Unpacking Government Social Media Messaging Strategies during

COVID-19 Pandemic in China

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Abstract: During pandemic emergencies, governments must be agile and respond to citizen demands to remain relevant. A core element of agile governance is effectively managing communications between a government and its citizens. However, doing so during an emergency – particularly a pandemic – is often complex and challenging. In this article, we examine how the Chinese government at different levels (central, provincial, and municipal) communicated with the public in response to the COVID-19 pandemic. Using government posts in the social media during the COVID-19 outbreak in Wuhan ("text as data"), we conducted topic modeling analyses and identified four strategies that characterize Chinese governments' response to a variety of issues at the ground level, which we label *instructing information, adjusting information, advocacy,* and *bolstering*. The results show that local government agencies predominantly used the first two strategies during the pandemic, whereas the central government mainly relied on the last two. These strategies explain how the governments engaged in agile governance through their communication with citizens, highlight the coordination and control work undertaken by governments at all levels, and demonstrate how these methods shielded the central government from blame for the pandemic. The study results have theoretical and practical implications for agile government response in pandemic management.

Keywords: social media, government posts, COVID-19, response strategy, situational crisis communication theory

Introduction

Natural hazards and disasters, such as floods, earthquakes, epidemics, and terrorist attacks, are becoming more regular and intense, threatening human survival if left to escalate (UN, 2019). Thus, actions and policies to reduce risk has grown in importance on the public administration and is regarded essential to achieve good governance. During disasters, particularly pandemics, governments must be more agile in responding to the information overload of bureaucratic work operation and roaring citizen demands. The interactions and communication between the government and citizens therefore become a central governance issue, which is often a complex and challenging matter for public administrators (McNutt, 2014; Medaglia & Zhu, 2017). With the development of information and communications technology (ICT), governments around the world have gradually learnt how to use social media to help with disaster relief and recovery such as evaluating public mood and disseminating alert information etc. (Plotnick & Hiltz 2016; Zavattaro, French, & Mohanty, 2015). Most of the existing literature in this field are conducted from the demand side and focus on how citizens' discourse can be engaged into the emergency network to deliver the service (Yin *et al*. 2012; Li, Chandra, & Kapucu, 2020). However, little research has paid attention on the supply side that is *how a big government especially that with various administrative levels provide information and communicate with the public via social media during a pandemic crisis.*

In this article, we attempt to fill this gap by examining how the Chinese government at various levels employed a variety of strategies to communicate with her citizens in response to the COVID-19 crisis. Our dataset contains government posts on social media during the outbreak of the virus in Wuhan (Hubei Province). We used *topic modeling* to probe the data and identified four strategies the government used to respond to various issues at the ground

level. Following Situational Crisis Communication Theory (SCCT), we label these strategies *instructing information, adjusting information, bolstering,* and *advocacy*. The topic modeling results demonstrated that local governments mostly used the first two strategies during the pandemic, whereas the central government predominantly used the last two. These strategies explain how the governments engaged in agile governance through their communication with citizens, highlight the coordination and control work undertaken by multiple levels of government, and illustrate how these methods shielded the central government from blame for the pandemic.

Our research focuses on the outbreak of COVID-19 in China and the Chinese governments' social media response for several reasons. First, the urgency of the pandemic compels authorities to make use of ICT to provide necessary information in a timely manner (Perry, Lindell, & Tierney, 2001) and potentially redirects public attention to disaster mitigation, preparation, and/or recovery strategies (Birkland, 1997). Therefore, COVID-19 provided an ideal case to study the government use of social media during a pandemic. Second, China's subnational variation combined with large populations enable us to look rigorously at how a big state with various levels of governments respond to the pandemic crisis and maintain consistency in providing information (Tsai, 2017).

This article contributes to the literature in four main ways. First, agile governance involves efficiently responding to evolving public needs by moving away from the traditional "waterfall" bureaucratic method (Mergel, Ganapati, & Whitford, 2020). The need for agile governance acknowledges that governments now not only provide services to their constituents; they also need to communicate and collaborate with citizens, mostly using ICT.

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Most of the empirical studies conducted so far have discussed agile approaches to designing, producing, and deploying government software or initiatives (e.g., Soe & Drechsler, 2018; Mergel, 2019). This article advances these literature by highlighting that agility is not merely a software design method but also demonstrate a system-level discretion that requires multiple governments and stakeholders to design and implement.

Second, the strategies and tactics uncovered in this article contribute to the public administration literature by offering empirical evidence on the effective communication approaches between multiple levels of government and citizens for the continued study of ICT in public administration. Government use of social media fundamentally shifts its approach to communicating with citizens (especially from the top level) in a more convenient and cost-effective way. In this sense, all government communication on social media remains at the street level. As this study shows, Chinese government's experience in using social media to deal with the pandemic enables the delivery of consistent and credible information and reduce potential friction and mistakes by empowering local governments and allowing local governments to transfer factual information to citizens locally. The information feedback loops from citizens and their collective intelligence therefore require further study.

Third, this article contributes to the literature on SCCT, which is often used to select the most appropriate crisis response strategies to protect an organization's reputation (Coombs & Holladay, 2002). Most previous studies in this field focus on corporate public relations (Kim & Liu, 2012; Sohn & Lariscy, 2015) or government responses to a crisis as a unitary unit (Liu, Lai, & Xu, 2018). Few scholars have analyzed a large state, which shares similarities with how a big organization communicates with different stakeholders and how the hierarchy

affects its response strategies. Combining topic modelling as a probabilistic content analytic approach with the SCCT, we demonstrate a new approach to studying pandemic crisis response strategies in the realm of social media and apply SCCT to a large government such as China. Latent Dirichlet allocation (LDA) analysis is particularly suited to identifying strategies from emerging social media content, in part because it expands the unit of analysis to the discursive associations among salient issues, actions and social actors specific to the crisis.

Finally, previous studies on the role and use of social media mainly focus on the experiences of developed countries (e.g., Anderson, Medaglia, Vatrapu, Henriksen, & Gauld, 2011; Barbera et al., 2019; Harrison & Johnson, 2019). Developing countries often have fragile state capacity, and disasters affect regime stability and the welfare of communities (Besley & Persson, 2010). As the largest developing country in the world, China's experience indicates how such countries adopt new technologies and employ flexible strategies to tackle the potential threats caused by crises. Furthermore, contrary to the conventional claim that China is a monolithic state, the article suggests that various levels of government in China have different preferences and approaches in handling a pandemic crisis, and that new technologies such as the social media offerednew approaches to responding to public health emergencies and fostering collaboration between the government and various stakeholders in a pandemic crisis.

The remainder of the article is structured as follows. The remainder of the article is organized around five sections. First, a literature review, second, background information, third, methodology, fourth, empirical analysis, and finally, conclusion and discussion.

Literature review

During pandemic emergencies, it is widely acknowledged that governments need to be more agile and respond faster to citizen demands. Research on the strategies related to the interactions and communication between a government and its citizens falls into three streams of literature: social media use for effective communication, social media for emergency management, and SCCT and government response strategy in emergency management. Each is discussed here in turn.

Social media use for effective communication

Early studies on the use of ICT in a public service context examined how governments employ Internet tools such as open government initiatives, one-stop service, and build government portals to improve transparency and enhance their political legitimacy (Liu, Chen, & Wang, 2012; Zhang, Xu, & Xiao, 2014). With the emergence of Web 2.0 products, more and more research has begun to assess the role of social media, especially microblogs, in building government–citizen relationships (Mossberger, Wu, & Crawford, 2013; Gintova, 2019), the effects of microblogs on internal government collaboration (Oliveira & Welch, 2013), factors that affect governments' microblog adoption (Ma, 2012), and the implications of using microblogging (e.g. Twitter) on perceived government reliability (Grimmelikhuijsen & Meijer, 2015; Porumbescu, 2016). Although this stream of literature offers valuable insights into the role of microblogs in public administration, few prior studies have explored government strategies to interact with the public, especially in developing countries.

Because of the interactive features, social media are often regarded as a means of promoting two-way communication. Research shows that governments use social media mostly to inform the public and less so for consultation purposes. These are observed both for national and subnational governments and among developed and developing countries. In other words, governments do not exploit the two-way communication features of social media to the extent initially expected. For instance, Mergel (2012) found that instead of interacting with the public, public agencies in the U.S. federal government relied on preexisting routines and procedures in the form of one-way communication strategies to communicate. Reddick and Norris (2013) demonstrated that local government agencies were mainly delivering information and service rather than interactions on social media. Medaglia and Zhu (2017) as well as Zheng and Zheng (2014) show that government social media were used in non-dialogical ways and there were little interactions between government and citizens were based on the experience of China.

Given the limited evidence on the use of microblogs to enhance interactions, we turn to the broader literature on effective public communication. Despite the evidence on good communication enhancing public trust (Park, Kang, Rho, & Lee, 2016) and facilitating transparency (Bertot, Jaeger, & Grimes, 2010), previous studies have focused primarily on government agencies' social media use and the interactions between the government and citizens, such as what factors motivate government agencies to use social media platforms, and whether the government responds to citizen demands expressed online (Ma, 2012; Meng, Pan, & Yang, 2017). Note that such interactions are inclusive, collective, and participatory based on the overall social media ecology. These indicate that the government use of social media is quite sophisticated, requiring the intelligence of the government with not only the clear and detailed guideline in business as usual time, but also the agile capacity to handle

with the emergencies. Understanding the government's social media strategies is therefore a first step to understand the management of effective public communication. A separate strand of the literature, discussed in the next section, investigates the role of social media during an emergency such as a pandemic.

Social media for emergency management

Social media platforms serve two crisis management-related functions. First, they enable the rapid diffusion of information, and are therefore useful for communicating emergency alerts and relief and recovery information during a crisis. Social media was used in this way after the 2010 Yushu earthquake in China (Qu, Huang, Zhang, & Zhang, 2011), the August 2011 riots in the UK (Panagiotopoulos, Barnett, Bigdeli, & Sams, 2016), the 2011 earthquake in Japan (Cho, Jung, & Park, 2013), Hurricane Sandy in 2012 (Hughes, St. Denis, Palen, & Anderson, 2014), and the 2012 tsunami in Indonesia (Chatfield, Scholl, & Brajawidagda, 2013). In various types of crises, government organizations are expected to provide timely and actionable information. For example, Liu, Fraustino, and Jin (2015) assert that during a crisis, citizens are more likely to seek information and follow government instructions, indicating that governments are expected to be credible information providers.

Second, governments can use social media to collect critical information and collaborate with other sectors. As the nature of social media is to voluntarily create content or collaborate on projects, when an emergency occurs, social media users will fill in a vacuum of information created by the government being distracted by responding to the emergency. For instance, Yates and Paquette (2011) use the US response to the 2010 Haiti Earthquake to demonstrate how social media can serve as an effective knowledge-sharing mechanism to support disaster

response. Chatfield and Reddick (2018) argue that networked citizen interactions on social media magnify the agility and reach of governments' disaster response capabilities, and that social media platforms play a critical role in empowering government agencies and citizens to coproduce disaster communication public services. Li, Chandra, and Kapucu (2020) find that social media platforms can provide a dedicated channel to allow the government to collect asking-for-help information during an emergency as well as mobilize citizens and non-profit organizations to support government response and recovery efforts.

Independently of these two functions related to emergency management, social media offers a two-way communication channel between the government and the public. During a crisis, governments are not only expected to provide credible information; they also have the responsibility to build public support and solidarity (Coombs & Holladay, 2010). Thus, devising the appropriate crisis response to meet public expectations and support is at the core of effective crisis management. This subject is closely related to SCCT, which is outlined in the next section.

SCCT and government response strategy in emergency management

SCCT offers a mechanism to explain how stakeholders will respond to a crisis and choose what strategies to use to address the potential reputational threats it poses (Coombs, 2007). It assumes that an organization's reputation – that is, how it is perceived by the public – is a valuable resource that can be threatened by crises. A smart and strategic communication response can therefore best protect the organization's reputation. From a public administration point of view, government organizations that communicate effectively during a crisis will enhance government legitimacy and shield it from public blame.

The SCCT framework categorizes natural disasters as one of 13 types of crises, under the victim cluster. In this cluster, the organization is regarded as a victim of the crisis and is attributed only minimal responsibility for its origins. However, unlike other types of organizations, governments are expected to provide social services to victims and will be blamed for sluggish response and recovery efforts during natural disasters. For instance, the Chinese government was severely criticized for its slow disclosure of critical information during the SARS crisis (Xue & Zeng, 2014) and lamentable government response during the Tianjin port blast (Lu & Xue, 2016). The US government also failed to effectively respond to Hurricane Katrina in 2005. Its systematic breakdowns were promulgated by poorly coordinated responses between all levels of government and across the public, voluntary, and private sectors (Townsend, 2006). Therefore, crafting appropriate response strategies and promoting effective communication across levels of government and sectors appear to be significant. Scholars working on SCCT have developed various lists of crisis response strategies (Coombs, 1999, 2007). Based on two rationales, we focus here on four types of strategies in response to natural disasters, which are most relevant to pandemic emergencies – *instructing information, adjusting information, advocacy,* and *bolstering*. The first rationale is that when a disaster occurs, truthful and timely information disclosure is necessary and should be the government's top priority to meet public expectations. Second, victims of disasters, including pandemics, need compassion: expressions of concern will help relieve victims' suffering.

Some prior studies have discussed how government and emergency management agencies use social media to communicate with the public during emergencies. For instance, Liu, Lai,

and Xu (2018) showed that government agencies used the strategy of instructing information predominantly before and during the disaster, whereas adjusting information and bolstering strategies are utilized more during post-disaster recovery based on the experience of US during Hurricane Harvey. Wukich (2016) provides a comprehensive analysis of messaging strategies over a one-year period in U.S. and find that messages are mainly about response and preparedness. However, they took multiple levels of government as a whole and focus on the various strategies the government used in different stages of crisis management (prevention, response, relief, and rebuild) rather than as entities with their own self-interests. Thus, to investigate how a large state with several administrative levels deals with a crisis, we used the COVID-19 outbreak in Wuhan, China (the first wave) as case study of emergency communication strategies employed by various levels of government.

In addition, in this article, we focus on the response strategies for the first wave of COVID-19 in China. Although the disaster management literature divides the impact of a natural hazard into four phases and regards them as a management cycle (preparedness, response, recovery, and mitigation, see Comfort, 2007). Unlike earthquakes, floods, or other natural disasters which are usually one off events occurring in a limited period, COVID-19 and other pandemic tend to come in several waves over a long period such as 1918 influenza pandemic and Ebola virus disease occurred in multiple waves (Saunders-Hastings & Krewski, 2016). It is difficult for a pandemic to distinguish response stage and recovery stage following the traditional categorization. Each new wave would be distinct. The conventional emergency management cycle may not be the case for the pandemic, and its response, recovery, and mitigation stages need to be integrated (Fakhruddin, Blanchard, & Ragupathy, 2020). Therefore, focusing on one wave of the COVID-19 can be regarded as a mini-cycle for

pandemic management and its implications can help to minimize the management mistakes for the following waves.

Background: china's social media development and Wuhan Lockdown

As the biggest developing country in the world, China's Internet use has skyrocketed; it has had the largest number of users in the world since 1994, the first year it gained access to the Internet. By the end of 2019, it had 904 million Internet users, which accounted for around 64.5% of its population. The government has provided a good institutional environment for expanding the social media and Internet industries. In 2015, the Chinese central government initiated the "Two Wei and One Duan" campaign in 2015 (i.e. two Wei refers to the Sina microblog and WeChat platform, and one Duan refers to the news provision application) and encouraged government organizations at various levels to build accounts on these social media platforms to communicate with the public. As of December 2019, the Sina platform had certified 139,000 government agencies' Weibo accounts; these come from 31 provinces, regions, and cities across the country. China's continuous progress makes it one of seven Asian pioneers to join the high UN's E-Government Development Index club in 2020 (UN DESA, 2020).[1]

The first major outbreak of COVID-19, an infectious disease caused by a type of new coronavirus, occurred in Wuhan, China. Its outbreak triggered a series of emergency management measures in which rapid response was required to prevent the spread of the virus. On January 23, 2020, the Wuhan municipal government announced "lockdown" measures and implemented a city-wide quarantine. Since then, the city has become well

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[1] The other six Asian countries are Saudi Arabia, Kuwait, Malaysia, Oman, Turkey and Thailand.

known as the ground zero of the COVID-19 pandemic. On April 8, 2020, Wuhan lifted its lockdown and resumed all transportation. The 76-day lockdown can be regarded as a "people's war" on COVID-19. This is known as the first wave of China's COVID-19.

During the Wuhan lockdown, almost all Chinese people paid attention to the situation in the city and expressed their worries and concerns. A flood of criticism, anger, blame, and frustration with the government appeared online although various social media platforms were subject to censorship (Ruan, Knockel, & Crete-Nishihata, 2020). Netizens' repercussions prompted the government to acknowledge that public criticism of the outbreak was understandable (Cadell & Liu, 2020) and to respond to the epidemic. Broad criticism of a government has the potential to weaken the regime's legitimacy and magnify pre-existing political and societal instability, especially in the case of China given its long tradition of disaster relief. Therefore, the Chinese government tried hard to improve its communication with the public via the Internet during the lockdown. For instance, on February 3, 2020, at the meeting of the Standing Committee of the Politburo of the Chinese Communist Party (CCP) on COVID-19 response, President Xi Jinping said that "we need to increase government transparency and reinforce public confidence in fighting novel coronavirus. We should strengthen efforts to track and study public opinion, be proactive about making our voice heard and provide positive guidance, and step up integrated communication and interaction, so that cyberspace is always filled with positivity" (Xi, 2020). Although China is often assumed to be a centralized and monolithic regime, there are large subnational variations, which introduces challenges for good governance and requires strong governance capacity. Therefore, studying how a big state with multiple administrative levels responded to the COVID-19 outbreak, and what kinds of strategies it used, can offer important new contributions to theory and policy.

Methodology

In this study, we crawled the posts of four government Weibo accounts during the Wuhan lockdown—*People's Daily*, *Xinhua Viewpoint, Hubei Publishing*, and *Wuhan Publishing*.[2] These four accounts cover government organizations at various administrative levels. We choose these four accounts since the People's Daily and Xinhua Viewpoint are the official accounts directly controlled by the central government and regarded as the mouthpiece of the CCP. Additionally, most of the infected cases of COVID-19 are from Hubei province. About 97.3% of deaths due to COVID-19 in China were from the Hubei province among which 85.7% of deaths were from Wuhan during this period. Thus, choosing the government account of both Hubei government and Wuhan government can depict the government response and communication strategies more directly. In total, we crawled 12, 411 posts from January 23 to April 8, 2020. Figure 1 displays the screenshots of these four accounts. All of them have a massive number of followers: *People's Daily* has 122 million, Xinhua Viewpoint has 99.94 million, Hubei Publishing has 1.88 million, and Wuhan Publishing 3.79 million. In total, we crawled 12, 411 posts from January 23 to April 8, 2020. Figure 1 displays the screenshots of these four accounts. All of them have a massive number of followers: People's Daily has 122 million, Xinhua Viewpoint has 99.94 million, Hubei Publishing has 1.88 million, and Wuhan Publishing 3.79 million.

[2] The *People's Daily* account is the official Weibo account of the People's Daily, an official newspaper of the Central Committee of the CCP. Xinhua Viewpoint is the official account of Xinhua News Agency, the ministry-level subordinate to the State Council. Note that in China's party-state system, it is seldom found the conflicted reports in the government controlled media. But the *People's Daily* are the most authoritative media.

Figure 1: Screenshots of Four Government Weibo Accounts

We then divided the posts into four categories based on the government's response strategies. We assigned three well-trained research assistants to independently annotate all the posts. Each assistant read the articles and had in-depth knowledge of the four strategies prior to the coding process. This method enables inter-rater agreement in natural language processing (Pustejovsky & Stubbs, 2012). We determined a post's type based on the consensus of at least two coders. Figure 2 provides the basic flowchart of our methodology.

Figure 2: Flowchart of Method
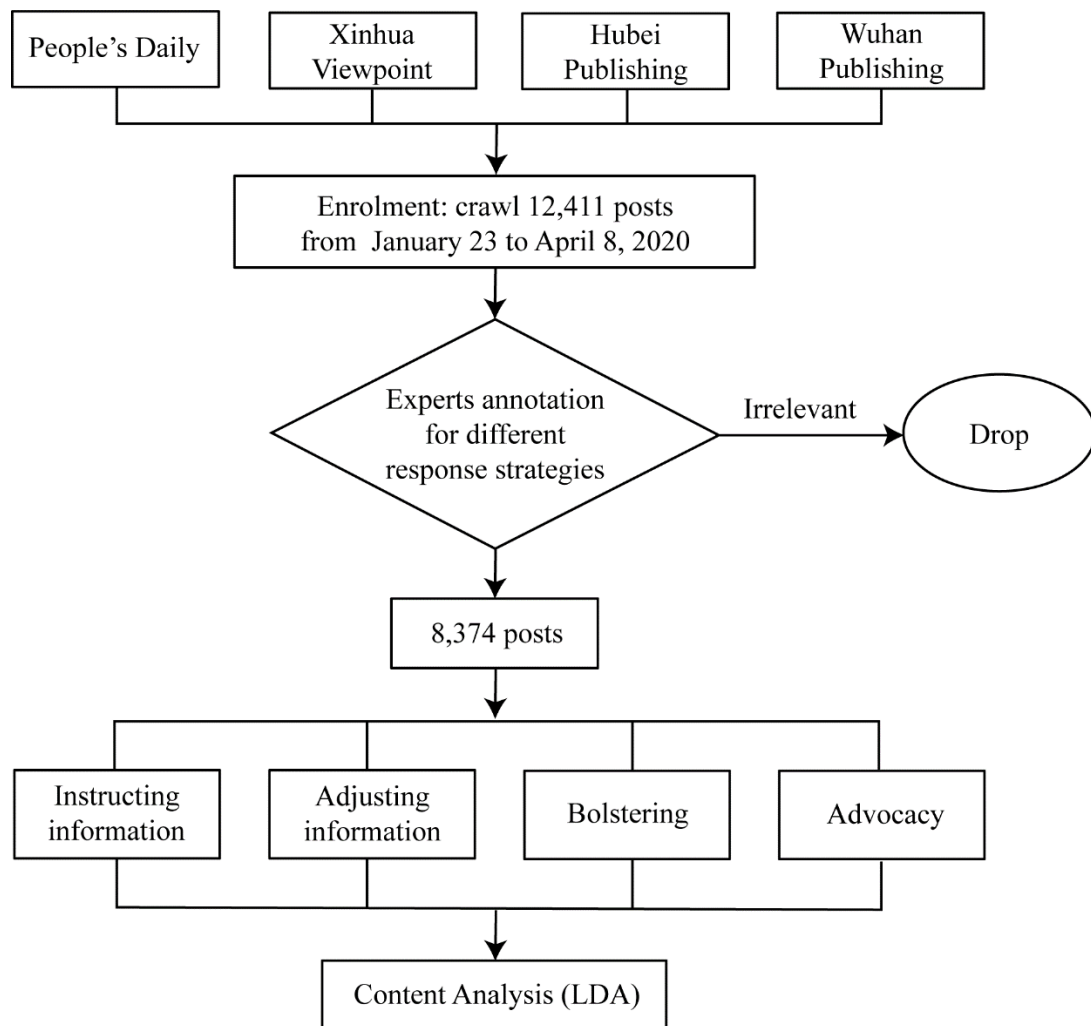
We explain the four coding categories below. *Instructing information* refers to the practice of reporting crisis-related information, as motivated by organizations' ethical expectations (Grunig & Dozier, 2003). This strategy is frequently used in natural disaster responses. Such messages may take the form of real-time disaster updates, rescue reports, and travel advisories, for instance (Coombs, 1995). During the Wuhan lockdown, *instructing information* refers to: 1) government reports on the epidemic situation (how many people have been infected, etc.); 2) government measures (lockdown measures, which hospitals are

designated treatment hospitals, the establishment of headquarters, how the hospitals rescue, etc.); 3) putting an end to rumors; and 4) measures to prevent COVID-19, such as washing hands frequently, using alcohol for disinfection, etc.

The *adjusting information strategy* seeks to help citizens cope with psychological stress and threats (Coombs, 2007). Prior empirical studies have found that this strategy is often associated with the expression of emotions such as compassion and sympathy (Coombs, 1999; Kim & Niederdeppe, 2013). In the context of the COVID-19 outbreak, this strategy mostly refers to: 1) government responses to online demands (for example, what kinds of help-seeking channels have been established in response to social demands, donation channels, etc.); 2) grid-style management, and highlighting stories of good people in the community; 3) communicating that the government cares about people's lives; and 4) expressing sympathy for patients. The emotions here focus more on encouraging people not to be depressed in the crisis.

Bolstering, which includes praising partners for their efforts and expressing sympathy for the victims, is an important response strategy during natural disasters (Coombs, 2007). It helps boost morale, communicate solidarity, and cultivate a sense of togetherness among victims and the broader community. Thus, the *bolstering strategy* in this epidemic refers to: 1) expressing love for the country, as well as support for the country and its leaders' policies and 2) communicating respect, praise and admiration for medical staff, volunteers, as well as praise for the cohesion of the country. The emotions relayed as part of this strategy relate more to praise and positive meaning.

Although the conventional SCCT model does not mention *advocacy*, we believe it is a common strategy that the central government used during the crisis (Nohrstedt, 2013). In China, the government plays the role as a key actor in emergency management network, while private or non-profit sectors also participate in the process. In fact, these non-state actors always complement the government work and contribute significantly during emergencies (Li, Chandra, Nie, & Fan, 2020; Hu & Sidel, 2020). Therefore, program advocacy strategy, focusing on advocacy during the implementation phase of the policy process (Reid, 2000), is use by the government. Advocacy strategies often emphasize public education and mobilization via the media (Fox, 2001; Napoli, 2007). In the context of the COVID-19 epidemic, *advocacy strategy* refers to: 1) calling on everyone to donate, helping Wuhan, recruiting volunteers, etc. and 2) expressing confidence in Wuhan and the medical staff, such as fighting against the epidemic, China can win, and so on. This strategy emphasizes a sense of mobilization.

Posts across the four accounts also included information on COVID-19 from elsewhere in Hubei Province, the COVID-19 situation outside Hubei Province, the overseas COVID-19 situation, resumption of work and production, and irrelevant information such as weather forecasts. Since we only focus on the COVID-19 outbreak in Wuhan, we excluded these other posts from our sample. Table 1 presents the distribution of types of posts across the four Weibo accounts. In general, the table shows that local government agencies sent more messages using instructing and adjusting information strategies, while central government accounts preferred to use bolstering and advocacy strategies.

Table 1: The Distribution of Types of Posts across Four Weibo Accounts

Type	Wuhan Publishing	Hubei Publishing	*People's Daily*	Xinhua Viewpoint
Instructing information	51.89%	68.92%	40.71%	70.58%
Adjusting Information	8.97%	7.28%	3.76%	3.31%
Bolstering	28.82%	16.75%	40.38%	19.67%
Advocacy	10.32%	7.05%	15.15%	6.44%
Total	3,411	1,731	904	2, 328

Empirical analysis

We further analyzed the content of the posts on these four accounts during the Wuhan lockdown. We conducted Latent Dirichlet analysis (LDA) topic modeling analysis (Blei, Ng, & Jordan, 2003) of the 8,374 posts on Wuhan. Topic modeling is an unsupervised machine-learning method that is frequently used to automatically discover latent themes in a collection of documents based on the probability of the distribution of words over documents and the distribution of topics over words (Blei, 2012). The outcome of topic modeling includes topics (a keyword list sorted by the relevance ranking to the topic) and topic proportions in each document. LDA topic modeling analysis can illustrate how government organizations at various administrative levels employed social media and different response strategies to communicate with the public during the pandemic. Moreover, since the unsupervised machine-learning method can avoid the potential bias associated with artificial labelling or cherry picking of data, it enhances the objectivity of the findings. Table 2 lists the keywords of the top five dominant topics and the respective response strategies of these topics across

the four accounts. The keywords are listed in the order of most to least important. The

proportion of topics refers to the weight of each topic in the Weibo text posted by the account

during the Wuhan lockdown. The results are similar with the artificial labelling. Wuhan

Publishing and Hubei Publishing prefer to use strategies of instructing and adjusting

information, while central-level accounts prefer to use bolstering and advocacy strategies.

Table 2: Key Words of the Dominant Topics in the Response Strategies in Four Weibo

Accounts

Account	Topic (Keywords)	Proportion	Response Strategy
Wuhan	Masks, enterprises, viruses, experts, protection, medical, transmit, measure, contacts, production	15.81%	Instructing information
	Headquarters, admit and treat, center, Red Cross, beds, treatment, open, materials, announcements, healthy	13.81%	Instructing information
	Medical treatment, treatment, hospital discharge, medical, severe, medical staff, clinical, patients, conference, nucleic acid test	11.55%	Instructing information
	Makeshift hospitals, supplies, beds, hospital discharge, charity, life, social, headquarters, residents, center	10.50%	Adjusting information
	Risks, activities, culture, measures, fight, vaccines, orderly, tomb-sweeping, cancel, guide	9.53%	Adjusting information
Hubei	Materials, headquarters, quarantine, life, medical, protection, publicity, residential communities, residents, centralized quarantine	21.53%	Instructing information
	Central government, medical treatment, admit and treat, headquarters, quarantine, General	12.47%	Instructing information

	Secretary Xi Jinping, deployment, materials, emphasize, makeshift hospitals		
	Risk, General Secretary Xi Jinping, headquarters, emphasize, meetings, the provincial committee of CCP, important, masks, spirit, material	11.73%	Adjusting information
	Makeshift hospitals, central government, medical treatment, press conferences, steering group, hospitals, headquarters, supplies, medical personnel, guidance	10.21%	Instructing information
	Headquarters, enterprises, support, the masses, the provincial committee of CCP, fever, strengthen, production, notifications, transmit	8.75%	Instructing information
People's Daily	Severe COVID-19, medical care personnel, spring, salute, fight against epidemic, start of school, medicine, nurse, scenic spot, team member	60.51%	Bolstering
	Medical personnel, Xi Jinping, strengthen, measures, regional, comprehensive, central government, implement, quarantine, respond	7.19%	Instructing information
	Patients, makeshift hospitals, hospital discharge, severe COVID-19, treatment, medical teams, quarantine, materials, viruses, accepted	6.53%	Instructing information
	Clinical, diagnosis, treatment, admission, death, hospital discharge, quarantine, viruses, accepted, severe COVID-19	5.15%	Instructing information
	Hospital discharge, heal, sacrifice, mourning, fellow, win, fight against, financial, headquarters, central government	4.00%	Advocacy
Xinhua Viewpoint	Medical teams, supplies, emergency, immigration, rush to the rescue, heroes, support, makeshift hospital, medical personnel, team member	43.56%	Bolstering

Press conferences, health, the State Council, materials, mechanisms, joint prevention and control, hygiene, National Health Commission, hospital discharge, treatment	11.23%	Instructing information
Treatment, conferences, central government, strengthen, medical care personnel, makeshift hospitals, research, admit and treat, deployment, the Central Committee of CCP	8.70%	Instructing information
Measures, timing, poverty reduction, data, business, donation, materials, masks, tasks, development	6.88%	Advocacy
Risks, measures, medical personnel, enterprise, regions, health, quarantine, notifications, organize, strengthen	6.51%	Instructing information

3.4. Topic modelling of governments' Weibo accounts across four SCCT strategies

We also conducted LDA topical modelling for the four accounts across response strategies to assess how the government used words to achieve its goals. Table 3 lists the keywords of the top five dominant topics related to the four response strategies. As in Table 2, the keywords are listed in order from most to least important. The proportion of topics refers to each topic's weight in each response strategy's Weibo text. For *instructing information*, topical words such as protection, masks, sterilization, headquarters, and State Council indicate how the government notified the public and the main decision-making agencies about preventing infection. For the *adjusting information* strategy, words like vegetables, drugs, group buying, and residential community illustrate the topics of livelihood and control of population mobility, suggesting the government responds to these issues about which the public has concerns. In posts on *bolstering*, words like hero, love, courage, and family indicate the emotional meaning of this strategy, expressing support for the national pandemic-controlled

policies and respect for the nurses and medical care personnel. In posts on *advocacy*, words like volunteers, charity, peace, win, and overcome indicate that the government called for donations and recruited volunteers, etc. and indicates confidence in defeating the virus.

Table 3: Key Words of the Dominant Topics across Four Response Strategies

	Topic Keywords	Proportion
Instructing Information		
	Enterprises, supplies, production, masks, support, press conferences, the State Council, supply, market, vegetables	14.84%
	Supplies, headquarters, risk, masks, protection, sterilization, Hubei, transportation, notifications, recovery	14.72%
	Headquarters, central, meetings, emphasize, strengthen, General Secretary Xi Jinping, implementation, deployment, Provincial Committee of CCP, treatment	12.08%
	Press conferences, rescue, health, experts, hygiene, scheme, National Health Commission, treatment, counseling, central government	11.97%
	Township-level community, residential community, transmit, viruses, Wang Zhonglin, health, units, streets, measures, experts	11.36%
Adjusting Information		
	Medical insurance, authority, price increase, severe COVID-19, township level community, purchase medicines, demand, ensure, vegetables, drugs	77.30%
	Township level community, residents, makeshift hospitals, vehicles, life, stick, investigation, critical, methods, recuperate	3.63%
	Compatriots, materials, mourning, supermarkets, sacrifice, martyr, death, activities, life, to fight	3.49%

	Residents, residential community, vegetables, township level community, group buying, materials, life, supermarkets, distribution, package	2.93%
	Study, township-level community, Li Keqiang, meetings, residents, living, the Politburo Standing Committee of CCP, quarantine wards, closed	2.51%
Bolstering		
	Medical care personnel, township-level community, heroes, express delivery, frontline, epidemic prevention, battlefield, fighting, army, ordinary	14.02%
	Supplies, support, tasks, fight, frontline, bread, medical team, telephone, players, family	11.79%
	Quarantine, materials, order, family, viruses, frontline, take-away, love, courage, residents	11.01%
	Press conferences, frontline, person recovered from COVID-19, hospital directors, nurses, fight against epidemic, photographs, medical care personnel, nucleic acid test, care	10.72%
	Medical teams, frontline, stick, Shouguang, medical, severe COVID-19, workers, police, support, arrived in	10.04%
Advocacy		
	Health, hospital discharge, medical care personnel, fight against, doctors, therapists, volunteers, viruses, fight against epidemic, overcome	11.82%
	Frontline, defense, win, fight against, music, victory, battle, workers, masks, party members and cadres	11.27%
	Medical teams, distance, cherry, makeshift hospitals, spring, peace, hospital discharge, music, nurses, charity	10.43%
	Heroes, masks, urban, frontline, motivation, materials, medical personnel, important, General Secretary Xi Jinping	10.43%
	Winning, frontline, fight against epidemic, battle, important, General Secretary Xi Jinping, activities, deployment, firmly, fight against	10.29%

Conclusion and discussion

The findings show a strategic and agile response of the government to communicate with the public when emergency happened. We used topic modeling techniques to analyze government posts on social media during the COVID-19 outbreak in Wuhan. We identified four situational crisis communication strategies that the Chinese government employed to respond to different issues at the ground level—*instructing information, adjusting information, bolstering,* and *advocacy*. The topical modeling results showed that the local government organizations (Wuhan Publishing and Hubei Publishing) predominantly used the instructing and adjusting information strategies during the pandemic, whereas the central government (*People's Daily* and Xinhua Viewpoint) mainly used advocacy and bolstering strategies. We also analyzed the topics and respective keywords when the government used the response strategy. We believe these strategies explain the Chinese government's flexibility and agility in responding to the pandemic crisis and highlight the coordination and control work undertaken by multiple levels of government.

The findings of this article prompt us to rethink the role of social media. Although it is often claimed that social media provide forums to disseminate emergency information and for collaboration, the misinformation and polarization in the social media make pose challenges for effective communication especially during emergencies. We demonstrate that effective public communication needs agile and dedicated policy design. The strategic focus by different levels of government provide an integrated design to respond to the crisis and maintain regime stability simultaneously. Such design can be seen as a method to proactively participate the agenda setting of public issue and supply the key information to the citizens. Although we do not provide direct evidence of the two-way communication, our findings suggest the complexity of in the management of social media accounts for effective

communication. We also show the importance of professional training on effective communication on social media for key actors in the government as well asother functional agencies within the government.

Moreover, this article highlights the work of disaster preparedness and crisis response. Previous literature discussed the difficulties and challenges in communication among organizations from various sectors and levels of governments and between the public and the government. Our findings demonstrate that this strategic communication policy design from the supply side can protect the central government from being blamed for the outbreak of the pandemic. More emotional and advocacy-style messages used by the central government can be seen as a framing tactic, which is consistent with Hood's blame-avoidance strategies (Hood, 2011). In addition, more situational and protective messages provided by the local government can reduce the costs for coordination and the probability of misinformation since less institution friction exists here. We found no evidence that such disaster preparedness was employed by the central government for a particular purpose (i.e., COVID-19 handling)due to the bureaucratic inertia embedded in the routine bureaucratic work. Thus, agile response in the wake of the pandemic is paramount and this requires less institutional friction, and better professional training and dedicated policy design, as part of a comprehensive disaster preparedness.

Our study suggests several avenues for future research. First, it lacks direct empirical evidence of public support with which to test the effectiveness of the government response strategies it identifies. It does not consider the real interactions between the government and the public such as whether the government change the response strategy due to citizens'

response etc. It also does not consider whether government uses the same approach to respond to the other public issues. Future research should examine citizens' perceptions and attitudes toward various levels of government and the policies they implement to tackle public health crises.

Second, the study only examines one wave of the COVID-19. It does not consider the policy-making process of pandemic communication strategies. Moreover, it does not consider the differences of government social media performance between normal periods and pandemic periods. Given the "new normal" in times of COVID-19, future research should examine the potential synergies of different government strategies on social media with respect to emergency management or conduct comparisons.

Another area of future research is to understand the architecture of governance for emergency management. Prior research recommends that governance under uncertainty requires an iterative process of review, reflection, and redesign to strengthen performance of multi-sectoral institutions under urgent stress. Considering the highly interactive and two-way communication characteristics of social media platforms, government should learn to effectively engage in the public discussion and lead the online discourse field to participate in the agenda setting and framing process. This "effectual" process of emergency handling (Chandra & Paras, 2020) can be a powerful tentacle of governance. Additional research therefore is needed.

Finally, the findings presented here were based primarily on data from the government's social media posts and other secondary data such as government policy documents; therefore,

they do not allow us to claim causality. Future studies should use online field experiments as well as laboratory or choice experiments to verify the interactions between government posting behavior and citizens' responses on social media platforms in the context of a health crisis and possible desirable outcomes.

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