Research on Network Public Opinion of Social-contradiction Events Based on the System Dynamics Modeling and Simulation

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Abstract

Targeting at the evolution of network public opinions of social-contradiction events, this paper conducts dynamic analysis to probe into the internal and external dynamism that generate crisis related to public feelings. It builds the system dynamics model of the heat of network public opinions, analyzes the mutual influences among various subjects in the system, and compares the strength of the acting force of relevant factors via using Vensim to conduct simulation on the modeling. It provides powerful foundation for controlling the rising heat of network public opinions of social-contradiction events and offers countermeasures and suggestions to controlling the heat of network public opinions.

Keywords: Network public opinion, Social-contradiction events, System dynamics, Model simulation

1. INTRODUCTION

With the rapid development of communication and computer technology, the Internet has penetrated into people's daily life and forged a new public opinion communication mechanism for China. People use micro-blog to read news and write reviews and deliver information in communities and forums. In today's society, the Internet has a huge impact on the traditional media, and has become the most influential new media in the society. It can reflect the social situation and public opinion more quickly and effectively. But on the other hand, the interaction and infiltration between the realistic society and the virtual society make social contradictions happen more frequently, and the ways and means of solving the contradictory events are also more complex and difficult.

In recent years, whether in the world or from the China itself, the relationship between government and the people, the gap between rich and poor, the hatred of the rich, mentality doctor-patient conflicts, rights disputes and social security, public health and other social conflict incidents, affect social stability, sustainable development needs of developing countries to a great extent. Social conflict events possess environmental complexity, evolution uncertainty, and population diffusion (Zhang et al., 2010). As for the continuous occurrence of such social contradictions, if the public managers can not accurately identify the underlying causes of the heat fluctuations of online public opinion as the guardian of the interests of the public and the main body of the administrative law enforcement, it is difficult to make timely and effective coping strategies. Digging to promote the basic factors affecting the volatility of online public opinion, exploring the internal motivation and external power of the crisis of public opinion, finding out the causal relationship between these factors and main factors affecting the popularity of online public opinion are vital for governments to deal with social contradictions events, network public opinion crisis, the development trend of network public opinion timely, decisively, justly, transparently and avoid further intensification of social contradictions and secondary crisis.

2. JOURNALS REVIEWED

Rousseau put forward the word "public opinion" in 18th century and was introduced into the field of public administration to express the concept of public opinion. Since then, the word has been translated into public opinion, public opinion and public opinion, and has appeared many times in the western political science, public administration, journalism and communication studies. With the rapid development of network technology, cyber democracy theory and cyber space governance theory have gradually entered the field of vision of scholars. Herbert Blumer defines online public opinion as a collective act of people in a given public place at any
time (Blumer, 1947). Noelle-Neumann uses the silent spiral theory to analyze network public opinion and the results show that in the process of the formation of online public opinion, people's opinions will be gradually strengthened due to the silence of the other party's opinions, and then become a group of network public opinion tendency through repeated formation of consistent public opinion (Noelle-Neumann, 1993). Brauchler Birgit studies the function principle of the theory of antagonism in network public opinion, and proves that the contradictory function in the network can lead to the network public opinion through the actual case (Brauchler, 2004).

At present, we mainly study network public opinion from the following aspects: (1) Research on the subject and characteristics of online public opinion. Lan believes that at the background of big data, the main network of public opinion includes ordinary Internet users, government, network media, opinion leaders, network push hands and so on (Lan et al., 2016). Based on the epistemology method, Liu thinks that the main body of the public opinion early-warning of the network includes the stakeholders, the social governance department and the professional public opinion service organization, and the corresponding object is the spiritual and economic interests of the parties involved (Liu, 2015). Liu believes that the evolution process of network public opinion shows "Matthew effect" and "group polarization" rule from the perspective of micro content of public opinion dissemination; (2) Study on evolution law and life cycle theory of online public opinion. Zhao summed up the characteristics of the life cycle theory of network public opinion and the stages of the life cycle, and divided life cycle into incubation period, growth period, the outbreak period and ending period of four stages through the typical features of a classic case of the extraction (Liu and Cai, 2013; Zhao et al., 2015). Zhang proposed the integration of knowledge for different stages and phases of the life cycle of online public opinion, and established a whole process of knowledge integration framework (Zhang, 2015). (3) Study on early warning of network public opinion. Nie constructed 3 levels of indicators, 6 two level indicators, and 21 three indicators of the network public opinion warning index system. And set up the public opinion warning mechanism with 5 subsystems, which provides an effective network public opinion monitoring and early warning method for colleges and universities (Nie, 2016). (4) Research on evolution modeling of network public opinion. Hong, Shi, and Li found that there was a strong interaction between the public opinion events, Internet users, media, network media and government of the five main role and network public opinion through establishing the system dynamics model of the network public opinion response (Hong et al., 2017). Wei found that with the increase of the probability of public opinion migration, it cannot reach the expectation that the time of balanced public opinion is constantly shortened through the system dynamics simulation of Internet public opinion transmission "migration" and "transformation" stage. On the contrary, when the probability of public opinion migration exceeds a certain value, it will lead to the failure of public opinion transmission (Wei et al., 2016).

Wu believes that social contradiction is in a social community between different social groups or social class mutual promotion, complementary symbiosis and common development and confrontation, mutual exclusion, mutual struggle situation (Wu, 2015). Wang, Huang use the method of causality forcing to find that social contradictions can be attributed to the instability of the various subsystems of society, and put forward the establishment of early warning index system of social contradiction, and finally give the threshold of social contradiction warning index (Wang and Huang, 2014). In the light of the differences between the early warning of social conflicts and the warning of social contradictions, Shi has not only defined the object of study, the realistic target and the object of service, but also introduced the differences between them from the analysis model (Shi, 2015).

To sum up, through the existing research situation, the importance of online public opinion to the subject of crisis management is gaining more and more scholars' recognition. At present, the academia has made some achievements in the theoretical research and early warning research of online public opinion, which provides a basis for the development of this topic. However, the following shortcomings still exist: (1) It has not found the main driving force to promote the evolution of network public opinion and the main influencing factors of the heat of online public opinion. (2) The current research focuses on the public opinion of emergencies, public crisis events and unexpected public crisis events. There are few studies on social conflict events, online public opinion, or studies on the characteristics of social conflict events.

3. ANALYSIS OF DYNAMIC FACTORS

3.1 Subjects of network public opinion

The subjects of network public opinion include: (1) The trigger of public opinion is social contradictory event. Social contradictory events exist in the actual economic society. It shows that some people are influenced by a
social event and disagree with the country's managers. It is an abnormal reflection or extreme externalization of public opinion, and also an emotional release of the masses. (2) Carrier of public opinion: network media. Because the net name mainly communicates and communicates through the network media, the carrier of the public sentiment is the network media. (3) The main body of public opinion is Internet users. As users of the Internet, Internet users use the Internet as the medium of communication and communication. They express their own opinions, express their opinions and evaluate them by participating in the interaction on the Internet so as to express their emotions and attitudes. (4) The main body of public opinion regulation is the government. As a supervisor and manager of society, the government has the responsibility to resolve the crisis as soon as possible and try to eliminate or minimize the impact and the harm to the public.

3.2 Endogenous and exogenous forces

From the impact factors of the evolution of network public opinion in social conflicts, the study considers the main force to promote and promote the evolution of network public opinion comes from three aspects: (1) The destructive force of the event itself. (2) The driving force of the Internet. The driving force of the network includes two aspects: the driving force of Internet users and the driving force of Internet media. (3) The regulatory power of a government or other organization. According to the nature of action and the mode of action, it can be divided into two types: endogenous power and exogenous power.

3.2.1 Endogenous forces - the destructive power of the event itself

The destructive power belongs to the internal motive force, because it is affected by the attribute of the contradictory event itself. We believe that the internal dynamics of events include the following factors:

(1) Event self-sensitivity. The basis of the endogenous motivation of events is the sensitivity of the event itself. For example, topic sensitivity refers to a topic of crisis, after the event, when it comes to the topic, the possibility of high online public opinion is relatively large.
(2) Event criticality. The present study suggests that the physical effects of social conflict events can be divided into the following dimensions: life, health, and resources.
(3) Event impact. The magnitude of events is often influenced by the social class, social influence, and social popularity of the people who are the main part of the event. The social class of higher social or higher visibility, the greater the influence of events.

3.2.2 Exogenous forces - Network impetus and government regulation

3.2.2.1 Network impetus

The driving force from the network includes two aspects: the driving force of Internet users and the driving force of network media.

(1) The impetus of Internet users
   a. Posting amount. Posting amount refers to the number of posts posted on a community, forum, post bar and other media by a network name. It is the primary consideration in the investigation of online public opinion events.
   b. Micro-blog article quantity and reprint quantity. As one of the most important ways of information transmission in today's society, micro blogging has greatly facilitated people's voice from time, geography and access equipment. The number of blog posts and the amount of translation indicates people's concern about an event.
   c. Netizen attitude. Internet users' attitude is very important indicators in the driving force, and the level of online public opinion crisis should be concerned about the amount of Internet users and attitudes of the comprehensive effect.

(2) Network media driving force
   a. Network news volume. As the main carrier of network public opinion, network media is an important channel for the formation of online public opinion.
   b. Agenda setting. In the context of information asymmetry and excessive information, agenda setting is very influential. The interaction between Internet users and media is mainly reflected in the information sources of
Internet users as media, moreover, in the mood and opinions have not yet formed the stage, the media agenda setting will affect the attitude of Internet users.

3.2.2.2 Government regulation

Under normal circumstances, because of the government's role in the network of public opinion, the public opinion can be properly adjusted, adjusted, and social order can be maintained. In the process of social conflicts and online public opinion transmission, the government participates in the social network public opinion through the guidance, interaction and disposal, and has a certain influence on the heat of public opinion. The factors that reflect the government's regulatory power include:

a. Government response speed. The speed of government response indicates that the government has responded effectively to the occurrence of an incident in order to reduce or eliminate the rate of impact and harm on the masses and society.
b. The speed at which governments resolve conflicts. When the network public opinion crisis occurs, the government should take corresponding measures to deal with the crisis quickly and effectively, to eliminate or reduce the impact of the crisis.
c. Government information transparency. When the information transparency is high, the public opinion is clearer about the judgment and feedback of social contradictory events, so it is more likely to produce positive and positive attitudes towards public opinion.
d. Government credibility. Public confidence refers to the influence and appeal of the government, which shows the authority, democracy, service and rule of law in government work. It is also the social public's evaluation of the quality of government work, reflecting the satisfaction and confidence of the people in government work.

The study summarized and analyzed the key components and variables of endogenous and exogenous forces. Through the system dynamics modeling, these factors and variables are modeled and simulated by system dynamics, and the main influencing factors of the heat of network public opinion are found.

4 SYSTEM DYNAMICS MODELING

4.1 Modeling preparation

4.1.1 Explicit system boundaries

In this study, the social contradictions of the network public opinion situation fluctuation system are from the endogenous power and exogenous power of the three forces to promote social contradictions network public opinion evolution. These three forces include event destructive power, network impetus, government regulation, and are also the research boundary of this system, as shown in figure 1. In addition, without considering the influence of other factors on the spread of online public opinion, these three forces affect the rise and fall of Internet public opinion through the logical relationship between them. This study only considers Internet users and network media of network public opinion transmission carrier instead of others.

4.1.2 Basic assumptions
As the network public opinion communication system is a dynamic, nonlinear and complex system, the propagation of network public opinion is influenced by many factors. But considering that some factors are not suitable for introducing into the system dynamics model, in order to facilitate the study, the following hypotheses are proposed:

1. Suppose that the information of network public opinion comes from the network.
2. The network used for public opinion dissemination is unimpeded, there is no network paralysis or a large area of broken network and so on.
3. The government can participate in the guidance and management of online public opinion, but the public opinion communication has not been artificially controlled.
4. The network public opinion event is isolated, and there is no cross influence of other network public opinion events.
5. The situation of public opinion and developments interact with each other and interact with each other.

4.2 Model establishment

4.2.1 Construction and analysis of causal loop diagram

Through the elaboration and analysis of the influencing factors of the online public opinion, the causal logic relationship between the influence factors and the popularity of the network public opinion is analyzed. On the premise of considering the internal factor relations of the system, the causality diagram of the network public opinion communication system is depicted as shown in figure 2:

![Causal Loop Diagram](image_url)

**Figure 2.** Network public opinion function mechanism causality diagram

Principal feedback loop analysis of causality diagrams:

A feedback loop is formed at this time when multiple variables ($n>3$) in the system can form a loop of causality and closure. Positive feedback loop and negative feedback loop can play a leading role alternately in different stages of the system evolution, thus promote the system to develop in different states. Through the feedback loop analysis can help us to sort out the feedback relationship between variables in a system, especially in the study of complex feedback system, variables, causes, trends, etc. can be analyzed. A few important feedback loops are shown below, as shown in Figure 3 and Figure 4:

1. The role of government in the negative feedback loop
In this study, the official news quantity refers to the official response to the amount of news, which means that after the event, there are official releases and clarifications concerning the cause, the process and the result of the incident. Suppose 3 indicates that the government is the government that has the ability, and the government has the ability to respond to online public opinion. When the government regulates and guides public opinion in a timely and effective manner, events and online public opinion will gradually improve, and the anger and discontent of the people and events and public opinion will gradually subside, and the system will enter another steady state.

The negative feedback loop is as follows:

a. The number of official response increases with the official corresponding efforts increasing, which means that the level of government regulation, network public opinion heat under the government's effective regulation, gradually dropped from high. But there is a time lag, and it takes some time to function. With the decrease of the popularity of the network public opinion, the time and influence are gradually declined, and the number of network news is decreasing.

b. The speed of the government's handling of contradictions means that the level of government regulation will rise, and that the heat of public opinion will gradually fall from the high level under the effective control of the government. But there is also a time lag.

The system of government action is mainly reflected in the number of official responses. What needs to be explained is that:

First, if the official response is authoritative, Internet users are much more trusting of official news than in forums or other online news outlets.

Second, the number of responses issued by the official caliber can indicate the extent of concern and disposal of the government to a certain extent. At the same time, the government regulation and disposal will be affected by the impact of network media on the system and the impact of Internet users on the system. The degree of concern of Internet users and Internet media also has a direct impact on the government's attention to events and the intensity of regulation.

(2) Netizens-network media role of positive feedback loop

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Second, the number of responses issued by the official caliber can indicate the extent of concern and disposal of the government to a certain extent. At the same time, the government regulation and disposal will be affected by the impact of network media on the system and the impact of Internet users on the system. The degree of concern of Internet users and Internet media also has a direct impact on the government's attention to events and the intensity of regulation.
Positive feedback loops are as follows:

a. The number of network news will increase with the influence of events increasing, and the network media and network name will pay more attention to this event, and the popularity of online public opinion will be high.

b. With the increasing influence of events, the amount of comments on Internet news will increase, which means that the level of news activity will increase, and the popularity of online news will upsurge.

c. Internet users are more concerned about the incident, and the number of visitors will increase. Internet users will send new discussion posts to the incident, posting and the participation of Internet users will increase, and the popularity of online public opinion will rise.

Internet users reflect the role of the system through three indicators:

First, the number of news reviews. The number of news reviews has risen as Internet users become more interested in news. Internet users pay more attention to event related news, and the evolution of online public opinion will also promote.

Second, the number of active pressing. The total number of forum posts can reflect Internet users’ attention to events. Internet users participate in the discussion of events by browsing, publishing and replying to events related posts, and the degree of Internet users participation can directly affect the development trend of online public opinion.

Third, Number of micro-blog articles. The number of blogs on micro-blog can directly reflect the netizens’ attention to the event. Currently in the network of public opinion, micro-blog play a role is gradually strengthening. There are two kinds of attitudes expressed by Internet users in micro-blog: one is to give vent to emotion directly on micro-blog; another is to evaluate the incidental emotions by releasing information.

The network media function system reflects through the inflow and flow of the network news. At the same time, through the network media attention, event destruction force, event influence and network news browsing, reply ratio and Internet users, there is a correlation between the amount of news comment.

4.2.2 Construction and analysis of flow graph

According to the above analysis results, and combined with the total causality diagram, this paper proposes a flow diagram of the mechanism of social conflict events online public opinion, as shown in Figure 5.

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**Figure 5.** Network public opinion mechanism mechanism flow chart
This study has a large number of primary data as a support to ensure the objectivity and authenticity of the study. At the same time, we have chosen some data processing methods for data transformation, as far as possible to ensure that the model is true and effective, and make the simulation can be carried out smoothly. The data processing methods involved in this study include: (1) expert evaluation method (Delphi method) (3) empirical observation method (4) qualitative analysis method.

We take the method of assignment for control variables such as event criticality, event sensitivity and government regulation. In view of the objective data such as the number of postviews, the number of network news and the total number of news comments, we use the network public opinion research institute of Communication University of China (IRI) to monitor the posting, pageview, comment volume, blog number and other indicators of network public opinion hot event.

Some of the data needed for this study relate to the psychological factors of netizens, and we actually understand and obtain these data in the form of questionnaires from netizens. In this study, the questionnaire mainly contains 20 questions, using the Likert five-level scale questionnaire. The research objects were mainly ordinary Internet users, the questionnaires were distributed by the network. A total of 100 questionnaires were issued, and all the questionnaires were collected. Among them, 91 were valid questionnaires. In this questionnaire survey, there are 47 males and 44 females. The proportion of male and female is 51.6% and 48.4% respectively. The proportion of men and women is close, and the data is reasonable. The consistency of the survey results should be tested to verify the validity and validity of the results. In this paper, the internal consistency reliability coefficient is used to test. After consistency test, the value of each variable is above 0.75, which shows that the questionnaire has good reliability. Specific variable parameters and function expressions are shown in Table 1 and Table 2.

Table 1 Variable parameter table

<table>
<thead>
<tr>
<th>Serial number</th>
<th>Variable name</th>
<th>Numerical range</th>
<th>Initial value</th>
<th>Acquisition mode</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Event criticality</td>
<td>0-100</td>
<td>70</td>
<td>Assignment</td>
</tr>
<tr>
<td>2</td>
<td>Event sensitivity</td>
<td>0-100</td>
<td>60</td>
<td>Assignment</td>
</tr>
<tr>
<td>3</td>
<td>Government credibility</td>
<td>0-1</td>
<td>0.6</td>
<td>Assignment</td>
</tr>
<tr>
<td>4</td>
<td>Government response speed</td>
<td>0-100</td>
<td>60</td>
<td>Assignment</td>
</tr>
<tr>
<td>5</td>
<td>Government information transparency</td>
<td>0-1</td>
<td>0.05</td>
<td>Assignment</td>
</tr>
<tr>
<td>6</td>
<td>Netizen attitude</td>
<td>0-100</td>
<td>70</td>
<td>Assignment</td>
</tr>
<tr>
<td>7</td>
<td>Micro-blog silence coefficient</td>
<td>0-1</td>
<td>0.23</td>
<td>Assignment</td>
</tr>
<tr>
<td>8</td>
<td>Micro-blog reproduced coefficient</td>
<td>No upper limit</td>
<td>121</td>
<td>Assignment</td>
</tr>
<tr>
<td>9</td>
<td>Post silence coefficient</td>
<td>0-1</td>
<td>0.28</td>
<td>Assignment</td>
</tr>
<tr>
<td>10</td>
<td>Network news silence coefficient</td>
<td>0-1</td>
<td>0.3</td>
<td>Assignment</td>
</tr>
<tr>
<td>11</td>
<td>Silence coefficient of news comment</td>
<td>0-1</td>
<td>0.3</td>
<td>Assignment</td>
</tr>
<tr>
<td>12</td>
<td>Silence coefficient of official response</td>
<td>0-1</td>
<td>0.3</td>
<td>Assignment</td>
</tr>
<tr>
<td>13</td>
<td>Network news reprint rate</td>
<td>0-1</td>
<td>0.2</td>
<td>Assignment</td>
</tr>
<tr>
<td>14</td>
<td>Post review ratio</td>
<td>0-1</td>
<td>0.011925</td>
<td>IRI</td>
</tr>
<tr>
<td>15</td>
<td>News review ratio</td>
<td>0-1</td>
<td>0.23</td>
<td>IRI</td>
</tr>
<tr>
<td>16</td>
<td>Posts pageviews</td>
<td>No upper limit</td>
<td>IRI</td>
<td></td>
</tr>
<tr>
<td>17</td>
<td>Number of network news</td>
<td>No upper limit</td>
<td>IRI</td>
<td></td>
</tr>
<tr>
<td>18</td>
<td>News comment totals</td>
<td>No upper limit</td>
<td>IRI</td>
<td></td>
</tr>
<tr>
<td>19</td>
<td>Official response quantity</td>
<td>No upper limit</td>
<td>IRI</td>
<td></td>
</tr>
<tr>
<td>20</td>
<td>Posting amount</td>
<td>No upper limit</td>
<td>IRI</td>
<td></td>
</tr>
<tr>
<td>21</td>
<td>Micro-blog article reprint quantity</td>
<td>No upper limit</td>
<td>IRI</td>
<td></td>
</tr>
<tr>
<td>22</td>
<td>Micro-blog article quantity</td>
<td>No upper limit</td>
<td>IRI</td>
<td></td>
</tr>
<tr>
<td>23</td>
<td>Official response</td>
<td>0-100</td>
<td>Questionnaire</td>
<td></td>
</tr>
<tr>
<td>24</td>
<td>Destructive power</td>
<td>0-100</td>
<td>Questionnaire</td>
<td></td>
</tr>
<tr>
<td>25</td>
<td>Government regulation level</td>
<td>0-100</td>
<td>Questionnaire</td>
<td></td>
</tr>
<tr>
<td>26</td>
<td>Government conflict resolution speed</td>
<td>0-100</td>
<td>Questionnaire</td>
<td></td>
</tr>
<tr>
<td>27</td>
<td>Internet users attention</td>
<td>0-100</td>
<td>Questionnaire</td>
<td></td>
</tr>
<tr>
<td>28</td>
<td>Event impact</td>
<td>0-100</td>
<td>Questionnaire</td>
<td></td>
</tr>
<tr>
<td>29</td>
<td>News activity level</td>
<td>0-100</td>
<td>Questionnaire</td>
<td></td>
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</table>
### Table 2 Main function expression table

<table>
<thead>
<tr>
<th>Serial number</th>
<th>Variable name</th>
<th>Function expression</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Official response</td>
<td>Official response=100-12.05<em>EXP(-0.0007634</em> Official response quantity)</td>
<td>Dmnl</td>
</tr>
<tr>
<td>2</td>
<td>Destructive power</td>
<td>Destructive power =0.55* Event sensitivity +0.45* Event criticality</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Explanation: The weights between the two factors are calculated using the analytic hierarchy process.</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Government regulation level</td>
<td>Government regulation level= Government credibility<em>10+0.651</em> Government conflict resolution speed +0.439* Official response+ Government response speed *0.421</td>
<td>Dmnl</td>
</tr>
<tr>
<td>4</td>
<td>Government conflict resolution speed</td>
<td>Government conflict resolution speed =2.81<em>DELAY11(Event impact, 10, 0 )</em>(1+ Government information transparency)</td>
<td>Dmnl</td>
</tr>
<tr>
<td>5</td>
<td>Internet users attention</td>
<td>Internet users attention = (Destructive power <em>0.001</em>0.55+ Event impact <em>0.01</em>0.45+1)<em>(0.4</em> Internet media attention +0.3<em>The heat of online public opinion -DELAY11(0.3</em> Government regulation level,4, 0 ))</td>
<td>Dmnl</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Explanation: The weights between the two factors are calculated using the analytic hierarchy process.</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Event impact</td>
<td>Event impact =(Destructive power *0.57+ The heat of online public opinion *0.43)*EXP(-Time)</td>
<td>Dmnl</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Explanation: The weights between the two factors are calculated using the analytic hierarchy process.</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>News activity level</td>
<td>News activity level = 100-56.1<em>EXP(-0.0001142</em> News comment totals)</td>
<td>Dmnl</td>
</tr>
<tr>
<td>8</td>
<td>Network media attention</td>
<td>Internet media attention = 100-91.86<em>EXP(-0.0014</em> Number of network news)</td>
<td>Dmnl</td>
</tr>
<tr>
<td>9</td>
<td>Internet users participation</td>
<td>Internet users participation = 100-51.85<em>EXP((-7.64</em>(-4))* Posting amount)+0.1* Netizen attitude -21.85<em>EXP((-7.64</em>(-4))* Micro-blog article reprint quantity)</td>
<td>Dmnl</td>
</tr>
<tr>
<td>10</td>
<td>The heat of online public opinion</td>
<td>The heat of online public opinion =0.1* News activity level -DELAY11(Government regulation level <em>0.05, 2, 0 )+0.15</em> Internet media attention +0.1* Internet users participation</td>
<td>Dmnl</td>
</tr>
</tbody>
</table>

### 4.3 Model test

The test of model mainly includes model validity test, mechanical error test and dimensional consistency test. After testing, this model has passed the ventsim software mechanical error test, dimension consistency test and validity test. The model can be used for simulation prediction.

### 5. SYSTEM MODEL SIMULATION AND ANALYSIS

#### 5.1 Basic simulation results

The initial value of each variable is set and the simulation period of the system model is set to 45 days. Vensim software is used to simulate the system model, and the basic operation diagram of network public opinion heat is obtained (As shown in Figure 6).

After the social conflicts, the heat of online public opinion will change as time goes on. It has gone through the formation, the rise, the demise process. The initial value of the system model variables in this study is analyzed and rationalized after the set, so the resulting graphics of simulation and the actual situation will be some differences. But from figure 8, we can see that the evolution trend of the network public opinion is consistent with the development trend of the actual network public opinion events.
5.2 Analysis of the influence of event characteristics on the network public opinion

The destructive power is affected by both the event sensitivity and the event criticality. The network initial state of the heat of network public opinion as shown in the Current curve (event criticality is 70, event sensitivity is 60). The event sensitivity is increased by 20% to 72, the heat of network public opinion as shown in the event sensitivity curve. The event criticality is increased by 20% to 84, the heat of network public opinion as shown in the event criticality curve. As can be seen from Figure 7, when the event sensitivity and event criticality increased, the heat of network public opinion will also increase. Moreover, when the event sensitivity and event criticality increase the same range, the the heat of network public opinion is more affected by event sensitivity.

5.3 Analysis of the influence of network media on the network public opinion

![Figure 8](image)

Figure 8. Analysis of the influence of network news-news comment silence coefficient on the heat of network public opinion
People usually get information through Internet media, so Internet media can influence the order and extent of people's attention to events. As shown in Figure 8, the network initial state of the heat of network public opinion as shown in the Current curve (The network news silence coefficient is 0.3, and the news comment silence coefficient is 0.3). The network news silence coefficient is increased by 20% to 0.36, and the heat of network public opinion is shown as the network news silence coefficient curve. The silence coefficient of news comment is increased from 20% to 0.36, and the heat of network public opinion is shown as the silence coefficient of news comment curve. As shown in Figure 9, the network initial state of the heat of network public opinion as shown in the Current curve (The Micro-blog silence coefficient is 0.23, and the post silence coefficient is 0.23). The Micro-blog silence coefficient is increased by 20% to 0.276, and the heat of network public opinion is shown as the Micro-blog silence coefficient curve. The Post silence coefficient is increased from 20% to 0.276, and the heat of network public opinion is shown as the Post silence coefficient curve.

With the network news silence coefficient, silence coefficient of news comment, post silence coefficient and Micro-blog silence coefficient increase, the network public opinion heat has the corresponding trend of falling. In addition, the effect of the network news silence coefficient on the network public opinion is higher than others. The effect of the silence coefficient of news comment is close to network news silence coefficient. The third is the Micro-blog silence coefficient, the fourth is the post silence coefficient.

5.4 Analysis of the influence of government's role on the network public opinion

In the government role system, government credibility, government response speed and government information transparency will affect the heat of network public opinion. By changing the government credibility, the government response speed and transparency of government information, can observe the change of evolution of the trend of network public opinion.
As shown in Figure 10, the network initial state of the heat of network public opinion as shown in the Current curve (the value of government credibility is 0.6, the value of government response speed is 40, the value of government information transparency is 0.05). The value of government credibility is increased by 20% to 0.72, and the heat of network public opinion is shown as the government credibility curve. The value of government response speed is increased by 20% to 48, and the heat of network public opinion is shown as the government response speed curve. The value of government information transparency is increased by 20% to 0.06, and the heat of network public opinion is shown as the government information transparency curve.

With the government's credibility, the government response speed and government information transparency increased, the popularity of the Internet has declined. Moreover, to enhance the speed of government response to reduce the effectiveness of network public opinion is the most obvious. This shows that to enhance the credibility of the government, the government response speed and transparency of government information can play a certain regulatory role on the heat of network public opinion. To a certain extent, through this way can reduce the heat network public opinion, reduce the event crisis.

6. CONCLUSIONS AND RECOMMENDATIONS

According to the above analysis, we can draw the following conclusions and make corresponding policy recommendations accordingly:

(1) The greater sensitivity an incident has, the greater heat corresponding online public opinions will have—thus a positive correlation between heat of online public opinions and sensitivity of an incident. Moreover, the sensitivity of an incident exerts more influence on the heat of online public opinions than its destructive power does so a government should place much emphasis on incidents of high sensitivity.

If an incident contains one or more sensitive factors of social contradictions, it can easily get on the public’s sensitive nerves and cause psychological imbalance in people. Driven by the online media, online public opinion crisis will occur. Therefore, building a “sensitive” keywords database is of great significance for a government to accurately, effectively and rapidly recognize sensitive incidents. By doing so, when somethings happens, the system will automatically begin to match related information with words in that database, and once the system manages to match related information with words in that database, warnings will be given immediately. It should be noted that after finishing building the database, the database should be consistently updated in order to make it keep pace with actual situations of society, thus further enhancing real time feature of the database and effectiveness of system matching. As a result, the scientific nature and reliability of discovering, warning of and evaluating hot topics of public opinions will be guaranteed.

(2) The greater destructive power an incident has, the greater heat corresponding online public opinions will have—thus a positive correlation between heat of online public opinions and destructive power of an incident. A government should place much emphasis on social incidents with great destructive power.

A government should handle controversial incidents that relate to the very interests of the people and probably cause great harms cautiously, pay close attention to their real-time status and spare no effort to decrease the probability occurrence of such incidents. Moreover, a government should place great emphasis on incidents that have already happened or that are predicted to cause bad consequences and monitor their developments so as to nip such incidents in the bud.

(3) When internet users’ attitudes weaken, the heat of online public opinions will also weaken—thus a positive correlation between heat of online public opinions and internet users’ attitudes. A government should pay close attention to the evaluation of internet users’ opinions and be good at guiding and mediating the public opinions.

A government should place emphasis on the evaluation of internet users’ attitudes and establish an online public opinion text processing and sentiment analyzing system through collecting comments on related articles in the news section of related mainstream media, forums, blogs, Weibo and Wechat. Then the attitude intensity of internet users can be analyzed so effective measures can be taken to guide and mediate internet users’ opinions. Moreover, a government should train its opinion leaders and make full use of their influence to publish true & reliable information and emphasize positive opinions in important forums.
(4) As online news, news comments, posts, blog articles are more likely to disappear and be replaced in a shorter period of time, the heat of online public opinions also correspondingly declines—a negative correlation between heat of online public opinions and replacement rate of online news, news comments, posts, blog articles. Moreover, when the replacement rate of online news, news comments, posts, blog articles increases equally at the same time, replacement rate of online news exerts most obvious influence on weakening heat of online public opinion, the replacement rate of news comments has nearly the same influence on it as replacement rate of online news has, then comes the replacement rate of posts and finally the replacement rate of blog articles.

Improving the replacement rate of online news, news comments, posts, blog articles can weaken the heat of online public opinions rapidly within a very short time but it works well only in earlier stages not in a later stage. That is to say, a government cannot weaken the heat of online public opinions for a long time and suppress expressions of the public opinions by means of closing posts forcibly, but on the contrary, putting an end to commenting will increase the intensity of internet users’ attitudes, probably leading to a secondary crisis. A government should listen to the public opinion through news comments and other ways, respect the public opinions and publish reliable information without delay. Only by doing so, can the crisis be solved. However, closing posts forcibly can weaken the heat of online public opinions rapidly within a short time so it could be an alternative for a government under extreme conditions.

(5) The faster response speed of a government has, the shorter time will be needed to control and weaken the heat of online public opinions—thus an inversely proportional relationship between the heat of online public opinions and the government’s response speed. Moreover, increasing response speed, credibility, information transparency of a government equally, increasing response speed of a government has the most obvious effects on weakening the heat of online public opinions.

A government should pay close attention to active forums, gain control of developments of corresponding public opinions and place great emphasis on incidents containing one or more sensitive factors of social contradictions so as to discover the controversial incidents before happening or at the very beginning and take effective measures to eliminate harms that will probably be caused by such controversial incidents.

(6) The higher credibility a government has, the better regulative effects it will have on online public opinions—thus a negative correlation between the heat of online public opinions and the credibility of a government.

The credibility of a government has positive influence on its capacity to guide, handle and regulate online public opinions and vice versa. Therefore, a government should actively do its duties, stick to its people-oriented principles and perform the official duties according to laws in order to increase people’s awareness of the government’s credibility and people’s trust in the government.

(7) Improving the information transparency of a government can also weaken the heat of online public opinions—thus a negative correlation between the heat of online public opinions and the information transparency of a government.

The harder a government tries to conceal online pubic opinion incidents, the more intense curiosity about the incidents of the public will be aroused so that more guesses of the pubic will appear and rumors will be generated, thus making things worse. However, if a government can inform the people of online pubic opinion incidents’ progress through official media and improve its information transparency, the people will know what is going on so that people’s guesses and doubts will be eliminated and impacts of online pubic opinion incidents on society will also be diminished.

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