

## Original Research

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# Key Factors Influencing Public Attitudes Toward Charities' Involvement in Emergency Management: A Study Based on Online Public Opinion in China

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## Abstract

Charities play a pivotal role in engaging the public in emergency management efforts. They serve to complement governmental restrictions by leveraging social resources to aid in emergency management. The involvement of charities in emergency management is likely to shape public attitudes, thereby influencing their effectiveness in this sphere. Therefore, understanding the factors that influence public attitudes toward charities in emergency management is crucial. This study sought to identify these key factors and offer recommendations for charities to enhance their participation in emergency management. The data for this study were collected from messages and comments on two prominent instant messaging platforms, WeChat Public and Sina Weibo. Content Analysis was employed to categorize the data, and the Apriori algorithm was utilized to uncover association rules and key factors. Based on the key factors, it is recommended that charities focus on collaborating with celebrities and enterprises, prioritize establishing and upholding a positive reputation, and enhance their expertise in emergency management practices.

In early 2020, during the onset of the COVID-19 outbreak, the Red Cross Society of China (RCSC) was actively involved in combating the epidemic. However, the RCSC faced criticism for alleged delays in action, management inefficiencies, and inadequate oversight. Given the initial scarcity of emergency resources in China during the outbreak, these issues led to public outcry. As a response, an investigation was launched against RCSC officials, ultimately resulting in professional organizations taking over operational duties. This incident served as a focal point for examining factors that shape public opinion shifts following charities' participation in emergency management.

In times of extreme disasters, swift mobilization of relief provisions is imperative. Governments may not always have ample resources to address all emerging needs, making charitable involvement crucial in bridging existing gaps in response efforts. Research indicates that charities play a pivotal role in transforming government-led relief initiatives into community-driven mutual aid systems.<sup>1–3</sup> They act as a vital intermediary, pooling societal resources for the greater good and ensuring effective distribution of support.<sup>4–6</sup> Charities play essential roles throughout the different phases of emergency management.<sup>7</sup> Prior to a disaster, they engage in volunteer training, disseminate crucial disaster information, and promote preparedness. During the actual disaster, charities play a central role in collecting and disseminating information, providing essential resources and services, and facilitating communication channels. In the aftermath of a disaster, charities aid in the reconstruction of affected areas and offer emotional support to those impacted. Relevant literature suggests that public attitudes toward charities are shaped by the hazard types they respond to, their actions, and their partnerships. By aligning with these insights, charities can enhance their efficacy and public trust in emergency management endeavors.

(1) Hazard types. Relevant literature indicates that natural hazards typically attract more donations compared to accidents.<sup>8,9</sup> Natural hazards tend to cause widespread devastation, affecting thousands or even millions of people. The scale of destruction often evokes a greater sense of empathy and a desire to help on a larger scale. Natural hazards often bring affected communities together and foster a sense of solidarity and shared purpose. This communal response can inspire outside donors to contribute to support and uplift those in need.

(2) Charities' actions. Charities play a crucial role in disaster relief efforts through fundraising activities that not only encourage donations but also help bridge information gaps and raise awareness about their causes. Public engagement in donating and the cultivation of positive

attitudes toward charities are essential outcomes of such activities.<sup>10</sup> The public often undervalues the economic and strategic significance of charitable activities.<sup>11</sup> People uphold high ethical standards for charities, expecting them to prioritize activities that benefit society.<sup>6</sup> Failing to meet these expectations can result in negative attitudes among the public. Transparency regarding the utilization of donations is critical as mismanagement or perceived excessive spending on daily operations can dissuade public support. Donors prefer their contributions to directly impact public welfare rather than cover operational expenses such as office rent and salaries.<sup>10</sup> Decreased donations may result if a charity's employees are deemed to be overpaid.<sup>12</sup> Additionally, charities involved in non-charitable activities for financial gain risk harming their reputation and undermining donor trust.<sup>13</sup>

(3) Charities' partnerships. Although governments bear primary responsibility for emergency management, charities play a supportive role by providing additional services and complementing governmental efforts. However, conflicts often arise when governments delegate responsibilities to private enterprises, nonprofits, or residents, leading to negative public attitudes toward both governments and charities.<sup>3</sup> This transfer of responsibilities can create a "crowding-out effect" where public giving diminishes as confidence in governmental capabilities grows.<sup>1,3</sup> Collaborations between enterprises and charities on initiatives like fundraising and community development can enhance enterprises' reputation and social impact.<sup>13,14</sup> Nevertheless, public attitudes may sour if charities associate with profit-driven enterprises, especially those with negative public attitudes, risking accountability and trust.

Relevant literature has explored the potential factors that shape public attitudes toward charities' participation in emergency management. This study aimed to consolidate these factors within a unified framework and pinpoint the key elements among them. The purpose was to enhance the comprehension of public sentiments regarding charities' roles in emergency management and to offer actionable insights for charities seeking to enhance their practices. Drawing on insights from relevant literature, this study formulated research inquiries from the three focal points mentioned above:

- (1) How do different hazard types influence public attitudes toward charities' involvement in emergency management?
- (2) In what ways do the public benefit initiatives and daily operations of charities shape public attitudes toward their involvement?
- (3) How do partnerships between charities and governments or enterprises impact public attitudes toward charities' involvement in emergency management?

## Methodology

### Design

Numerous methodologies have been employed by scholars to investigate the factors influencing public attitudes toward charities' involvement in emergency management. The research draws upon a rich array of statistical sources, including the daily updated fundraising totals from the Center of Philanthropy at Indiana University, the dataset for disaster response programs operated by the International Federation of Red Cross and Red Crescent Societies, and the Emergency Events Database launched by the Centre for Research on the Epidemiology of Disasters.<sup>2,10</sup> Additionally, researchers have aggregated and synthesized fragmented data from various sources.<sup>11,15–17</sup> Valuable insights have also emerged from

case studies, notably from events such as the COVID-19 pandemic, the Indian Ocean Tsunami in 2004, Hurricane Katrina in 2005, and Typhoon Morakot in 2009.<sup>5,11,16,18</sup>

This study focused on the actual activities undertaken by charities in emergency management and the resultant feedback from the public. The primary data for this study were sourced from instant messaging platforms where public opinions are extensively expressed. The study employed two first-level categories: Charities' Involvement and Public Attitudes (Table 1). Aligned with the literature review, Charities' Involvement encompassed second-level categories such as Hazard Types, Charities' Actions, and Charities' Partnerships. The first-level category Public Attitudes included second-level categories such as Attention Degrees, Positive Public Attitudes, and Negative Public Attitudes. The third-level categories highlighted the factors influencing public attitudes toward charities' roles in emergency management, sourced from the content of instant messaging platforms.

Textual data extracted from instant messaging platforms were subjected to Content Analysis for organization and quantification into factors and their frequencies. Factors that occur frequently but do not evoke significant public discussions or interest are not deemed key factors. Thus, this study not only considered the frequency of each factor but also explored the interrelationships among them. Content Analysis was pivotal for determining factor frequencies, whereas the Apriori algorithm was employed to explore associations between factors.

### Data

This study involved searches on two major Chinese instant messaging platforms, WeChat Public and Sina Weibo, focusing on discussions related to hazards and emergency management within the context of China's geographical and cultural landscape. The search criteria utilized the Chinese language, given the predominant usage on these platforms. The search query employed was "{disaster OR emergency management OR natural hazard OR accident} AND {charity OR donation OR volunteer}," targeting content posted between 2011 and 2021. Data types included both messages and comments, sorted based on indicators such as reads, retweets, and comments.

During data collection, this study meticulously followed the privacy guidelines set forth by WeChat Public and Sina Weibo. Since this research did not include human participants, the data gathered was entirely void of personal information. To safeguard privacy, all potentially sensitive details, including names of places, organizations, individuals, products, and events, were anonymized prior to any analysis. Additionally, this study consciously avoided collecting or examining any of the aforementioned information as part of its research framework.

### Content Analysis

Content analysis has previously been utilized to analyze the archived news coverage from the LexisNexis database.<sup>2</sup> This method converts textual data into numerical data by coding text to identify key words and calculating their frequencies.<sup>19</sup> Research questions are addressed by analyzing patterns within these codes.

The first-level categories established were Charities' Involvement and Public Attitudes, serving as the first-level codes (Table 1). Charities' Involvement as a first-level code included second-level codes such as Hazard Types, Charities' Actions, and Charities' Partnerships. Detailed types of the second-level codes served as

**Table 1.** Framework of Content Analysis, outlining three levels of coding and the frequency of third-level coding

First-level codes	Second-level codes	Third-level codes	Frequencies		
Charities' Involvement	Hazard Types	General Topics	338		
		Hydro-Meteorological Hazards	254		
		Biological Hazards	179		
		Geophysical Hazards	28		
		Technological Hazards	7		
	Charities' Actions	Enterprise Donations	148		
		Emergency Relief	78		
		Social Organization Donations	77		
		Daily Operations Introduction	68		
		Celebrity Donations	64		
		Special Interviews	50		
		Scientific Popularization	50		
		Fundraising	36		
		Promotional Activities	33		
		News Release	33		
		Internal Training	30		
		Government Agency Donations	26		
		Social Training	24		
		Character Promotion	19		
		Projects	18		
		Awards	18		
		Infrastructure Formation	13		
		Emergency Exercises	12		
		Product Promotion	10		
		Organization Formation	9		
		Fund Formation	9		
		Volunteer Recruitment	8		
		Feedbacks	6		
		Charities' Partnerships	Collaboration with Enterprises	155	
			Collaboration with Other Social Organizations	85	
			Collaboration with the Government	59	
		Public Attitudes	Attention Degrees	Low Attention	325
				Medium Attention	317
High Attention	164				
Positive Public Attitudes	Approval of Charitable Behavior		40		

(Continued)

**Table 1.** (Continued)

First-level codes	Second-level codes	Third-level codes	Frequencies	
		Approval of Celebrities	34	
		Approval of Enterprises	24	
		Approval of Emergency Behavior	11	
		Approval of Promotional Behavior	9	
		Willingness to Join	9	
		Approval of Charities	8	
		Approval of Employees	8	
		Approval of Viewpoints	6	
		Approval of Emergency Agencies	1	
		Negative Public Attitudes	Questioning Charitable Behavior	25
			Questioning Promotional Behavior	21
	Questioning Charities		16	
	Questioning Enterprises		13	
	Questioning Celebrities		9	
	Asking for Help		9	
	Questioning Original Intent		8	
	Questioning Viewpoints		6	
	Questioning Emergency Response Behavior		6	
	Calling for Government Regulation		5	
	Worrying about the Development of Charities		4	
	Questioning Emergency Agencies		2	

third-level codes, determined by the units of analysis. This study adopted the “Groups” identified in the “WHO Classification of Hazards” within the “Health Emergency and Disaster Risk Management Framework” by the World Health Organization (WHO) for Hazard Types.<sup>20</sup> Public attitudes encompassed second-level codes like Attention Degrees, Positive Public Attitudes, and Negative Public Attitudes. Attention Degrees comprised Low Attention, Medium Attention, and High Attention based on read/like/retweet counts. Low Attention was characterized by zero read/like/retweet counts; Medium Attention was defined within a range of 1 to 10 total read/like/retweet counts; High Attention was denoted by more than 10 read/like/retweet counts. Positive Public Attitudes and Negative Public Attitudes were further broken down into specific types, serving as third-level codes based on the units of analysis.

Messages and comments on both platforms follow a structured format, comprising posting subject, posting time, main body, and read/like/retweet counts. Third-level codes under Hazard Types, Charities' Actions, Charities' Partnerships, Positive Public Attitudes, and Negative Public Attitudes were derived from the main body, while codes under Attention Degrees stemmed from the read/like/retweet counts.

To ensure reliability, three coding researchers identified as R1, R2, and R3 were involved. The first 10 analytical units from both WeChat Public and Sina Weibo were sampled for a reliability test. Each researcher provided coding results. The probability ( $p$ ) that third-level codes match was calculated under each second-level code. A probability of  $p \geq 0.75$  signified acceptable coding reliability.

### Association Rule Analysis

In this study, Association Rule Analysis was employed to explore associations between different factors. This study employed one-hot encoding to convert the third-level codes for Association Rule Analysis. This study utilized the widely adopted Apriori algorithm.<sup>21</sup> This algorithm identifies high-frequency items and association rules by tallying the occurrences of Antecedents and Consequents and calculating metrics like Support, Confidence, Lift, and Leverage. This study primarily emphasized the values of Support and Confidence. Support denotes the frequency of occurrence of Antecedents or Consequents, whereas Confidence indicates the probability of the Consequents occurring given that the Antecedents have occurred.

Setting Support as a hyperparameter is crucial. A high value may result in too few items being identified, whereas a low value can lead to a larger number of items and slower processing speeds. In this research, the minimum Support value was set at 0.01, implying that the probability of occurrence and co-occurrence exceeds 1%. Only the first-level frequent item sets were presented in the results. Specifically, the third-level codes under the first-level codes Charities' Involvement were designated as Antecedents, whereas the third-level codes under the first-level codes Public Attitudes were considered as Consequents.

## Results

### Reliability

A total of 12 396 messages and comments were gathered, comprising 603 messages and 203 comments with substantive content. Each message and its comments were treated as an analytical unit in this study, resulting in 603 analytical units.

The values of  $p$  for all metrics exceeded 0.75, indicating that the results have successfully passed the reliability test (Table 2). For Hazard Types, Charities' Partnerships, and Attention Degrees, the  $p$ -values were all 1, signifying a high level of consistency in the coding process due to the inherently objective nature of these categories. However, codes such as Charities' Actions, Positive Public Attitudes, and Negative Public Attitudes involved some subjective judgment, reflected in slightly lower values.

### Codes

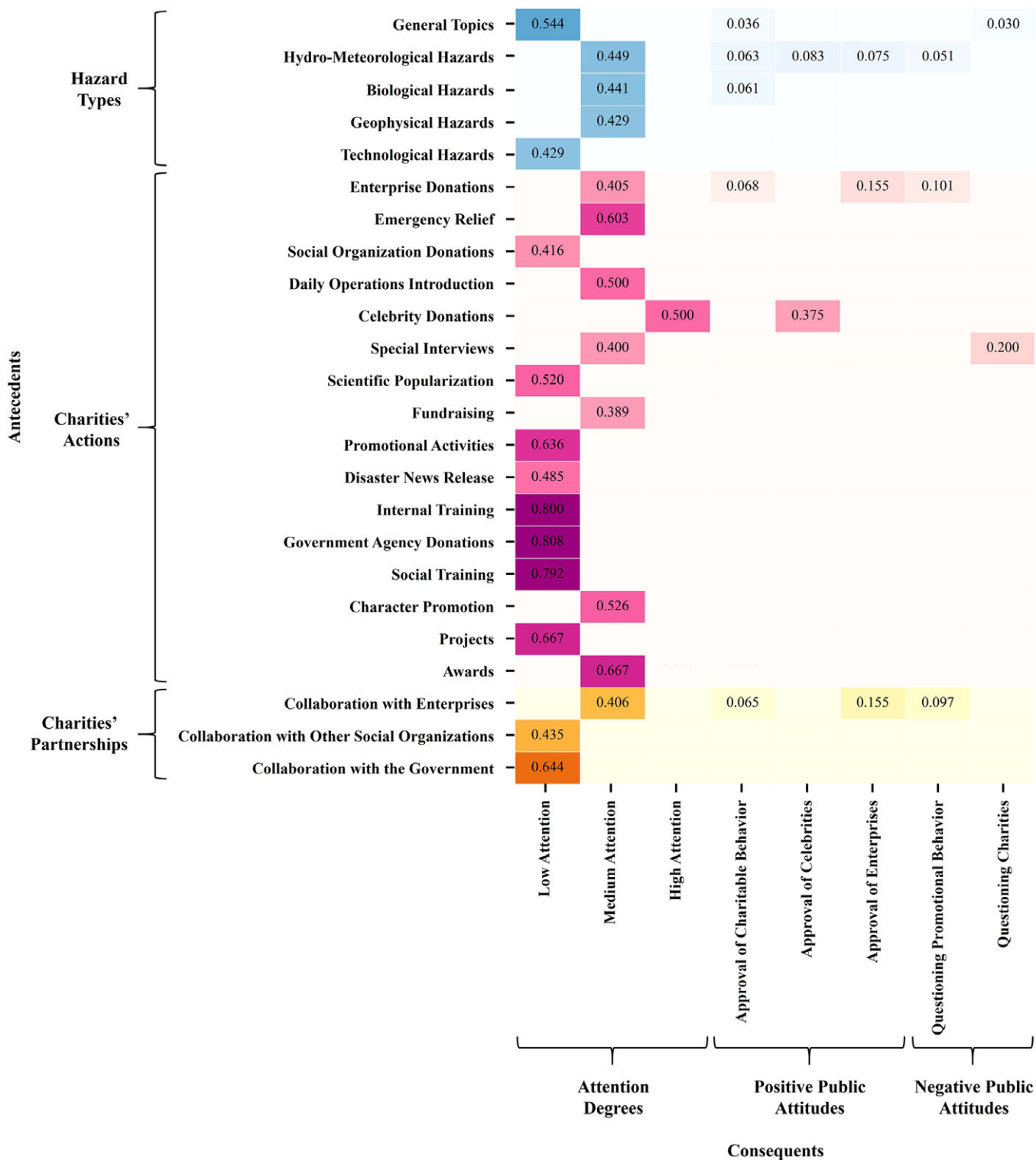
The research yielded fewer hazard types through Content Analysis compared to "WHO Classification of Hazards" (Table 1). Four main hazard types were identified: Geophysical Hazards, Hydro-Meteorological Hazards, Biological Hazards, and Technological

**Table 2.** The values of  $p$  for the reliability analysis performed by coding researchers identified as R1, R2, and R3

Hazard Types			
	R1	R2	R3
R1	1	1	1
R2	1	1	1
R3	1	1	1
Charities' Actions			
	R1	R2	R3
R1	1	0.908	0.934
R2	0.908	1	0.921
R3	0.934	0.921	1
Charities' Partnerships			
	R1	R2	R3
R1	1	1	1
R2	1	1	1
R3	1	1	1
Attention Degrees			
	R1	R2	R3
R1	1	1	1
R2	1	1	1
R3	1	1	1
Positive Public Attitudes			
	R1	R2	R3
R1	1	0.908	0.961
R2	0.908	1	0.895
R3	0.961	0.895	1
Negative Public Attitudes			
	R1	R2	R3
R1	1	0.934	0.921
R2	0.934	1	0.868
R3	0.921	0.868	1

Hazards. Throughout the encoding process, it was noted that many messages and comments only vaguely referred to hazards or emergency management without specifying the particular types. These references were classified as General Topics within this study. Among the 5 hazard types discussed, General Topics had the highest frequency, with Hydro-Meteorological Hazards and Biological Hazards also significantly represented. Geophysical Hazards and Technological Hazards had fewer mentions.

In addition to the hazard types, within the overarching classification of Charities' Involvement, charities were found to engage in 23 main types of charitable actions, highlighting a broad spectrum of activities involved in emergency management. Some charitable actions were more frequently observed compared to others, with Enterprise Donations notably standing out in terms of frequency, followed by a decline in frequencies for other forms of charitable actions. Charities primarily collaborated with enterprises, other social organizations, and the government, with collaboration with enterprises being particularly common.



**Figure 1.** Heat map illustrating association rules generated by the Apriori algorithm based on confidence values. The numbers in the map represent the confidence value of each association rule, with darker shades indicating higher confidence.

Regarding the first-level code of Public Attitudes, there were more instances of Low Attention and Medium Attention, with relatively fewer instances of High Attention. Positive Public Attitudes were often expressed through Approval of Charitable Behavior, Approval of Celebrities, or Approval of Enterprises,

whereas other forms of positive attitudes were less prevalent. Negative Public Attitudes were mainly directed at Questioning Charitable Behavior and Questioning Promotional Behavior, exhibiting higher frequencies compared to other types of negative attitudes.

### Association Rules

This study has identified a total of 39 valid association rules (Figure 1). These rules were categorized into 12 concerning Hazard Types, 21 concerning Charities' Actions, and 6 concerning Charities' Partnerships. The majority of Hazard Types, Charities' Actions, and Charities' Partnerships were found to be associated with either Low Attention or Medium Attention, with only Celebrity Donations being linked to High Attention.

Positive Public Attitudes was associated with Approval of Charitable Behavior, Approval of Enterprises, and Approval of Celebrities. Approval of Charitable Behavior stood out as having the most significant number of associated rules. General Topics, Hydro-Meteorological Hazards, or Biological Hazards was associated with Approval of Charitable Behavior. Enterprise Donations or Collaboration with Enterprises was associated with Approval of Charitable Behavior. Hydro-Meteorological Hazards, Enterprise Donations, or Collaboration with Enterprises was associated with Approval of Enterprises. Hydro-Meteorological Hazards or Celebrity Donations was associated with Approval of Celebrities.

Negative Public Attitudes was associated with Questioning Charitable Behavior and Questioning Promotional Behavior. Hydro-Meteorological Hazards, Enterprise Donations, or Collaboration with Enterprises was associated with Questioning Promotional Behavior. General Topics or Special Interviews was associated with Questioning Charitable Behavior.

## Discussion

### Attention Degrees

Public attention varies across different hazard types. General Topics or Technological Hazards was associated with Low Attention, whereas Geophysical Hazards, Hydro-Meteorological Hazards, or Biological Hazards was associated with Medium Attention. This indicates that the nature of hazards significantly influences public awareness. Studies suggest that emergency messages are more captivating and draw greater attention compared to general messages.<sup>22</sup> Public perceptions of emergency charity are shaped by coverage and charitable actions. Geophysical Hazards, Hydro-Meteorological Hazards, or Biological Hazards with their significant impact on lives and property, typically attracted more attention due to the tangible losses involved. Conversely, General Topics, involving abstract or diffuse elements and lacking clear focal points, often received less attention as they are harder for the public to emotionally engage with.

In terms of Charities' Actions, Celebrity Donations was associated with High Attention, whereas Enterprise Donations was associated with Medium Attention. Most other forms of Charities' Actions were associated with Low Attention. In terms of Charities' Partnerships, Collaboration with Other Social Organizations or Collaboration with the Government was associated with Low Attention. However, Collaboration with Enterprises could elevate attention to a medium level. This underscores the importance of associations with well-known enterprises or celebrities in enhancing a charity's visibility. Although some suggest that conflicts between governments and charities could impact public attitudes, current research findings do not strongly support this notion.

Additionally, Charities' Actions like Emergency Relief, Daily Operations Introduction, Special Interviews, Scientific Popularization, Fundraising, Character Promotion, or Awards was associated with Medium Attention. This suggests that both public welfare activities and routine operations within charities can capture some level of public interest, with similar attention conditions.

Importantly, the public tends not to view charities negatively when informed about their daily functions. Recent studies emphasize the public's concern regarding the transparency of charities, as donors often remain uncertain about the outcomes of their contributions.<sup>23,24</sup> To build public trust and support, charities must be transparent and clearly communicate their operations.<sup>25</sup> Misunderstandings and deviations from public expectations can lead to skepticism and negative perceptions.<sup>6</sup> These instances highlight the importance of transparent disclosure by charities to foster positive images and trust among the public.

### Positive Public Attitudes

This study identified 10 categories of Positive Public Attitudes through coding, with only Approval of Celebrities, Approval of Enterprises, and Approval of Charitable Behavior showing associations with specific Hazard Types, Charities' Actions, or Charities' Partnerships. Notably, General Topics, Hydro-Meteorological Hazards, or Biological Hazards was associated with Approval of Charitable Behavior. Public approval of charitable behavior is generally perceived as kind, beneficial, and friendly, with individuals expressing a willingness to engage in charitable activities. This indicates that public approval of charitable behavior tends to transcend specific hazard types, apart from less frequent Geophysical Hazards or Technological Hazards.

Moreover, Hydro-Meteorological Hazards was not only associated with Approval of Charitable Behavior but also with Approval of Celebrities and Approval of Enterprises. In terms of Charities' Actions and Charities' Partnerships, Celebrity Donations was associated with Approval of Celebrities, whereas Enterprise Donations or Collaborations with Enterprises was associated with Approval of Charitable Behavior and Approval of Enterprises. The involvement of celebrities in charities' emergency management efforts has been noted to have a significant impact, often termed the "celebrity effect". Although other Charities' Actions attract attention, they may not necessarily alter public attitudes. Messages and comments indicated that celebrities and enterprises often made substantial donations through charities, leading to expressions of gratitude, praise, and encouragement from the public. These significant donations not only enhance charities' reputations but also bolster emergency preparedness and response efforts. Media coverage plays a vital role in disseminating hazard and emergency information, expanding public responses beyond affected regions.<sup>2</sup> Partnerships between charities are also supported.<sup>17,23,26,27</sup> The enhanced engagement of charities in emergency management is facilitated by partnering with celebrities and businesses for increased publicity.

### Negative Public Attitudes

In this study, 12 types of Negative Public Attitudes were coded. However, only Questioning Promotional Behavior and Questioning Charities showed associations with specific Hazard Types, Charities' Actions, or Charities' Partnerships. Hydro-Meteorological Hazards, Enterprise Donations or Collaborations with Enterprises was associated with Questioning Promotional Behavior. The public often questioned the accuracy of donation amounts in some messages and comments, suspecting them to be incorrect. There were also suspicions regarding official activities aimed at dispelling rumors. Furthermore, the unequal distribution of publicity power, where some charities receive more attention than others, faced public scrutiny. Some messages and comments suggested that promoting charities was perceived as "exploiting the deceased for profit."

General Topics was associated with Questioning Charities. Since the content of General Topics lacked specificity and did not mention particular hazards in most messages and comments, the public typically recalled past instances of stigmatization and trust crises surrounding charities. Research indicates that respondents familiar with numerous charity scandals tend to give lower ratings to charities.<sup>28</sup> The public attitudes toward charities are influenced by their historical track record, shaping how current actions are interpreted. Public tolerance for charity misconduct, such as corruption or inaction, is diminishing.<sup>10,11</sup> The surge of self-media platforms has significantly amplified the dissemination and impact of negative public sentiment.

Special Interviews was also associated with Questioning Charities in two key ways. First, the public questioned the credibility of experts featured in interviews, suspecting that unqualified individuals may be hired by charities for personal gain. Second, doubts arose regarding the accuracy of specialized knowledge shared in these interviews, leading to challenges against experts' assertions. This highlights a public demand for the professionalism of charities involved in emergency management. Charities must exercise caution during emergency management to prevent errors that could negatively impact public attitudes.

### Limitations

This study necessitates further investigation in three critical aspects. First, the analysis hinged on a decade's worth of data from two instant messaging platforms, implying that any deleted or censored data may introduce limitations. Given that messages on these platforms can vary widely in content, with some comprising mere likes or emojis devoid of substantial information, such instances were not factored into the analysis. Subsequent research ought to persist in monitoring the involvement of charities in emergency management, necessitating expansive data collection to unearth novel influencing factors.

Second, although this study concentrated on factors rather than specific case studies, there exist some emblematic cases that merit scrutiny in future inquiries. Delving into these cases could offer greater clarity and enrich the study's depth.

Third, this study primarily drew data from China, with the information collected predominantly in Chinese. The absence of comparative analysis with international data poses a significant gap. To address this, future endeavors should encompass instant messaging platforms from diverse countries and languages, facilitating cross-country comparative analyses for a more comprehensive understanding.

### Conclusion

This study employed Content Analysis and Association Rule Analysis to delve into the key factors shaping public attitudes toward charities' involvement in emergency management. The research scrutinized concise messages and comments across two instant messaging platforms, WeChat Public and Sina Weibo, spanning from 2011 to 2021. The investigation delved into 5 Hazard Types, 23 Charities' Actions, 3 Charities' Partnerships, 3 Attention Degrees, 10 Positive Public Attitudes, 12 Negative Public Attitudes, and 39 Association Rules.

In light of the findings, 3 key strategies emerge for enhancing public attitudes toward charities. First, fostering collaborations with celebrities and enterprises emerges as a vital avenue. By engaging with these entities, charities stand to benefit from direct donations

while leveraging their influence to amplify visibility. Second, it is imperative for charities to concentrate on constructing and upholding a positive reputation over the long term. Given the enduring memory of past charitable missteps, charities must meticulously curate a favorable image and swiftly disassociate from any untoward activities. Third, professionalism in emergency management and publicity becomes imperative. To sidestep professional pitfalls, charities should align their information dissemination with public preferences, meeting their appetite for insights into emergency charitable efforts.

**Supplementary material.** To view supplementary material for this article, please visit <http://doi.org/10.1017/dmp.2024.145>.

**Data availability statement.** Primary data are available with authors and can be accessed on request.

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