Postprint: A Study on Response Mechanisms and Risk Typology of Multimedia Network Public Opinion Crises

Authors: Zhou Xin, Li Rui, Huang Wei

Date: 2023-07-26T00:00:00+00:00

Abstract

[Purpose/Significance] Addressing current issues in China's multimedia network public opinion response, this study systematically reviews and proposes mechanisms for integrating and matching government organizational response pathways and constructing response workflow models based on crisis risk classification, aiming to provide reference for management decision-makers to enhance resource integration capabilities and the effectiveness of precise response to online public opinion crises. [Method/Process] The study analyzes the role of dynamic factors in online public opinion crises within big data environments, extracts basic coefficients for online public opinion crisis risk classification, and from the perspective of multimedia dissemination paths of multi-structured online public opinion information, extracts superimposed coefficients for online public opinion crisis risk classification, then sequentially extracts key operational points for online public opinion crisis response under each risk classification. [Results/Conclusion] Based on the ordered combination of crisis action forms of subject structure factors, media effectiveness factors, and object attribute factors, a base level for multimedia online public opinion crises is established at their relational nodes. According to the different impact effects on online public opinion crises following the differentiation of ontological components, superimposed coefficients for multimedia online public opinion crises are established. A risk classification model for multimedia online public opinion crises is constructed, deconstructing online public opinion crisis risk into level coefficients and superimposed coefficients. This enables more accurate description of online public opinion crisis characteristics, facilitates judgment of future development trends of online public opinion crises, and improves the speed and accuracy of matching with previous online public opinion crisis cases.

Full Text

Preamble

Volume 63, Issue 20, October 2019
ChinaXiv Collaborative Journal

Research on Crisis Response Mechanisms and Risk Classification of Multimedia Network Public Opinion

Zhou Xin, Li Rui, Huang Wei
School of Management, Jilin University, Changchun 130022

Abstract

[**Purpose/Significance**] Addressing current challenges in China's multimedia network public opinion response, this study proposes a mechanism for integrating government organizational response pathways and constructing response workflow models based on crisis risk classification. The aim is to provide management decision-makers with references for enhancing resource integration capabilities and improving the precision and effectiveness of network public opinion crisis responses.

[**Method/Process**] This paper analyzes the role of dynamic factors in network public opinion crises within big data environments, extracts foundational coefficients for network public opinion crisis risk classification, and derives superposition coefficients from the perspective of multimedia transmission paths for multi-structured network public opinion information. It then systematically extracts key response points for network public opinion crises under each risk classification.

[**Result/Conclusion**] By establishing ordinal combinations of crisis manifestation patterns among subject structural elements, media effectiveness elements, and object attribute elements, this study constructs a baseline crisis level for multimedia network public opinion crises at their relational nodes. Based on the differential impacts of ontology component differentiation on public opinion crises, an addition coefficient for multimedia network public opinion crises is established. The resulting risk classification model deconstructs public opinion crisis risk into level coefficients and addition coefficients, enabling more accurate characterization of crisis manifestations. This facilitates judgment of future development trends and enhances the speed and precision of matching with historical public opinion crisis cases.

Classification Number: G203
Keywords: multimedia network public opinion; network public opinion crisis; public opinion crisis response; crisis risk classification
DOI: 10.13266/j.issn.0252-3116.2019.20.001

According to the 42nd "Statistical Report on China's Internet Development" released by the China Internet Network Information Center (CNNIC), as of

June 30, 2018, China's internet user population reached 802 million, with a penetration rate of 57.7%. Among them, mobile internet users totaled 788 million, with 98.3% of netizens accessing the internet via mobile phones. The ubiquitous network provides netizens with the most convenient social platforms while simultaneously offering a public space for expressing personal opinions and emotions. As a major internet nation, network public opinion governance has become a critical issue in the internet era.

Meanwhile, China's online government service user base reached 470 million, accounting for 58.6% of all internet users, with 42.1% of netizens obtaining government services through Alipay or WeChat urban service platforms. First, governments have actively introduced policies to promote online government development, breaking down information barriers and building integrated online service platforms to create a service-oriented government that satisfies the people. Second, the centralization of government websites has significantly improved, with the total number of government websites decreasing to 19,868, a 70.1% reduction from the first survey in 2015. Finally, party and government organizations at all levels actively utilize new media such as Weibo, WeChat, and client applications ("two micros and one terminal") to release government information and respond to public concerns, continuously enhancing the level of government information disclosure. Government organizations have prioritized public opinion crisis response and governance in their daily work, establishing foundational conditions and resources for network public opinion crisis response in big data network environments. How to effectively organize crisis response technologies and resources to achieve precise and rapid reaction during public opinion crisis response processes represents a critical demand in current practical work.

With the development of big data network environments and the use of multimedia technologies, the dissemination of network public opinion and the evolution of public opinion crises have acquired new characteristics, posing new requirements and challenges for government organizational perspectives on network public opinion crisis response. Relevant prior research indicates that the attributes of public opinion crisis events and their domains significantly impact government response efforts. Studies have shown that Chinese government responses to online events vary by issue [1], and that public opinion in different regions differs in terms of event quantity, type, initial exposure media, and governance effectiveness [2]. Therefore, research on risk classification of network public opinion crises provides substantial support for improving government response effectiveness and control capabilities.

Regarding the hierarchical management of network public opinion, scholars have conducted systematic research. Li Wenjie et al. comprehensively evaluated network public opinion information from perspectives of thematic complexity, synchronous interaction, emotional intensity, and overall controllability [3]. Liu Jian et al. attributed the influencing factors of information dissemination effects in Weibo public opinion to Weibo users, communication channels, communica-

tion environment, and content, enabling evaluative analysis [4]. Chen Peiyou et al. established an indicator system from four dimensions—event destructiveness, media influence, netizen impact, and government guidance/control—to provide early warning for social network public opinion risks [5]. Wang Ning et al. constructed a measurement indicator system for public opinion events using Sina Micro Index, Baidu Index, and Toutiao Index to achieve unified prediction and classification [6]. Existing research on public opinion risk evaluation standards emphasizes different research objectives, sacrificing some comprehensiveness and systematicity of evaluation results, while leaving room for improvement in dimensional analysis and indicator refinement. Moreover, current research treats all analytical dimensions as parallel and equivalent, warranting further investigation into the complex relationships among various influencing factors or forces.

In network public opinion crisis response research, studies have noted that media plays a significant role in shaping public perception of government crisis management capabilities [7]. Scholars have also pointed out that government intervention timing, level, information release, and accountability all affect intervention effectiveness [8]. Higher-level government intervention correlates with greater quantity and quality of administrative resources, stronger information control capabilities, and enhanced emergency management capacity, indirectly influencing specific implementation behaviors [9]. Timely, accurate, comprehensive, and authoritative government information release represents the key to government event guidance [10]. The correlation between new media forms like Weibo and government response effectiveness has also been demonstrated [11].

Overall, current domestic research on government network public opinion crisis response exhibits several limitations: (1) Limited adaptation of research progress to environmental changes, with differential manifestations brought by new environments and technologies requiring further investigation; (2) Relatively generalized research objects, with most studies focusing on macro-level strategy research rather than micro-level, department-specific research, leaving room for improved operability; (3) Methodologically, most research relies on experience and qualitative description, with quantitative research aspects such as parameter settings requiring further development.

This research team has conducted a series of studies on public opinion dissemination. Building upon prior research on big data environment network public opinion dissemination elements and operational mechanisms, this paper further examines the influence of these elements in multimedia network public opinion evolution and crisis formation. By analyzing the role of network public opinion crisis dynamic factors in big data environments, this study extracts foundational coefficients for network public opinion crisis risk classification and derives superposition coefficients from the perspective of multimedia transmission paths for multi-structured network public opinion information. This forms a flexible risk classification system that can reflect the morphological characteristics of multimedia network public opinion crises, and systematically extracts key response

points for each risk classification. Based on this foundation, the paper proposes an integration mechanism for government organizational response pathways and constructs response workflow models grounded in multimedia network public opinion crisis risk classification, providing references for management decision-makers to enhance resource integration capabilities and achieve precise, effective crisis response.

2. Evolutionary Dynamics of Big Data Multimedia Network Public Opinion Crisis

Multimedia network public opinion refers to the aggregation of diverse expressions of viewpoints and attitudes by the public, government, and traditional media (the subjects) toward public opinion objects, processed and disseminated through multimedia channels within big data network spaces [2]. Synthesizing domestic and international scholars' definitions of network public opinion crises, this study defines them as phenomena in cyberspace where audience viewpoints dominate the development trend of public opinion and cause certain negative impacts. Multimedia network public opinion crises exhibit clearer characteristics: first, the massive volume of information presents a multiplicative trend through multimedia dissemination; second, information diversity manifests through multimedia modalities; third, the high growth rate of public opinion information accelerates through multimedia transmission; and fourth, the low value density effect of information intensifies after multimedia dissemination.

From communication theory perspectives, this study analyzes the dynamic factors influencing multimedia network public opinion crisis evolution across four dimensions: public opinion subject, object, ontology, and media—specifically, object attribute elements, media effectiveness elements, subject structural elements, and ontology component elements, as shown in Figure 1 [Figure 1: see original paper].

2.1 Object Attribute Elements

Network public opinion objects are the stimuli and targets of network public opinion, directly triggering its occurrence and dissemination. In big data environments, multimedia network public opinion objects are affected by information volume and fragmentation, lowering the threshold for triggering public opinion subjects. Therefore, their inherent, unchangeable attribute characteristics play an irreversible, fundamentally deterministic role in triggering and evolving network public opinion crises.

2.1.1 Responsibility Attributes

The responsibility attributes of multimedia network public opinion crisis objects refer to the direct perpetrators of the object, including organizational direct responsibility, organizational indirect responsibility, and individual responsibility. Organizational direct responsibility points directly to government departments and officials, exhibiting high sensitivity and strong negative emotional polar-

ization among public opinion audiences, with rapid short-term outbreak and development. Organizational indirect responsibility objects typically involve livelihood-related public opinion events, where viewpoints easily shift toward government organizational work efficiency and policy practicality. Individual responsibility objects arise from improper words or actions of natural persons, creating mutual comparisons and connections that trigger public opinion fusion, deriving compound public opinion crises or series of crises with wide impact and long duration.

2.1.2 Duration Attributes

The duration attributes of multimedia network public opinion crisis objects manifest both as the object's own lifecycle and its comparative continuity with other objects. When an object's time span is extremely short, such public opinion events are typically sudden accidents with strong stimulative effects that easily trigger crises but have clear rights/responsibilities and explicit viewpoints. When an object's time span is longer, its stimulation of public opinion audiences has temporal continuity, continuously triggering new discussions as the object changes, making such crises highly uncontrollable.

2.1.3 Domain Attributes

The domain attributes of multimedia network public opinion crisis objects represent their essential characteristics, with fixed sensitivity values and corresponding high-risk audiences. Single domain attributes include safety incidents, public health incidents, and accident disaster incidents. Objects not falling into these categories are classified as other events, representing compound attributes where multiple domain attributes may combine to form compound public opinion events, with sensitivity increasing proportionally to the degree of compounding. When serial crises occur within a domain attribute, the risk coefficient for that domain attribute exhibits 阶段性大幅增高 (periodic substantial increases).

2.2 Media Effectiveness Elements

Communication media, also called media channels, encompass all forms and means of communication between communicators. Channels or means refer to the platforms through which information travels from communicators to recipients. Multimedia network public opinion crisis media channels exhibit diversification, covering PCs, smartphones, wearable electronic devices, and other carriers.

2.2.1 Guiding Effectiveness

In big data environments, the guiding effectiveness of multimedia network public opinion crisis media primarily refers to the guiding role of media-released viewpoints and evaluative tendencies on public opinion audience sentiments during crisis evolution—i.e., audience trust in and dependence on media. Media scale, authority, and discourse power proportion all influence guiding effectiveness. Based on publishers, media can be categorized as government official media, online news media, and self-media. When self-media guiding effectiveness exceeds

both government official media and online news media, the crisis risk level is higher and development trends more difficult to control.

2.2.2 Dissemination Effectiveness

In big data environments, media dissemination effectiveness in multimedia network public opinion crises represents the comprehensive measure of frequency and duration of reporting, evaluation, and forwarding by various media types. Network characteristics of big data environments have strengthened media roles in crisis evolution; higher dissemination effectiveness leads to faster growth and flow of public opinion information, increasing audience attention and crisis heat. The quantitative growth rate of dissemination effectiveness indicators within a given timeframe affects the polarization degree of crisis subjects and topic evolution speed, thereby driving crisis progression. Dynamic changes in dissemination effectiveness constitute important factors for measuring big data multimedia network public opinion crisis levels.

2.3 Subject Structural Elements

Network public opinion subjects are entities expressing cognition, emotion, attitude, and opinions in cyberspace. Therefore, subject structure plays a decisive role in multimedia network public opinion crisis evolution. The viewpoint polarization structure, participation willingness structure, and emotional tendency structure of subjects reflect their attitudes and demands, representing the most intuitive manifestation of network public opinion crises.

2.3.1 Viewpoint Polarization Structure

The viewpoint polarization structure in multimedia network public opinion crises refers to the aggregation of subjects with similar viewpoints under the influence of authoritative opinion leaders when multiple viewpoints exist among subjects. Higher polarization degree leads to lower individual rational thinking and judgment capabilities, with emotions and attitudes prone to extremism. Blind following and polarized viewpoint clusters expand subject influence. When a viewpoint's subject cluster constitutes a higher proportion of the current crisis's core viewpoint cluster, the risk of multimedia network public opinion crisis viewpoint polarization structure is considered higher. Crises under this structure evolve rapidly with high deterioration risk.

2.3.2 Participation Willingness Structure

The participation willingness structure reflects audience activity in commenting and forwarding during public opinion diffusion stages, as well as attention allocation to individual public opinion events. This element serves as the driving force for crisis evolution. Participation willingness is a dimension of public opinion subjects' information behavior with strong individual characteristics. Analyzing individual subjects' historical information behavior can reveal their participation willingness fluctuation thresholds and preferences, enabling analysis of group characteristics. The rate of change of these quantitative indicators over time reflects crisis evolution trends.

2.3.3 Emotional Tendency Structure

The emotional tendency structure of network public opinion subjects constitutes the primary factor influencing crisis trajectories. Subject emotions toward crises can be divided into three basic forms: positive, neutral, and negative. The distribution proportion and intensity of these emotional tendencies during crisis evolution constitute the emotional tendency structure of multimedia network public opinion crises. Subject emotional tendencies are guided by government organizations, mainstream news media, and opinion leaders, while under the influence of heavily forwarded and discussed mainstream viewpoint polarization, individual will weakens, judgment and critical thinking abilities decline, and imitation/following of group viewpoints emerges. Additionally, changes in crisis objects further stimulate emotional tendency structure shifts; as crises evolve, subject attention may transfer from the object itself to the event resolution process, deriving new viewpoints or related public opinion events.

2.4 Ontology Component Elements

Network public opinion ontology refers to the specific content of cognition, emotion, attitude, and opinions expressed by network public opinion subjects regarding certain issues, phenomena, or events in cyberspace. In big data environments, multimedia network public opinion ontology manifests as text, images, video, image-text combinations, video-text combinations, and three-way combinations of images, video, and text. Multimedia technology makes public opinion information easier to understand and disseminate, accelerating viewpoint polarization processes while expanding crisis impact scope.

2.4.1 Acceptance Willingness Component

The acceptance willingness component refers to audience preferences for different information presentation forms and priority selection during information retrieval. Video simultaneously stimulates audiences with audio and visual inputs, requiring less time for information acquisition. The rise of video platforms also leads increasing audiences to prioritize video information. Image information, also concrete, ranks slightly below video in preference but is easier to save and publish, making its acceptance willingness considerable. Only text information is abstract, requiring more difficult information acquisition and reprocessing. However, during crisis dissemination, text information carries subjects' viewpoints and emotional tendencies with extremely clear directionality, making it preferred by core public opinion subjects.

2.4.2 Comprehension Effect Component

The comprehension effect component refers to audiences' ability to accept different presentation forms of public opinion information—i.e., information screening and absorption during browsing. Video, combining audio and visual elements, can maximally present original details while providing greater information selection space, allowing audiences to understand and form evaluations based on personal preferences and knowledge. Text information has clearer internal logic, conveying established viewpoints while describing events, representing processed

information with higher and clearer intrinsic value density, enabling audiences to more directly understand core content during reading. Image information, while presenting static details, cannot guarantee information completeness, easily leading to incomplete interpretation or over-interpretation, thus hindering audience comprehension.

2.4.3 Memory Effect Component

The memory effect component refers to the duration of sensory cognition of different information presentation forms and the ability to reproduce information during use and reprocessing. Audience memory for text information is abstract memory, requiring more subjective effort within unit time to form effective memory. Given the need for longer comprehension time and the quantitative growth of information in big data network environments, text information is disadvantaged in achieving memory effects. Video and image information can achieve effective memory through "photographic" concrete memory, being more easily understood and remembered within unit time. Video, in particular, demonstrates advantages through multi-channel information transmission, presenting richer and more detailed scene information to help audiences complete detailed memory formation.

3. Multimedia Network Public Opinion Crisis Response Process and Mechanisms

Multimedia network public opinion crisis response refers to a series of actions by government functional departments in big data and multimedia network environments when facing emergencies that affect organizational operations, survival, and development, causing damage to organizational image and triggering negative public opinion impacts. These actions involve mobilizing resources and technical means to guide public opinion and eliminate crises. Previous research has primarily discussed response strategies from perspectives of social trust, public participation, government transparency, information sharing, functional settings, and technological innovation. While recognizing these as effective response pathways, this study argues that comprehensive crisis response system construction cannot fully meet the requirements for precise and rapid response to complex and volatile multimedia network public opinion crises. Therefore, based on multimedia network public opinion crisis risk classification, this study extracts crisis response key points for different risk classifications, matches them with response pathways, and ultimately constructs a multimedia network public opinion crisis response model.

3.1 Multimedia Network Public Opinion Crisis Response Process Analysis

The mechanism for constructing multimedia network public opinion crisis response models represents the integrated mechanism of the entire workflow, as shown in Figure 2 [Figure 2: see original paper].

First, optimized crisis response key points and response pathway matching coefficients must be mobilized to screen corresponding response pathways with higher matching coefficients based on crisis response key points. Starting from decomposed crisis response key points, this process analyzes urgent problems in current crises and, following the associations between these problems and government response pathways, constructs an integrated combination of all potentially effective government response pathways, thereby building a foundational government public opinion crisis response model. This model only displays effective response pathways without planning application strategies for each pathway.

Second, significant gaps exist between the foundational model and specific crisis scenarios during practical application. To achieve precise guidance and rapid reaction, the foundational model requires further optimization. This necessitates mobilizing cases matched during the deconstruction of multimedia network public opinion crisis risk classifications, analyzing and evaluating the evolution processes and actual effectiveness of response strategies in these cases, and using these as decision-making bases to effectively embed response strategies into the foundational model, adjusting application weights and timing for each response pathway to achieve model optimization.

Third, multimedia network public opinion crisis risk classification requires deconstruction, mobilizing diagnostic results of crisis key nodes obtained during deconstruction. Based on screening results of crisis dynamic factors, response pathways with targeted effects are mobilized for key nodes driving crisis evolution, supplementing and further refining the foundational model by adjusting response pathway application weights to priority levels for rapid reaction. This constructs the multimedia network public opinion crisis application model—a precise, rapid, and highly operable workflow and strategy driven by prior knowledge from extensive historical data analysis, integrating resources of specific government organizations, and addressing concrete crisis response needs.

3.2 Multimedia Network Public Opinion Crisis Response Pathway Matching Mechanism

The pathway matching mechanism serves as the 先导机理 (preceding mechanism) in the workflow, expressing the matching relationships between government response pathways and multimedia network public opinion crisis response key points, as shown in Figure 3 [Figure 3: see original paper].

First, multimedia network public opinion crisis response pathways available to the government must be 梳理 (sorted out). Existing research has established relatively stable response pathways for government public event and crisis response/control, including social trust, public participation, government transparency, information sharing, functional settings, and technological innovation. However, government construction levels and emphases vary across administrative levels and regions. To develop effective response strategy models, government resources must be inventoried. Through literature review and investiga-

tion of government functional department workflows, this study completes the 梳理 (sorting) of government response pathways. This process clarifies mobilizable resources and effective means available during multimedia network public opinion crisis response, preparing for subsequent effectiveness evaluation and matching.

Second, from the analytical perspective of multimedia network public opinion crisis risk classification response prior knowledge points, government crisis response pathway effectiveness is decomposed into several dimensions during evaluation, constructing an effectiveness evaluation indicator system to evaluate each response pathway individually. Grounded in response pathways controlled by specific government organizations at current stages, effective evaluation algorithm models are used for quantitative analysis of government response pathway effectiveness. Evaluation results reflect the abundance of technologies, platforms, and other resources, as well as organizational and policy construction levels, during multimedia network public opinion crisis response processes.

Finally, based on historical data analysis, associations between government response pathways and crisis risk classification response prior knowledge points are established. This analysis identifies which government crisis response pathways can effectively guide prior knowledge points, using response pathway matching coefficients to quantify their effectiveness weights. The resulting one-to-one matching coefficient table between crisis risk classification response prior knowledge points and response pathways serves as a crucial decision-making basis for constructing multimedia network public opinion crisis response models.

3.3 Multimedia Network Public Opinion Crisis Response Key Points Extraction Mechanism

During multimedia network public opinion crisis response, rapidly anchoring response strategy key points and investing resources and time into workflows that can quickly control and purify crises forms the foundation for achieving precise and effective response, as shown in Figure 4 [Figure 4: see original paper].

First, response prior knowledge points for each crisis risk classification must be derived through historical data analysis. During dynamic factor analysis and evaluation, expert interviews, questionnaires, and other methods are combined with expert knowledge and experience to extract response prior knowledge points during crisis evolution and development, based on multimedia network public opinion crisis risk classification. Taking the relatively severe Red-type crisis as an example: Red I crisis response requires improving government information disclosure quality, continuously maintaining public trust, and employing technical means to purify rumors and misinformation. Red II crisis response requires activating proactive response mechanisms to disperse public participation attention. Red III crisis response requires activating real-time tracking response mechanisms. Red IV crisis response requires activating multi-directional anal-

ysis emergency response mechanisms to enhance government information disclosure levels. Evidently, even among similarly critical public opinion crises, response key points exhibit different distribution characteristics due to varying dynamic factor roles and effectiveness during formation.

Second, after obtaining crisis risk classification response prior knowledge points, crisis category attribute characteristics with statistical significance become known. To further anchor individual crisis characteristics, response key points must be extracted by analyzing matched public opinion crisis cases. Starting from case development and response processes, key factor response points are analyzed based on quantitative results of dynamic factor indicator decomposition. These serve as optimization conditions for detailed supplementation and priority adjustment of crisis risk classification response prior knowledge points, ultimately extracting decision-supporting multimedia network public opinion crisis response key points.

3.4 Multimedia Network Public Opinion Crisis Risk Classification Deconstruction Mechanism

During multimedia network public opinion crisis response, risk classification evaluation and deconstruction provide decision support, outputting three analytical results under this mechanism, as shown in Figure 5 [Figure 5: see original paper].

First, multimedia network public opinion crisis features are extracted, and influencing elements and their relationships are deconstructed. Based on existing theories and prior knowledge, crisis situation prediction is decomposed into low-dimensional measurable indicator data. Data relationships are integrated, core information obtained through semantic analysis, and crisis dynamic factors evaluated through probability operations and corresponding evaluation algorithms combined with expert assessment. This yields multimedia network public opinion crisis level baseline coefficients and addition coefficients. As previously discussed, crises can be risk-classified, and through periodic data extraction, crisis development trend information can be obtained for early warning of crisis risk classifications.

Second, during multimedia network public opinion crisis dynamic factor evaluation, based on massive information in big data network environments, after collection and processing, indicators are matched one by one according to decomposed crisis dynamic factor indicators. Through prior knowledge and case analysis, preliminary classifications form case sub-databases across different dimensions, including outbreak-phase cases, rapid diffusion-phase cases, and decline-phase cases in the dissemination dimension; and public safety cases, food safety cases, and emergency incident cases in the event attribute dimension. These are matched with crisis level baseline coefficients and addition coefficients to obtain referential and directional cases.

Finally, the multimedia network public opinion crisis level evaluation process

involves bottom-up aggregation from indicators to derive crisis occurrence probability. This evaluation process has reverse mathematical significance in its algorithmic flow. Crisis risk classification early warning is a dynamic trend analysis process along the time dimension. When the current risk classification of multimedia network public opinion crisis is obtained at a static time point, reverse top-down operations can analyze the probability distribution of key dynamic factors causing the crisis. This deconstruction analysis can diagnose key indicators of crisis dynamic factors, providing more precise disposal bases for multimedia network public opinion crisis response and optimizing response models.

4. Risk Classification and Representation Analysis of Big Data Multimedia Network Public Opinion Crisis

4.1 Multimedia Network Public Opinion Crisis Risk Classification Model

Classification involves studying different states of the same phenomenon and their associated circumstances. During multimedia network public opinion crisis evolution, different manifestation states of dynamic factors combine to produce different external representations with varying risk state trends. Therefore, this study posits that multimedia network public opinion crisis risk classification further subdivides the severity level of network public opinion crises based on level evaluation, classifying and analyzing the representations and associated risk states of public opinion events within current crisis levels.

Based on in-depth analysis of multimedia network public opinion crisis evolutionary dynamic factors, this study finds that subject structural elements, media effectiveness elements, and object attribute elements determine crisis evolution paths and trends through mutual interaction during crisis formation and evolution. Ontology component elements affect dissemination efficiency and impact degree without altering crisis evolution processes. Accordingly, this study establishes a multimedia network public opinion crisis risk classification model, shown in Figure 6 [Figure 6: see original paper].

Subject structural elements, media effectiveness elements, and object attribute elements can each be decomposed into qualitative and quantitative indicators, allowing each element to be classified as high-risk, medium-risk, or low-risk crisis manifestation patterns according to their effectiveness in crisis evolution and impact on crisis trends. Dynamic factors influence each other under different crisis manifestation patterns and output comprehensive results. Based on ordinal combinations of dynamic factor crisis manifestation patterns, a baseline crisis level for multimedia network public opinion crises is established at their relational nodes.

Information presentation forms under ontology component elements differentiate in terms of audience acceptance willingness, comprehension effect, and

memory effect through single-component and composite-component structures. According to the differential impacts of ontology component differentiation on public opinion crises, multimedia network public opinion crisis addition coefficients are established. The final representation is:

Multimedia Network Public Opinion Crisis Risk Classification = Baseline Level + Addition Coefficient

This representation more accurately describes crisis manifestations, facilitates judgment of future development trends, accelerates identification of key nodes in crisis formation and evolution, and improves the speed and precision of matching with historical cases, thereby providing decision-making bases for government crisis response.

4.2 Multimedia Network Public Opinion Crisis Risk Baseline Level and Representation Analysis

In safety risk level and early warning research, risks are divided into four levels—"Red, Orange, Yellow, Blue"—to distinguish severity. This visual classification method has been introduced into common network public opinion crisis level classifications, where red indicates extremely major and urgent crises, orange indicates relatively major and high-risk crises, yellow indicates moderately risky crises, and blue indicates relatively calm and safe crises. For clarity, this study classifies the 12 multimedia network public opinion crisis baseline levels formed by dynamic factor manifestation pattern combinations into four categories, as shown in Table 1 .

4.2.1 Red Risk Classification and Representation Analysis

Red I crisis represents the most severe risk classification, with extremely wide impact scope and strong negative public opinion pressure. Its management requires activating high-level emergency response mechanisms, improving government information disclosure quality, continuously maintaining public trust, and employing technical means to purify rumors and misinformation.

Red II crisis is a relatively severe classification, with wide impact scope, high subject participation, and sensitive objects. Management requires activating proactive response mechanisms, dispersing public participation attention, continuously maintaining public trust, and promoting accelerated government information sharing.

Red III crisis is a relatively severe classification, with high public participation and wide impact scope, where objects generate high discussion volume. Management requires activating real-time tracking response mechanisms, actively maintaining public trust, accelerating government information sharing, and clarifying government functional settings.

Red IV crisis is a relatively severe classification, with high object exposure and extremely wide impact scope, and high subject participation enthusiasm. Management requires activating multi-directional analysis emergency response mech-

anisms, enhancing government information disclosure levels, promoting information sharing, and effectively leveraging government functional settings.

4.2.2 Orange Risk Classification and Representation Analysis

Orange I crisis is the second-most severe classification, with relatively high subject participation and medium object exposure/dissemism. Management requires activating hierarchical management response mechanisms, effectively leveraging government functional settings, maintaining trust between government and public, and accelerating information sharing processes.

Orange II crisis is the second-most severe classification, with highly sensitive objects and moderate subject participation and media exposure. Management requires activating decision quality response mechanisms, effectively leveraging government functional settings, promoting information sharing, and actively maintaining social trust.

Orange III crisis is the second-most severe classification, with relatively wide impact scope and moderate subject participation enthusiasm and object public emotion arousal value. Management requires activating information sharing response mechanisms, effectively promoting government information sharing, maintaining social trust, and leveraging government functional settings.

4.2.3 Yellow Risk Classification and Representation Analysis

Yellow I crisis is the third-most severe classification, with relatively high subject participation and moderate object exposure. Management requires activating fixed-point tracking response mechanisms, focusing on opinion leader trends while effectively maintaining social trust and promoting information sharing.

Yellow II crisis is the third-most severe classification, with highly sensitive objects and moderate subject participation and media exposure. Management requires activating diffusion suppression response mechanisms, taking targeted measures for specific public opinion events while effectively maintaining social trust and government functional settings.

Yellow III crisis is the third-most severe classification, with relatively wide impact scope and moderate subject participation enthusiasm and object public emotion arousal value. Management requires activating guidance management response mechanisms, focusing on major dissemination media while maintaining social trust and guiding public participation channels.

4.2.4 Blue Risk Classification and Representation Analysis

Blue I crisis is the fourth-most severe classification, requiring activating targeted early warning response mechanisms, focusing on high-level elements while effectively leveraging government functional settings and promoting information sharing.

Blue II crisis is the fourth-most severe classification, requiring activating dynamic monitoring response mechanisms, monitoring public opinion evolution trends according to specific element developments while effectively promoting information sharing and guiding public participation.

4.3 Multimedia Network Public Opinion Crisis Addition Coefficient and Representation Analysis

Multimedia network public opinion information forms crisis ontology components through different presentation formats, generating different addition effects through dissemination effectiveness differences. Through historical data analysis of multimedia network public opinion crisis addition systems, crisis response prior knowledge points can be extracted.

Extensive research by domestic and international scholars on multimedia technology effects in information dissemination indicates that "media stimuli directly cause sensory channel reactions—for example, sound and images simultaneously convey external real-world information. This response is purely an unconscious natural reaction, whereas text stimuli require activating the most abstract organs, requiring concentrated effort and controlled processing to accurately receive information" [12]. Synthesizing such research yields comparative results on the strength relationships of different multimedia presentation combinations within ontology component elements.

Comparison results for acceptance willingness components show: video + text multimedia presentation achieves the best acceptance willingness, followed by image + text presentation, with video alone slightly lower than image + video + text combination, then image + text presentation, with image-only public opinion information showing poorer acceptance willingness and text-only the poorest.

Comparison results for comprehension effect components show: video + text multimedia presentation achieves the best comprehension effect, followed by video-only, then image + text multimedia combination, with text slightly worse than image + text combination, image + video + text multimedia combination showing poorer comprehension, and image-only the poorest.

Comparison results for memory effect components show: video + text multimedia presentation achieves the best memory effect, with image-only memory effect equal to image + text combination, video-only memory effect similar to image + video + text multimedia combination, and text-only showing the poorest memory effect.

Based on these comparative relationships, crisis addition coefficients are derived, as shown in Table 2 .

(1) α Addition Coefficient Model and Representation Analysis

The α addition coefficient corresponds to ontology structures including video and text, characterized by high audience information adoption willingness, high comprehension degree, and good memory effect. Its addition effect, compared to other ontology structures, more easily leads to short-term, large-scale dissemination and promotes subject viewpoint polarization. Therefore, responding to crises with this addition coefficient requires rapid and accurate multimedia public opinion information semantic recognition and effective technical means for

discovery, early warning, and control during information dissemination.

(2) β Addition Coefficient Model and Representation Analysis
The β addition coefficient corresponds to ontology structures containing only video or only images and text, characterized by barrier-free information adoption, comprehension through environmental or auxiliary information, and average memory effect. Its addition effect produces moderate dissemination and easily generates viewpoint derivation. Therefore, responding to crises with the β addition coefficient relies more on government public opinion response system construction oriented toward public opinion monitoring, enabling real-time crisis prediction through technical algorithms while providing interaction channels between government and netizens for network space guidance and purification.

(3) γ Addition Coefficient Model and Representation Analysis
The γ addition coefficient corresponds to ontology structures including images, video, and text, or only images or only text, characterized by low information adoption willingness, information redundancy, information asymmetry issues, and average memory effect. Its addition effect somewhat reduces public opinion dissemination effectiveness, making crises easily dissipated under other public opinion impacts but prone to misinterpretation, spawning rumors or negative emotional tendencies. Therefore, crises with the γ addition coefficient require government information disclosure mechanisms and timely release of authoritative information to curb rumor generation and dissemination.

4.4 Case Analysis

To verify and analyze the multimedia classification model, this study selects the "Textbook Deadbeat" public opinion event as a case study. With extensive existing research on this event, basic data was crawled and comprehensive public opinion report data was analyzed to derive classification analysis results.

Using keywords such as "Textbook Deadbeat," "Serious Mr. Zhao," and "Huang Shufen," from November 22, 2017 to December 11, 2017, 2,883 original posts and 33,347 comments were collected from WeChat public accounts, Toutiao, selected news websites, and Weibo using Octopus web scraping software and manual collection, involving 1,935 posting users.

(1) Subject Structure Analysis
The event featured four viewpoints: condemnation of Huang Shufen and her daughter (45% of total, mainstream viewpoint), sympathy for victim Zhao Yong (18%), questioning law enforcement inaction (11%), and 谩骂行为 (abusive behavior toward Huang Shufen and her daughter, 11%, extreme viewpoint). The polarization degree evaluation was "medium." Most comments were genuine and valid with few useless comments, high core user ratio, and high posting volume from core users, showing "high" participation willingness characteristics. Users predominantly displayed negative emotions with high emotional tendency, also showing "high" characteristics. Considering guiding effectiveness impacts on emotional tendency and viewpoint polarization structures, the subject structure

crisis level evaluation was "high."

(2) Object Attribute Analysis
The primary responsible party was "Huang Shufen and her daughter," representing individual responsibility. As the event fermented, some netizens also questioned government enforcement effectiveness, exhibiting organizational indirect responsibility characteristics. Combined with expert evaluation and analysis, this event's responsibility attributes were determined as both "organizational indirect responsibility" and "individual responsibility," both evaluated as "medium." The entire event spanned 19 days, representing a continuously fermenting event without serial characteristics. Through membership analysis, the event was determined to be a continuously fermenting civil dispute event, with duration attribute also evaluated as "medium." As a civil dispute event, domain attribute was evaluated as "medium." With responsibility, duration, and domain attributes all showing "medium" warning levels, the final object attribute level was "medium."

(3) Media Effectiveness Analysis
The event had average forwarding of 15 times, average comments of 32, and average likes of 58. Government official media participated less than online news media and self-media, resulting in "medium" guiding effectiveness. Compared with other contemporary events, the event had extensive forwarding, commenting, and liking, with wide dissemination scope, resulting in "high" dissemination effectiveness. Object duration attributes influenced dissemination effectiveness, while object domain attributes influenced media guiding effectiveness, with final media effectiveness showing "medium" crisis level.

According to Table 1, the "Textbook Deadbeat" multimedia network public opinion crisis risk baseline level is "Orange I." According to Table 2, its multimedia network public opinion crisis addition coefficient is "γ video + image + text." Therefore, the final crisis classification for "Textbook Deadbeat" is "Orange I + γ" type. Based on this study's results, this classification represents the second-most severe crisis level, with relatively high audience participation and possible extreme emotions. Information comprehension suffers from redundancy and asymmetry issues with average memory effect. Its addition effect somewhat reduces public opinion dissemination effectiveness, making the crisis easily dissipated under other public opinion impacts but prone to misinterpretation, spawning rumors or negative emotional tendencies. Management requires activating hierarchical management response mechanisms, effectively leveraging government functional settings, maintaining trust between government and public, and accelerating information sharing processes. Timely release of authoritative information is needed to curb rumor generation and dissemination.

5. Conclusion and Outlook

The multimedia network public opinion crisis risk classification coefficient system proposed in this study first 梳理 (sorts out) the basic morphologies of net-

work public opinion crises in the new environment and analyzes the impact of multimedia technology-enabled multi-structured network public opinion information on crisis evolution using coefficient superposition classification. From the perspective of government public opinion crisis response, this study extracts specific representations and response key points under the multimedia network public opinion crisis risk classification system, visualizing them through charts and other tools. On this basis, the study deduces the working mechanisms through which government organizations integrate effective resources and analyze network public opinion crisis response processes according to multimedia network public opinion crisis risk classification, laying the foundation for developing more efficient, precise, and rapid response strategies and ensuring the applicability of response pathways in workflows.

Research on multimedia network public opinion crisis risk classification and response mechanisms can provide targeted decision-making bases for government organizations to develop work plans aligned with their operational levels. However, due to space limitations, this paper does not elaborate further on the clustering indicator system and classification model for multimedia network public opinion crisis risk classification. In the authors' prior related research, Naive Bayes, Incremental Bayes, and Dynamic Bayesian models have been applied to achieve network public opinion crisis level evaluation, diagnostic analysis, and case matching. Bayesian network models are equally applicable to multimedia network public opinion crisis risk classification evaluation and clustering analysis. Additionally, how to establish mapping relationships and quantification between network public opinion crisis risk classification response key points and government organizational response pathways, and how to monitor and evaluate the effectiveness of mobilizable government network public opinion crisis response pathways, require deeper investigation. These remaining issues provide clear directions for future research.

References

[1] CHI E. The Chinese government's response to use of Internet [J]. Asian perspective, 2012, 36(3): 387-409.
[2] Xie Yungeng. China Social Public Opinion and Crisis Management Report [M]. Beijing: Social Sciences Academic Press, 2013: 276.
[3] Li Wenjie, Hua Cuncai, He Weiquan, et al. Construction of a comprehensive evaluation indicator system and fuzzy evaluation model for network public opinion information [J]. Information Science, 2015, 33(9): 93-99.
[4] Liu Jian, Bi Qiang, Li Rui. Research on constructing an evaluation indicator system for Weibo public opinion information dissemination effects—Based on fuzzy data envelopment analysis [J]. Information Studies: Theory & Application, 2016, 39(12): 31-38.
[5] Chen Peiyou, Hou Tiantian. Research on social network public opinion risk early warning based on ANP-grey fuzzy theory—Taking the "Chongqing bus crash incident" as an example [J]. Information Science, 2019, 37(5): 115-120.

[6] Wang Ning, Zhao Shengyang, Shan Xiaohong. Research on network public opinion prediction and classification methods based on grey system theory [J]. Information Studies: Theory & Application, 2019, 42(2): 120-126.
[7] Yu Jing. "From Media to Audience": Constructing a two-level evaluation model for government crisis communication effectiveness [J]. Journalism & Communication, 2012, 19(2): 52-58, 111.
[8] Yu Guoming, Li Biao. Characteristics and reference significance of government crisis intervention in hot public opinion incidents [J]. News & Writing, 2009(6): 57-59.
[9] Liu Zhezhao, Zhang Houding. Research on local government network public opinion response behavior—Taking People's Daily Online as an example [J]. Journal of Intelligence, 2013, 32(10): 13-17.
[10] Lan Yuexin, Dong Xilin, Chen Chengxin. Research on local government network public opinion response capability evaluation and crisis early warning [J]. Journal of Modern Information, 2012, 32(5): 8-12.
[11] SUNDA S S. Multimedia effects on processing and perception of online news: A study of picture, audio, and video downloads [J]. Journalism & Mass Communication Quarterly, 2000, 77(3): 480-499.
[12] MAYER R E, FENNELL S, FARMER L, et al. A personalization effect in multimedia learning: Students learn better when words are in conversational style rather than formal style [J]. Journal of Educational Psychology, 2004, 96(2): 389-395.

Author Contributions

Zhou Xin: Proposed research ideas, designed research plan, wrote the paper
Li Rui: Conducted text organization and literature collection
Huang Wei: Provided revision suggestions

Research on Crisis Response Mechanism and Risk Classification of Multimedia Network Public Opinion

Zhou Xin, Li Rui, Huang Wei
School of Management, Jilin University, Changchun 130022

Abstract: [Purpose/significance] Aiming at the current public opinion response problem of multimedia network in China, this paper combs and proposes the mechanism of government organization response path integration matching and response workflow model construction based on crisis risk classification, in order to provide reference for management decision-makers to improve resource integration ability and precise response effectiveness of network public opinion crisis. [Method/process] This paper analyzes the role of dynamic factors of network public opinion crisis in big data environment, extracts the basic coefficient of network public opinion crisis risk classification, and extracts the superposition coefficient of network public opinion crisis risk classification from the perspective of multimedia transmission path of multi-structure network public opinion

information, and then extracts the key points of network public opinion crisis response under each risk classification one by one. [Result/conclusion] According to the ordering combination of the crisis manifestation forms of the main structural elements, media effectiveness elements and object attribute elements, the base level of multimedia network public opinion crisis is established on their relationship nodes. According to the different influence effects of ontology component differentiation on the public opinion crisis, the addition coefficient of multimedia network public opinion crisis is established. The multimedia network public opinion crisis risk classification model is established, which deconstructs the public opinion crisis risk into level coefficient and addition coefficient. This can more accurately describe the characterization of public opinion crisis, which is conducive to judging the future development trend of public opinion crisis and improving the speed and accuracy of matching with previous public opinion crisis cases.

Keywords: multimedia network public opinion; network public opinion crisis; public opinion crisis response; crisis risk classification

Note: Figure translations are in progress. See original paper for figures.