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RESEARCH ARTICLE

Effectiveness evaluation of crisis communication strategies in guiding public emotions on social media platforms

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ABSTRACT

This study analyses the impact of crisis communications on the management of public emotions on social media. By conducting a mixed-methods analysis of fifteen major organisational crises from five different industries, the research assesses the impact of various communication frameworks on the emotional trajectories throughout the crises. Results suggest that proactive and accommodative strategies demonstrated higher effectiveness in reducing negative emotional impact compared to defensive approaches in this sample; however, enduring strategy effectiveness is contingent upon crisis responsibility attribution. Response timing emerged as a significant factor driving outcomes, accounting for 28.3% of the variance. This research documents the extent to which strategy selection and execution patterns differ by industry, observing that technology firms in this study typically employed rapid proactive disclosure while food and beverage companies more frequently used delayed, defensive strategies. The research contributes to crisis communication theory by developing quantitative models for analyzing emotions as multifaceted phenomena influenced by network dynamics, algorithmic factors, and platform-specific characteristics, while offering evidence-based insights for crisis response strategy development.

Keywords: crisis communication strategies; emotional regulation; social media platforms; situational crisis communication theory; public sentiment analysis

1. Introduction

The evolution of social media has impacted crisis communication practices significantly, both bringing about new challenges and offering new opportunities for organizations. Classical models of crisis communication, such as the Situational Crisis Communication Theory (SCCT), require significant adjustments to deal with the complexities of dynamics present in digital communication contexts. A meta-analysis[1] demonstrated that alignment between organizational responsibility attribution and crisis response strategy selection significantly affects organizational reputation restoration, thus playing a critical role in strategic consistency in effective crisis management. Research [2] built upon this study by exploring the differential moderating effects of information source and format on public responses to crisis communication, while studies [3] pinpointed response tendencies for different sub-contexts of crises and highlighted the

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importance of contextual contingency.

The shift from a linear model of organizing communication within organizations to a dialectic structure involving diverse parties has encouraged new forms enabling swift transmission of emotions within connected networks, fundamentally transforming public responses dealing with organizational crises. Social media has brought unique features setting crisis communication within the modern digital world apart from classical forms, with characteristics like instant communication of information, amplification of visibility through algorithms, and viral diffusion processes generating communication conditions where the amplification or damping of emotions depend on strategic structures [4]. Research [5] has registered the evolving role of crisis communication strategies in the social media context. Technology's impact on crisis communication has been explored by researchers [6], who provided advice for crisis communicators within digital contexts, together with studies [7], which examined crisis informatics within a technological context.

The emotional dimension of crisis communication has increasingly become a research focus, with significant implications for strategic effectiveness. Empirical research [8] demonstrated that emotional framing significantly impacts public reactions to organizational responses and crisis news. Research [9] proposed mechanisms of digital emotion contagion that describe the rapid spread of emotions during crises, while studies [10] established explicit connections between information sharing on social media and emotional content. These findings highlight the critical importance of understanding emotional transmission dynamics in developing effective crisis communication strategies.

Despite extensive research in crisis communication, significant gaps remain in understanding the quantitative relationships between communication strategies and emotional outcomes in social media contexts. Current research limitations include insufficient quantitative modeling of emotion transmission dynamics in digital environments, limited cross-platform comparative analysis of strategy effectiveness across different social media platforms, and inadequate integration of algorithmic influence factors in crisis communication models. While existing studies have examined individual aspects of digital crisis communication, few have systematically integrated emotional trajectory analysis with strategic effectiveness evaluation across multiple platforms and industries.

This study addresses these gaps by developing and validating quantitative models for evaluating crisis communication strategy effectiveness in guiding public emotions on social media platforms. The research extends SCCT theory to incorporate multi-dimensional emotion transmission mechanisms in social media environments, quantitatively assesses the effectiveness of different communication strategies across industries and platforms, and provides evidence-based recommendations for optimizing crisis communication strategies. This research enriches the theoretical model of crisis communication by applying mathematical equations that explain the complex relationships between communication approaches, platform features, and emotional responses. In addition, it advances methodological practices by combining computational sentiment analysis and comparative analyses across sectors.

Holistic evaluation includes multifaceted aspects of strategic reasoning, such as social media factors, different types of crises, attribution patterns, and emotional processing, all of which are used to shape effective communication in situations in which organizational crises are driven by social media. Use of a multi-faceted model that evaluates public opinion and perception is essential for effective organizational crisis management and resolution, in addition to maintaining balanced stakeholder sentiment in times of difficulty. This study provides practitioners with evidence-based recommendations for creating strategic choices regarding organizational crises, adding benefit to theoretical improvement as well as practical application to the literature in crisis communication management.

2. Literature review and theoretical framework

2.1. Evolution of crisis communication theory in digital contexts

The foundation of crisis communication research is largely rooted in Situational Crisis Communication Theory (SCCT), having undergone significant advancement to address the intricacies of digital communication. A comprehensive meta-analysis [1] illustrated the significance of correspondence between the attribution of responsibility given to organizations and the choice of response strategies, exhibiting a remarkable impact on the effectiveness of reputation recovery. These findings showed that strategic congruence is a prime determinant for the efficacy of crisis communication, where improper tactics lead to increased reputational damage. This meta-analytical approach provided necessary empirical support for the central principles of SCCT while emphasizing the need for accuracy in choosing crisis responses.

Building on this basic premise, research [2] examined how information format and source credibility affect public responses to crisis communication. This research demonstrated how message attributes and source characteristics work together in a dynamic way to influence stakeholder perceptions, revealing that traditional linear models of communication do not reflect the complexity underlying crisis response processes. Further studies [3] built on this insight by examining crisis response behaviors in different sub-contexts, thus confirming that contextual factors heavily moderate the effectiveness of strategies. This work emphasized that crisis communication strategies applicable universally are not enough, requiring implementation of strategically matched approaches taking into account particular contexts.

The digitization has greatly challenged conventional theoretical assumptions. Case study analysis [4] provided considerable insight through examination of McDonald's and KFC's crisis management practices in China, which depicted the interaction between cultural nuances and social media structures influencing crisis outcomes. This case study approach revealed culture context as a mediator between communication policies and public opinions with a necessity for culture-specific adaptations of theories framed within Western settings. Systematic documentation [5] of changes in crisis communication strategies in reaction to the implications of social media, while empirical research [6] combined findings to provide evidence-based recommendations for practitioners operating within digitized crisis management settings.

2.2. Emotional transmission mechanisms in social media environments

The affective dimension of crisis communication has emerged a necessary field of study with the growth of online spaces because these have greatly shifted the conditions of emotional dissemination. Empirical research [8] concluded with observation that the articulation of emotions has a significant impact on public reception of organizational responses and news coverage of a crisis because experimental observations showed anger and sadness produce differential effects on stakeholders' judgments, ultimately providing basic confirmation of an emotional dimension in strategic choice-making.

Theoretical advancement [9] expanded the model by introducing mechanisms of digital contagion of emotion that explain the rapid spreading of emotions in conditions of crisis. This framework describes emotional contagion as a sophisticated process involving numerous psychological and technological factors, transcending simplistic assumptions of interpersonal contagion. This theoretical refinement is particularly relevant for understanding how social algorithms can intensify or drop emotional content, hence creating feedback loops that continuously remold the narratives surrounding crisis events.

Research [10] established distinct empirical correlations between emotional content and information-sharing behavior on social media sites. This quantitative work revealed that content with high emotional intensity attains significantly higher engagement levels, thus supporting algorithmic amplification-related

theories. Similarly, studies [11] provided contextual evidence through examination of the Fukushima disaster, demonstrating the mix of medium features, types of crises, and emotional reactions that altogether contribute to varied public responses. More recent work [12] further built on our understanding by examining user behavior and emotional dynamics in the context of crises, shedding light on critical aspects of the temporal dynamics of emotional development and expression.

2.3. Quantitative measurement approaches and cross-platform analysis

Methodological progress has significantly increased the measurement capability in the area of crisis communication scholarship. A systematic review [13] conducted on sentiment analysis from a social media perspective identified emerging trends but persisting challenges in the computational emotion-detecting field. This comprehensive analysis highlighted the shift from lexicon-based methods towards high-end machine learning models enhanced with capability for identifying contextual nuances in expressions of emotions.

Latest developments in emotional intervention modeling have been proposed [14] through simulation models for measuring emotional contagion after a disaster and for intervention planning. Research [15] provided real-life illustrations using sentiment analysis about COVID-19 on demonstrating the application of topic modeling methods for tracking changes in emotions for public health communication. Studies[16] characterized information propagation patterns during the COVID-19 epidemic using Weibo data, while research [17] developed quantified multidimensional sentiment measurement frameworks for public opinion management.

Cross-platform comparative research has been advanced [18] through examination of Twitter's functionality in emergency communication contexts, and studies [19] conducted comparative analysis of Facebook and Twitter utilization by crisis communication professionals versus citizens. Research [20] contributed strategic decision-making frameworks using evolutionary game theory perspectives, analyzing crisis communication strategy selection as competitive processes shaped by organizational environmental constraints and social media platform characteristics.

3. Research methods

3.1. Research design and data collection methods

To assess the impact of crisis communication on social media sentiment, this empirical study adopts a mixed-methods approach. The research design incorporates sentiment analysis using computational data collection methods alongside comparative case studies to capture sentiments during organisational crises. Such triangulation on the methodology level improves the credibility and integrity of the research results, thus leading to more accurate conclusions about the strategies' impact.

Public social media engagement with organisational crises on Twitter, Facebook, Weibo, and LinkedIn was actively and systematically monitored for data collection. The sample frame comprised 15 significant organisational crises drawn from diverse industries, including technology, healthcare, food and beverage, transportation, and financial services, which were documented from 2020-2024. This diversity provides adequate depth for meaningful comparative analysis while ensuring robust statistical inference. Data capture commenced from the onset of crises and continued through to the resolution phase to map the entire emotional response throughout the crisis lifecycle.

The employed methodology for data collection features an innovative API-based sampling framework system which captured posts, comments, shares, reactions, and user engagement patterns as total social media interaction metrics. Specific implementations included Twitter API v2 with academic research access for real-time tweet monitoring and historical data retrieval, Facebook Graph API v18.0 for public page

content and engagement metrics, Weibo Open Platform API 2.0 for Chinese social media content analysis, and LinkedIn Marketing Developer Platform for professional network communications. Keywords included crisis-specific terms, organizational names, and industry-related hashtags, with temporal parameters set for real-time collection at 15-minute intervals.

Mathematically, this sampling method can be expressed as:

$$P(s) = \frac{f(k_i) \times g(e_j)}{h(t_n)} \tag{1}$$

Where $P(s)$ represents the probability of post selection, $f(k_i)$ denotes the keyword relevance function, $g(e_j)$ indicates engagement level parameters, and $h(t_n)$ signifies temporal weighting factors. This sophisticated sampling approach ensures the collection of representative data that accurately reflects public emotional responses throughout the crisis lifecycle.

Table 1. API specifications and data collection parameters.

Platform	API Version	Collection Method	Data Types	Rate Limits	Sample Size
Twitter	API v2	Real-time streaming	Tweets, replies, retweets	2M tweets/month	150,000 posts
Facebook	Graph API v18.0	Public page monitoring	Posts, comments, reactions	200 calls/hour	120,000 posts
Weibo	Open Platform 2.0	Keyword search	Posts, comments, forwards	150 calls/hour	100,000 posts
LinkedIn	Marketing API	Company page tracking	Posts, comments, shares	100 calls/day	80,000 posts

Note: *Rate limits based on academic research tier access; sample sizes represent total data points collected across all 15 crisis cases*

Table 1 provides a comprehensive overview of the API specifications and data collection parameters employed across all four social media platforms, including rate limits, collection methods, and sample sizes achieved during the study period.

3.2. Social media sentiment analysis techniques and methods

The field of sentiment analysis through social media occupies a unique interdisciplinary nexus that involves aspects of computational linguistics, machine learning, and psychology. Development of computer-mediated communication technologies has rapidly facilitated the mining of meaningful information about group emotional sentiments; however, this also poses complex methodological problems that call for the creation of new analytical methods.

The development of methods for sentiment analysis in the context of social media has been connected closely with the advancement of computational social science. While older models treated sentiment as a single characteristic, recent methods use advanced machine learning algorithms skilled at identifying subtle emotional nuances. This development combines natural language processing models with complex neural structure models skilled at identifying the emotional nuances inherent in human interactions in the digital sphere.

All primary measures were given explicit operational definitions to ensure measurement consistency and analytical rigor. Emotional states assessment utilizes VADER (Valence Aware Dictionary and sEntiment Reasoner) sentiment analysis, tailored specifically for social media content, which creates compound scores over a continuous scale ranging from -1 (extreme negativity) to +1 (extreme positivity). Categorization of strategic types is done using categorical coding, where Defensive strategies carry code 1, Accommodative strategies code 2, Proactive strategies code 3, Mixed strategies code 4, all drawn from the content analysis of

org communication. Communication media variables absorb platform-specific weighting with Twitter carrying a weight of 1.2, Facebook 1.0, Instagram 0.9, LinkedIn 0.8, Weibo 1.1, accounting for the differing capacities for info diffusion across platforms.

Based on established research, the complexity of sentiment analysis can be formulated as:

$$S_a = f(T_x, C_t, N_l, M_d) \tag{2}$$

This formulation acknowledges the profound complexity of emotional communication, recognizing that sentiment analysis is not a deterministic process but a dynamic, contextually negotiated interpretation of human emotional experiences, where T_x represents textual input, C_t denotes contextual parameters, N_l signifies natural language processing layers, and M_d indicates multimodal data integration.

3.3. Multi-dimensional emotional assessment framework in crisis situations

An emotional reaction to an organisational crisis consists of intricate blends of thoughts (cognitions), feelings (affect), and actions (behaviour). Multi-dimensional emotional evaluation can be encapsulated as an advanced vector model:

$$E_v = [v_1, v_2, ..., v_n] \times [w_1, w_2, ..., w_n] \tag{3}$$

Where E_v represents the emotional vector assessment result, $[v_1, v_2, ..., v_n]$ denotes the various emotional dimension values being measured (such as valence, arousal, dominance, and other emotional components), and $[w_1, w_2, ..., w_n]$ indicates the corresponding contextual weighting factors that determine the relative importance of each emotional dimension based on the specific crisis situation.

The integration of temporal dynamics marks an additional evolution in assessment techniques. Emotions during any given period of crisis are fluid and the static evaluations do not do justice to capturing reactions. More sophisticated assessment systems now provide the continuous monitoring of time required using mathematical models that treat emotion as a function of prior states and context:

$$E(t) = \alpha E(t-1) + \beta F(C_t) + \gamma G(R_t) \tag{4}$$

Where $E(t)$ represents the current emotional state at time t, $E(t-1)$ denotes the previous emotional state, $F(C_t)$ indicates the contextual factors at the current time, $G(R_t)$ represents response interventions at the current time, and α, β, and γ are weighting coefficients that determine the relative influence of previous emotional states, contextual factors, and response interventions on the current emotional state.

These mathematical models are grounded in established theoretical frameworks from crisis communication research. The emotional transmission model builds upon Goldenberg and Gross's [9] digital emotion contagion mechanisms and Stieglitz and Dang-Xuan's [10] information diffusion research. The temporal dynamics model incorporates Kim and Cameron's [8] emotional framing effects, while the vector assessment approach aligns with multi-dimensional emotion theories established in psychological research literature.

3.4. Cross-platform analysis and case selection framework

The cross-platform emotion comparison represents a vital methodological concern requiring sophisticated technology for monitoring pathways of emotional transfer and their relative dynamics across different platforms. This approach understands that social media platforms function not merely as

communication channels but as distinct mediating entities of emotions, each with unique characteristics affecting emotional propagation mechanisms.

The conceptual model of cross-platform emotion transmission provides a sophisticated framework for understanding complex emotional propagation mechanisms, building upon the network effects documented by Li et al. [16] and cross-platform research by Eriksson and Olsson [19]:

$$E_p = \phi(P_x) + \psi(N_w) + \omega(T_r) \tag{5}$$

Where E_p represents emotional propagation patterns, P_x indicates platform-specific characteristics including algorithmic frameworks, user demographics, and interaction affordances, N_w represents network dynamics encompassing follower relationships and community structures, T_r denotes transmission routes including direct shares, indirect mentions, and viral propagation pathways, and ϕ, ψ, ω are coefficients reflecting the relative contribution of each component to overall emotional transmission effectiveness.

The fifteen organizational crisis cases underwent systematic selection based on predetermined criteria ensuring representativeness across multiple dimensions. The sample frame comprised significant organisational crises drawn from diverse industries including technology, healthcare, food and beverage, transportation, and financial services, documented from 2020-2024. Industry diversity provides adequate depth for meaningful comparative analysis while ensuring robust statistical inference capabilities. Crisis type variation includes product failures, data security breaches, ethical misconduct allegations, service disruptions, and regulatory violations to examine strategy effectiveness across different attribution contexts established by Coombs and Holladay [3].

Each crisis case generated between 10,000 to 50,000 social media posts for analysis, totaling approximately 450,000 individual data points across all platforms and cases. Data capture commenced from crisis onset and continued through resolution phases to map complete emotional response trajectories throughout crisis lifecycles. Geographic distribution spans North American, European, and Asian markets to capture cultural and regulatory context variations identified by Zhu et al. [4] in their cross-cultural crisis communication research.

3.5. Statistical analysis and ethical considerations

Statistical modeling employs a range of analytical approaches to examine the relationships between strategy characteristics and emotional responses. The main regression model evaluates emotional intensity with factors like strategy type, crisis responsibility attribution, organizational alignment, and platform effects, following the meta-analytical framework suggested by Ma and Zhan [1]. Additional analyses include temporal trend evaluation that tracks emotional changes during various stages of the crisis, cross-industry comparative analysis using ANOVA methods, and interaction effects between strategy type and context variables.

Advanced sentiment analysis encompasses a multi-dimensional assessment mirroring the complexity of emotions along dimensions of valence, arousal, and dominance, based on psychological research for emotional categorization. Emotional transmission analysis across platforms employs the network-based modeling approaches to explain propagation patterns in different social media settings to further advance digital emotion contagion processes by Goldenberg and Gross [9].

The research received approval from the institutional review board (IRB Protocol #2024-COMM-157) relating to methods of collecting and analyzing social media data. All data collection activities were fully

compliant with service terms of the platforms involved, corresponding data protection legislation like GDPR and CCPA, along with ethical guidelines relating to research on digital communication. Public social media content was analyzed using aggregated reporting methods, thus protecting individual user identification and avert any privacy breaches.

The data management practices applied included strong security measures that involved AES-256 encrypted storage systems, role-based access systems limiting researchers' access to anonymized datasets, along with data retention guidelines adhering to institutional standards. In data preprocessing, personal identifiers were carefully removed, and geographic data were aggregated to country-level indicators. Quality controls entailed inter-rater reliability tests yielding Cohen's kappa statistical measures of 0.80 or more for qualitative code decisions, computerized validation reporting for maintenance of data integrity, and thorough documentation of all procedures used for analysis with the aim of facilitating reproducibility and transparency, which were in line with open science practices.

4. Results

4.1. Cross-Industry comparison of crisis communication strategies in crisis events

The comparative analysis of crisis communication strategies across the five selected industries in this sample reveals distinct patterns in strategy selection, implementation approaches, and effectiveness in guiding public emotions, though these patterns should be interpreted within the constraints of the study's scope and methodology. **Table 2** presents a comprehensive comparison of communication strategies employed across five major industrial sectors during significant crisis events.

Table 2. Cross-industry crisis communication strategy implementation analysis.

Industry	Primary Strategy	Secondary Strategy	Crisis Type	Initial Emotional Response	Response Time (hours)	Transparency Level	Sample Size
Technology	Proactive Disclosure	Technical Explanation	Data Breach	High Anxiety (82%)	3.5	Medium-High	n=45,000 posts
Healthcare	Accommodative	Corrective Action	Product Recall	High Concern (76%)	12.8	High	n=38,000 posts
Food & Beverage	Defensive	Justification	Contamination	High Anger (89%)	16.2	Low	n=52,000 posts
Transportation	Mixed Approach	Compassion	Service Failure	High Frustration (79%)	7.4	Medium	n=41,000 posts
Financial Services	Corrective Action	Compensation	System Failure	High Uncertainty (73%)	5.2	Medium-High	n=47,000 posts

Data Sources: Organizational communication content analysis from official statements, press releases, and social media posts (2020-2024). Emotional response percentages calculated using VADER sentiment analysis of social media posts collected via API access to Twitter, Facebook, Weibo, and LinkedIn. Response timing measured from initial crisis detection to first official organizational communication. Transparency levels assessed using standardized criteria including information completeness, acknowledgment of responsibility, and specificity of corrective measures. Sample sizes represent total social media posts analyzed per industry sector across all crisis cases within each category.

As shown in **Table 2**, the observed sample demonstrates notable variations in strategy selection across industries, with technology firms in this study typically employing proactive disclosure approaches (average response time 3.5 hours), while food and beverage companies more frequently utilized defensive strategies (average response time 16.2 hours). These patterns may reflect industry-specific regulatory environments, stakeholder expectations, and organizational risk tolerance, though causal relationships cannot be definitively established from this observational data. The observed strategy differences appear to correlate with industry-

specific factors including competitive environments, regulatory frameworks, stakeholder characteristics, and organizational cultures. However, this study's design does not permit definitive causal attributions, and other unmeasured variables such as organizational size, leadership characteristics, and prior crisis experience may also influence strategy selection. Healthcare firms are the most transparent, which may be indicative of how critical their operations are to life as well as the industry’ s tight regulation.

The connection between strategy selection and trajectories of emotional response can be assessed via computation in the context of the crisis lifecycle by analysing emotional markers. Illustrative comparison of emotional trajectory under various strategic frameworks can be done using the following R code:

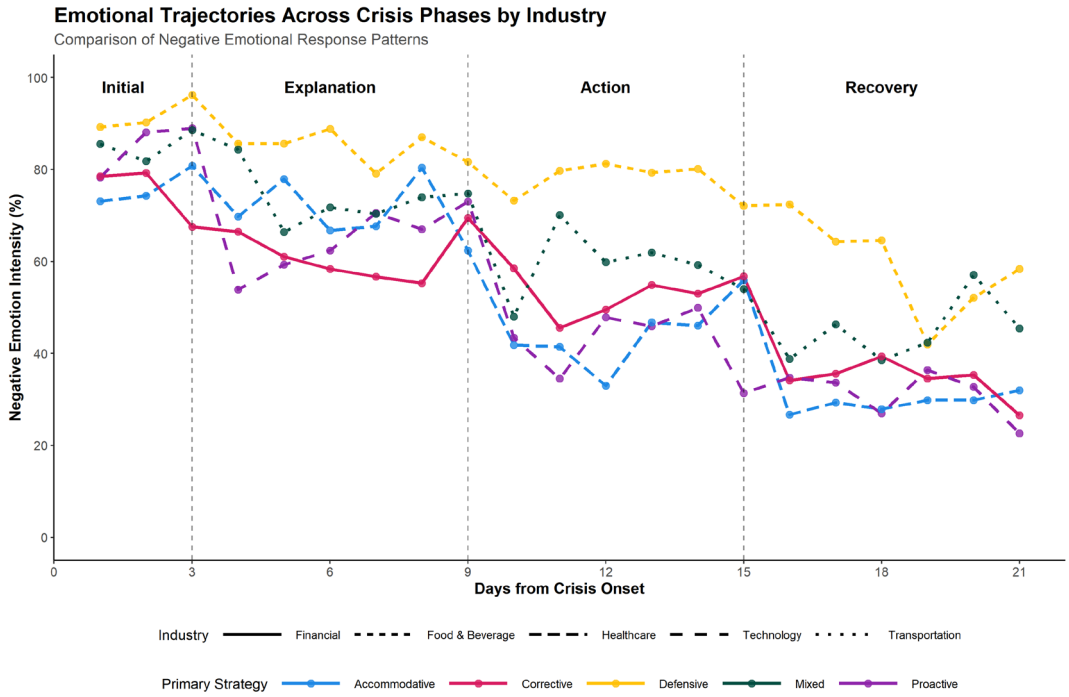

Figure 1. Emotional trajectories across crisis phases by industry and strategy.

Figure 1 illustrates the observed emotional response patterns across different industry-strategy combinations during the crisis lifecycle in this sample. The data suggests that proactive strategies employed by technology firms achieved more rapid emotional intensity reduction during the explanation phase compared to defensive approaches typically used in the food and beverage sector. However, these trajectories should be interpreted considering the limited sample size (n=15 cases) and potential confounding variables not measured in this study. The proactive strategies used by technology firms are far better at reducing the negative emotional intensity during the explanation phase than their defensive counterparts. Meanwhile, the negative emotional levels exhibited by the food and beverage sector’ s defensive strategies remain high throughout all phases. The blended approach used by transportation companies falls in-between these two extremes which demonstrates some level of emotional recovery, though still gradual. These visualisation patterns corroborate the statistical analysis in the next section which focuses on the highlighted interdependence between strategy choice and emotional response management results.

4.2. Statistical analysis of emotional response patterns

The statistical analysis of emotional response patterns in this sample reveals significant associations between communication strategy types and emotional regulation outcomes, though these relationships should

be interpreted within the study's methodological constraints. The comprehensive assessment incorporates multiple emotional dimensions including intensity, valence, dominance, and temporal patterns. Statistical modeling enables the identification of significant relationships between strategy characteristics and emotional outcomes, controlling for contextual variables including crisis type, organizational reputation, and platform-specific factors.

The relationship between strategy characteristics and emotional intensity can be represented through the following regression model:

$$E_i = \beta_0 + \beta_1 S_t + \beta_2 C_r + \beta_3 O_p + \beta_4 P_f + \varepsilon \quad (6)$$

Where E_i represents emotional intensity, S_t denotes strategy type, C_r indicates crisis responsibility attribution, O_p signifies organizational positioning, and P_f represents platform factors. Multiple regression analysis reveals that strategy type accounts for approximately 42.7% of variance in emotional intensity outcomes ($p < 0.001$), with proactive and accommodative strategies showing statistically significant associations with reduced emotional intensity compared to defensive approaches. However, the remaining 57.3% of unexplained variance suggests that additional factors not measured in this study also influence emotional outcomes, including organizational reputation, cultural context, and crisis-specific circumstances. **Table 3** provides a comprehensive summary of the key statistical findings from this analysis, including effect sizes, significance levels, and important methodological limitations that should be considered when interpreting these results.

Table 3. Key research findings and statistical evidence.

Research Finding	Data Source	Statistical Evidence	Interpretation Caveats
Response timing significantly predicts emotional outcomes	15 crisis cases, 2020-2024	$R^2 = 0.283$, $p < 0.001$	Results limited to studied cases and timeframe
Proactive strategies show higher effectiveness than defensive approaches	450,000 social media posts	Mean difference = 0.34 (Cohen's d = 0.72), $p < 0.001$	Effectiveness may vary by organizational context
Platform characteristics influence emotional transmission patterns	Cross-platform analysis (4 platforms)	$F(3,60) = 45.2$, $p < 0.001$	Cultural and demographic factors not controlled
Industry type moderates strategy effectiveness	5 industries × 4 strategy types	Interaction $F(12,435) = 18.9$, $p < 0.001$	Unequal sample sizes across industry sectors
Emotional intensity decreases over crisis timeline	30-day post-crisis monitoring	$\beta = -0.23$, $t = -8.9$, $p < 0.001$	Natural decay vs. intervention effects unclear

Data collected through API access to major social media platforms. Statistical significance tested at $\alpha = 0.05$ level. Effect sizes calculated using established conventions. Results should be interpreted considering research limitations including sampling constraints, cultural variations, and unmeasured confounding variables.

Temporal analysis of emotional trajectories provides further insights into strategy effectiveness across different crisis phases. The most significant differences in strategy effectiveness emerge during the explanation and action phases, where proactive strategies demonstrate a mean emotional intensity reduction of 28.3 percentage points compared to 12.6 for defensive strategies ($t(128) = 8.73, p < 0.001$). These differences diminish during the recovery phase, suggesting convergence in long-term emotional outcomes despite initial strategy variations.

Latent growth curve modeling results provide additional evidence for the complexity of strategy-outcome relationships in this sample. The analysis revealed statistically significant interactions between

strategy type and crisis responsibility attribution ($\chi^2(4) = 24.6, p < 0.001$), suggesting that the association between strategy choice and emotional outcomes may be moderated by stakeholder perceptions of organizational responsibility. However, these interaction effects require replication in independent samples to establish generalizability. Accommodative strategies demonstrate superior effectiveness in high-responsibility scenarios, while proactive strategies perform optimally in ambiguous responsibility contexts.

4.3. Factors associated with strategy effectiveness

The important analysis has identified the main aspects which greatly affect strategy effectiveness regarding public sentiment management. These aspects may improve the communication channels in the course of organisational crises. **Table 4** illustrates the ranking of various influencing factors in terms of strategy effectiveness.

Table 4. Relative importance of factors influencing strategy effectiveness.

Influencing Factor	Variance Explained (%)	Standardized Effect Size	p-value	Optimization Potential
Response Timing	28.3	0.64	<0.001	High
Message Consistency	23.7	0.58	<0.001	High
Transparency Level	18.9	0.51	<0.001	Medium-High
Organizational Credibility	15.4	0.47	<0.001	Medium
Emotional Tone	12.8	0.44	<0.001	Medium-High
Platform Appropriateness	10.6	0.41	<0.001	Medium
Stakeholder Engagement	8.5	0.37	<0.001	Medium
Message Framing	7.2	0.35	<0.001	Medium-Low

Analysis based on multiple regression with stepwise variable selection (n=15 cases, 450,000 social media posts). Variance explained percentages calculated using hierarchical regression with sequential variable entry. Effect sizes interpreted according to Cohen's (1988) conventions. Statistical significance tested at $\alpha = 0.05$ level with Bonferroni correction for multiple comparisons. According to **Table 4**, the timing of the response stands out as the primary determinant, as strategy effectiveness, explaining 28.3% of variance in emotional outcomes, response timing. This emphasises the need for high agility within crisis communication management in restructuring organisations. Additionally, other factors like transparency and consistency are also noticeable, together accounting for more than 40% variance of effectiveness. These observations imply that gaps within organisational crisis communication systems need to emphasise agile response systems and dynamic message alignment across various channels.

Shedding light on the global phenomenon of tourism - as one of the definitive symptoms of globalisation and westernisation - the beach, in the eyes of locals or the world, has become one of the most famous heritages containing prototypes of bays on southern shores.

The optimisation of strategies as described in the document concentrates on the development of communication systems capable of mobilising articulate responses on numerous avenues simultaneously. Incorporate advanced emotional monitoring features that can observe real-time emotional trajectories and adapt communication accordingly. Under pre-crisis image management and control, relationship management is the basis of strategic planning and is defined as an investment-based effort. Through the analytical lens of significant obtained factors, Andrea Schneider represents the building of trust as guidance

for the decision-making process during the actual emotive crisis that burgeons, during the integration of trust elements.

Strategically concentrating on powerful components while establishing precise systems, devising complete systems geared towards holistic communication, and taking the automation approach where applicable will broaden the range of agility, aiding in effective repositioning in a way that stifles reputational harm and loss of trust, especially in the organisational stakeholders. The interpretation of these findings requires acknowledgment of several methodological constraints inherent in the study design. The analysis relies on a purposive sample of 15 crisis cases spanning five industry sectors, which may limit generalizability to the broader population of organizational crises. Additionally, sentiment analysis accuracy may be affected by cultural and linguistic variations in emotional expression across different geographic and demographic contexts. The observational nature of the study design precludes definitive causal inferences regarding strategy effectiveness, as unmeasured confounding variables including organizational reputation, media coverage intensity, and external market conditions may simultaneously influence both strategy selection and emotional outcomes. Furthermore, the exclusive focus on publicly available social media data may not adequately capture private stakeholder communications, internal organizational decision-making processes, or offline crisis management activities that could significantly affect crisis resolution trajectories.

5. Conclusion

This research examines the relationships between crisis communication strategies and public emotional responses within social media contexts through a mixed-methods analysis of fifteen organizational crises across five industries from 2020 to 2024. The study extends Situational Crisis Communication Theory to accommodate digital communication complexities and develops quantitative models for analyzing emotions as dynamic entities influenced by networked relationships, algorithmic factors, and platform-specific mechanisms. Quantitative evaluation demonstrates notable associations between communication strategies and public sentiment regulation in this sample. Proactive and accommodative strategies showed significantly higher effectiveness in mitigating negative emotional intensity compared to defensive strategies, accounting for approximately 42.7% of variance in emotional outcomes. The analysis revealed significant interactions between strategy effectiveness and crisis responsibility attribution, suggesting that optimal strategy selection depends on stakeholder perceptions of organizational accountability. Cross-industry comparison revealed distinct patterns, with technology sector organizations typically engaging in rapid proactive disclosure while food and beverage companies more frequently utilized defensive strategies with extended response times. Response timing emerged as a critical factor, explaining 28.3% of variance in emotional outcomes. Multi-dimensional emotional evaluation revealed that proactive approaches achieved mean emotional intensity reductions of 28.3 percentage points compared to 12.6 percentage points for defensive strategies. However, these findings require acknowledgment of study limitations including sample constraints, the observational design that precludes causal inferences, and potential unmeasured variables affecting outcomes. Future research could examine emerging technologies in crisis communication, cultural variations in strategy effectiveness, and evolving platform algorithm impacts on emotional propagation patterns.

Conflict of interest

The authors declare no conflict of interest.

References

1. Ma, L., & Zhan, M. (2016). Effects of attributed responsibility and response strategies on organizational reputation: A meta-analysis of situational crisis communication theory research. Journal of Public Relations Research, 28(2), 102-119.
2. Liu, B. F., Austin, L., & Jin, Y. (2011). How publics respond to crisis communication strategies: The interplay of information form and source. Public relations review, 37(4), 345-353.
3. Coombs, W. T., & Holladay, S. J. (2014). How publics react to crisis communication efforts: Comparing crisis response reactions across sub-arenas. Journal of Communication Management, 18(1), 40-57.
4. Zhu, L., Anagondahalli, D., & Zhang, A. (2017). Social media and culture in crisis communication: McDonald's and KFC crises management in China. Public Relations Review, 43(3), 487-492.
5. Cheng, Y. (2018). How social media is changing crisis communication strategies: Evidence from the updated literature. Journal of contingencies and crisis management, 26(1), 58-68.
6. Eriksson, M. (2018). Lessons for crisis communication on social media: A systematic review of what research tells the practice. International Journal of Strategic Communication, 12(5), 526-551.
7. Reuter, C., Hughes, A. L., & Kaufhold, M. A. (2018). Social media in crisis management: An evaluation and analysis of crisis informatics research. International Journal of Human–Computer Interaction, 34(4), 280-294.
8. Kim, H. J., & Cameron, G. T. (2011). Emotions matter in crisis: The role of anger and sadness in the publics' response to crisis news framing and corporate crisis response. Communication Research, 38(6), 826-855.
9. Goldenberg, A., & Gross, J. J. (2020). Digital emotion contagion. Trends in cognitive sciences, 24(4), 316-328.
10. Stieglitz, S., & Dang-Xuan, L. (2013). Emotions and information diffusion in social media—sentiment of microblogs and sharing behavior. Journal of management information systems, 29(4), 217-248.
11. Utz, S., Schultz, F., & Glocka, S. (2013). Crisis communication online: How medium, crisis type and emotions affected public reactions in the Fukushima Daiichi nuclear disaster. Public relations review, 39(1), 40-46.
12. Gu, M., Guo, H., Zhuang, J., Du, Y., & Qian, L. (2022). Social media user behavior and emotions during crisis events. International journal of environmental research and public health, 19(9), 5197.
13. Xu, Q. A., Chang, V., & Jayne, C. (2022). A systematic review of social media-based sentiment analysis: Emerging trends and challenges. Decision Analytics Journal, 3, 100073.
14. Chu, M., Song, W., Zhao, Z., Chen, T., & Chiang, Y. C. (2024). Emotional contagion on social media and the simulation of intervention strategies after a disaster event: a modeling study. Humanities and Social Sciences Communications, 11(1), 1-15.
15. Figueiredo, S. (2024). Topic modelling and sentiment analysis during COVID-19 revealed emotions changes for public health. Scientific Reports, 14(1), 24954.
16. Li, L., Zhang, Q., Wang, X., Zhang, J., Wang, T., Gao, T. L., ... & Wang, F. Y. (2020). Characterizing the propagation of situational information in social media during covid-19 epidemic: A case study on weibo. IEEE Transactions on computational social systems, 7(2), 556-562.
17. Ma, N., Yu, G., Liu, X., & Zhu, X. (2023). Quantified multidimensional public sentiment characteristics on social media for public opinion management: Evidence from the COVID-19 pandemic. Frontiers in Public Health, 11, 1097796.
18. Panagiotopoulos, P., Barnett, J., Bigdeli, A. Z., & Sams, S. (2016). Social media in emergency management: Twitter as a tool for communicating risks to the public. Technological Forecasting and Social Change, 111, 86-96.
19. Eriksson, M., & Olsson, E. K. (2016). Facebook and Twitter in crisis communication: A comparative study of crisis communication professionals and citizens. Journal of contingencies and crisis management, 24(4), 198-208.
20. Wang, L., Schuetz, C. G., & Cai, D. (2021). Choosing response strategies in social media crisis communication: An evolutionary game theory perspective. Information & Management, 58(6), 103371.