance strategies

## 1 Introduction

Rumour management is a worldwide problem, and I have learned from literature reading and Internet websites that most scholars and experts have conducted research from the perspectives and dimensions of sociology, law, psychology, and communication, resulting in different research directions and controversies. This paper takes a typical online rumor case in Dalian, Liaoning province as a sample, summarises the background and impact of the case, summarises the relevant experiences of online rumor management in countries such as the UK and the US, and tries to explain the social basis of the spread of rumors and provide basic strategies for dealing with rumors by analyzing the spread paths, characteristics and patterns of the selected typical online rumors in the Chinese context.

The research in this paper helps to systematically understand the path of online rumor propagation, and helps to understand the causes and hazards of online rumors from an intuitive system; it helps to think about the problem of online rumors from different

dimensions and perspectives and propose measures to combat them, contributing to the creation of a clear online environment.

Then the article's main purpose is as follows. The virtual nature of the Internet increases the difficulty of preventing and controlling online rumors, and is also a bottleneck in the prevention, control, and management of online rumors. The study of the dissemination paths of online rumors and the proposal of practical governance strategies have become important issues in real-life work. How to take effective measures to curb the spread of online rumors and maintain social stability, based on the actual situation, is the main purpose of this paper.

The following is the innovation of this article. Most scholars have cut their research on online rumors from a purely journalistic and communication theoretical perspective, which limits the breadth of the study, and many analyses are not accurate, for example, most scholars and government officials have attributed the generation of online rumors to the original sin of the Internet. Therefore, it is an innovative point to adopt a sociological analytical perspective by applying knowledge from sociology, psychology, and other related aspects to make a comprehensive analysis of the causes of online rumors.

From the specific content of the current relevant studies, most researchers only focus on the means of online communication itself. This paper creatively combines mathematical modeling to systematically analyze online rumors, further expanding the research horizon of governing online rumors and providing strong theoretical support for the study of governing online rumors, which will be an innovation.

At the same time, this article will overcome the limitations of previous studies based purely on case study methods. It will take a "small to big" approach and use typical online rumors in Dalian, Liaoning Province as a sample to quantify and analyze their causes, characteristics, and hazards, thus providing case data to support the study.

This article first uses the literature method, case study method, and so on, through the analysis and study of a large number of realistic Internet rumor cases, so that readers can understand the content and ideas of the article more intuitively. Through the analysis of typical Internet rumor incidents, the author summarises the causes and characteristics of Internet rumors and proposes a comprehensive strategy for Internet rumor management, which provides references for relevant departments to manage Internet rumors.

## **2 Characteristics of Internet Rumors and the Ways of Dissemination**

With the development of Internet communication technology, unlike traditional rumors, the spread of Internet rumors is no longer confined to word of mouth but is more often spread by means of the Internet, and their scope and speed of dissemination have been greatly expanded.

### **2.1 Characteristics and Classification of Internet Rumors and Channels of Dissemination**

#### **2.1.1 Internet Rumors Characteristics**

Due to the global coverage of the Internet and the freedom of dissemination, the negative effects of Internet rumors spread by means of the Internet are becoming increasingly

significant and are gradually becoming a factor that causes social oscillations and endangers public security. They are characterized by the following features: firstly, they spread very quickly; secondly, they spread very widely; and thirdly, they spread in many ways and through many channels.[1] The low cost of reproduction and the high degree of convenience of internet documents make the characteristics of internet rumors even more prominent.

## **2.2 Forms and Classification of Internet Rumors**

### **2.2.1 Classification of Internet Rumors**

(1) Classified according to the content of the rumors created.

Internet political rumors, Internet disaster rumors, Internet terrorist rumors, Internet crime rumors (Dalian child-snatching rumors), Internet video and product safety rumors, and Internet personal event rumors.

(2) Classified according to the manner in which the rumor was created.

Online breaking news, publishing fabricated and untrue information; online seeking evidence, netizens publish posts seeking the truth, and some followers make comments based on imagination, forming rumors; “online water army”, “public relations companies” or unscrupulous online platforms, fabricating news, time and false Some media legal persons or media practitioners, with their real names, made inaccurate statements on microblogs and weibo.

### **2.3 The Main Channels of Transmission of Internet Rumors**

BBS, websites and forums, online news, email, WeChat, Weibo, Stranger, QQ, Jitterbug, YY and other online media.

## **2.4 Main Modes of Dissemination of Online Rumors**

### **2.4.1 Chain Propagation**

This chain of communication is also the basic pattern of all communication. A piece of news is told to each other by everyone in the network because in the process of spreading in a chain, rumors often form because of mishearing and miscommunication.

### **2.4.2 Tree Propagation**

The tree-like spread of internet rumors means that rumors spread from one person to several people, and then from several people to a certain number of people respectively, passing on like a snowball, creating a geometric multiplication of the spread rate.

### 2.4.3 Radial Spread

The radial spread of internet rumors means that a point is taken as the centre and then begins to spread to many points, with rumors being sent from the source to countless recipients, like a light source emitting light and heat in all directions.

### 2.4.4 Vortex-Type Compound Propagation

Rumors on the Internet are often spread both verbally between people and through the intersection of mass media and the Internet. Some of these cross-media combinations tend to create a vortex of rumors that accumulate even more energy. The cross-pollination of some media tends to create a vortex of rumors that accumulate even more.

## 3 Governance of Internet Rumors Strategies

### 3.1 Internet Rumor Identification and Control

The formula given by Allport & Postman for determining rumors: rumor equals the importance of an event multiplied by the ambiguity of event, i.e. rumor generation is proportional to the importance and ambiguity of the event, the more important and ambiguous the event, the greater the chance of rumor generation and its effect. The more important the event and the more ambiguous it is, the more likely and effective it is.

Drawing on the infectious disease model: individuals within the population are abstracted into several categories in the model, each of which is in a state whose basic states include: S (Susceptible) - susceptible, or healthy; I (Infected) - infected; R (Recovered) - removed or immune, recovered. -Infected), and R (Recovered) - removed or immune, recovered. The transition process between these states is often used to order different models of contagion: the SIR model (the susceptible group is infected and then restored to a healthy and immune state), the SIS model (the susceptible group is infected and then returns to the susceptible state), etc. [2–6]. The index of the number of people who have heard the rumour as a proportion of the total number of people, and the corresponding index of the evaluation of the level of the rumour on the Internet, is established according to the audience.

According to rumour equals to event importance multiplied by event ambiguity[7], if the importance and ambiguity of the event corresponding to the rumour is analyzed directly and quantitatively, there are more factors to be considered, if the main factors determining the importance of the event and the ambiguity of the event are abstracted, the importance of the event is linked to the audience population (the result of the treatment of question one), and the credibility of the event is used (to establish the credibility of the occurrence of the event corresponding to the internet rumour level of the evaluation index) to measure the ambiguity of the event, thus simplifying the problem and creating a new model: rumour equals to evaluation index of the level of the internet rumour multiplied by the index of the event's implausibility.

## **3.2 Typical Domestic Rumors and Hazards in Recent Years**

### **3.2.1 ‘Earthquake’ Rumors Frighten Millions in Shanxi**

On February 20–21, 2010, news of an earthquake in some areas of Shanxi spread wildly through SMS, the Internet, and other channels, and millions of people in dozens of counties and cities in Taiyuan, Jinzhong, Changzhi, Jincheng, Lvliang and Yangquan began taking to the streets in the early hours of February 20 due to rumors of an earthquake. “The official website of the Shanxi earthquake was once paralyzed. 21 morning, the Shanxi Earthquake Bureau issued a bulletin to dispel the rumors. The relevant departments of the Shanxi provincial government immediately launched an investigation into the source of the rumors, which later identified a total of five rumor-mongers.

### **3.2.2 Internet Rumors Triggered a Frenzied Rush to Buy Salt**

On 16 March 2011, there was a frenzied rush to buy salt in some parts of China, with salt being snapped up in a day in many areas, with some traders taking advantage of the price hike and the market in disarray. The rush was prompted by two pieces of news: the iodine in salt protects against nuclear radiation and there will be a shortage of salt production in the country due to the effects of nuclear radiation in Japan.

After investigation, a digital market in Hangzhou City, Zhejiang Province, an ordinary employee with the screen name “Fisherman” sent a message on the QQ group: “According to valuable information, the explosion of the Japanese nuclear power plant has an impact on the sea in Shandong, and constantly polluted, please tell your family and friends around you to stock up on salt, dry seaweed, for a year Do not eat seafood.” The message was then widely forwarded and on the 16th, a rush for salt occurred in Beijing, Guangdong, Zhejiang, and Jiangsu, producing a nationwide radiation scare and salt rush.

## **3.3 The Construction of Relevant Domestic Regulations**

On 9 September, the Supreme People’s Court and the Supreme People’s Procuratorate jointly issued a judicial interpretation on several issues concerning the application of laws in handling criminal cases of defamation committed through the use of information networks, which provides the necessary legal basis and criteria for conviction and sentencing to combat crimes committed through the use of information networks, and is an important step to improve the regulations on the management of information networks in China, as well as to combat cybercrimes in accordance with the law This is an important step to improve China’s information network management regulations, and to combat cybercrimes in accordance with the law, protect the legitimate rights and interests of citizens, and safeguard social order and national interests.

The introduction of the judicial interpretation has adapted to the urgent need to fight against cybercrime under the new situation. The judicial interpretation clarifies the criteria for conviction and sentencing for crimes committed using information networks, increasing the operability of the application of criminal law and enabling the relevant laws and regulations on internet management to be put into practice, so as to accurately and effectively punish crimes committed using networks. The introduction of the judicial

interpretation is also necessary to safeguard citizens' rights of expression and supervision. By clarifying the legal boundaries of speech on the information network, it makes it clear what speech can be published and what speech violates the red line of the law, so that the constitutional right to freedom of expression and supervision can be fully exercised in accordance with the law, and the right to expression of the general public can be protected to the maximum extent.

### **3.4 The Governance of Online Disinformation Abroad.**

- (1) The US has enacted 130 laws and regulations to regulate the content of online communications. In order to effectively manage the Internet, the US Congress and various government departments have passed about 130 relevant laws and regulations, including the Federal Computer Crime Prevention Act, the Computer Crime Act, the Communications Decency Act, and the Children's Internet Protection Act, to regulate the content of Internet communications, including rumors. Various states and municipalities in the US have also adopted relevant legislation.
- (2) In the UK, Citizens Advice Bureaux have been set up in the community with the primary role of answering questions and clarifying the root causes of social problems. The Citizens Advice Bureau is a free legal advice service provided by the government and is staffed by volunteers with expertise from different sectors of society. The Citizens' Advice Bureau has close links with the government, parliament, and other parties and is, therefore, able to guarantee authority in the provision of advice. At the same time, through the Citizens Advice Bureau, the public can also find the relevant authorities more directly, which improves the efficiency of communication between the public and the relevant authorities and expands the right to information. Practice in the UK has proven that rumor control centers or advice centers can disseminate truthful information in a timely manner in times of crisis, such as social unrest and natural disasters, thus achieving community harmony and social stability. At particular times in history, Northern Ireland has launched "anti-rumor and anti-intimidation" campaigns to ensure social stability.

## **3.5 Internet Rumour Management Strategy**

### **3.5.1 Enhancing Media Literacy of Internet Users and Improving Rumor Recognition**

Strengthening individual moral self-discipline: To a certain extent, the reason why Internet rumors arise is also due to the lack of morality of the rumor-mongers. Therefore, the prevention and control of Internet rumors require, first and foremost, that Internet users strengthen their individual moral self-discipline on the Internet.

### **3.5.2 Broadening Official Information Channels**

At the initial stage of rumor generation, government agencies should release truthful information related to the whole incident through official information channels. At the same time, rumors can be dispelled through the internet, with the help of chat tools, website forums, celebrity blogs, emails, shake-downs, and clients.[8] This three-dimensional,

all-weather coverage of rumor dispelling can make rumors disappear into thin air, and more importantly, it can make netizens become rumor dispellers, allowing the internet to act as a powerful tool in combating online rumors.

### **3.5.3 Strengthened Source Management**

During the 2011 riots in the UK, the government shut down microblogging, social networking sites, and the Blackberry Messenger service to stop rioters from using these social networking tools to collude. This shows that technically blocking online rumors through political means using advanced online technology is an effective way to combat online rumors and clean up the online environment. The only way to ensure a clean online environment is to block the bad comments that may appear on the Internet from the source and to do so in a timely and effective manner.

### **3.5.4 Improve Relevant Network Laws and Regulations**

Just like in the real world, there is a set of laws against defamation in cyberspace. In the United States, where the internet was first launched, defamation lawsuits have been heard in the courts as early as eight or nine years ago. Similar defamation lawsuits have since been heard in the UK and Australia.

Since the 1990s, the rapid development of computer network technology has begun to enter its heyday, and at the same time has given rise to many new problems. This has made government regulation and management of the network industry more difficult and severe. The state has issued and implemented some legal provisions, but these provisions lag behind the development of the network, so can not effectively solve the emerging network problems. This has seriously undermined the legitimate rights of Internet users, who often blame the government. Therefore, the government should change this situation, improve the information network legislation as soon as possible, establish sound information network laws and regulations, reasonably stipulate the rights and obligations of social individuals in the network society, effectively manage network information resources and provide high-quality network services; at the same time, it should increase the efforts to combat network fraud, counterfeiting, network infringement and other illegal acts on the network according to the law, so as to protect the freedom of expression of Internet users. At the same time, efforts should be stepped up to combat online fraud, counterfeiting, online infringement, and other illegal acts, and to protect the Internet users' rights to freedom of expression, information, and speech.

### **3.5.5 Strengthening Government e-Government Capacity**

At present, the websites of Chinese governments and organizations at all levels are constantly enriched in content and increasingly become more functional. It has built an important platform for the government to promote open government affairs and strengthen the interaction between the government and society. However, compared with the technical level of websites in developed countries, China's government websites still suffer from uneven development and inadequate website service functions, which cannot yet meet the public's demand for e-government functions. Therefore, it is necessary to

strengthen the construction of the government's online information disclosure system and promote the healthy development of e-government.

Firstly, we need to improve the quality of information technology in the public service. Today's public servants need to be able to change their traditional mindset and establish the concept of competition, innovation and democracy, while also enhancing their awareness of information technology.

Secondly, the functions of the website are constantly improved. On the one hand, the government takes the initiative to disclose information through the portal to attract a wider online audience, so that more people can understand the government and eliminate cognitive bias towards the government so that they can evaluate the government objectively and rationally and effectively monitor the government's administrative power; on the other hand, the government website provides more interactive channels for the public to contribute to the government's decision-making in order to promote government management reform and innovation.[9].

Thirdly, while actively developing the government portal, we should further promote the linkage between government websites and public websites, start online business functions, adjust and provide various online services in a timely manner according to the needs of the public. High-quality e-services can help save the cost of doing business for the public and increase public satisfaction with the government.

### **3.5.6 Strengthening the GOVERNMENT'S Ability to Guide Public Opinion**

To strengthen the government's ability to combat online rumors can be done in the following ways.

Firstly, the relevant departments should establish a multi-channel information collection mechanism to prevent the creation of online rumors. Rumors are not created without any warning, and prevention can be twice as effective as a cure for online rumors.[10].

Secondly, after the formation of rumors, government departments should be more proactive and timely and actively respond to online rumors. They should actively announce the truth at the first time, take the initiative to respond to the media, meet the public's right to know information and minimize the information asymmetry between the public and the government; at the same time, they should establish a sense of the overall situation to avoid the "butterfly effect" of rumors.

Third, strengthen government supervision and management, regulate the behavior of market players and step up efforts to combat them. To prevent and manage online rumors, it is necessary to improve institutional construction, regulate the economic behavior of social organizations, enterprises, individuals and other market players, and solve the large number of difficult economic and social problems that have arisen as a result of excessive marketization. Based on this aspect to govern online rumors, firstly, we need to strengthen and improve the construction of laws and regulations, raise citizens' awareness of the legal system, make them consciously develop the behavioral habit of abiding by the laws and regulations on online communication, and create a civilized and healthy atmosphere of online public opinion. Secondly, it is necessary to improve and strengthen institutional management, establish a strict system of accountability and responsibility for the prevention, dissemination, and management of Internet rumors,



increase the punishment of those responsible for violations and establish a mechanism of fixed penalties or sentencing based on the degree of social harm caused by rumors.

### **3.5.7 Innovative Network Management Techniques**

Necessary online rumour monitoring technology is also an effective way to combat online rumors, and in reality, there are lots of monitoring software and surveillance mechanisms in place. Rumor Bot software, for example, is a technical software that tracks internet rumors through search engines and databases, and further analyses and identifies the source of the rumors. Such software can be used by the relevant authorities to monitor and remove undesirable or harmful information in time to prevent the spread of negative information on the Internet. Technical measures could be based on Singapore's experience in implementing a categorized licensing system for internet control, whereby "publishers and distributors of internet information are required to pass through a government information control center, and free filtering software is installed for users in public places and at home". In addition, technical means can be used to try to establish systems such as "Internet gatekeepers", "opinion leaders" and "real name registration".

### **3.5.8 Strengthening Self-regulation of Online Media**

Improve the standard of information audit by strengthening the self-regulation of online media. As a fast-growing new media, online media must do a good job of verifying the authenticity of news if they want to establish credibility, and this work depends on the information gate-keeping standards of online editors.

Media organisations, mainly Internet companies, should be good gatekeepers and social watchdogs, improve their ability to analyse rumors and guide public opinion, and promptly filter and clean up rumors that mislead and harm audiences. A sound gate-keeping system should be established to effectively prevent illegal, uncivilised and unhealthy information from entering cyberspace.

### **3.5.9 Implementing Press System Reform to Achieve Open and Transparent Information**

In today's highly developed Internet, the public vent their doubts and dissatisfaction with the government through online media, and gather into a wide range of online public opinion, triggering a crisis of trust in the government. In the author's view, apart from strengthening its own construction, the government should take advantage of the situation and use the internet to enhance the government's credibility.

At the same time, it is important to establish sound, timely and smooth information dissemination channels to reduce the blind spots in the information available to the public, and to curb the probability of rumors through the transparency of information. On the other hand, if public opinion is a barometer of public opinion, then rumors are a magnifying glass of public opinion. The authorities can also use rumors to gauge public sentiment and understand public sentiment so that they can make decisions that are in line with public opinion and the wishes of the people.

## 4 Conclusion

The problem of internet rumors is an important issue facing society today, and as a widespread phenomenon in network ethics its negative impact is growing. The spread of Internet rumors not only has a significant negative impact on the stability and development of society but also affects people's normal lives and undermines the credibility of the Internet itself. Therefore, it has become an urgent social problem to regulate the behavior of the Internet, to control the "pollution" of the Internet environment, and to tackle the problem of Internet rumors from the root.

To better manage online rumors one must understand the causes and hazards of online rumors. This paper provides a detailed introduction to the causes and hazards of online rumors and proposes some countermeasures in the governance of online rumors. Relevant government departments play a major role in the prevention and control of internet rumors and should play the role of early warning, supervision, guidance, and management. However, a large number of our nationals, combined with the anonymity of the Internet and the freedom of online speech dissemination, plus the loopholes in online governance make it increasingly difficult to control online rumors. At present, the main problems in the prevention and control of Internet rumors in China are lack of awareness of the problem of Internet rumors; poor early warning capability regarding; single means and methods of preventing Internet rumors; inadequate facilitation and guidance of Internet opinion; lack of strong means of monitoring rumors; lack of legal regulation of Internet rumors, etc. Only by doing a good job of addressing the above problems can we better manage online rumors and mitigate the harm of online rumors.

As the selection and optimization of strategies in the prevention and control of online rumors involve sociology, communication, psychology, and political science, it is difficult to conduct a detailed study and analysis of all aspects of the issues in this paper, given the time and knowledge available. These problems can only be solved step by step in future research.

## References

1. F. Zhao, G. Duan, and L. Chen. "A study on the characteristics of online rumors and countermeasures under the new crown pneumonia epidemic." *Journal of Journalism Research Guide* 12.12(2021):3.
2. Zanette, and H Damián. "Dynamics of rumor propagation on small-world networks." *Physical Review E* 65.4(2002):041908.
3. M. Nekovee, et al. "Theory of Rumour Spreading in Complex Social Networks." *Physica A Statistical Mechanics & Its Applications* 374. 1(2008):457–470.
4. J. Wei, J. Yang, P. Lin, et al. Research on the dissemination of microblog online public opinion based on the improved SIR model[J]. *Intelligence Science*, 2019, 37(6):7.
5. W. Fu, J. Wang, X. Pan et al. A model for SIR rumor propagation on dynamic homogeneous networks[J]. *Computer Applications*, 2018, 38(7):6.
6. S. Tian, M. Sun, J. Zhang. Research on the evolution of online public opinion sentiment based on improved SIR model[J]. *Intelligence Science*, 2019(2):7.
7. A. Liu, Y. Liang, et al. *The psychology of rumors* [M]. Liaoning Education Press, 2003.
8. P. Jiang. Microblogs and "dangerous blogs" [J]. *Internet Communication*, 2011(8):2.

9. C. Cao. Strategies for eliminating fake news on the Internet [J]. *Internet Communication*, 2011(5):2.
10. Y. Liu. Internet public opinion and the paradigm shift of government governance [J]. *Frontiers*, 2006(10):4.

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