

Research Article

Influence of We Media Information Dissemination on Public Emotional Cognition and Behavior under Government Responsibility Constraint

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In recent years, We Media's chaotic behavior has emerged one after another. How to properly supervise We Media and effectively manage its violations has become an urgent problem in the process of national governance system and governance capacity building. From the three aspects of opportunity, motivation, and control methods, this paper analyzes the relevant stakeholders and their relationships in the process of We Media information dissemination. It constructs a tripartite evolutionary game model of government, We Media, and public participation, which focuses on the analysis of the equilibrium point of the game model and carries out simulation experiments to explore the influence of government responsibility constraints on the evolution results. The research results show that government regulation plays an important role in restricting We Media's information release. When the government's willingness to regulate increases, We Media will be punished more if it violates rules. In order to reduce the cost of punishment and other factors, We Media will reduce the willingness to violate the rules. After the occurrence of social hot events, the public is more willing to be guided by positive information from We Media, prompting the government to choose strict supervision strategies, effectively reducing the violations of We Media and achieving the Pareto optimum. According to the research results, this paper puts forward reasonable countermeasures to realize the comprehensive governance pattern of noncompliance of We Media and correct guidance of public emotional cognitive behavior under responsibility constraints. The research results provide theoretical support and decision-making basis for We Media information management and control.

1. Introduction

After the occurrence of social hot events, the public is the information receiver and the direct stakeholder. In recent years, the public's attention to hot events has increased, and the negative emotion cognition of events will expand the scope of influencing events and even produce a derivative crisis. According to the data of China Internet Network Information Center, as of June 2020, the number of Internet users in China has reached 940 million. The Internet provides technical support and a diffusion platform for the development of We Media. We Media has become an important way for the public to obtain information and cognitive events.

We Media information dissemination presents new characteristics that traditional media do not have. Text, video, and other information, like the speed of light, instantly spread to the whole country and even the world. Xu and Ju pointed out that the earliest reports of work safety accidents are often from the pictures and videos taken by on-site We Media [1]. When We Media make a lot of reports on hot events, what's more, in order to blindly publicize the influence of We Media, it is easy to cause public anxiety, panic, and other negative emotions, which have a huge impact on the cognitive behavior of public emotions. Novel coronavirus pneumonia has been reported by some media since 2011, after the Japanese nuclear leak incident, which triggered the public's salt buying disturbance in China. In

2019, the new crown pneumonia appeared and spread throughout the country. Some media rumors were released, causing public confound psychology, and causing the public to panic buying Shuanghuanglian oral liquid. Tian et al. believe that We Media network public opinion information subverts the authenticity principle of traditional media reports, creates public unrest, dilutes the credibility of the government, brings difficulty to the public cognitive judgment, erodes the public emotional cognition, and causes the crisis of network public opinion reversal [2]. Therefore, the government's responsibility to restrict the supervision of We Media and the punishment of illegal We Media has become an important measure to maintain a harmonious and healthy We Media environment and stabilize the people.

According to the characteristics of information in the process of information dissemination, relevant scholars make research. Guo and Wan analyzed the influence of the authenticity of the information, the degree of information sharing of Internet users, and the ability of information discrimination on the event development process according to the communication mode of microblog community information [3]. Gao and Huang combed the generation mechanism of emotional polarization of online public opinion information audience, pointed out that, in the face of different cognitive styles of the public, the portrait is conducive to the construction of online public opinion participation filing mechanism, curb extreme and improper words and deeds information, and avoid the polarization incitement of public emotional cognition [4]. Helbing and others believe that the improvement and popularization of computer capabilities, the availability of new data quality, and important theoretical insights from network science enable scientists to develop highly complex computing platforms to form complexity science. They point out that network science, in particular, can help extract the characteristics of potential communication and make a general statement of potential global communication. Since this method is very general and completely based on the use of a more appropriate concept of distance in heterogeneous network systems, it is obviously suitable for other types of infectious processes on the network, such as news, information, or fashion communication in social networks [5]. Taking public health emergencies as an example, Zhang pointed out that pseudoscientific information is extremely harmful and usually causes public panic. Because most of the public does not understand the deep mechanism of public health events, pseudoscientific information is spread among the public with its confusion and falsity. The government should invite experts to refute the rumors of pseudoscientific information in time and widely publicize it to the public [6]. Wang et al. analyzed the mobile short video network public opinion information composed of voice and image, pointed out that its information processing is more diversified and complex, and strengthened its supervision and public opinion guidance, in order to build a better Internet information ecology [7]. Shi et al. proposed the feature of user-generated content, constructed a system dynamics model of social media information quality, and explored the influencing factors and improved methods of social media information quality in a quantitative way [8].

In psychology, emotion cognition is that emotion comes from the evaluation of stimulating situations or things. Relevant scholars pointed out that, in the process of information dissemination of social hot events, grasping the public emotional cognitive behavior state can timely control the deterioration of events. Jia et al. collected the emotional cognitive behavior data of the public in the face of public safety events through field research in the earthquake-stricken areas and compared the public in the disaster-stricken areas with those in the no disaster-stricken areas [9]. Lewis et al. attempted to improve the understanding of emotional appeal, taking response efficiency as a key cognitive structure, and confirmed the importance of emotional and cognitive components of persuasive health information [10]. Meng and Lai pointed out that the government regulatory departments should respond positively, voice in time, and convey an active and responsible attitude to the public, which can guide the positive development of public emotional cognition [11]. Liu studies the impact of government response on public cognition after public events. The empirical results show that government action response, that is, learning from the successful case experience of event response, releasing authoritative information in time, and improving the accuracy and transparency of information release, can effectively reduce the degree of public cognitive bias. At the same time, it also points out that the government cuts off the sources of false information by accountability for the market of commercial media [12]. Matjažperc puts forward that many collective behaviors of human society can be predicted and studied. The progress of statistical and theoretical physics, the arrival of the era of network science and computational social science, and the continuous innovation of computer and information technology promote research and development. It also gives representative examples to study whether human cognition imposes constraints in digital space and connects human behavior in the physical world and the digital world. Finally, the author points out that physics in the 21st century will enable us to better understand our society [13]. Taking COVID-19 as an example, Zhang et al. analyzed the public's information concern and emotional cognition change by acquiring relevant text content on the knowledge platform [14].

At present, for the guidance and governance of social hot events, some scholars use game theory to analyze the game strategy selection of participants from the perspective of network public opinion. From the perspective of network public opinion, Chen and Huang introduced the tripartite game theory into the research and pointed out that the essence of the evolution process of network public opinion is the process of tripartite interest game among the government, Internet users, and online media. In order to build a healthy network environment, it is far from enough to rely on one-sided forces, and multiparty cooperation is needed [15]. Guo et al. pointed out that the negative network public opinion has certain harm to the society and morality and law should regulate and restrict it and use the game theory method to study the public opinion communication mechanism [16]. Li and Wang take emergencies as the background, consider the cognitive

differences of the main body of public opinion information dissemination, and use evolutionary game theory to study the game relationship of the main body of public opinion information dissemination [17]. Tanimoto pointed out that one of the provisions is the financial support provided by the government in the form of subsidies. In fact, in Japan, the elderly and others in need of support are subsidized for seasonal influenza vaccination. On the other hand, due to the steady rise of medical costs and welfare costs, the Japanese government is suffering from a huge budget deficit. The evolutionary game theory is used to express the system dynamics, and the corresponding evolutionary formula is successfully established. The dynamic ordinary differential equation in the study can be solved numerically. In order to verify the theoretical framework, a series of numerical simulations are carried out based on the MAS method. Numerical results are given. By comparing the prediction results with the simulation results, the research framework is verified [18]. Wei and Chen studied the network's false information, tried to build a tripartite game model of government enterprise citizens, and analyzed the stability strategies of the three participants in different situations [19]. Based on the animal epidemic situation, Li and Ding proposed the problem of trust repair, pointed out that social trust loss would occur under the influence of network public opinion, constructed a tripartite evolutionary game model, analyzed the strategic behavior of participants and its effect on trust repair, and finally pointed out that, in the background of network public opinion, the repair of social trust must make joint efforts [20]. At the same time, tripartite game theory has been effectively developed in related research fields [21–26].

Most of the existing studies are carried out from the perspective of network media, and there is less research on the government's supervision of information dissemination of We Media in social hot events, and there is also a lack of research on the impact of information dissemination of We Media on public emotional cognitive behavior on this basis. In the Internet era with highly developed social media, it is urgent to solve the dilemma of violations brought by the dissemination of information from We Media and strengthen government information supervision [18]. In this paper, we will build a tripartite game theory of public emotion management and public media management and help the three parties to conduct the research.

2. Model Hypothesis and Construction

2.1. Basic Assumptions of the Model. Based on the opportunity, motivation, and control method of daily activity theory, the model is analyzed [22]. Opportunity refers to the favorable situation in time, which explains why We Media has the ability to choose violations. Motivation is the psychological tendency to make action-oriented to a specific goal, which explains why We Media seeks illegal behavior. The control method is to check whether the work is carried out according to the established standards, find problems, and correct them. It is used to protect the public's emotional

cognitive behavior from the harm caused by opportunities and motives. The government's regulatory behavior is affected by the choice of We Media behavior and the public's willingness to be affected. Based on the above analysis, the following hypotheses are put forward. It is reflected in whether the public, as the information receiver, is willing to be affected by the illegal information. The motivation of the illegal behavior of We Media comes from the economic benefits such as a high click-through rate.

Hypothesis 1: based on the two participants of the government and the public proposed by Liu et al. [27], the three participants are further proposed. Under the operation and government supervision of We Media, there are three participants, namely, the government, We Media, and the public. The three participants are all bounded rationality.

Hypothesis 2: on the basis of the strategy set proposed by Zhang et al. [28], it further points out that the government's strategy choice space $Q_1 = (\text{supervision, no supervision})$; We Media's strategy choice space $Q_2 = (\text{violation, no violation})$; public emotion cognitive behavior's strategy choice space $Q_3 = (\text{influence, no influence})$. In the model, the proportion of government supervision is x , and the proportion of choosing not to supervise is $1 - x$; the proportion of We Media choosing to violate rules is y , and the proportion of choosing not to violate rules is $1 - y$; the proportion of public emotional cognitive behavior affected is z , and the proportion of not affected is $1 - z$, where $x, y, \text{ and } z \in [0, 1]$.

Hypothesis 3: improve the setting of cost loss variables by Yin et al. [29], and put forward the cost factors related to the government, We Media, and the public under different strategies as follows. (1) The supervision system platform owned by the government needs daily maintenance, and the maintenance cost is G_{11} ; when the government supervises We Media, it needs to pay extra time and other costs G_{12} ; at the same time, when dealing with the violations of We Media, the field investigation needs to be carried out. It is about the cost of manpower and so on G_{13} . When the government does not supervise, illegal information has a negative impact on the public's emotional cognitive behavior, leading to the loss of public trust in the government and the ability to question W_{11} ; at the same time, it is easy to cause risk losses such as network chaos W_{12} . (2) The daily maintenance cost of We Media platform is G_{21} : when We Media chooses to violate the rules, it needs to bear the loss of public attention W_{21} ; if the government chooses to supervise at this time, We Media needs to bear the legal responsibility W_{22} ; in addition, the proportion coefficient of risk loss caused by We Media violation in the loss of negative impact on the public is m . (3) When the public receives violation information, it is easy to cause panic, emotional loss, and other losses W_{31} ; the risk of negative impact on emotional cognitive behavior of the public living in We Media environment without government supervision is W_{32} .

Hypothesis 4: improve the setting of income variables by Yin et al. [29], and put forward the relevant income factors of the government, We Media, and the public under different strategies as follows. (1) When the government chooses to supervise, it will gain the public's trust and ability recognition P_{11} ; at the same time, it will create a healthy and stable environment to bring additional income P_{12} . (2) When We Media chooses not to violate the rules, it will get more attention from the public and increase the revenue such as traffic P_{21} ; at the same time, the proportion coefficient of potential revenue generated when We Media chooses not to violate the rules to have a positive impact on the public is n . (3) When the public receives positive information, they can enjoy knowledge, psychological satisfaction, and other benefits P_{31} .

According to the construction principle of the three-party game model, the parameter assumptions of the participants are shown in Table 1.

2.2. Construction of the Payment Matrix. According to the above concept definition and parameter hypothesis setting, a three-party game model is established. In this paper, the game tree is used to represent the three-party game process. According to the above model assumptions and game tree, the game payment matrix of three participants is constructed, as shown in Table 2.

3. Solution of the Evolutionary Stability Strategy

3.1. Construction of Income Expectation Function. According to Table 2, the expected revenue U_{11} of "supervision" strategy, the expected revenue U_{12} of "no supervision" strategy, and the average expected revenue U_{13} of the government choosing in the game are as follows:

$$\begin{aligned} U_{11} &= yz(P_{11} + P_{12} - G_{11} - G_{12} - G_{13}) \\ &\quad + y(1-z)(P_{12} - G_{11} - G_{12} - G_{13}) \\ &\quad + (1-y)z(P_{12} - G_{11} - G_{12}) \\ &\quad + (1-y)(1-z)(P_{12} - G_{11} - G_{12}) \\ &= yzP_{11} - yG_{13} + P_{12} - G_{11} - G_{12}, \end{aligned} \quad (1)$$

$$\begin{aligned} U_{12} &= yz(-G_{11} - W_{11} - W_{12}) \\ &\quad + y(1-z)(-G_{11} - W_{12}) + (1-y)z(-G_{11} - W_{12}) \\ &\quad + (1-y)(1-z)(-G_{11} - W_{12}) \\ &= -G_{11} - W_{12} - yzW_{11}, \end{aligned} \quad (2)$$

$$\begin{aligned} U_{13} &= xU_{11} + (1-x)U_{12} \\ &= xyzP_{11} - xyG_{13} + xP_{12} - xG_{12} \\ &\quad - G_{11} - W_{12} - yzW_{11} + xW_{12} + xyzW_{11}. \end{aligned} \quad (3)$$

The expected revenue U_{21} of "violation" strategy, the expected revenue U_{22} of "no violation" strategy, and the average expected revenue U_{23} of We Media choosing in the game are as follows:

$$\begin{aligned} U_{21} &= xz(-G_{21} - W_{21} - W_{22}) \\ &\quad + x(1-z)[-G_{21} - m(W_{22} + W_{21})] \\ &\quad + (1-x)z(-G_{21} - W_{21}) \\ &\quad + (1-x)(1-z)(-G_{21} - mW_{21}) \\ &= -xzW_{22} - xmW_{22} + xzmW_{22} \\ &\quad - zW_{21} - G_{21} - mW_{21} + zmW_{21}, \end{aligned} \quad (4)$$

$$\begin{aligned} U_{22} &= xz(P_{21} - G_{21}) \\ &\quad + x(1-z)(nP_{21} - G_{21}) + (1-x)z(P_{21} - G_{21}) \\ &\quad + (1-x)(1-z)(nP_{21} - G_{21}) \\ &= zP_{21} + nP_{21} - G_{21} - znP_{21}, \end{aligned} \quad (5)$$

$$\begin{aligned} U_{23} &= yU_{21} + (1-y)U_{22} \\ &= y(-xzW_{22} - xmW_{22} + xzmW_{22} - zW_{21} - G_{21} \\ &\quad - mW_{21} + zmW_{21}) \\ &\quad + (1-y)(zP_{21} + nP_{21} - G_{21} - znP_{21}). \end{aligned} \quad (6)$$

The expected revenue U_{31} of the "influence" strategy, the expected revenue U_{32} of the "no influence" strategy, and the average expected revenue U_{33} of public choice in the game are as follows:

$$\begin{aligned} U_{31} &= xy(P_{32} - W_{31}) + x(1-y)(P_{31} + P_{32}) \\ &\quad + (1-x)y(-W_{31} - W_{32}) \\ &\quad + (1-x)(1-y)(P_{31} - W_{32}) \\ &= xP_{32} - yW_{31} + P_{31} - W_{32} - yP_{31} + xW_{32}, \end{aligned} \quad (7)$$

$$\begin{aligned} U_{32} &= xyP_{32} + x(1-y)P_{32} \\ &\quad + (1-x)y(-W_{32}) + (1-x)(1-y)(-W_{32}) \\ &= xP_{32} - W_{32} + xW_{32}, \end{aligned} \quad (8)$$

$$\begin{aligned} U_{33} &= zU_{31} + (1-z)U_{32} \\ &= -yzW_{31} + zP_{31} - yzP_{31} \\ &\quad + xP_{32} - W_{32} + xW_{32}. \end{aligned} \quad (9)$$

3.2. Using the Evolutionary Stability Strategy of Copying Dynamic Equation to Solve the Problem. Based on the above analysis, we can see that the dynamic equation of government replication is as follows:

$$\begin{aligned} F(x) &= \frac{dx}{dt} = x(U_{11} - U_{13}) \\ &= x(1-x)(yzP_{11} - yG_{13} + P_{12} - G_{12} + W_{12} + yzW_{11}). \end{aligned} \quad (10)$$

TABLE 1: Related parameter settings and their meanings of three-party participants.

Participant parameter meaning	
Government	G_{11} Daily network operation and maintenance costs when the government does not supervise We Media
	G_{12} Additional cost of government regulation of We Media
	G_{13} When the government supervises the violations of We Media, how much does it cost to deal with the violations
	P_{11} When the government supervises the negative impact of We Media on the public, the public's trust in the government will increase and the government's ability will be recognized
	P_{12} When the government supervises We Media, it can create a healthy and stable network environment
	W_{11} When the government does not regulate the negative impact of We Media on the public, the public's trust in the government will be reduced and the government's ability will be questioned
We Media	W_{12} When the government does not supervise We Media, it will bring risks such as an unstable network environment
	G_{21} Daily operation and maintenance cost of We Media
	P_{21} When We Media has a positive impact on the public, the public's attention to We Media increases
	W_{21} When We Media has a negative impact on the public, the public's attention to We Media is reduced
	W_{22} When We Media is supervised by the government, it will be punished by the government
	m The proportion coefficient of the risk loss caused by We Media violations in the loss of negative impact on the public
Public	n The proportion coefficient of the potential revenue generated by we media when it does not violate the rules to the positive impact on the public
	P_{31} The public's knowledge, psychological satisfaction, and other benefits from the positive influence of We Media
	P_{32} The public lives in the environment of government supervision of We Media, and their emotional cognition is positively affected
	W_{31} The loss of panic and emotional loss caused by the negative influence of We Media
	W_{32} The risk of negative impact on emotional cognition of the public living in We Media environment without government supervision

TABLE 2: "Government-We Media-public" tripartite game payoff matrix.

Game strategy	Government revenue	We Media revenue	Public revenue
(Supervision, violation, impact)	$P_{11} + P_{12} - G_{11} - G_{12} - G_{13}$	$-G_{21} - W_{21} - W_{22}$	$P_{32} - W_{31}$
(Supervision, violation, no impact)	$P_{12} - G_{11} - G_{12} - G_{13}$	$-G_{21} - m(W_{22} + W_{21})$	P_{32}
(Supervision, no violation, influence)	$P_{12} - G_{11} - G_{12}$	$P_{21} - G_{21}$	$P_{32} + P_{31}$
(Supervision, no violation, no influence)	$P_{12} - G_{11} - G_{12}$	$nP_{21} - G_{21}$	P_{32}
(No supervision, violation, influence)	$-G_{11} - W_{11} - W_{12}$	$-G_{21} - W_{21}$	$-W_{32} - W_{31}$
(No supervision, violation, no influence)	$-G_{11} - W_{12}$	$-G_{21} - mW_{21}$	$-W_{32}$
(No supervision, no violation, no influence)	$-G_{11} - W_{12}$	$P_{21} - G_{21}$	$P_{31} - W_{32}$
(No supervision, no violation, no influence)	$-G_{11} - W_{12}$	$nP_{21} - G_{21}$	$-W_{32}$

The dynamic equation of We Media replication is as follows:

$$\begin{aligned}
 F(y) &= \frac{dy}{dt} = y(U_{21} - U_{23}) \\
 &= y(1 - y)[(zm - z - m)(xW_{22} + W_{21}) + (zn - z - n)P_{21}].
 \end{aligned}
 \tag{11}$$

$$\begin{aligned}
 F(z) &= \frac{dz}{dt} = z(U_{31} - U_{33}) \\
 &= z(1 - z)(P_{31} - yW_{31} - yP_{31}).
 \end{aligned}
 \tag{12}$$

By combining equations (10)–(12), the government, We Media, and the public have the following power systems for replication:

The dynamic equation of public reproduction is as follows:

$$\begin{cases}
 F(x) = x(1 - x)(yzP_{11} - yG_{13} + P_{12} - G_{12} + W_{12} + yzW_{11}), \\
 F(y) = y(1 - y)[(zm - z - m)(xW_{22} + W_{21}) + (zn - z - n)P_{21}], \\
 F(z) = z(1 - z)(P_{31} - yW_{31} - yP_{31}).
 \end{cases}
 \tag{13}$$

Referring to Friedman's method [30], the evolutionary stability strategy (ESS) of the differential equation system can be obtained from the local stability analysis of

the Jacobian matrix of the system, and the Jacobian matrix (14) of the system can be obtained from equation (13) as

$$J = \begin{bmatrix} (1-2x)(yP_{11} - yG_{13} + P_{12} - G_{12} + W_{12} + yzW_{11}) & x(1-x)(zP_{11} - G_{13} + zW_{11}) & x(1-x)(yP_{11} + yW_{11}) \\ W_{22}y(1-y)(zm - z - m) & (1-2y)[(zm - z - m)(xW_{22} + W_{21}) + (zn - z - n)P_{21}] & y(1-y)[(m-1)(xW_{22} + W_{21}) + (n-1)P_{21}] \\ 0 & z(1-z)(-W_{31} - P_{31}) & (1-2z)(P_{31} - yW_{31} - yP_{31}) \end{bmatrix}. \quad (14)$$

In equation (14), let $F(x) = F(y) = F(z) = 0$, and the local equilibrium points of the system are $E_1(0, 0, 0)$, $E_2(0, 0, 1)$, $E_3(0, 1, 0)$, $E_4(0, 1, 1)$, $E_5(1, 0, 0)$, $E_6(1, 0, 1)$, $E_7(1, 1, 0)$, and $E_8(1, 1, 1)$. According to the evolutionary game theory, the equilibrium point where all the eigenvalues satisfying the Jacobian matrix are nonpositive is the evolutionary stability point of the system.

3.3. Stability Analysis of the Equilibrium Point. The Jacobian matrix of $E_1(0, 0, 0)$ is as follows:

$$J_1 = \begin{bmatrix} P_{12} - G_{12} + W_{12} & 0 & 0 \\ 0 & -mW_{21} - nP_{21} & 0 \\ 0 & 0 & P_{31} \end{bmatrix}. \quad (15)$$

The eigenvalues of the Jacobian matrix are $\lambda_1 = P_{12} - G_{12} + W_{12}$; $\lambda_2 = -mW_{21} - nP_{21}$; $\lambda_3 = P_{31}$. In addition, the other seven equilibrium points are substituted into the Jacobian matrix (15), and the eigenvalues of the Jacobian matrix corresponding to each equilibrium point are shown in Table 3.

In order to analyze the positive and negative signs of the eigenvalues corresponding to each equilibrium point and not lose generality, we assume that $P_{12} - (G_{12} + G_{13}) > 0$; that is, when the government supervises We Media, the additional benefits obtained by creating a healthy and stable network environment are greater than the sum of the additional costs required by the government to supervise We Media and the costs required by the government to deal with We Media violations. In this case, it can be seen from Table 4 that the eigenvalues of the Jacobian matrix corresponding to equilibrium point $E_6(1, 0, 1)$ are negative, then the system has a stable point $(1, 0, 1)$, and its corresponding evolution strategy is (supervision, no violation, influence).

4. Numerical Analysis

In recent years, the rapid development of media has brought about the diversity of information dissemination. At the same time, it also caused the chaos of We Media. For the sustainable and healthy development of the We Media environment, relevant national departments have put forward relevant policies. During the two sessions in 2017, Liu Chun, a member of the National Committee of the Chinese people's Political Consultative Conference (CPPCC), proposed improving the We Media platform. He believed that We Media should bear the corresponding responsibilities while getting dividends. The official account of the state network office banned 9800 WeChat public numbers in 2018 and interviewed Tencent, Zhihu, Baidu, and other We Media platforms to rectify the irregular media practices. In July 2020, the State Network Information Office held a special

deployment meeting for We Media and decided to carry out a three-month special rectification action for We Media across the country. In order to further analyze the strategic relationship between the government, We Media, and the public in the game, this paper uses the valuation method of literature for reference and makes the following valuation on the model parameters involved [31–33].

When the government supervises We Media, the negative impact on the public, the increase of public trust in the government, and the recognition of the government's ability are $P_{11} = 20$; when the government supervises We Media, the additional benefits of creating a healthy and stable network environment are $P_{12} = 10$; when the government supervises We Media, the additional cost is $G_{12} = 4$; when the government supervises We Media's violations, the cost of handling We Media's violations is $G_{13} = 3$; when the government does not regulate the negative impact of We Media on the public, the loss caused by the public's trust in the government and doubts about the government's ability is $W_{11} = 25$; when the government does not regulate We Media, the risk loss caused by the unstable network environment is $W_{12} = 12$; when We Media has a positive impact on the public, the gain caused by the public's increasing attention to We Media is $P_{21} = 20$, and daily operation and maintenance cost of We Media is $G_{21} = 4$. When We Media has a negative impact on the public, the loss caused by the reduction of public attention to We Media is $W_{21} = 25$; when We Media is regulated by the government, it is punished by the government $W_{22} = 22$; the ratio coefficient of risk loss caused by We Media violation to loss caused by the negative impact on the public is $m = 0.5$; the ratio of potential benefit caused by We Media nonviolation to loss caused by the positive impact on the public is $n = 0.5$; the public's knowledge, psychological satisfaction, and other benefits from the positive influence of We Media are $P_{31} = 15$; the public's panic, emotional loss, and other losses caused by the negative influence of We Media are $W_{31} = 20$. At the same time, we assume that the initial willingness of the government, We Media, and the public to participate is $x = y = z = 0.5$.

Through the above analysis and the initial value setting of parameters, the dynamic evolution process of strategy selection of government, We Media, and the public under different initial states is simulated and analyzed by using MATLAB software. According to the simulation results, the initial participation willingness and proportion coefficient of the three participants are discussed.

4.1. Influence of Initial Intention on the Evolution of Game Relationship among Three Participants. Figure 1 is a simulation of the influence of changes in the initial willingness of the government, We Media, and the public on the game

TABLE 3: Eigenvalues of the Jacobian matrix corresponding to each equilibrium point.

Equilibrium point	Characteristic value λ_1	Characteristic value λ_2	Characteristic value λ_3
$E_1 (0, 0, 0)$	$P_{12} - G_{12} + W_{12}$	$-mW_{21} - nP_{21}$	P_{31}
$E_2 (0, 0, 1)$	$P_{12} - G_{12} + W_{12}$	$-W_{21} - P_{21}$	$-P_{31}$
$E_3 (0, 1, 0)$	$P_{12} + W_{12} - G_{13} - G_{12}$	$nP_{21} + mW_{21}$	$-W_{31}$
$E_4 (0, 1, 1)$	$P_{11} + P_{12} + W_{11} + W_{12} - G_{12} - G_{13}$	$W_{21} + P_{21}$	W_{31}
$E_5 (1, 0, 0)$	$G_{12} - P_{12} - W_{12}$	$-mW_{21} - mW_{22} - nP_{21}$	P_{31}
$E_6 (1, 0, 1)$	$G_{12} - W_{12} - P_{12}$	$-W_{21} - W_{22} - P_{21}$	$-P_{31}$
$E_7 (1, 1, 0)$	$G_{12} + G_{13} - P_{12} - W_{12}$	$mW_{21} + mW_{22} + nP_{21}$	$-W_{31}$
$E_8 (1, 1, 1)$	$G_{12} + G_{13} - P_{11} - P_{12} - W_{11} - W_{12}$	$W_{21} + W_{22} + P_{21}$	W_{31}

TABLE 4: Local stability analysis of the equilibrium point.

Equilibrium point	Characteristic value	Characteristic value	Characteristic value	Stability
$E_1 (0, 0, 0)$	+	-	+	Unstable point
$E_2 (0, 0, 1)$	+	-	-	Unstable point
$E_3 (0, 1, 0)$	+	+	-	Unstable point
$E_4 (0, 1, 1)$	+	+	+	Saddle point
$E_5 (1, 0, 0)$	-	-	+	Unstable point
$E_6 (1, 0, 1)$	-	-	-	ESS
$E_7 (1, 1, 0)$	-	+	-	Unstable point
$E_8 (1, 1, 1)$	-	+	+	Unstable point

strategy when other parameter values remain unchanged. Suppose that the initial intention of the government, We Media, and the public is the same, that is $x = y = z$. According to the simulation results in Figure 1, the government’s supervision intention x converges to 1, We Media’s violation intention y converges to 0, the public’s emotion cognition behavior affected intention z converges to 1, and the final equilibrium point tends to $(1, 0, 1)$; with the initial intention x, y, z increasing from 0.4 to 0.5 and then to 0.6, the speed of x, z converging to 1 is accelerated, and the speed of y converging to 0 slows down, and finally, the three tend to a stable point $(1, 0, 1)$. The reason is that when the additional benefit of creating a healthy and stable We Media environment is greater than the sum of the additional cost of government’s supervision of We Media and the cost of government’s supervision of We Media violations, the government’s supervision willingness is higher, which tends to be 1; the misleading harm of We Media violations to the public’s emotional cognitive behavior is extremely serious. The government’s punishment and other comprehensive factors determine that We Media will not choose violation strategies, and the violation intention tends to zero; emotional cognition is an advanced function of the human brain, which is not only a subjective feeling but also an objective physiological reaction. After hot events, the public is vulnerable to We Media information, and the violation intention tends to one.

Figure 2 is a simulation to study the influence of the change of the government’s initial supervision intention x on the game strategy when other parameters remain unchanged. From the simulation results in Figure 2, it can be seen that whether the government’s regulatory will choose any value of 0.3, 0.5, or 0.7, the government’s regulatory will eventually converge to 1; in addition, with the increase of the initial willingness x of government supervision, from 0.3 to 0.5 and

then to 0.7, the speed of x converging to 1 accelerates. With the increase of the government’s willingness to supervise, We Media’s willingness y to violate regulations converges to zero faster. Under this assumption, the final equilibrium point of the tripartite game tends to $(1, 0, 1)$. This is because when the government’s willingness to supervise increases, We Media will be punished more by the government if it violates the rules. In order to reduce the cost of punishment and other factors, We Media will reduce the willingness to violate the rules; that is, the speed of the willingness to violate the rules that tends to zero is accelerated.

Figure 3 is a simulation of the impact of the change of the initial participation intention y of We Media on the game strategy when other parameters remain unchanged. From the simulation results in Figure 3, it can be seen that whether We Media choose any value of 0.3, 0.5, or 0.7, y converges to 0; with the increase of initial intention x of We Media, from 0.3 to 0.5 and then to 0.7, the speed of y converging to 0 slows down. With the increase of We Media’s willingness to break the rules, the government’s willingness y to supervise is converging to 1 faster; the public’s willingness z to be affected by emotional cognition behavior is converging to 1 slower. Under this assumption, the final equilibrium point tends to $(1, 0, 1)$. This is because when We Media’s willingness to violate regulations increases, the government’s willingness to supervise We Media will gain the public’s trust in the government and recognition of the government’s ability, as well as additional benefits from the creation of a healthy and stable network environment when the government regulates “We Media”, which accelerate the speed of the tendency of government supervision willingness x to 1; the increase of We Media’s willingness to violate regulations will cause public panic and emotion. The public wants to receive positive information, so in this case, the public’s willingness to be affected will slow down.

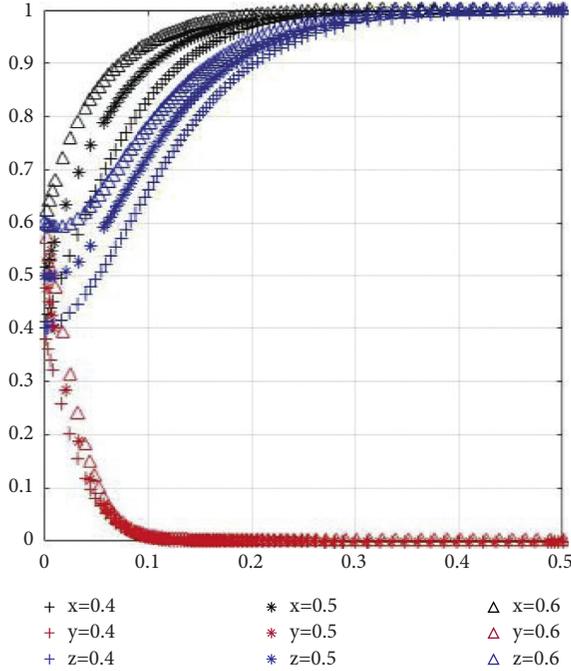


FIGURE 1: The evolution result of the simultaneous change of participation willingness x , y , and z ($x=y=z=0.4 \rightarrow x=y=z=0.5 \rightarrow x=y=z=0.6$).

Figure 4 is a simulation of the impact of the change of public emotion cognitive behavior's willingness z to be affected on the game strategy with other parameters unchanged. As can be seen from the simulation results in Figure 4, no matter whether z chooses any value of 0.3, 0.5, or 0.7 for the willingness to be affected by public emotional cognitive behavior, z converges to 1; with the increase of z , from 0.3 to 0.5 and then to 0.7, the speed of z converging to 1 accelerates. With the increase of the public's willingness to be affected, the government's supervision willingness x converges to 1 faster; We Media's violation willingness converges to 0 faster. Under this assumption, the final equilibrium point tends to $(1, 0, 1)$. This is because the public's emotional cognition behavior is positively affected by We Media, which can obtain knowledge and psychological satisfaction, thus enhancing the trust and attention to We Media, and reducing the willingness of We Media to violate regulations; the public lives in the environment of effective government supervision of We Media, and their emotional cognition is protected by positive information, so as to improve the trust and support to the government and promote the increase of government supervision willingness.

Figure 5 is a simulation of the influence of the initial willingness y to participate in We Media violations and the willingness z of public emotional cognitive behavior to be affected simultaneously on the game strategy when other parameters are unchanged. As can be seen from the simulation results in Figure 5, when y increases from 0.1 to 0.9 and z increases from 0.1 to 0.9, the convergence rate of government supervision willingness x to 1 is accelerated. This is because the violations of We Media are more and more obvious, and the public's emotional cognitive behavior

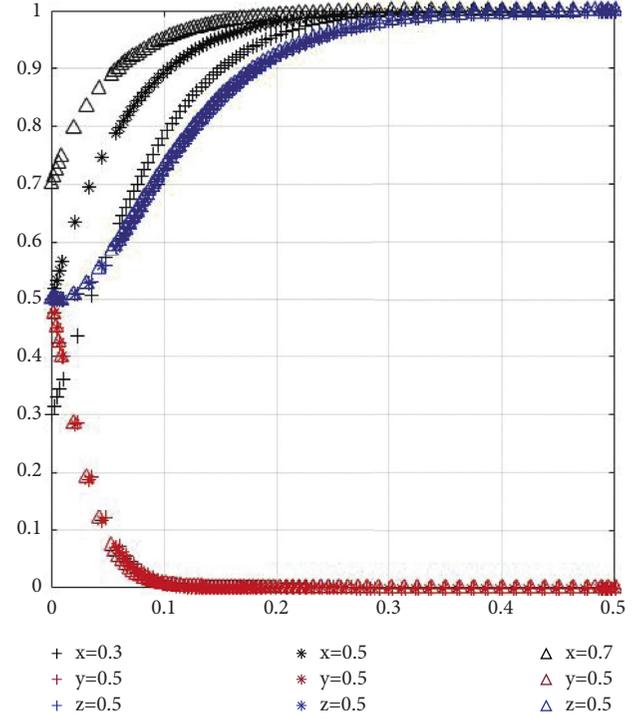


FIGURE 2: The evolution result of the change of government participation willingness x ($x=0.3 \rightarrow x=0.5 \rightarrow x=0.7$).

is easily affected, so the government's choice of supervision strategies is speeding up.

Figure 6 is a simulation of the influence of the government's initial supervision willingness x and the willingness z of public emotional cognitive behavior to be affected simultaneously on the game strategy when other parameters are unchanged. As can be seen from the simulation results in Figure 6, when x increases from 0.1 to 0.9 and z increases from 0.1 to 0.9, the speed of We Media violation willingness z converging to 0 is accelerated. This is because the public's emotional cognitive behavior is easily affected, the government's willingness to implement supervision increases, and We Media will face greater punishment for violations, so We Media chooses to reduce violations strategy.

Figure 7 is a simulation of the impact of the simultaneous changes of the government's initial willingness x to supervise and We Media's initial willingness y to participate in violations on the game strategy with other parameters unchanged. As can be seen from the simulation results in Figure 7, when x increases from 0.1 to 0.9 and y increases from 0.1 to 0.9, the speed of public emotion cognitive behavior's willingness z to be affected converges to 1 slows down. This is because We Media's willingness to violate regulations increases, and the probability of the public receiving negative information increases. Therefore, the public will reduce their willingness z to be affected by emotional cognition and behavior, and require the government to increase its willingness to supervise, so as to reduce the risk of negative impact on the public living in the We Media environment that is not supervised by the government.

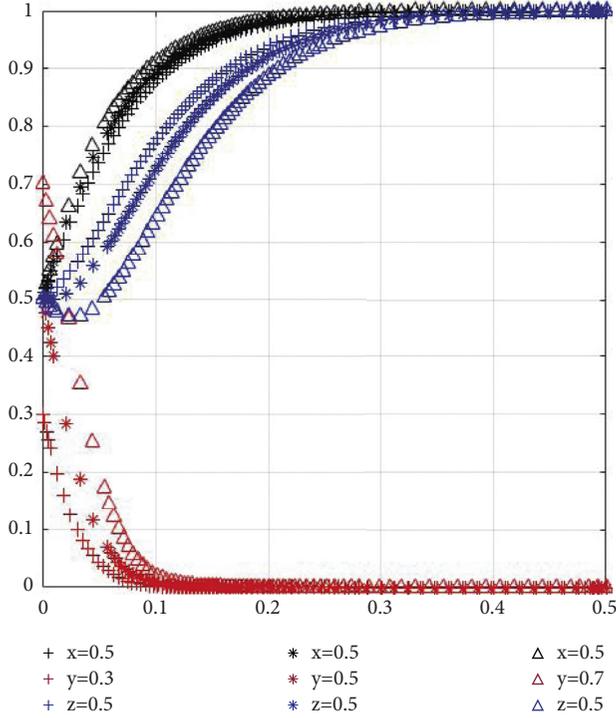


FIGURE 3: The evolution result of the change of We Media participation willingness y ($y=0.3 \rightarrow y=0.5 \rightarrow y=0.7$).

4.2. *Influence of Whether the Government Supervises the Revenue on the Evolution of Game Relationship.* Figure 8 is a simulation of the influence of the change of the government's choice of regulatory strategy income on the game strategy when other parameters remain unchanged. For the convenience of description, let the total government revenue under this strategy be $P1 = P_{11} + P_{12}$. It can be seen from the simulation results in Figure 8 that when P_{11} increases from 10 to 20 and then to 30, and P_{12} increases from 5 to 10 and then to 15, that is, when $P1$ increases from 15 to 30 and then to 45, the speed of x converging to 1 is accelerated. This is because when the government actively supervises We Media, the public will increase their trust in the government and their recognition of the government's ability and promote the increase of the government's total revenue. Therefore, the government chooses the supervision strategy.

Figure 9 is a simulation of the impact of the change of government's choice of no supervision strategy loss on the game strategy with other parameters unchanged. In order to describe the simulation results, the total government loss under this strategy is assumed to be $W1 = W_{11} + W_{12}$. It can be seen from the simulation results in Figure 9 that when W_{11} increases from 15 to 25 and then to 35, and W_{12} increases from 6 to 12 and then to 18, that is, when $W1$ increases from 21 to 37 and then to 53, the speed of x converging to 1 is accelerated. This is because when the government chooses the no supervision strategy, the public will reduce their trust in the government and question the government's ability, which will increase the total loss of the government. In order to reduce losses, the government chooses to supervise We Media.

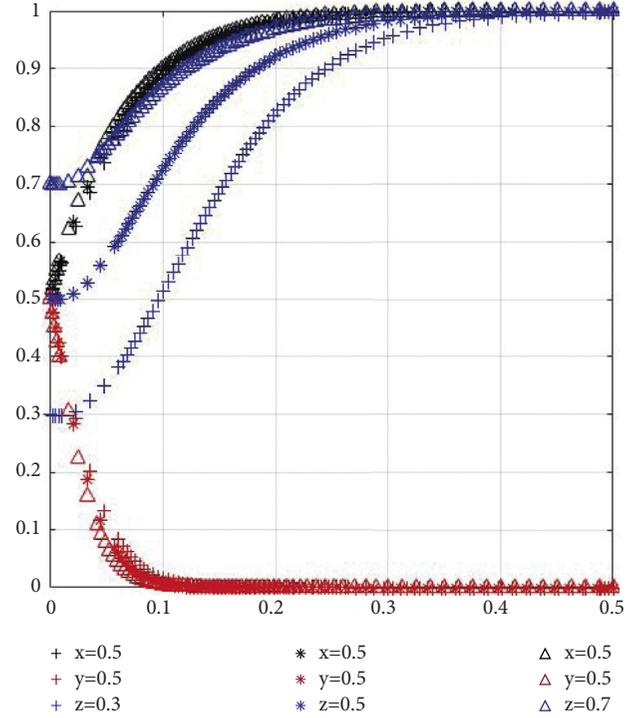


FIGURE 4: The evolution result of the change of public participation willingness z ($z=0.3 \rightarrow z=0.5 \rightarrow z=0.7$).

4.3. *Impact of Whether We Media Releases Information Benefits on the Evolution of Game Relationship.* Figure 10 is a simulation of the impact of the change of We Media's positive information revenue on the game strategy when other parameters are unchanged. For the convenience of description, let the total revenue of the government be $P2 = P_{21} + nP_{21}$, where n is 0.2, 0.5, and 0.8, and P_{21} is 5, 20, and 35, respectively. From the simulation results in Figure 10, it can be seen that when n increases from 0.2 to 0.5 and then to 0.8, and P_{21} increases from 5 to 20 and then to 35, that is, when $P2$ increases from 6 to 30 and then to 63, the speed of We Media violation willingness y converging to 0 is accelerated. This is because when We Media publishes positive information, the public will pay more attention to We Media and other factors, which will promote the total revenue of We Media to increase. Therefore, We Media chooses the no violation strategy.

Figure 11 is a simulation of the impact of the loss of illegal information released by We Media on the game strategy with other parameters unchanged. For the convenience of description, let the total loss of We Media $W2 = W_{21} + W_{22} + mW_{21}$, where m is 0.2, 0.5, and 0.8, respectively. W_{21} is 10, 25, and 40, respectively. W_{22} is 14, 22, and 30, respectively. As can be seen from the simulation results in Figure 11, when m increases from 0.2 to 0.5 and then to 0.8, W_{21} increases from 10 to 25 and then to 40, W_{22} increases from 14 to 22 and then to 30, that is, when $W2$ increases from 26 to 59.5 and then to 102, the rate of We Media violation willingness y converging to 0 is accelerated. This is because when We Media chooses the illegal strategy, the government's punishment to We Media and other factors lead to the increase of the total loss of We Media. In order to reduce losses, We Media chooses not to violate the rules.

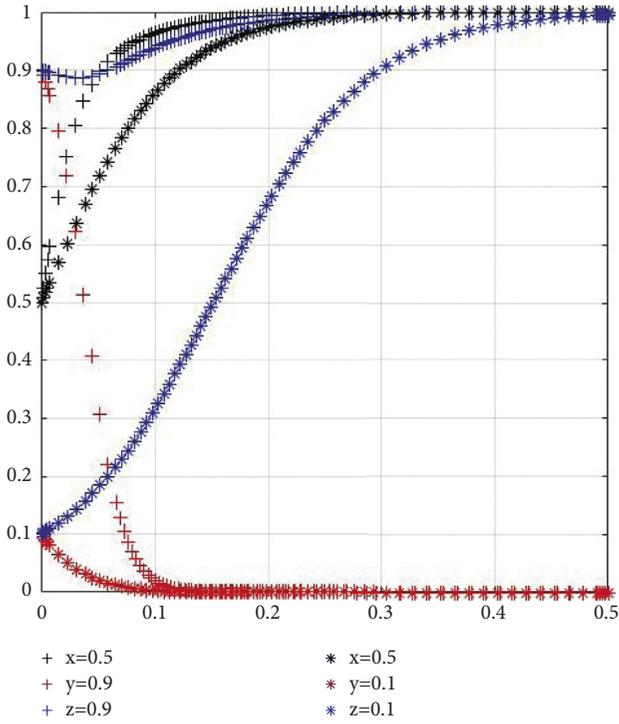


FIGURE 5: Participation willingness x remains unchanged, while y and z change simultaneously ($y = z = 0.1 \rightarrow y = z = 0.9$).

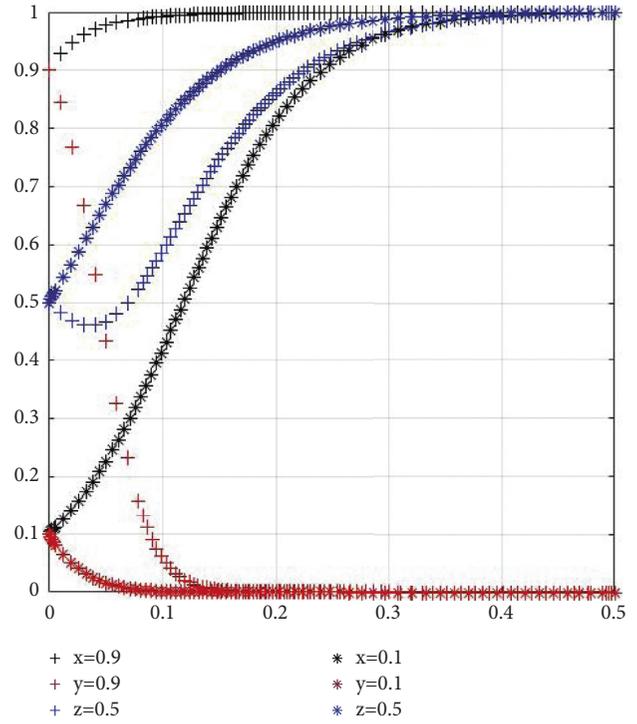


FIGURE 7: Participation willingness z remains unchanged, while x and y change simultaneously ($x = y = 0.1 \rightarrow x = y = 0.9$).

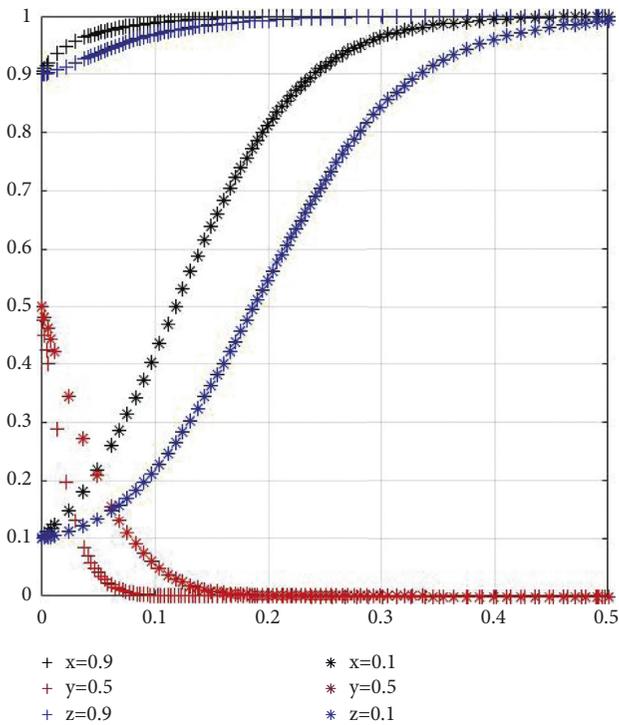


FIGURE 6: Participation willingness y remains unchanged, while x and z change simultaneously ($x = z = 0.1 \rightarrow x = z = 0.9$).

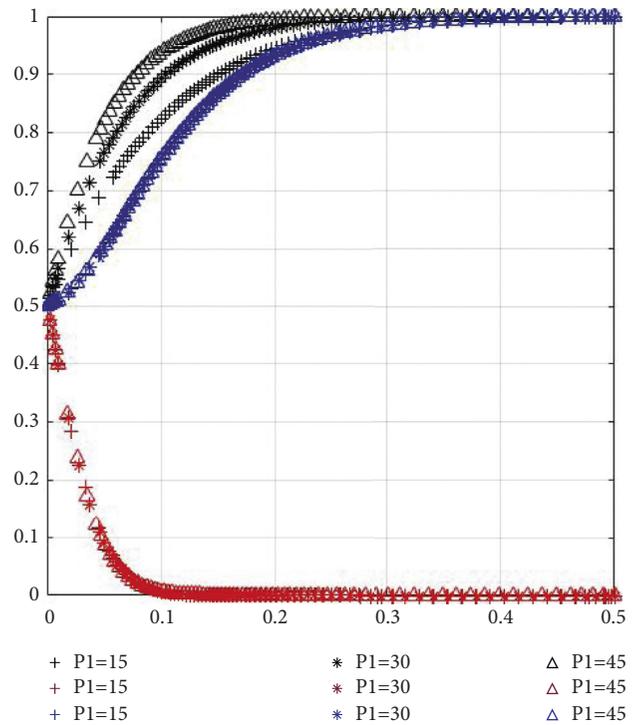


FIGURE 8: The government chooses to supervise the changes in the revenue of the strategy ($P1 = 15 \rightarrow P1 = 30 \rightarrow P1 = 45$).

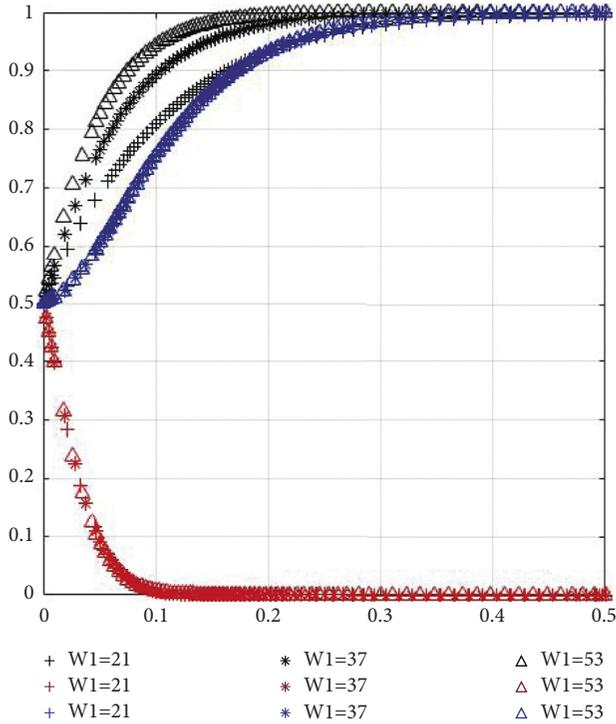


FIGURE 9: The government chooses not to supervise the changes in the loss of the strategy ($W1 = 21 \rightarrow W1 = 37 \rightarrow W1 = 53$).

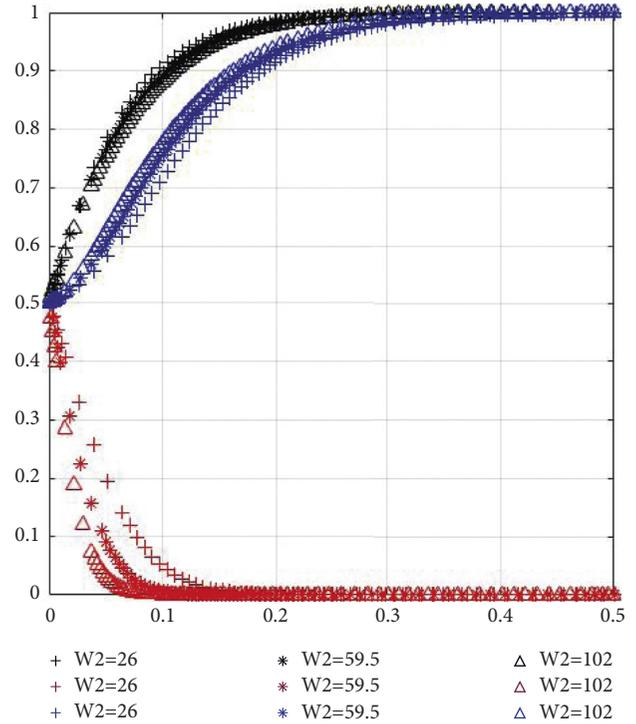


FIGURE 11: Loss of We Media publishing illegal information from small to large ($W2 = 26 \rightarrow W2 = 59.5 \rightarrow W2 = 102$).

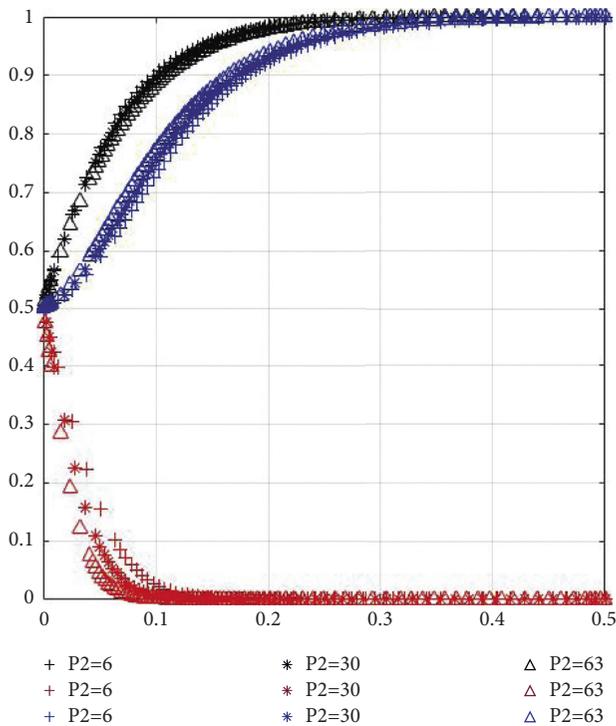


FIGURE 10: The revenue of We Media publishing positive information from small to large ($P2 = 6 \rightarrow P2 = 30 \rightarrow P2 = 63$).

4.4. Whether the Public Receives the Information Influence or Not and Its Influence on the Evolution of Game Relationship.

Figure 12 is a simulation of the impact of the change of the public's emotional cognitive behavior on the game strategy under the condition that other parameters remain unchanged. For the convenience of description, let the total public revenue $P3 = P_{31}$, where P_{31} is 8, 15, and 22, respectively. It can be seen from the simulation results in Figure 12 that when $P3$ increases from 8 to 15 and then to 22, the speed of z converging to 1 is accelerated. This is because when We Media releases positive information, the public emotional cognitive behavior can obtain the satisfaction of knowledge, psychology, and other aspects, and the income increases. Therefore, the public chooses to accept the positive information influence strategy.

Figure 13 is a simulation of the impact of the change of loss on the game strategy under the condition that other parameters remain unchanged. For the convenience of description, we assume that the total public loss under this strategy is $W3 = W_{31}$, where W_{31} is 5, 10, and 15, respectively. As can be seen from the simulation results in Figure 13, when W_{31} increases from 5 to 10 and then to 15, the speed of z converging to 1 slows down. This is because when We Media publishes illegal information, the risk of negative impact on public emotional cognitive behavior increases, which is easy to cause public panic, so the loss increases and the public does not want to be affected.

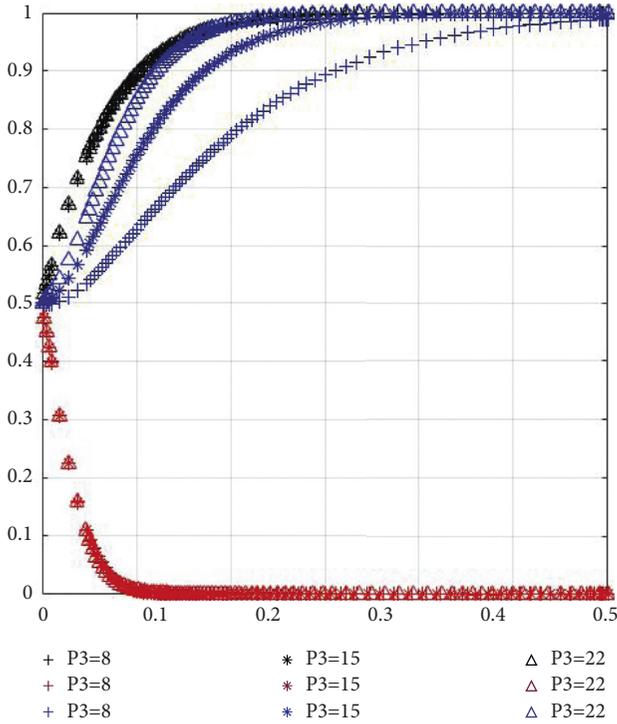


FIGURE 12: Public's revenue affected by positive information released by We Media ($P3 = 8 \rightarrow P3 = 15 \rightarrow P3 = 22$).

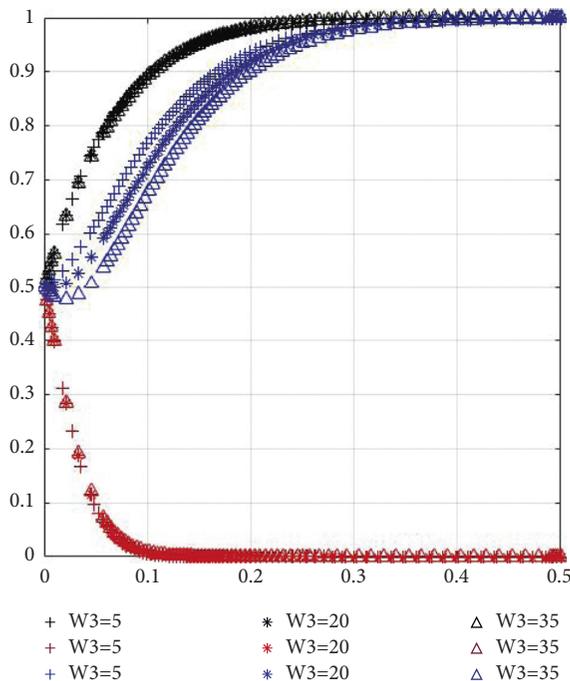


FIGURE 13: Public's loss caused by illegal information released by We Media ($W3 = 5 \rightarrow W3 = 10 \rightarrow W3 = 15$).

5. Conclusions and Suggestions

Based on the limited rationality of the three participants, this paper establishes the game payment matrix of the government, We Media, and the public participation by

using the evolutionary game theory, systematically analyzes the evolution process, verifies the tripartite game relationship with numerical analysis, and draws the following conclusions:

- (1) Government regulation plays an important role in restricting We Media's information release. When the government's willingness to regulate increases, We Media will be punished more if it violates the rules. In order to reduce the cost of punishment and other factors, We Media will reduce the willingness to violate the rules.
- (2) The strategy choice of the three parties is sensitive to the change of relevant single parameter variables, but it will eventually reach the equilibrium state that the government regulates We Media, We Media does not violate the rules, and the public is affected by positive information.
- (3) After the occurrence of social hot events, the public is more willing to get positive information guidance from We Media, which urges the government to choose a strict supervision strategy to effectively reduce the violations of We Media and achieve Pareto optimization.

According to the above conclusions, after the occurrence of social hot issues, the following suggestions are put forward to achieve a comprehensive governance pattern that We Media does not violate the rules and correctly guides the public's emotional cognitive behavior under the constraint of responsibility.

5.1. Explore a New Method of Supervision Integration. From the perspective of control methods, based on the behavior choice of We Media and the public's willingness to be affected, this paper explores new regulatory integration methods. First of all, the government needs to establish and improve the supervision system of the We Media information release to reduce the generation and dissemination of misleading information. For example, with the help of the characteristics of blockchain technology that cannot be tampered with and easy to trace, the information release of each media is recorded and permanently retained, which provides a real evaluation basis for government supervision, so as to improve the government's response-ability, improve the supervision efficiency, and reduce the supervision cost. Secondly, we strengthen the regulatory responsibility of the competent authorities, take the initiative to integrate the supervision of We Media into social hot events, and release timely policies. At the same time, we should open a public supervision hotline to smooth the reporting channels of We Media's untrue information, give full play to the role of public supervision, and curb the chaotic behavior of We Media. In addition, the corresponding regulatory authorities should also set up an incentive mechanism, through the corresponding material or spiritual incentives to promote We Media to positively guide the public emotional cognitive behavior.

5.2. Promote the Standardization of We Media Information Release. From the perspective of motivation, We Media should take the initiative to abide by professional ethics and give full play to its effectiveness to reduce the motivation of illegal behaviors and obtain a higher click-through rate. The authenticity of We Media reports will affect the public's cognition of the development trend of hot events. When facing hot events, We Media should first abide by professional ethics, curb opportunistic behavior, and report events in a true and rigorous manner. We Media should establish a standardized self-regulation mechanism, strengthen the audit and screening of event content reports, realize the two-way linkage with government supervision, and gain the public's trust and attention. We Media establishes an information interaction platform, promotes We Media's information release standard, and improves their business ability and social recognition.

5.3. Give Full Play to the Role of Public Supervision. From the perspective of opportunity, the public, as the information receiver, is not willing to be affected by illegal information. The public can actively integrate into the supervision by improving their information literacy. As people are affected by emotional cognitive behavior, the public needs to improve information identification ability, understand the development trend of hot events through multiple channels, and treat the bad information in We Media rationally. At the same time, the public should enhance legal awareness, actively fulfill social responsibilities, play the role of supervision, and become an effective driving force of government supervision, which can jointly create a harmonious and healthy We Media environment and reduce the opportunities of We Media chaos.

Data Availability

The data used to support the findings of this study are available from the corresponding author upon request.

Conflicts of Interest

The authors declare that they have no conflicts of interest.

Acknowledgments

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Colleges and Universities of Anhui Province under grant gxbj202005.

Supplementary Materials

In the manuscript, through analysis and the initial value setting of parameters, the dynamic evolution process of strategy selection of the government, We Media, and the public under different initial states is simulated and analyzed by using MATLAB software. According to the simulation results, the initial participation willingness and proportion coefficient of the three participants are discussed. In the process of numerical analysis, we use the source code. The source code is attached here. The source code would promote the usage of the approach and also allow others to take better advantage of this research. (*Supplementary Materials*)

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