Journal of Organizational and End User Computing
Volume 34 • Issue 6

How to Promote Public Engagement and Enhance Sentiment Through Government Social Media During the COVID-19 Crisis:
A Public Value Management Perspective

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ABSTRACT

In the period of public health crisis, effective and efficient transmission of crisis information to the public through social media is an important support for achieving social stability and orderly online public engagement. From the perspective of public value management, this study systematically investigated how local government agencies in China used social media to promote public engagement and raise public sentiment during the COVID-19 crisis. Using data captured from the "Wuhan Release" Sina Weibo account, the authors studied the factors that influence public engagement, including information sources, language styles, and media types. Further, it explores the influence of the interactive effects of public value with information sources, language styles, and media types on public engagement and public sentiment. The results show that the consistency of government response content and public value promotes public engagement and raises public sentiment. This research provides enlightenment and ideas for cognition, understanding, and governance of public opinion in practice.

KEYWORDS

Government Social Media, Information Source, Language Style, Media Type, Public Engagement, Public Sentiment, Public Value

INTRODUCTION

Social media has become an indispensable tool for public access to information and government work. According to the 49th China Statistical Report on Internet Development, by December 2021, the number of Chinese internet users reached 1.032 billion. In addition, the number of Weibo accounts of Chinese government agencies certified by Sina Weibo is 177,437. Government agencies can use social media to disseminate information, communicate with public and survey public opinion, especially as a system to quickly distribute information in times of crisis (Graham, 2015; Zhang et al. 2021). Government agencies are increasingly using social media to establish contact with the public

DOI: 10.4018/JOEUC.308819 *Corresponding Author

and encourage the public to participate in government social media in order to eliminate information asymmetry and enhance public sentiment (Meltzer et al., 2018; Barberá, et al. 2019). For example, Li et al. (2020) studied how the government used social media to alleviate the information asymmetry problem in the crisis response process during COVID-19, and showed that through social media platforms, the government can not only solve the problem of information overload, but also it can alleviate the contradictions between governments at all levels. Baniamin (2021) used network analysis technology to analyze the different groups of Bangladeshi people on Face-book and found that people are trying to use social media to solve various information asymmetry problems, realize connections and solve needs. Hong et al. (2021) studied the health information sharing behavior of WeChat users and found that social capital and gratification are the key determinants of health information sharing. Yuniarto et al. (2021) found that the government can suppress the spread of the virus by using social media to disseminate scientific information related to COVID-19 to the public.

Public engagement refers to public participate in public affairs, aimed at establishing a trust relationship that goes beyond simple information exchange (Chen & Min et al., 2020; Di et al., 2016). Public engagement in a crisis period can not only reduce public panic, fear and anxiety, but also improve the ability of government agencies to handle crisis information and provide public services (Chatfield & Reddick, 2018). The benefits of mutual trust and interaction between government agencies and the public are obvious (Díaz-Díaz, et al. 2016). However, the public's willingness and status quo to participate in government social media are currently not good. For example, Parker et al. (2018) studied the role of social media in the field of public value and found that the public usually has five types of communication, such as antagonistic, critical, affirming, action-oriented, and indoctrinating. Su et al. (2021) also pointed out that during the COVID-19, if social media information is not properly disseminated, it will cause public mental health problems.

The government is not optimistic about promoting public engagement and raising public sentiment through social media. The main reason is that most government agencies still view social media as a supplementary channel for disseminating information, rather than as a tool to promote public engagement (Neely & Collins, 2018; Wukich, 2016). Secondly, the two-way interaction and communication between the government and the public is inadequate, most of the interaction is public shares and likes, and the comment interaction is not enough (Tang et al., 2015). Finally, the government agencies may encounter a series of problems, risks, and challenges when they use social media in their work, such as the digital divide, privacy, and security (Carlson et al., 2016; Elbanna et al., 2019).

In recent years, scholars in the fields of management, journalism, and information science have begun to study how to promote public engagement and enhance sentiment through government social media during the COVID-19 crisis. Looking back at previous studies, it is found that the promotion of public engagement through government social media is mainly carried out from the following three aspects. 1) Reveal the influence of language and sentiment through the analysis of content (Yang et al., 2021); 2) Reveal the influence of the topic through the mining of the topic content (Han et al., 2020; Cinelli et al., 2020; Wang & Haase et al., 2020); 3) Reveal the influence of source and media type through analysis of government social media characteristics (Sharif et al., 2016; Wang &Yang et al., 2020; Chen & Min et al., 2020).

The authors agreed that if government agencies want to promote public engagement in government social media and enhance public sentiment, the government must keep its response content consistent with public values. Public opinion is essentially an expression of public value preferences, and the core reason why government responses are not recognized by the public is the inconsistency between the responses and public values. The problem of public opinion response in China can be logically better explained if it is viewed from the perspective of public value consistency, which provides a new way of thinking to explain the governance of public opinion. To date, however, no scholar has discussed the relationship between public value management and public engagement on government social media.

The purpose of this study is to explore how to promote public engagement in government social media and enhance public sentiment. Firstly, based on public value theory (Piotrowski et al., 2002;

Rosenbloom, 2017; Brown, 2021), the response content was classified into two categories, mission based public value and non-mission based public value; secondly, three moderating variables were selected, information source (original vs. repost); language style (formal vs. informal); and media type (plain text vs. visual media). The main findings of this study are as follows: the content of government social media responses has a significant impact on public engagement and public sentiment; the media form used is not the richer the better, but needs to be determined based on the specific content; social-oriented, less formal and more spontaneous informal communication is better for government-public communication in the new media environment.

The structure of this paper is organized as follows: the first part is the introduction; the second part is the theoretical framework and research model; the third part is the data source and analysis; the fourth part is the two-dimensional interaction analysis; the fifth part is the summary of this study; and the sixth part is the discussion, including practical and theoretical implications. Finally, there are references and appendices of the paper.

THEORETICAL FRAMEWORK AND RESEARCH MODEL

Public Value Theory

In the context of public crisis events, how governments can improve their social media response effects is a practical problem that needs to be solved urgently, and it is also an important theoretical proposition (Lin, 2016; Li & Chandra, 2020). Many scholars try to explain and solve this problem based on different theoretical perspectives. In recent years, some scholars have based on the development trend of public management. Driven by the new public management movement, some scholars believe that the government should pursue customer-oriented reform goals and learn all good practices from the private sector (Hsu et al., 2017). Scholars such as Henrich and Holmes (2011) believe that online public opinions are the embodiment of public values, which reflect the public's expectations of government agencies, and social media has become more influential in shaping public engagement, citizenship and political discourse.

It can be inferred from this: in the face of public crisis events, if the government's social media response content did not meet or only partially meets the public's value preferences, it may trigger online public opinion. This inference can also be explained based on the theory of relative deprivation. When the government's social media response content has insufficient supply of value expectations, there will be a relative deprivation (Page & Shapiro, 1983). Therefore, the key for the government to improve the response effect is to reflect public value preferences as much as possible.

The classification of public value is the prerequisite for this research. Based on Piotrowski 's research, this paper divides public values into mission based public values and non-mission based public values. Among them, the mission based public value aims to complete the main tasks of government agencies, which is mandatory. Relevant information can be obtained from specific policies, regulations, and documents. It is derived from the values of traditional public administration concerns, including fairness and efficiency.

Non-mission based public value is also an important part of public value. In fact, the degree to which non-mission based public values are met also affects public sentiment. From a definition point of view, the value that does not support to achieve the goals and tasks of government agencies is non-mission based public value. It has three basic characteristics: (1) It is not innate when government agencies are created; (2) Promoting the development of values that has nothing to do with organizational tasks, such as government transparency, information disclosure and accountability; (3) The values that the public expects with the attributes of "good government" should be included.

Based on the above definition and combined with a series of policy and regulatory documents, mission based public values coding can be carried out (Table 1). For government social media content, the mission based public values can be summarized as: truth, justice, efficiency, and responsibility.

Table 1. Mission based public values

Policy regulatory documents	Content involving mission based public values	Coding
"Opinions on Further Strengthening the Disclosure of Government Information to Respond to Social Concerns and Improve the Government's Credibility" (General Office of the State Council of the PRC), 2013	• Improve government credibility • Respond in a timely manner through online news releases, press conferences, etc. • To respond to public concerns, government must speak with facts, avoid empty preaching, and really play a positive role in guiding.	Justice Efficiency.
"Notice on Further Responding to Public Opinions in Government Affairs in the Work of Open Government Affairs" (General Office of the State Council of the PRC), 2016	• It is necessary to respond promptly to public opinions involving major emergencies. • The content should focus on the hotspots and key issues of public opinion, seek truth from facts, be well-founded, and investigate and deal with in accordance with laws and regulations.	Truth Justice
"Opinions on further compacting the main responsibility of the information content of the website platform"(National Internet Information Office), 2021	• Guide and promote the website platform to accurately grasp the main responsibility, clarify the work specifications, improving the management system and operating rules. • Effectively prevent and resolve various hidden risks, and actively create a clear cyberspace.	Efficiency Responsibility

In the context of the COVID-19 crisis, mission based public values are also manifested in the four dimensions of efficiency, responsibility, facts, and justice. It is easy to judge that these four public values are not only the value content explicitly required by the policy documents, but also the public values preferred by the public and mainstream media. It can be inferred from this that the higher the consistency between the government social media response content and the mission based public values, the more helpful it is to promote online public engagement and emotional enhancement. Therefore, this paper proposes hypothesis H1.

H1: The consistency of government social media response content and mission based public values will positively affect public engagement (H1a) and public sentiment (H1b).

Non-mission based public value is not compulsory due to the lack of policy regulations, and belongs to the value that the public expects that the government can provide in addition to missions. Based on the literature, this paper constructs a non-mission public value set consisting of four values: transparency, accountability, reasonableness, and sympathy for the weak (Table 2). From the above analysis, it can be seen that non-mission based public value satisfies the alternative value preference of the public, and has more requirements for the content of government social media responses. Previous studies have shown that the commitment to transparency and accountability in the response can help

Table 2. Non-mission based public values

Literatures	Content involving non-mission based public values	Coding
Rosenbloom (2017)	• It promotes the development of public values such as government transparency, information disclosure, and accountability; • It improves social groups that are politically and economically disadvantaged.	Transparency Sympathy for the weak
Moynihan et al. (2012)	• It is closely linked to values such as accountability, transparency, and legitimacy.	Accountability, Transparency, Reasonableness

calm the situation. Responding reasonable and sympathizing with the weak can gain good feelings, eliminate barriers, and help promote public engagement and emotional enhancement. Therefore, this paper proposes hypothesis H2.

H2: The consistency of government social media response content and non-mission based public values will positively affect public engagement (H2a) and public sentiment (H2b).

INFORMATION SOURCE

When government agencies respond to the public through social media, in addition to the original content of the official account, they often forward some important information from other media account. During the COVID-19, local government Weibo accounts will forward content from other Weibo accounts, such as People's Daily Online, CCTV News, and Healthy China. Among them, Healthy China is the official Weibo of the National Health Commission. However, do original content and reposted content have different effects on public social media engagement and public sentiment? That is, whether there is a difference in the influence of the source of the information on the public. The current research on this issue was still insufficient. However, there have been a lot of research results on the relationship between information sources and consumer behavior in the fields of marketing and e-commerce.

For example, Filieri et al. (2018) studied the influence of information sources on consumer behavior, and the results revealed that expert-sourced information is helpful for consumers to evaluate service quality, which indirectly affects consumers' willingness to purchase. Ismagilova et al. (2020) systematically reviewed the impact of source trustworthiness characteristics on consumer behavior, and pointed out that source trustworthiness has a positive effect on adoption of eWOM and intention to buy. Xie et al. (2017) pointed out that Chinese government social media is playing an increasingly important role in crisis communication. Bonsón et al. (2015) studied the engagement of people in Western Europe on local government Face-book websites, and found that different media and content types have obvious differences in the degree of citizen engagement. During the public health crisis, Qazi et al. (2020) found that the authoritative and formal information sources can increase public awareness of the situation and increase protective health behaviors, thereby curbing the spread of the virus. Yang et al. (2021) studied the posts of the "Wuhan Release" Weibo account and found that original tweets can promote user engagement more than tweets from other accounts.

In the context of the COVID-19 crisis, the public eagerly hope to obtain the real situation and progress of events happening around them in order to take corresponding measures. Information posted by official government social media accounts is more likely to receive public attention than information retweeted from other media accounts. Therefore, the authors believe that during a public health emergency, information from different sources will have different effects on public social media engagement and public sentiment. Furthermore, information derived from official government social media accounts can better promote public engagement and enhance public sentiment. Thus, the following hypotheses H3 and H4 are proposed.

H3: When government social media response content is consistent with mission based public values, original post can promote public engagement (H3a) and enhance public sentiment (H3 b) more than reposted post.

H4: When government social media response content is consistent with non-mission based public values, original post can promote public engagement (H4 a) and enhance public sentiment (H4 b) more than reposted post.

LANGUAGE STYLE

Thelwall et al. (2009) first studied the language of social media, with the purpose of determining whether the language of the Internet is closer to spoken or written. They found that languages on different internet platforms (such as twitter, social networking sites, blogs, etc.) have different similarities with spoken and written language. Specifically, web language is more similar to written language, and its main characteristics are information-oriented, more formal and complex; while social media language is more similar to spoken language, with its main characteristics being social-oriented, less formal and more spontaneous.

For example, Lee et al. (2018) found that emotional information is more likely to be shared on Face-book and complexity reduces consumer engagement. Deng et al. (2021) also pointed out that complexity of posts negatively impacts consumer engagement. Gretry et al. (2017) found that adopting an information communication style on social media can increase the trust of consumers who are familiar with the brand. Barcelos et al. (2018) found that the use of human voice on social media can increase the hedonic value of consumers' online experience, thereby increasing consumers' willingness to buy.

In addition, studies in the field of sociolinguistics have found that emotional, informal, and less complex language is relationship-oriented (Rennekamp and Witz, 2020; Gesselman et al., 2019). Therefore, use to emotionalize, informal and less complex language styles can positively influence consumer engagement. Otterbacher et al., (2017) found that informal communication styles can be used to soften hierarchical power relations, reduce social distance, and convey a sense of intimacy.

In the context of the COVID-19 crisis, the government and the public need to adopt equal and dialogue communication style. In this paper, the style of government social media is divided into informal communication style and formal communication style. Informal communication refers to an emotional, less complicated, and equal interactive communication style. Formal communication refers to official, more complex, and more structured information release and communication style. The authors believe that when the government uses social media to communicate with the public, it should fully consider the characteristics of social media language, that is, social media language is more similar to spoken language, with its main characteristics being social-oriented, less formal and more spontaneous. Therefore, in order to achieve the desired effect, the government should adopt equal and interactive informal communication style on social media. Based on the above analysis, the authors propose the following hypotheses H5 and H6:

H5: When government social media response content is consistent with mission based public values, informal communication style arouses more active public engagement (H5a) and public sentiment (H5b) than formal communication style.

H6: When government social media response content is consistent with non-mission based public values, informal communication style arouses more active public engagement (H6a) and public sentiment (H6b) than formal communication style.

MEDIA TYPE

The content posted on social media is usually presented in the type of plain text, pictures or videos, and their media richness ranges from low to high (Yue et al. 2019). Due to word limit, social media information releasers usually expand the content they want to express by including supplementary materials (such as figures or videos) (Lee & Xu, 2018). Therefore, different types of social media show different media richness. Daft and Lengel (1986) proposed the theory of media richness and pointed out that higher media richness is not always better; it depends on the specific content of the organization's mission. In other words, the best results can be obtained when the media richness matches the mission.

Regarding the research on the relationship between media richness and public engagement, the existing results are quite controversial. For example, Lee and Xu (2018) found that plain text tweets are the most popular, and tweets that include pictures have no effect on the number of likes and shares received. In addition, it is observed that the video has no effect on sharing, but it greatly reduces the number of likes. Xu and Zhang (2018) found that the number of words contained in each post has a significant impact on the number of shares. For pictures, there are also some controversial conclusions. Ji and Chen et al. (2019) supported that pictures increase the

number of comments received. However, Kim and Yang (2017) found that pictures reduce comments. For video, Kim and Yang (2017) found that video has no effect on the number of likes and comments, but it does increase the number of reposts. However, Ji and Chen et al. (2019) found that video increased likes and shares, while comments decreased. Chung (2017) confirmed that the negative impact of video on sharing is not significant.

In the context of the COVID-19 crisis, authors believed that: (1) the public is more concerned about whether government social media information can meet their needs and reduce uncertainty. For example, Hong et al. (2018) found that the matching degree of demand and supply determines the effect of online communication. During the crisis, the public expects the government to provide timely and accurate information (Bakker et al., 2019). Xie et al. (2017) found that the public is most interested in receiving information about the government's handling of crises and crisis development. (2) According to media richness theory (Chen et al., 2020), media richness should match the specific context and missions; if the application of high media richness does not match the missions, poor results will be obtained. Based on the above analysis, the authors propose the following hypotheses H7 and H8.

H7: When government social media response content is consistent with mission based public values, plain text evokes more active public engagement (H7a) and public sentiment (H7b) than visual media.

H8: When government social media response content is consistent with non-mission based public values, visual media evokes more active public engagement (H8a) and public sentiment (H8b) than plain text.

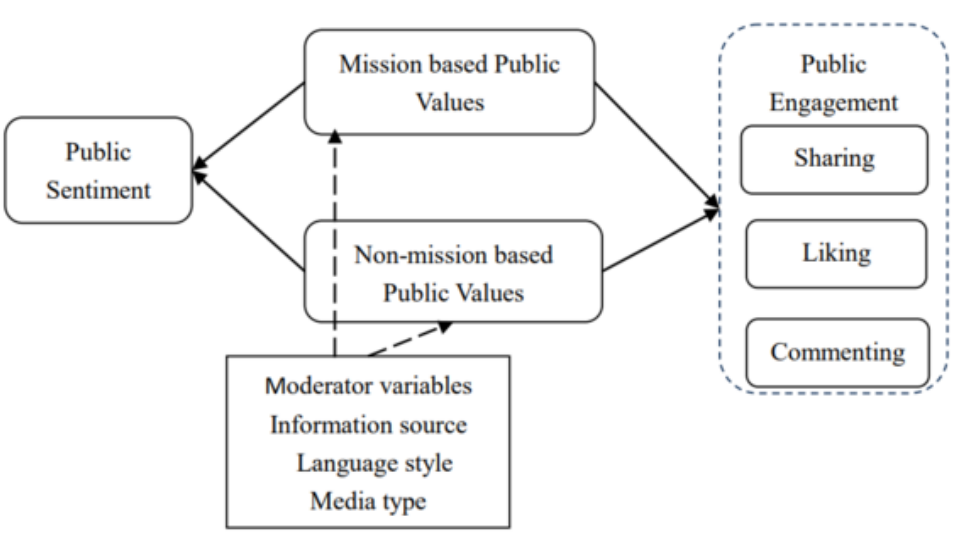
Based on the above hypotheses and theories, the authors made an analysis of the differences between the existing literature and the current study in terms of variables, theories and data sources (Table 3).

In summary, the authors propose the research model as shown in Figure 1:

Table 3. Comparison of the literature

Authors/ Year	Variables	Theory	Data
Chen Q. et al., (2020)	IV: media richness; dialogic loop; content type	dialogic communication theory media richness theory	1441 posts 'Healthy China' Sina Weibo account
	DV: citizen engagement		
	MOV: emotional valence		
Bonsón E. et al., (2015)	IV: media type; multimedia content; administration style; open local governments	——	2950 posts of face-book, 75 Western EU local governments
	DV: citizen engagement		
Graham, M. W. et al., (2015)	IV: crisis type; community size	Situational crisis communication theory (SCCT)	125 participants who started the survey
	DV: social media use		
Wang, Y. et al., (2020)	IV: dialogic principles	Dialogic communication theory	6678 tweets were posted by the sampled organizations
	DV: Public engagement		
Xu, W. et al., (2018)	IV: Sentiment; Richness; Authority; Relevance	Elaboration Likelihood Model	83,192 tweets about 83,192 tweets in Twitter
	DV: social media sharing		
This study	IV: mission based public values; non-mission based public values	Public value theory Media rich theory	2552 Weibo posts and 285,935 comments released by "Wuhan Release" Weibo account
	DV: public engagement; public sentiment		
	MOV: information source; language style; media type		
Notes: IV means independent variables; DV means dependent variables; MOV means moderator variables.			

Figure 1. Research model



DATA SOURCES AND ANALYSIS

This study takes COVID-19 as an example. Wuhan City is the place where the first case occurred in China. Therefore, it is more representative to use the Wuhan government Weibo account "Wuhan Release" as the object, and to collect data from January 1 to April 30, 2020 as the analysis corpus. The content of the post and the number of likes, comments, shares, release time, topics text, comments and other related information of the post are extracted. Considering that the authors need to perform sentiment analysis on the comments of posts, we only keep posts with comments greater than ten, 2552 Weibo posts and 285,935 comments were retained. Subsequent model analysis and testing are done using SPSS Statistics 25.0.

RESEARCH VARIABLES

The dependent variables of this study are divided into two aspects, public sentiment and public engagement (including sharing, commenting, and liking). Public sentiment is obtained by computing the sentiment of comments (Liu et al., 2018; Kaur et al., 2019). Calculate the positive probability of each comment. The value ranges from 0 to 1. The closer the value is to 1, the more positive the sentiment of the comment, and the closer the value is to 0, the more negative the sentiment of the comment. The public sentiment value of each post refers to the proportion of positive comments in the total comments. Public engagement includes sharing, commenting and liking. Among them, sharing refers to the number of reposts obtained by the Weibo post, commenting refers to the number of comments obtained by the Weibo post, and liking refers to the number of likes obtained by the Weibo post.

The independent variables include mission based public values (MPV) and non-mission based public values (NPV). Analyze the content of each Weibo post, and judge according to Table 1 and 2. MPV=1 if the content of the post relates to the mission of the government agency, otherwise MPV=0. NPV=1 if the content of the post relates to the non-mission of the government agency, otherwise NPV=0. Further, the topic text of Weibo posts was analyzed, which were between two hashtags (#). When the topic text contains words such as anti-epidemic, information briefing, defense, announcement, etc., it

can be determined that the Weibo post is consistent with mission based public values. When the topic text contains words such as Wuhan must win, Wuhan be strong, Wuhan hold on, life service, health news, etc., it can be determined that the Weibo post is consistent with non-mission based public values. Detailed results of topic text analysis and public values coding are in Appendix 1 and Appendix 2.

This study had three moderator variables, namely information source (IS), language style (LS) and media type (MT). The information source refers to the source of the Weibo post. When the post is the original content of the account "Wuhan Release", IS=1; when the post is from the other Weibo accounts, IS=0. Language style refers to the language style adopted by the post. If it is a formal language style, LS=1; if it is an informal language style, LS=0. Media types are divided into plain text and visual media (pictures and videos) according to the media rich theory. If the post is plain text, MT=1; if it contains visual media, MT=0. The names, symbols and measurements of the variables can be seen in Table 4.

Table 4. Variables description

Variables	Name	Symbol	Variables description and measurement
dependent variables	Public Sentiment	PS	The percentage of positive comments on this post.
	Sharing	SH	The number of reposts obtained by this post.
	Commenting	CM	The number of comments obtained by this post.
	Liking	LK	The number of likes from the public on this post.
Independent variables	Mission based Public Values	MPV	The content of this post involves mission based public values, and the value is 1; otherwise, the value is 0.
	Non-mission based Public Values	NPV	The content of this post involves non-mission based public values, the value is 1; otherwise, the value is 0.
Moderator variables	Information Source	IS	The post is generated by the local government media, the value is 1; sharing post from other accounts, the value is 0.
	Language Style	LS	The post adopts a formal style, the value is 1; adopts an informal style, the value is 0.
	Media Type	MT	The post is a plain text , the value is 1; it contains visual media (pictures or videos), the value is 0;

DATA ANALYSIS

First, the authors perform descriptive statistical analysis on the sample data, and the results are shown in Table 5.

From Table 5, the authors find that the number of shares, comments, and likes of Weibo posts are too large, and do not conform to the normal distribution. In the subsequent analysis, the three variables will be logarithmic transformation.

From the correlation analysis results of the variables in Table 6, it is found that the public government social media engagement behavior is highly correlated. For example, the number of likes and comments are positively correlated with a correlation coefficient of 0.829; the number of likes and shares are positively correlated with a correlation coefficient is 0.76; the number of comments is positively correlated with the number of shares, and the correlation coefficient is 0.712. Mission based public values and non-mission based public values are significantly negatively correlated with a correlation coefficient of -0.702. In addition, Mission based public value is significant positive correlated with Weibo post language styles, with the correlation coefficient is 0.458. Non-mission based public value and public sentiment are significant positive correlation, the correlation coefficient is 0.4.

Table 5. The descriptive statistics of sample characteristics

Symbol	Min	Max	Mean	SD	N
PS	0	1	0.52	0.20	2552
SH	0	75712	76.62	1550.23	2552
CM	1	85645	112.04	1717.39	2552
LK	1	2625954	1397.74	52087.25	2552
MPV	0	1	0.21	0.40	2552
NPV	0	1	0.32	0.39	2552
IS	0	1	0.87	0.33	2552
LS	0	1	0.26	0.44	2552
MT	0	1	0.18	0.39	2552

Table 6. Correlation analysis

	PS	SH	CM	LK	MPV	NPV	IS	LS	MT
PS	1								
SH	-0.005	1							
CM	-0.110***	**0.712*****	1						
LK	-0.031	**0.760*****	**0.829*****	1					
MPV	-0.161***	0.037	0.128***	0.030	1				
NPV	**0.400** ***	-0.004	-0.099***	-0.037	**-0.702*****	1			
IS	-0.037	-0.138***	-0.059**	-0.123***	0.256***	-0.201***	1		
LS	-0.153***	0.038	0.169***	0.084***	**0.458*****	-0.340***	0.219***	1	
MT	0.109***	-0.066**	-0.165***	-0.066**	-0.155***	0.103***	0.023	-0.211***	1
Notes: *p<0.05, **p<0.01,***P<0.001;All the p-value are for two-tailed tests; the same as following									

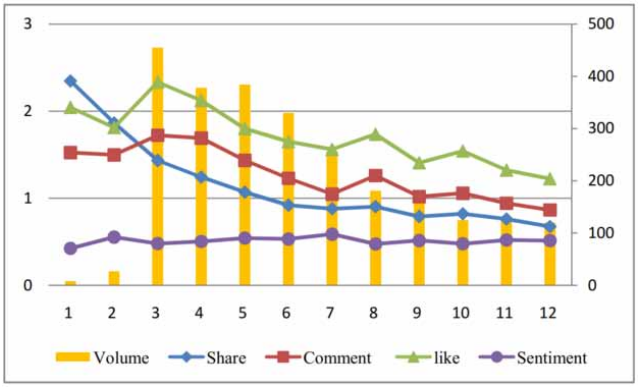
EVOLUTION OF PUBLIC ENGAGEMENT AND PUBLIC SENTIMENT

Next, the authors analyze the evolution of public engagement behavior (including sharing, commenting and liking) and public sentiment. During the data collection period from January 1 to April 30, 2020, the Weibo account "Wuhan Release" issued Weibo posts in 118 days. If the data is visualized on a daily basis, the visualization effect is not good due to too many data points. This study takes 10 days as an interval. Count the number of Weibo posts sent during the time interval, as well as the average number of shares, comments and likes received by each Weibo post. The statistical results are shown in Figure 2.

From Figure 2: In the early stage of the COVID-19 crisis, the number of Weibo posts was relatively small, but the number of shares, comments, and likes received by Weibo posts were higher due to the active public engagement. However, the value of public sentiment is at its lowest at this time. The main reason for this phenomenon is that the supply of government social media content is less than the public demand. The public is not clear about the current crisis and progress. The existence of information asymmetry makes the public anxious, uneasy and nervous, resulting in lower public sentiment.

With the development of the COVID-19 crisis, there was a sudden increase in the number of Weibo posts, and then gradually decreased. The public's engagement behavior also increased with

Figure 2. Evolution of public engagement and public sentiment



the evolving trend of Weibo posts, and then gradually decreased. Public sentiment fluctuates in the early stage of the event, and basically stabilizes at a fixed value in the later stage. This shows that government agencies communicate with the public in a timely manner through social media, which helps stabilize the public's sentiment towards the COVID-19 incident at a higher value in the later period. The social media work of government agencies has achieved good results.

REGRESSION AND VARIANCE ANALYSIS

Through IBM SPSS 25.0 software, the authors performed regression analysis on the variables, and the results are shown in Table 7. In model 1, the dependent variable is public sentiment and the regression model is shown in equation (1). When the response content of government social media is consistent with mission based public values ($t=10.431$, $p<0.001$) and non-mission based public values ($t=22.671$, $p<0.001$), it has a significant impact on public sentiment. Therefore, **Hypothesis H1b and Hypothesis H2b are supported**.

Table 7. Regression analysis

Variables	Model 1		Model 2		Model 3		Model 4	
	SC	SD	SC	SD	SC	SD	SC	SD
MPV	0.277***	0.011	0.077**	0.036	0.060*	0.039	-0.007	0.039
NPV	0.565***	0.012	0.036	0.040	-0.021	0.043	-0.034	0.043
LS	-0.076***	0.009	0.039	0.030	0.131***	0.032	0.100***	0.033
MT	0.077***	0.005	-0.046*	0.017	-0.124***	0.018	-0.039*	0.018
IS	0.021*	0.006	-0.158***	0.016	-0.104***	0.017	-0.149***	0.017
N	2552		2552		2552		2552	
Adjust R^2	0.199		0.029		0.059		0.030	
F	127.646		15.263		31.683		15.974	
Notes: SC means standard coefficient; SD means standard error								

$$PS = 0.277*MPV + 0.565*NPV - 0.076*LS + 0.077*MT + 0.021*IS \quad (1)$$

$$SH = 0.077 * MPV - 0.046 * MT - 0.158 * IS \quad (2)$$

$$CM = 0.06 * MPV + 0.131 * LS - 0.124 * MT - 0.104 * IS \quad (3)$$

$$LK = 0.100 * LS - 0.039 * MT - 0.149 * IS \quad (4)$$

In Models 2, 3 and 4, the dependent variables are Sharing, Commenting and Liking, respectively, regression models is shown in equations (2-4). When the government's social media response content is consistent with the mission based public values, it has a significant impact on the public's sharing (t=2.638, p=0.008) and commenting (t=2.082, p=0.037) behavior. However, when the government's social media response content is consistent with the non-mission based public values, the effects on the dependent variables sharing, commenting and liking were all insignificant. Therefore, **Hypothesis H1a is partially supported, Hypothesis H2a is not supported**.

Furthermore, the authors use analysis of variance to explore whether information sources, media types and language styles have an impact on public sentiment and public engagement. The results are shown in Table 8. The public sentiment value and public engagement of the original posts of the "Wuhan Release" account are significantly higher than those of the posts reposted by other media accounts. The source of information has an impact on public sentiment and public engagement behaviors.

Table 8. Variance analysis

	Information Source (IS)			Media Type (MT)			Language Style (LS)		
	Original	**Repost**	**F**	**Text**	**Visual**	**F**	**Formal**	**Informal**	**F**
PS	0.69*	0.59*	5.33	0.65**	0.75**	7.86	0.61***	0.73***	11.89
CM	1.76***	1.29***	37.23	1.70	1.57	ns	1.64	1.70	ns
SH	1.57*	1.39*	5.85	1.53	1.56	ns	1.46*	1.59*	4.98
LK	2.48**	2.25**	9.41	2.43	2.44	ns	2.38	2.48	ns

TWO-DIMENSIONAL INTERACTIVE ANALYSIS

Interaction of information sources and public values

This section explores the two-dimensional interactive effect of information sources and public values. The results are shown in Table 9 and Figure 3.

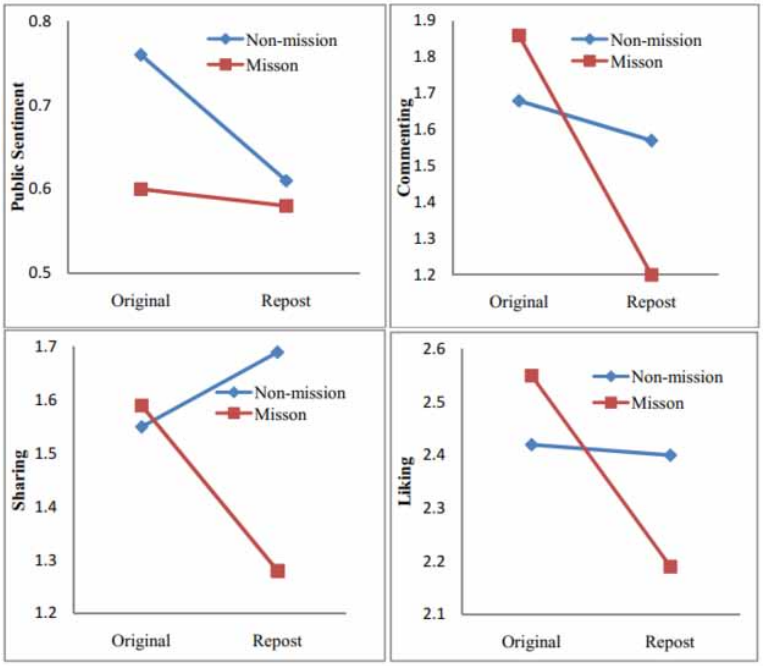
When government social media response content is consistent with non-mission based public values, original post can enhance public sentiment more than reposted post (Original=0.75, Repost=0.61, P<0.05). **Hypothesis H4b is supported**. However, Weibo posts from different accounts have no impact on public engagement. Therefore, **hypothesis H4a is not supported.**

When government social media response content is consistent with mission based public values, the number of shares (Original =1.59, Repost=1.28, P<0.001), comments (Original =1.86, Repost =1.19, P<0.001) and likes (Original =2.55, Repost=2.19, P<0.001) received by the original posts

Table 9. Interactive effect of information sources and public values

PV	MPV			NPV		
IS	Original	Repost	F	Original	Repost	F
PS	0.60 (0.031)	0.58 (0.026)	ns	0.76* (0.023)	0.61* (0.022)	3.91
CM	1.86*** (0.058)	1.19*** (0.053)	36.89	1.68 (0.034)	1.57 (0.032)	ns
SH	1.59*** (0.054)	1.28*** (0.044)	10.52	1.55 (0.038)	1.69 (0.036)	ns
LK	2.55*** (0.059)	2.19*** (0.048)	11.71	2.42 (0.035)	2.40 (0.034)	ns

Figure 3. Interactive effect of information sources and public values



were significantly higher than that of posts from other Weibo accounts. **Hypothesis H3a is supported**. On the contrary, Weibo posts from different sources did not have a significant impact on public sentiment. **Hypothesis H3b is not supported**.

From Figure 3, it can be found that in terms of public sentiment, the interaction effect between information sources and non-mission based public values is significant. In terms of public engagement, the interaction effect between information sources and mission based public values is significant. This provides theoretical support for the government's social media crisis response strategy. For example, when posting non-mission based public value content, government social media should try to use original posts, which can significantly enhance public sentiment. When posting mission based public value content, original content should also be used, as this can promote public engagement behaviors.

INTERACTION OF LANGUAGE STYLES AND PUBLIC VALUES

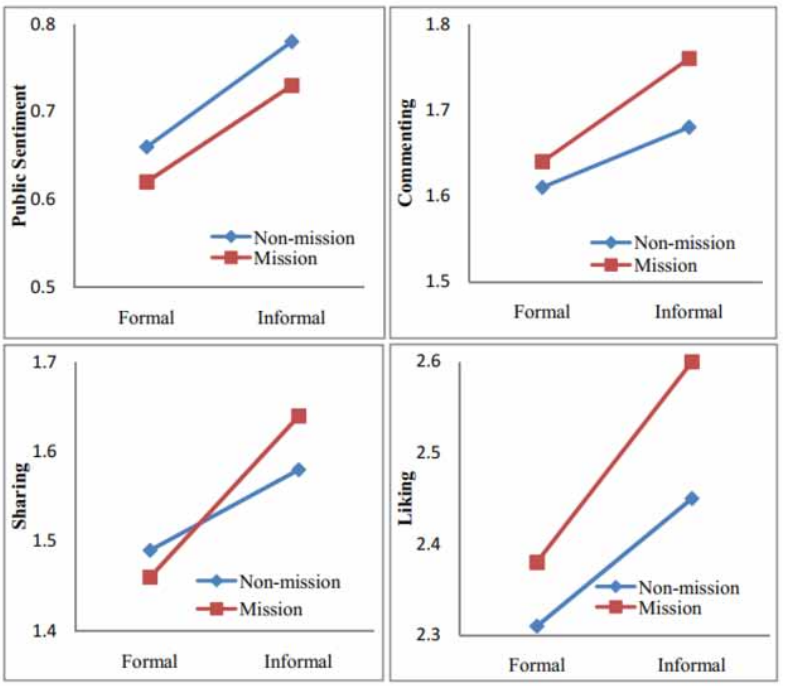
Through the analysis of variance, this study further explores the two-dimensional interactive effect of language styles and public values. The results are shown in Table 10 and Figure 4.

When government social media response content is consistent with mission based public values, informal communication style arouses more active public liking behavior than formal communication style (Formal=2.38, Informal=2.60, P<0.05). **Hypothesis H5a is partially supported**. In term of public sentiment, informal communication style is significant greater than that of formal communication style (Formal=0.62, Informal=0.73, P<0.05). **Hypothesis H5b is supported**.

Table 10. Interactive effect of language styles and public values

PV	MPV			NPV		
LS	**Formal**	**Informal**	**F**	**Formal**	**Informal**	**F**
PS	0.62* (0.031)	0.73* (0.026)	ns	0.66** (0.020)	0.78** (0.025)	13.18
CM	1.64 (0.061)	1.76 (0.053)	ns	1.61 (0.032)	1.68 (0.034)	ns
SH	1.46 (0.051)	1.64 (0.044)	ns	1.49 (0.036)	1.58 (0.041)	ns
LK	2.38* (0.054)	2.60* (0.048)	4.02	2.31 (0.034)	2.45 (0.036)	ns

Figure 4. Interactive effect of language styles and public values



When government social media response content is consistent with non-mission based public values, informal communication style arouses more active public sentiment than formal communication style (Formal=0.66, Informal=0.78, P<0.01). **Hypothesis H6b is supported**. When government social media response content is consistent with non-mission based public values, the results are not significant. **Hypothesis H6a is not supported.**

As can be obtained from Figure 4, in terms of public sentiment, the interaction effect of language types and non-mission based public values is significant. In terms of public engagement, the interaction effect of language type and mission based public values was significant only in the dependent variable of Liking.

INTERACTION OF MEDIA TYPES AND PUBLIC VALUES

Through the analysis of variance, this study further explores the two-dimensional interactive effect of government social media types and public value. The results are shown in Table 11 and Figure 5.

When government social media response content is consistent with mission based public values, plain text type evokes more active public commenting behavior (Plain Text=1.75, Visual Media =1.18, P<0.001) and public liking behavior (Plain Text=2.49, Visual Media=2.21, P<0.005) than visual media type. **Hypothesis H7a is partially supported.** In terms of public sentiment, on the contrary, the value of visual media type is greater than that of plain text type. However, the result is not significant (Plain Text=0.65, Visual=0.72, ns). Therefore, **hypothesis H7b is not supported.**

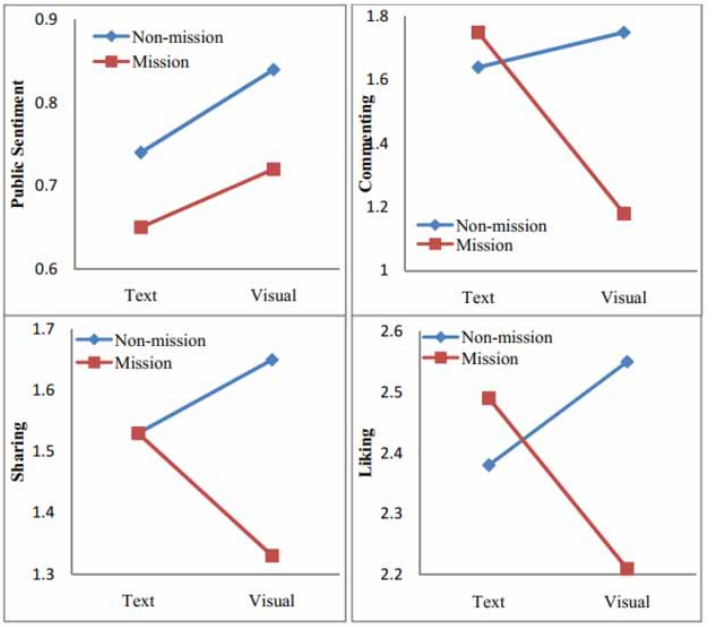
When government social media response content is consistent with non-mission based public values, visual media type evokes more active public liking behavior than plain text type, and the result is significant (Plain Text=2.38, Visual Media=2.55, P<0.05). In terms of public sharing behavior (Plain Text=1.53, Visual Media =1.65, ns) and public commenting behavior (Plain Text=1.64, Visual Media =1.75, ns), although the value of the visual media type is higher than that of the plain text type, the result is not significant. Therefore, **hypothesis H8a is partially supported.** In terms of public sentiment, the value of visual media type is greater than that of plain text type, and the result is significant (Plain Text=0.74, Visual Media =0.84, P<0.05). Therefore, **hypothesis H8b is supported.**

In Figure 5, the authors found that media types interacted significantly with mission based public values in terms of Commenting and Liking behaviors. In terms of public sentiment, media types interacted significantly with non-mission based public values. Therefore, to enhance public sentiment when posting non-mission based public values content, government social media should use visual media, such as videos and images.

Table 11. Interactive effect of media types and public values

PV	MPV			NPV		
MT	Plain Text	Visual Media	F	Plain Text	Visual Media	F
PS	0.65 (0.026)	0.72 (0.028)	ns	0.74* (0.024)	0.84* (0.035)	4.26
CM	1.75*** (0.055)	1.18*** (0.053)	13.41	1.64 (0.040)	1.75 (0.048)	ns
SH	1.53 (0.047)	1.33 (0.043)	ns	1.53 (0.041)	1.65 (0.080)	ns
LK	2.49* (0.052)	2.21* (0.048)	3.70	2.38* (0.041)	2.55* (0.059)	4.71

Figure 5. Interactive effect of media types and public values



CONCLUSION

Based on the perspective of public value theory, this research explores the impact of local government social media responses on public engagement and public sentiment during COVID-19. Specifically, the content of government social media responses is divided into mission based public values and non-mission based public values. First, through regression analysis, explore whether public value has an impact on public engagement in local government social media and public sentiment. Secondly, the three moderator variables of information source, language and media type are introduced, and the interaction between them and public value is studied separately through analysis of variance. The conclusions of the study are summarized in Table 12.

DISSCUSSION

Practical Implications

Based on the above conclusions, it can bring enlightenment for cognition, interpretation and optimization of government crisis response by social media based on public values:

1. According to Hypothesis 1 and 2, when the government responds to a crisis through social media, the content of the response should be consistent with public values. The purpose of this is to eliminate public opinion and enhance public sentiment by satisfying public value preferences.
2. According to the findings of hypothesis 3 and 4, both original tweets and repost tweets, have an effect on public engagement and public sentiment, but this effect is not strong. The government can choose according to the actual situation when responding to a crisis.
3. Based on the findings of hypothesis 5b and 6b, it can be inferred that informal communication style with characteristics such as social-oriented, less formal and more spontaneous can improve public sentiment more than formal communication style. Therefore, in the social media environment,

Table 12. Research conclusions

Hypothesis	Result
H1: The consistency of government social media response content and mission based public values will positively affect public engagement (H1a) and public sentiment (H1b).	H1a is partially supported
	H1b is supported
H2: The consistency of government social media response content and non-mission based public value will positively affect public engagement (H2a) and public sentiment (H2b).	H2a is not supported
	H2b is supported
H3: When government social media response content is consistent with mission based public values, original post can promote public engagement (H3a) and enhance public sentiment (H3b) more than reposted post.	H3a is supported
	H3b is not supported
H4: When government social media response content is consistent with non-mission based public values, original post can promote public engagement (H4a) and enhance public sentiment (H4b) more than reposted post.	H4a is not supported
	H4b is supported.
H5: When government social media response content is consistent with mission based public values, informal communication style arouses more active public engagement (H5a) and public sentiment (H5b) than formal.	H5a is partially supported
	H5b is supported
H6: When government social media response content is consistent with non-mission based public values, informal communication style arouses more active public engagement (H6a) and public sentiment (H6b) than formal.	H6a is not supported
	H6b is supported
H7: When government social media response content is consistent with mission based public values, plain text type evokes more active public engagement (H7a) and public sentiment (H7b) than visual media type.	H7a is partially supported
	H7b is not supported
H8: When government social media response content is consistent with non-mission based public values, visual media type evokes more active public engagement (H8 a) and public sentiment (H8 b) than plain text type.	H8a is partially supported
	H8b is supported

the government should adopt social media language to communicate with the public, rather than emphasizing authority and using complex written language.

4. According to the conclusions of Hypothesis 7 and 8, the richer the media type, the better the results are not necessarily. The media type should be determined by the mission. For example, in this study, plain text works well when publishing the contents of mission based public value; visual media works better when publishing the contents of non-mission based public value.

THEORETICAL IMPLICATIONS

The theoretical contribution of this research is mainly reflected in two aspects:

1. First, this study enriches modern public value theory. An empirical study of promoting public engagement in government social media during the COVID-19 validated that the applicability of public value theory in government crisis management.
2. Second, this study further supports the media richness theory. Scholars in marketing and business management have validated the media richness theory when studying communication with customers through social media. In the field of government crisis management, although scholars have adopted media richness theory for communication research, the research is

still insufficient. This study further explores the role of media richness in government-public communication through social media during COVID-19. The results of this study further support the conclusion that higher media richness is not always better, it depends on the specific content of the organization's mission. in other words, the best In other words, the best results can be obtained when the media richness matches the mission.

LIMITATIONS AND FUTURE RESEARCH

Crisis response is a very complex systemic problem. This paper proposes that public value should be emphasized in response, but it does not mean that public value is the only decisive factor. There are many factors that influence public engagement in government social media and public sentiment, and recent studies have shown that factors such as the sentiment, topic, interestingness, and usefulness of Weibo posts are very important (Tang et al.,2021; Zhou et al.,2021). These issues were not discussed in this study. In future studies, we will focus on the interaction effects of public values with these factors.

Due to data limitations, the data collected in this study only comes from the Weibo account "Wuhan Release". Are the empirical results obtained from the single-sample data universal? This issue has not been resolved. Later, more local government Weibo accounts data can be collected and the reliability of the results can be studied.

DISCLOSURE STATEMENT

The authors reported no potential conflict of interest.

ACKNOWLEDGMENT

Funding: This work was supported by Philosophy and Social Science Foundation of Shanghai [grant number: 2021BGL007]

This study thanks undergraduate student Zhicheng Cao and graduate student Haichao Xu for pre-processing the microblogging data.

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APPENDIX 1

Table 13. Topic text analysis and mission based public values coding

Topic text	Frequency
#武汉抗疫防线# #Wuhan anti-epidemic defense#	812
#情况通报# #Briefing#	180
#全力以赴遏制疫情# #Go all out to eliminate the epidemic#	42
#武汉疫情防控不松懈# # Wuhan epidemic prevention and control does not let up#	41
#坚决遏制疫情蔓延# # Resolutely curb the spread of the epidemic	41
#遏制疫情在行动# #Curbing the epidemic in action#	37
#公告# #Announcement#	36
#武汉重启# #Wuhan restart#	35
#万众一心抗击新冠肺炎# # All hands on deck in the fight against the COVID-2019#	30
#见证争分夺秒的春天# #Witness the spring racing against time#	26
#全力抗击新型冠状病毒肺炎# #All-out fight against the COVID-2019#	24
#武汉复工复产# # Wuhan resumed work and production#	21
#打赢疫情防控阻击战# # Winning the epidemic prevention and control blockade#	18
#打赢武汉保卫战# # Winning the battle for Wuhan#	18
#武汉新闻# #Wuhan News#	18
#微博辟谣# #Weibo Refutes Rumors#	15
#湖北通报疫情防控最新进展# #Hubei reported the latest progress in epidemic prevention and control#	13

APPENDIX 2

Table 14. Topic text analysis and non-mission based public values coding

Topic text	Frequency
#武汉必胜# #Wuhan must win#	496
#武汉我们在一起# #Wuhan, we are together#	453
#关注新冠肺炎# #Concerned about Covid-19#	180
#武汉加油# #Wuhan be strong #	132
#复苏中的武汉# #Wuhan in recovery#	94
#湖北加油武汉挺住# #Hubei be strong Wuhan hold on#	37
#为医护人员点赞# #Penhance the medical staff#	23
#武汉我们一起加油# #Wuhan, let’s be strong together#	22
#生活服务# #Life service#	22
#防疫科普# #Epidemic prevention and popular science#	20
#晚安武汉# #Good night, Wuhan#	18
#健康新知# #Health News#	16

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